

*Core Rules*

---

***TRAVELLER***<sup>5</sup>

*Science-Fiction Adventures  
in the Far Future*

**Far Future Enterprises**





*Core Rules*

---







***TRAVELLER***<sup>5</sup>

*Science-Fiction Adventures  
in the Far Future*


Far Future Enterprises



Previous editions of the **Traveller** role-playing game system:

	<b>Classic Traveller (CT).</b> The original edition of <b>Traveller</b> published by GDW Game Designers' Workshop 1977 and revised in 1981. The intention was a generic science-fiction system, but it quickly concentrated on the Third Imperium as a setting supported with adventures and supplements.
	<b>MegaTraveller (MT).</b> The second edition of <b>Traveller</b> published by GDW 1987, introduced a unified task game mechanic supported by a fully developed skill system; it advanced the <b>Traveller</b> universe history and setting into the Rebellion era.
	<b>Traveller: The New Era (TNE).</b> The third edition of <b>Traveller</b> , the last to be published by GDW 1993, adopted GDW's RPG <i>House System</i> rules (also used for <b>Twilight: 2000</b> and <b>Dark Conspiracy</b> ). Adventures chronicled the aftermath of a widespread collapse of interstellar civilization.
	<b>Marc Miller's Traveller (T4).</b> The fourth edition of <b>Traveller</b> , published by Imperium Games 1996, (after GDW closed its doors). Its adventures and supplements chronicle the founding years (beginning in Year Zero) of the Third Imperium.
	<b>GURPS Traveller (GT).</b> A parallel edition (published by Steve Jackson Games 1998) chronicling an alternate universe in which Strephon was not assassinated and the <b>MegaTraveller</b> Rebellion did not happen. This edition adapted the setting to the Steve Jackson Games GURPS rules set.
	<b>Mongoose Traveller (MgT).</b> Produced as a universal science-fiction role-playing rules set (published by Mongoose Games 2007), this edition again emphasized the Spinward Marches and its surrounding sectors.

This edition of **Traveller**:

	<b>Traveller5 (T5).</b> The fifth of the direct line of editions of the <b>Traveller</b> game system, ambitiously intended as the ultimate science-fiction role-playing system covering near everything in role-playing, and capable of managing situations across a variety of eras and technology levels.
---	---

# TRAVELLER<sup>5</sup>

*Science-Fiction Adventures  
in the Far Future*

Copyright © 2015 Far Future Enterprises

All Rights Reserved. Printed in Canada.

No part of this book may be reproduced in any form or by any means without express written permission from the publisher.

Print Edition 5.1

**Traveller, Basic Traveller, Starter Traveller, Classic Traveller, MegaTraveller, Traveller: The New Era, Traveller4, Traveller5, Traveller8, The Spinward Marches, The Edge of the Empire, EPIC, The Galaxiad, and Journal of the Travellers' Aid Society** are trademarks of **Far Future Enterprises**.

FFE maintains a FUP Fair Use Policy (available on request) detailing reasonable uses of the **Traveller5** game system (including references to the material, copying, web presences, and derivative works) while still respecting its copyright and intellectual property.

FFE invites questions and comments on this edition.  
Please contact us at:

Far Future Enterprises  
1418 N Clinton Blvd  
Bloomington IL 61701

[traveller5@farfuture.net](mailto:traveller5@farfuture.net)  
[www.farfuture.net](http://www.farfuture.net)  
[www.traveller5.net](http://www.traveller5.net)



---

Travel without companions is a truly unsatisfying endeavor.  
My joy and my satisfaction in writing and playing **Traveller**  
would be empty without the faithful support of my life's companion.

to Darlene

---



# *TRAVELLER*<sup>5</sup>

*Science-Fiction Adventures in the Far Future*

**Marc Miller**

Robert Eaglestone

Don McKinney

Andrew Boulton, Ron Brown, Bill Cameron, Val J. Dauterive III, Ryan Fitch-Davis.

Greg Frantsen, Craig A. Glesner, Hunter Gordon, Gregory P. Lee.

Chad Russell, Scott Martin, David Smart, L. M. Spitz, Kurt Willer, Jeff Zeitlin.

Fritz Brown, Roger Howe, Andrew Ford, Ian Stead.

Loren Wiseman, John Harshman, Frank Chadwick, David Nilsen.

Lester Smith, William H. Keith, Jr., J. Andrew Keith, Joe Fugate, Gary Thomas.

Craig Taylor, William Wilson, Collin Krause, Sawyer Krause, Shane McLean, Liam Devlin.

SS Crompton, Liz Danforth, David Deitrick, Bryan Gibson, Paul Jaquays, Jennell Jaquays, Tim Osborne.

Mike Wightman, David Golden, Joseph Heck, Guy Garnett, Joshua Bell, Jesse DeGraff.

Gedeon Trias, Wolfgang Reich, Constantin Terton, James Kilbride, Kevin Walsh, Stan Shinn.

Ty Beard, Tony Lee, Dave Sering, Peter Trevor, Ken Whitman, Andrea Vallance, John Wick.

Shipwrights: Craig A. Glesner, Michael Morgan, Andrew Hartman, Anthony Wrightson.

and an army and navy of dedicated, helpful referees, players, and playtesters.

---

## **Introductions**

Absent Friends	10
Traveller Is About...	11
Traveller is a Role-Playing Game	12
The Galaxy	14
A Brief History of the Universe	15
Foundations of the Universe	18

## **Basic Information**

You'll Need Dice	
Money	
Humanity	
The Basics of Role-Playing	
Beginning...	

## **Characters and Life**

Characteristics	58
Characters	68
Careers	78
Craftsman	83
Scholar	84
Entertainer	85
Citizen	86
Scout	87
Merchant	88
Spacer	89
Soldier	90
Agent	91
Rogue	92
Noble	93
Marine	94
Functionary	95
Life Pursuits and Experience	110
Genetics	112
Clones	118
Chimeras	122
Androids and Synthetics	124

## **Everyday Actions**

Tasks	128
Skills	142
QREBS	100
Personals	100
The Senses	197

## **Combat**

Personal Combat	210
The Armory	236
GunMaker	240
ArmorMaker	261
VehicleMaker	280



## **Starports and Starships**

Starports	304
Starship Design	312
ShipSheets	352
Adventure Class Ships	358
Fuel Benchmarks	360
How Starships Work	
Maneuver	363
Jump	366
Power Systems	376
Sensors	379
Weapons	386
Defenses	394
Starship Combat	404

## **Stars and Worlds**

Sectors and Subsectors	418
Charting The Stars	420
Star Systems and Worlds	426
Mapping Worlds	444
Terrain	

## **Trade**

Trade and Commerce	477
--------------------	-----

## **Technology**

Technology	497
Computers and Consoles	514
Personalities and Brains	522

## **Special Situations**

Psionics	527
Sophonts	537
Robots	560
BeastMaker	574
BeastMaker Events	586
The Beastiary	588
ThingMaker	596
ThingMaker Equipment	608

## **Adventures**

Adventures	631
EPIC Adventures	635

## **Guide to Starships**

Ship Details	
Deck Plans	

## **Appendices**

1 Dice	
2 Ehex	
3 The Ton	
4 Range and Distance	
5 Benchmarks	
6 Costs	
7 Values	
8 Size	
9 Hot and Cold	
Money	
Humanity	
Master Mods	
The Imperial Calendar (Birthdates)	
System Maps	
Crimes	

## **Index**

Keywords	527
Characters	
People	



## Absent Friends

**Traveller** players are a unique and diverse group who all enjoy the opportunities that this game provides for imagination and camaraderie.

Lamentably, some of our friends are no longer with us, while our memories and their contributions remain.



### J. Andrew Keith 1958 - 1999

Andrew was a prolific science fiction and role-playing game author with **Traveller** clearly predominant. He was intelligent and creative in his writings and an asset to the **Traveller** system.

### Clayton R. Bush 1958 - 2007

Clay was an prolific author of convention scenarios in many game systems, but he always returned to **Traveller**. In 1991 he received a *Lifetime Achievement Award* for writing and running over 100 convention events.

### John M. Ford 1957 - 2006

John was an extraordinarily intelligent and witty man with exceptional writing talents on the larger science-fiction scene. He nonetheless lent his talents to gaming and specifically to **Traveller**. He wrote *GURPS Traveller Starports* and was a frequent contributor to the **Journal of the Travellers' Aid Society**.

### Hunter Gordon 1966 - 2013

Hunter, a self-taught programmer and designer, created the Citizens of the Imperium discussion boards. When D20 appeared, he designed and published **Traveller20**.

### Don Rapp 1936 - 2007

Don caught the **Traveller** bug early and enjoyed promoting **Traveller** at conventions. He authored the first supplements to **Traveller**: *Scouts and Assassins*, and *SORAG*.

### Dave Sering 1946 - 2014

Dave found his niche writing role-playing materials for Judges Guild, especially for **Traveller**: sectors, deck plans, and adventures, including the Border Prowler series, and the Deck Plan series.

### Paul Montgomery Crabaugh 1956 - 1985

Paul was an early writer for **Traveller** and, regrettably, an early loss. Issue 51 (1982) alone of *Dragon Magazine* featured four of his articles on **Traveller**, each short, punchy, and insightful. He was also an advocate of characters as Civilians-- the career for players to experiment with being an average Joe.

### Bari Z. Stafford Sr. 1953 - 2002

Bari enjoyed designing ships, sectors, and situations for **Traveller**, and he enjoyed sharing them with fellow gamers. His magnum opus was *Turokan's Expedition to the Rim*.

### Robert E. "Bob" Bledsaw 1942 - 2008

Bob pioneered licensed D&D supplement and expanded his efforts to include **Traveller**. He conceived and published *Starships and Spacecraft*, the **Traveller Judges Screen**, and the adventure *Dra'k'ne Station*.

### Andrew Boulton 1969 - 2012

Andrew Boulton took great pride (and justly so) in his contributions to **Traveller**. He was an admin on the **Traveller** discussion boards; his *Beowulf in Distress* was the cover of the **Traveller5** Beta CDROM; he produced the **Traveller Calendar** annually from 2007, and it continues in his memory.

### Bryan Gibson 1966 - 2014

Bryan was an incredibly talented artist who thought in pictures and could capture those thoughts in ink. His illustrations shaped many players' visions of the **Traveller** universe.

### E. Gary Gygax 1938 - 2008

All role-players owe a debt of gratitude to Gary Gygax. It was his pioneering of the recreational role-playing *genre* with *Dungeons & Dragons* that created the modern role-playing game. In the long view, he ranks with H. G. Wells (whose *Little Wars* pioneered military battle games) and Fred Jane (whose *Jane's Naval Wargame* pioneered sea battle games).

Gary Gygax's *Dungeons & Dragons* had a strong and lasting influence on **Traveller**, and he will forever be appreciated.

# Traveller Is About Travel

Most people never venture beyond the familiar boundaries of their own particular village: they live their entire lives close to home, if not geographically, then culturally and socially. They are not failures; they are the pillars of society: they pursue honorable goals; they raise families; they are the fabric of society and economy and civilization. But they also do not adventure. Adventure comes only to the bold: to those who move, who act, who travel.

*"For my part, I travel not to go anywhere, but to go.  
I travel for travel's sake. The great affair is to move."*

Robert Louis Stevenson  
*Travels with a Donkey*, 1879

*In those times it was not safe for anyone to go or  
come, for great disturbances afflicted all the inhabitants  
of the lands.*

Ezra the Scribe  
*2 Chronicles 15:5 NRSV 450 BCE*

## Traveller is about travel

Players want to know about the universe: about fantastic things and incredible science, about worlds and cultures and technologies they never see at home.

**Traveller** is about those grand opportunities.



*"We travel to try to outrun death, attempting to see  
all of the sights creation has to offer before the day  
comes that we can see no more."*

Clif, 1996

## Traveller is about danger

Travel without danger is only tourism: no more than a series of casual looks at interesting places. Danger transforms travel into adventure!



*"Shall we rise again to be lords of space and the  
rangers of the star lanes? Do we begin this day a second  
cycle leading to another empire?"*

*Zicti's thought answered his. "It is just history, my  
boy, history. We fashion that whether or no. But there  
is a very old saying known to my people--- 'When a  
man comes to the end of any road let him remember  
that the end is not yet and a new way shall open for  
him.' "*

Andre Norton  
*Star Rangers*, 1953

## Traveller is about the human condition

Players may encounter strange worlds and alien species, but they always see through human eyes. A race of warriors makes us think about violence and how we perceive it. A culture that prohibits music forces us to examine the value of music in our own society. **Traveller** is a journey of understanding about what it means to be human.



*We set out to rule the world!  
Maybe I'm dreaming, but I don't care  
Because whether I'm asleep or awake,  
doing good is what matters.*

*When I'm awake, for its own sake  
if not, to win friends for when we awake.*

Pedro Calderón de la Barca  
*La Vida Es Sueño*, 1635

## Traveller is about risk and reward

Chance gains are no more than lottery prizes; true rewards come when players plan, take risks, and act boldly.



*this is the life in which  
the work of this life is to be done.*

Richard L. Evans  
*The Spoken Word*, 1945

## Traveller is about consequences

All that we do has consequences: kindnesses are ultimately repaid; irresponsibility triggers repercussions even years later. Every act has consequences that (should) strongly influence every role-player's decisions.

## Ultimately, Traveller is about goals

Some players are empire-builders; some care about money, others power, still others knowledge. Each player is different: each sets his own goals and his own pace. But all tread a path which is as important as the ultimate goal.



# Traveller Is A Role-Playing Game

**Traveller** is a role-playing game. Simply put, Players assume roles as characters in the universe of the far future. These characters journey to the many different worlds of the galaxy, encountering unique challenges which may bring rewards or disaster, but which always bring adventure.

Players use **Traveller** to live through stories, governed by rules, in which fictional characters, controlled by one or more players, act within a fictional reality governed by a game master.

The **Game Master** is the moderator who presents (and often creates) the game situation, accepts input and action decisions by the players, and implements the rules results. The Game Master is, in various games, also called the DM Dungeon Master, the Judge, GM Game Master, or in **Traveller**: the Referee.

The **Players** are the real world participants in the game. Their in-game personalities in **Traveller** are their **Characters**.

**Traveller** describes a consistent **universe** of the far future, complete with an extensive history and a vast array of human and non-human inhabitants. **Traveller** also provides a comprehensive set of **game rules** which address many (but could never address all) of the activities characters can expect to undertake.

**Traveller** is a co-operative game: there are no winners or losers. Players are friends: members of a group who travel together in pursuit of their various goals; they work together rather than at cross-purposes. They may be the crew of a starship, soldiers-in-arms, or even random people brought together by chance or fate. They travel together, make group decisions, supplement, and complement each other as they explore and interact with the universe.

## HOW TO PLAY

Players sit around a table equipped with paper, pen, various game reference books, and dice. The **Referee** presents the **Players** with situations and asks for their responses.

**Referee:** *"You have just arrived in this remote star system. Now you stand on the observation deck of your Imperial explorer. The reason for the anomalous signal you detected is now apparent: a derelict ship drifting above a barren world."*



The **Players** describe what their **Characters** choose to do and how they want to do it.

**Player1:** "Can we see more detail? Any sign of life?"

**Player2:** "I'm checking sensors. Do they pick up anything? Scanners? Communications?"

The **Referee** then responds with information.

**Referee:** "The ship is bullet-shaped with large fins.

"Your sensors tell you very little.

"There is nothing on the communications wavelengths.

"You can see a large marking on one of the fins: two circles superimposed in a symbol you recognize as an eclipse."

The players react, each in their own ways.

**Player2:** "An eclipse? That's the First Empire symbol! I'm checking the data banks."

**Player1:** "Is there any sign of what's going on? Is there hull damage? Hull breaches?"

**Referee:** Your data banks identify this as a First Empire Pioneer-class ship. It's huge, clearly a hundred times the size of your explorer. And, it's more than 7,000 years old! It dates from the jump-1 era of the old Empire.

"The hull looks intact and appears undamaged. Each of those hatches is big enough to dock our ship's boat."

**Player1:** "Let's go over and explore it!"

**Player2:** "Wait! Is the signal still on?"

**Referee:** "It's still going off once an hour. It beeped again, just now."

**Player3:** "How can that be?"

### Resolution Through Discussion

Many activities are resolved through discussion.

**Player1:** "We all board our ship's boat and make the journey across to the ship."

**Player2:** "I have my sensor set; I'm checking readings."

**Player3:** "I've prepared my laser carbine; I'll go first."

**Referee:** "OK, it takes about an hour to get ready and depart, and now your small craft is drifting just outside of the open hatch, which is about ten times wider than your boat."

**Player1:** "I pilot the boat into the air lock."

**Referee:** "As you do, the outer hatch closes. There is a whoosh of air as pressure equalizes. Lights flicker on. Your boat settles to the deck under artificial gravity."

**Player1:** "How can this be? Full pressure after thousands of years? The power still works."

**Player3:** "Someone's been here. Recently."

Discussion sets the scene. Facts come out in descriptive discussion from the referee; players ask questions looking for more detail and to better understand their situation.

### Resolution With Dice

Some details are best driven by the randomness of dice. Easy situations usually come out the way the players intend, but there is sometimes the chance of something going wrong. Difficult situations are more likely to go wrong; Formidable situations seem to usually go wrong.

There are times when players need to tackle a Formidable situation, give it their best effort, and hope they succeed.

**Player2:** "I check air pressure. And run life sensors."

The Referee says the atmosphere is breathable; and there are no signs of life.

**Player1:** "Which way is the bridge?"

**Referee:** "You boarded about mid-hull, and the bow is that way, but the corridor is barred by a heavy blast door."

**Player1:** "Use the laser carbine!"

**Player 3:** "I start to cut the blast door."

The player and the referee discuss, within the rules framework, how hard this particular event will be, how much skill and ability will be needed, and several other rules details. The referee ultimately rules the player must roll 12 or less on 4 dice. That's about 1 chance in 4 of success. After three tries, it's clear this isn't going to work.

**Player3:** "This isn't working. Is there another way?"

### PLAYING THE GAME

Role-playing isn't a competition: referee and players work together to tell a story. There's a basic plot created by the referee, but where it leads is governed by the players actions and reactions, by the game rules, and by the dice.

**The Referee.** The referee is in charge of the game session. He (or she) knows the rules and enjoys administering them. The referee usually likes story-telling and spends time planning the situations that the players will encounter.

**The Players.** The players enjoy the challenge of encountering situations and responding to them. They face the unknown when the game begins and they are confronted with the unfamiliar and challenging as the adventure unfolds.

Some players play themselves: they react in role-play as they would in reality. Other players assume true roles: the player is smart, but the character is dumb; the player is average, but the character is strong, or dexterous, or both.

**The Game Rules.** The **Traveller** rules are consistent systems for doing, in the game universe, many of the things that people do in the real universe. The important concept is consistency. Any player who understands the rules understands how the abilities of his character will interact with various challenges he faces. The rules convey how much weight someone can carry; how hard picking a lock is; what to expect in a battle.

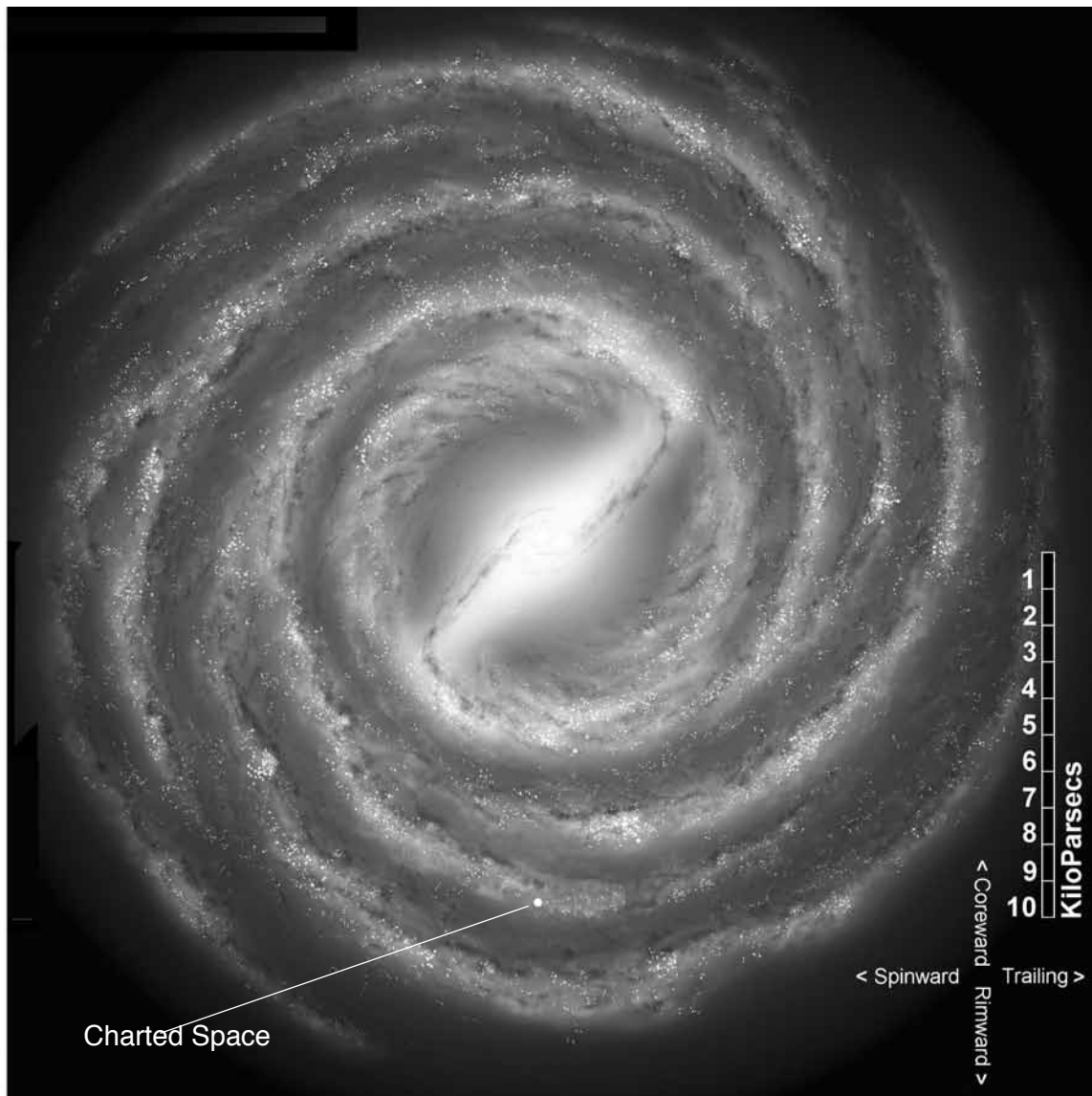
### First Steps

The first step for every player is to create a **character**. Most characters are human, but some may be sophonts (intelligent aliens), or robots, or artificials. Every character has a career: soldier, merchant, scholar, and others. The career choice affects the character's abilities, experience, and potential. Read the Characteristics and the Character Generation chapters and then start rolling dice.

### Other Steps

Much (but not all) of **Traveller** is *solitaire*: the creation and description of worlds and starships and devices and objects; the definition of histories and backgrounds and cultures. For example, there is a process for designing starships; the player must decide for themselves the details of the ship appropriate for its mission. Another process describes both random and deliberate creation of planets; the referee details worlds that will be encountered. Rules cover mapping of worlds or interstellar sectors; design of weapons or communicators; wild animals or alien races.

# The Galaxy



The **Galaxy** (also called **Our Galaxy**, the **Milky Way Galaxy**, **Galaxias**<sup>1</sup>, or **Dakhaseri**<sup>2</sup>) is the barred spiral galaxy that is home to Humaniti and thousands of other alien intelligent species. In size, some 30 kiloparsecs in diameter and 300 parsecs thick at its center, it contains an estimated 400 billion star systems. The Galaxy is almost as old as the universe itself: its oldest stars date to less than a billion years after the beginning of time. The majority of its stars, however, are middle-aged: between 6 and 10 billion years old. Most of its stars have planetary systems with habitable zones capable of producing and maintaining life.

In some of the Galaxy's systems, life has come and gone: their worlds bear the marks of long-dead civilizations. In other systems, the time for life has not yet arrived: some day, life may yet arise in their primordial seas. But in many, their worlds have intelligent life with cultures and societies almost too strange to understand.

**1. Galaxias.** Literally, *Milky* [Greek]. There is an ancient Ter-ran fable that the band of bright light visible across the heavens is breast milk spilt by the queen of the gods

**2. Dakhaseri.** Literally, *Audience of Stars* [Vilani]. An ancient Vilani story tells of meritorious souls allowed to watch the events of the world; their discussions (and futile attempts to intervene) are the basis of many Vilani myths.

# A Brief History of the Universe

The universe teems with life: everywhere, worlds coalesce from gas and star-dust; everywhere, life begins; everywhere, life evolves toward intelligence. On some of those worlds, intelligence reaches for the stars, and on some of those worlds, intelligence succeeds.

The history of the universe is the history of the exploits of many different intelligent species and their interactions (a euphemism for expansion, aggression, and conflict) with other intelligent species.

This history is divided broadly into **milieux** (plural; the singular is **milieu**) or **eras** dominated by two controlling principles: a few intelligent species, and a few important facts. Each milieu is focused on some specific step in the progress (or temporary decline) of interstellar civilization. Finally, each milieu had a long-lasting and profound influence on future generations.

## LONG, LONG AGO

Intelligence does not guarantee success for a species. For eons, worlds have evolved intelligent life, and each of those sophont<sup>1</sup> species lived and died without ever leaving its home system.

Eventually, some sophonts reached beyond their own systems to the nearest stars; others established colonies; some tried to explore the universe with generation ships, seeding probes, robot drones, or cold sleep explorers. All, however, were restricted by their NAFAL<sup>2</sup> technology ships, and even long-lived races eventually found the universal light-speed limit frustrated their interstellar ambitions.

At most, sophonts would reach a few neighboring worlds and then retreat to their homeworld, each species to live out its cultural lifespan confined to or near its home system. The worlds of charted space are littered with evidence of now-extinct intelligent species from hundreds of thousands, or millions, of years ago.

Galactic historians identify important periods as **milieux** (the singular is **milieu**). The first truly important milieu was Grandfather's Era.

## Grandfather's Era (300,000 BCE)

The universe as we know it was irrevocably changed by a meek, even dull, pastoral sophont species which thrived some 200 parsecs from Earth in the long ago past.

These Droyne and their society prospered at a comfortable, if not very high, technology level. They expanded to settle the continents of their homeworld and eventually achieved a stable plateau of civilization. Their society remained static, albeit reasonably happy, for literally hundreds of thousands of years.

In the blink of an eye, some 300,000 years ago, everything changed. One of the newborn Droyne was different... a mutation, incredibly intelligent, incredibly talented, and incredibly ambitious. In his early adulthood, he came to understand the full power of his talents and used them to conquer his world and his people (not that either really resisted). This super-genius (called **Grandfather** by modern sophontolo-

gists; they call this genius species the **Ancients**) then turned his attention to space, inventing powerful space ships and then even more powerful starships capable of crossing interstellar space in weeks rather than years.

He and his people ventured boldly out into the universe. He raised a family of super-genius sons (each nearly as smart as he) and they flew in many different directions to settle thousands of worlds. At Grandfather's suggestion, each of these sons focused his genius on conquering some aspect of the universe:

- one discovered a means of controlled stellar evolution;
- another invented a series of elementary particles;
- another built several future-predicting computers;
- another manipulated reality itself,
- yet another discovered the secret of happiness,
- and there were many others as well.

The many sons manipulated existing lifeforms and created new ones, both organic and artificial. They created systems for controlling individuals, small groups, and even large populations. Some of their discoveries and inventions had practical uses; others were mere curiosities.

Back on the homeworld, Grandfather invented immortality (only for himself it seems; he shared a lesser form with his children). He created new energy sources, world-shattering weapons, mind-boggling transportation systems, pocket universes, and more. He found, and exploited, loopholes in the laws of the universe. Much of what he invented has never been fully understood or replicated.

At some point, he and his children had a disagreement. It escalated into a galaxy-spanning war that destroyed their civilization and their thousands of cities on thousands of worlds. The modern universe can still see evidence of this Ancient War: worlds with poisoned atmospheres, worlds cra-

---

1. **Sophont**. *Intelligent* [from the Greek *sophos*]. -noun. The term covers all intelligent species (including Humans), as opposed to *aliens*, which covers all intelligent species except humans

2. **NAFAL**. **Not As Fast As Light**. An interstellar drive process which does not exceed light speed; impractical for all but the most long-loved species. Contrast with FTL Faster Than Light.

---



tered by asteroid bombardments and scrubbed clean of life; ruined cities littered with high-tech devices that no longer work (or that still perform incomprehensible functions).

But the Ancients left another, less obvious but vastly more important, reminder of the influence. At some time in their travels, Grandfather himself visited Earth and carried away several thousand near-intelligent early Humans. They must have been useful in some obscure way because he carried those humans to hundreds of his worlds.

When the Ancient War ended and the Droyne worlds lay in ruins; their humans lived on. Each of those planets became a new world which humans conquered and on which they created a unique, yet human, culture. Today, humans (as a direct result of Grandfather's intervention) inhabit many of the worlds of Charted Space<sup>1</sup>.

### The False Dawn (200,000 BCE)

There was a time, after the Ancients and before the rise of Humaniti, when another intelligent race – the **Kursae** – rose to technological power, reached the stars, and then faded to obscurity.

From an unidentified homeworld somewhere in now-Charted Space, these sophonts reached out and settled nearly five thousand worlds across half the galaxy.

Over the next thousand centuries these many worlds of the Kursae all followed a common path: a downward spiral to a comfortable low technology level where they are today... sharing a common heritage of myths about their past.

**1. Charted Space.** A small part of one spiral arm of the Galaxy inhabited by Humans (and others) and dominated by the Third Imperium. Approximately 500 parsecs in diameter.

**2. Jump Drive.** The interstellar drive process that enables practical travel between the stars. The basic single jump is about one parsec in about a week.

**3. Ziru Sirka.** Literally, *Many Star Family* [Vilani]. The Grand Empire Of Stars, the Vilani Empire, the First Imperium.

What drove these enigmatic sophonts, filled with such potential, to reject expansion and abandon growth and instead embrace a simple static existence?

### The Vilani Era (9200 BCE to 2300 CE)

The first of the human races to reach the stars was the Vilani. They launched crude sublight interstellar exploration and colonization missions starting in about 10,000 BCE.

Tauri, a mere 2 light years from Vland, was the first system they visited. Over the course of the next five hundred years, the Vilani created a small interstellar community of six systems, each with its own colonies and scientific stations.

About 9300 BCE, an exploratory expedition to a nearby system discovered intelligent life, a race of aquatic mantas. Soon thereafter a colonial expedition to another discovered archeological evidence of a human civilization which had died out several thousand years before.

About 9200 BCE, routine experiments in energy storage led to the discovery of the Jump<sup>2</sup> Drive: the key to FTL Faster-Than-Light travel. The Vilani were empowered and transformed. They alone, of everyone they visited, had the secret of fast interstellar travel. They kept their technology a monopoly and used it to dramatically expand their territory, which ultimately became a star-spanning empire: the Ziru Sirka<sup>3</sup>. Its 7,000-year reign can be divided into three periods:

**The Early Imperium (9200 BCE to 5400 BCE).** Heady with their newfound technology, the Vilani explored hundreds of star systems; they encountered dozens of sophont species. With their monopoly on FTL, the Vilani dominated every culture they met, even those with higher technology. For the early empire, this was a time of rapid expansion and easy domination.

The early years also bred a spirit of discontent among the subject races. Goods travelled only in Vilani hulls, passengers travelled only with Vilani bureaucratic approvals, and everyone paid taxes and tariffs to the central empire.

**Consolidation Wars (5400 BCE to 4400 BCE).** As the Empire's subject cultures achieved higher tech levels, they began to compete with the Vilani, evading the trade monopolies and forming their own interstellar ties.

One such culture was the **Suerrat**: an independent set of Humans who flourished and expanded with their newly gained technology. The Vilani reaction was brutal and uncompromising: a series of Consolidation Wars which brutally suppressed the Suerrat and absorbed every competing culture into the Empire, imposing rigid, subservient governments, and ruthlessly exploiting worlds and peoples. Suerrat cultural memories of this period boil under the surface even today.

**Rigid Culture (4400 BCE to 2300 CE).** With the end of the Consolidation Wars, the Vilani Empire took the final steps to protect their monopoly. They created a structure of laws and customs that repressed technological innovation. World after world reached a sustainable, but low, level of technology and found itself locked at that level. Innovation and technological change were discouraged, then criminalized. Populations were barraged with widespread emphases on sports, fitness, religion, philosophy, hobbies, environmental stewardship, ritual competitions, and other diversions.



Vilani interstellar society became a rigid culture dedicated to maintaining the *status quo*. Laws, politics, and social norms all emphasized conformity and conservatism. The rigid Vilani Empire survived as a static government and culture for six thousand years, until it met the Terrans.

### THE TERRAN BRANCH OF INTERSTELLAR HISTORY

Terrans became actively involved in the history of the universe late in the 21st century. The nations of Terra dabbled in interplanetary exploration, primarily by robotics, but by mid-century, manned expeditions had reached Mars and Mercury. By late-century, various nations had colonized the planets and begun mining the asteroids.

By sheer chance, a clandestine lab in the asteroid belt discovered the secret of Jump Drive; almost immediately a modified ore freighter was sent on the first interstellar mission to Barnard's Star. Imagine the Terrans' surprise to find the stars already belonged to someone else!

#### The Interstellar Wars (2100 to 2300 CE)

Fortunately for tiny Earth, the vast Vilani Empire ignored the upstarts, at least long enough for them to gain a foothold among the stars. Over the course of the next two centuries, the Vilani and the Terrans fought more than a dozen interstellar wars, each one seemingly inconclusive, but each one edging the Vilani Empire closer to collapse. In 2299, the Vilani were so soundly defeated that they surrendered.

#### The Rule of Man (2300 to 2750 CE)

Terra, with perhaps a hundred worlds in its Terran Confederation, now faced the formidable task of ruling a conquered territory a hundred times its size: the 15,000 systems of the collapsed Ziru Sirka. Terra established a successor empire: the Rule of Man<sup>1</sup>, to govern the conquered territories. At times it assigned mere lieutenants as governors of worlds, naval captains to rule subsectors of 30 to 40 worlds, and admirals to take the reins of power.

Terra's valiant effort was doomed from the start. Nothing, not technological innovation, not social change, not new blood, not threat of outside invasion, was sufficient to raise the former Vilani worlds from their cultural lethargy. Over the next 400 years, the worlds of The Rule of Man plunged deeper and deeper into a dark age.

#### The Long Night (2750 CE to 4550 CE)

When the Rule of Man collapsed as an interstellar government, interstellar trade shut down. Each world found itself on its own, living or dying on its own resources. The populations of outpost worlds dependent on food or supplies simply died. Ultimately, this Long Night would last for more than a thousand years.

Scattered starship trade kept some other worlds alive, but after a few centuries, even the starships stopped running. Each world found itself alone in the sea of space, completely dependent on its own resources.

---

1. **The Rule Of Man.** Often abbreviated TROM. The Terran-dominated Second Imperium, the interstellar government successor to the First Imperium.

---

Some worlds struggled to keep civilization alive. A lucky few found themselves in possession of a ship (and enough expert crew to keep it operating). These ships flew between worlds, operating in secret (lest some desperate world seize their ship) carrying bits of technology and information to keep civilization alive until the Long Night ended.

#### The Third Imperium (4521 to 5637 CE)

Some few worlds maintained their technologies and their ships. One such world survived for centuries, preserving its knowledge, using them to remain alive during the Long Night and ultimately bringing about the New Dawn.

That world was Sylea. From an existing base of a dozen worlds, Sylea declared a new and Third Imperium and began a systematic effort to contact the thousands of worlds of the old Ziru Sirka and bring them under one rule. Some systems accepted immediately; others hesitated, but ultimately none could resist the combined military might and economic incentives that the new Imperium brought to bear. Ultimately, the Third Imperium reached its pinnacle of achievement: the Imperial Golden Age of relative peace and great prosperity.

### PARALLEL CIVILIZATIONS

The human-dominated Third Imperium was not alone in Charted Space: its neighbors were themselves large interstellar empires, each dominated by a sophont species and each with its own history: the Aslan Hierate, the Zhodani Consulate, the Vargr Extents, the Two Thousand Worlds, the Hive Federation, and others.

### THE IMPORTANT ERAS IN HISTORY

Era	Players	typical date	Note
Grandfather's Children	Droyne	300,000 BCE	
The False Dawn	Kursae	200,000 BCE	
Early Ziru Sirka	Vilani	9000 BCE	
Consolidation Wars	Vilani, Suerrat	5000 BCE	
First Contact	Terrans, Vilani	2100 CE	
The Interstellar Wars	Terrans, Vilani	2200 CE	
The Rule of Man	Terrans, Vilani	2500 CE	
The Long Night	- -	3500 CE	
Early Imperium	Syleans	0 IC	4
Aslan Border Wars	Aslan, Imperial	300 IC	
Civil War	Imperial	600 IC	
Psionic Suppressions	Imperial, Zhodani	880 IC	
Solomani Rim War	Imperial, Solomani	990 IC	
The Golden Age	Imperial	1000 IC	1
The Rebellion	Imperial	1116 IC	2
The Virus Era	-	1130 IC	3
The New Era	-	1200 IC	3
The New New Era	Imperial	1248 IC	
The Far Far Future	-	1902 IC	5

CE and BCE= Terran Calendar.

IC =Imperial Calendar [0= 4521 CE]

This list is not comprehensive.

1. As chronicled in **Classic Traveller**.

2. As chronicled in **MegaTraveller**.

3. As chronicled in **The New Era**.

4. As chronicled in **T4**.

5. The **Galaxiad**.

Notes:

# The Foundations of the Traveller Universe

---

**Traveller** is a comprehensive science-fiction game system spanning a major portion of the galaxy and reaching far into the future and far into the past. Fundamental to the system are answers to many questions about life, society, and civilization in the universe. Everything is part of a cohesive structure that gradually unveils itself... to the participants and to observers (whether they are readers, viewers, or players).

**Traveller** describes a vast future universe in which mankind has already reached the stars and conquered thousands of worlds, but still faces the never-ending struggle to conquer more worlds and wrest more secrets from the universe.

**Traveller** uses a foundation of hard science, supplemented by the soft sciences to add character and flavor, and driven by characters, to explore the worlds and cultures of the future universe, all in search of adventure.

## BASED ON A ROLE-PLAYING GAME

The basis for all of **Traveller** is the combined science-fiction role-playing game rules set and its comprehensive background detailing the fundamental principles of the universe...

how people function and interact,  
how starships fly, fight, and survive,  
how guns (and armor) work,  
how businesses operate and make profits,  
how worlds are defined, and how they affect players,  
how vehicles operate,  
and more.

Using those principles, any activity is possible, and players attempt most of them. Over time, the adventures of players and the ideas of writers have helped to create the future **Traveller** universe.

**Traveller Is Based On Both Hard And Soft Sciences:** technological science and social science. Each adds realism to the system's universe while enhancing its adventure potential.

## TECHNOLOGICAL SCIENCE IS A FOUNDATION

The technological basis for **Traveller** provides a common ground from which all story ideas are built.

### The Jump Drive

The secret of interstellar travel is the Jump Drive.

RealSpace limits travel to the speed of light (and to years of travel between stars); jump drives propel ships between stars in a matter of weeks. A simple jump covers a parsec (3.26 light years) in about a week. Improved drives can reach up to six times that speed, or more.

Nevertheless Jump Drive has its drawbacks: requirements for (literally) tons of fuel, specialized power sources, and careful astrogation, all of which challenge the players as they pilot ships from world to world.

---

*The **Jump Drive** and **JumpSpace** concepts make star travel both easy to achieve and easy to understand.*

---

## Communication Limited To Transportation Speed

The universe is so vast that even the mega-speeds of jump drive can't work miracles. No one has yet invented a hyper-communicator that will send messages faster than the speed of light. Communication is limited to the speed of transportation; a message to the edge of the empire needs to be literally carried there. For an empire 300 parsecs across, that message takes more than a year to deliver, even under the best of circumstances. News of war, conflict, invasion, disaster, or even peace takes just as long to get back to the center of government.

Consequently the individuals governing "out there" have a lot of independence. A war can be over before the news of it reaches the Capital—and reactive orders return—so Dukes and Archdukes have to act on their own. Commanders of ships have a lot of independence as well. The characters have to think on their own—if they work for a merchant company, opening new markets, they can't "phone home" every time negotiations break down—and on the other hand, the company needs to accept all sorts of wacky contracts and situations!

---

*A communication speed limit establishes an independence for characters at great distances from their superior. Situations demand resourcefulness and initiative.*

---

## A Spectrum of Available Technology

Technology is not evenly distributed throughout the universe; some worlds are on the cutting edge, others are content to lag behind; some worlds are blessed with the intellectual resources that drive innovation, others have no ability to change or improve technology on their own. Worlds and



cultures can be classified by their achieved technology level.

The technology available includes alternatives to traditional or normally expected technology, although radical deviations from “normal” technology are rare and unusual encounters.

Primitive technology also has its place: backwaters off the main routes are often content with their own levels of technology.

---

*Different levels of technology allow players significant alternatives in how they approach situations.*

---

### Gravity Manipulation

Technology has produced practical methods for gravity manipulation, which is expressed in four ways: artificial gravity, inertial dampers, lifters, and maneuver drives.

**Artificial gravity** is built into the deck plates of starships; ship environments are similar to planetary surfaces.

**Inertial dampers** eliminate the extremes of inertia which can pull and push people and equipment as a ship maneuvers. Although such dampers are imperfect, they do allow a normal environment on starships as they maneuver, and they allow extreme physical maneuvers on small craft as they perform high-G maneuvers.

**Lifters** negate gravity and let ships (and other vehicles) move more easily near world surfaces. Lifters operate effectively only near large masses. They are ineffective (and aren’t really needed anyway) in deep space.

Finally, gravitic technology is the foundation for Gravitic Drives, **Maneuver Drives**, and even NAFAL: the drives that carry ships between worlds in a star system.

---

*Gravity Manipulation makes it easier for players to conceptualize the actions of their characters; illustrations are more understandable if they simply show people standing up.*

---

### Fusion Power

Cheap power means that the inhabitants of this universe are not tied to fossil fuels, refuelling stations or complex fuel systems; costs for energy are reasonable rather than oppressive. Hydrogen from water, ice, even the atmospheres of gas giants (like Jupiter) is all that is required to produce abundant electricity. Once a culture rises to the minimum re-

quired tech level, its cities depend on electricity produced by efficient, pollution-free fusion power. Starships can easily draw their fuel from the worlds or systems they visit.

---

*Cheap fusion simplifies adventuring: it allows starships to refuel with readily available hydrogen; it makes most vehicles independent of fossil fuels or power distribution grids. At the same time, fuel problems can be imposed when they add to the situation.*

---

Cheap fusion power also supports vehicles: travels are not constrained by fuel depots or resupply concerns.

### Artificial People

A natural consequence of high technology is an expansion of the concept of person. **Traveller** allows the creation of artificial people: clones, chimeras, synthetics (androids<sup>1</sup>, sophontoids<sup>2</sup>), robots, even raw personalities in computers. Non-anthropomorphic robots (robots not in the shape of people) are commonplace at the higher technological levels, although they are effectively invisible... they fade into the background. People-like robots appear at the upper limits of technology and are always imitations; they may be superior in one or more areas, but they all lack a common feature... initiative. Robots are unable to act with clear initiative in unfamiliar situations.

---

*At higher tech levels, robots (and other artificials) are possible and often present.*

---

### SOCIAL SCIENCE ADDS CHARACTER AND FLAVOR

The social sciences add their own flavor to the universe. The encounters of the far future are more than high tech equipment and interesting hard science. The soft sciences –psychology, sociology, archeology, and more– are powerful tools for interaction with the many people to be encountered in **Traveller**.

Psychology supports the role and skill of counsellor; psychohistory adds the potential for large-scale manipulations of society; archeology helps understand the relics of

---

**1. Android.** An artificial organic Human.

**2. Sophontoid.** An artificial organic intelligent being. The term is more inclusive than android, encompassing all possible sophonts (rather than only Humans).

---



the past; and sophontology helps understand the intelligent beings of society.

### A Cosmopolitan Universe

**Traveller** is a diverse, heterogeneous universe composed of many different factions, concepts, communities, races, and individuals. People (and the term is used to refer to “beings”) come in many different forms, all of whom constantly interact as a matter of course. Unless local circumstances require a homogeneous local population, travellers will continually encounter local populations which reflect diversity in terms of age, gender, and race. Even apparently homogeneous groups will demonstrate (upon closer examination) more diversity than expected.

---

*Traveller accepts diversity and allows (even requires) a wide variety of beings to interact for their mutual benefit. Such a universe is richer than a purely human environment.*

---

Naturally, there is friction, antagonism, conflict, and strife between various groups, but the universe itself allows any individuals with talent to rise to the top of their field.

**Conflict.** Differences breed conflict. In many cases, that conflict can be resolved with words and negotiation. On the other hand, violence and the threat of violence are integral parts of the universe of the **Traveller** universe.

### A Human-Dominated Universe

Through a combination of fortuitous accident and strong-willed effort, humanity has reached a position of dominance in the universe (at least in Charted Space, the part of the universe which most of **Traveller** addresses). Three distinct groups of humans (the Vilani<sup>1</sup>, the Zhodani<sup>2</sup>, and the Solomani<sup>3</sup>) have each created empires that span thousands of stars and trillions of citizens. In addition, more than a hundred additional human societies are scattered among the stars; each is, in its own way, a commentary on the strengths and the particular weaknesses of the human condition.

---

*The cosmopolitan universe is nevertheless human-dominated, primarily to retain a sense of familiarity for the players.*

---

### Everything Is Driven By Economics

Economics is not strictly the study of finance; it is the study of making choices between and among limited possibilities. Regardless of the pronouncements of political, moral, or cultural leaders, action in this universe takes place because it will produce some economic advantage. Economic advantage generally means rewards in a monetary sense, but it can also mean rewards in political or social power. Behind all lies some economic motive.

---

1. **Vilani.** The Humans transplanted long ago to Vland; ultimately the source of the Vilani Empire.

2. **Zhodani.** The Humans transplanted long ago to Zhdant. The Zhodani Consulate is an interstellar empire neighbor to the Third Imperium.

3. **Solomani.** The original Humans of Terra.

---

---

*Players can understand what happens in Traveller because it is driven by the same elements that drive all human (or sophont) endeavor: economics.*

---

### There Is No “Prime Directive”

Most interstellar governments encourage development, especially economic development. Governments rarely impose “Prime Directives” (that undeveloped cultures and societies be allowed to develop without interference until they can enter the community of interstellar civilizations). Instead, economic forces drive exploration and trade.

---

*There are no artificial rules constraining player action. Nevertheless, their actions have (potential) consequences.*

---

### Duty, Honor, and Loyalty

Interstellar society naturally values people (human or not) on whom it can depend: those who are loyal and who faithfully do their duty are the ones to whom society awards responsibility. A natural nobility arises of those leaders of society who faithfully and with innovation follow the orders of their superiors. At the same time, superiors have learned to express their orders in the most general of terms: to give greater freedom of action.

---

*People with responsibilities are expected to act responsibly. If they do not, they won't hold their positions for long.*

---

### Wheels Within Wheels

The quest for meaning is always fruitful in the **Traveller** universe. Events, ideas, concepts, and beliefs are shaped by environments, but they are also shaped by the thinkers themselves. As thinkers (readers, players, or viewers) learn and mature, they begin to find new insights into their beliefs. Truths become mere cover stories, enemies become friends, lies become truths.

For example, the casual player knows the Imperial beliefs (or perhaps prejudices) about the Zhodani (that they are an evil empire intent on destroying the Imperium). Their history of many wars with the Imperium is cited as proof.

Over time, some players may have the opportunity to see deeper, that these Zhodani are humans with families, goals, and desires just like other humans. With time, some players may come to see some Zhodani as inherently good.

And, over time, is it possible to see that some Zhodani are still evil.

In the **Traveller** system, Wheels Within Wheels is constantly showing players new visions of old ideas.

---

*The rationale behind events or situations has a surface explanation, but when examined fully there are often deeper explanations which in turn give a greater understanding of how the universe works.*

---

## **RDME Rich Decision Making Environment**

Players enjoy role-playing when it challenges them to find new and different solutions to problems as they come up. **Traveller** continually provides circumstances where they can analyze options and come to many different conclusions about what actions they will take. A situation may call for gunplay, but players can also turn to technological innovation, or bargaining, or many other aspects of the game rules.

---

*Many choices and alternatives give both the players and the referee an opportunity to choose between them, which make for more interesting and more exciting adventures.*

---

## **DRIVEN BY CHARACTERS**

While every person in this universe of the future is a potential character to be played by a participant, **Traveller** concentrates on the exciting potential of travellers, explorers, powerful negotiators, military leaders, and intelligent academics. Each player assumes an alter ego of one or more characters and it is through these characters that the adventures of **Traveller** are played out.

Most characters follow a natural progression as the players behind them grow in knowledge and sophistication.

### **Money**

At the most elementary level, characters (and their players) are interested in economic benefits and in the adventures that bring them money and equipment.

Money buys them things that help in their adventures; it ultimately frees them from dependence on patrons and assigned missions.

Ultimately, money becomes the source of power.

### **Power**

Once a certain level of economic independence is reached, money (as a personal goal) declines in importance. Players can concentrate on power: on authority and responsibility granted to them by their patrons and their superiors.

Power comes in many forms: status, rank, fame, reputation, followers, comrades, corporate power, political power. Power makes it possible to do things: to have dreams and achieve them, to build organizations and empires, to become an icon in the stream of history.

Ultimately, power brings a thirst for knowledge and understanding.

### **Understanding**

Once characters reach a certain level of power, many move on to the next step of personal development: understanding the many and varied aspects of the universe that surrounds them.

Once again, the **Traveller** game system satisfies this goal with a varied universe filled with the potential for discovery, and adventure to be had in the process.

## **EXPLORING WORLDS AND CULTURES**

**Traveller** not only defines future history, it provides mechanisms for creating and describing that history:

## **Generated Worlds**

Specific rules within **Traveller** can randomly generate and define more than a million different worlds with the rolls of a few dice, or allow a player to carefully craft specific worlds.

More than worlds, **Traveller** supports the creation of alien cultures and societies.

## **Generated Sophonts**

The sophont creation rules allow the random creation (or specific definition) of more than a million different non-Human intelligent species, providing interesting and challenging encounters for trade, exploration, or intrigue.

## **Generated Things, Beasts, Robots**

**Traveller's** many Maker systems allow the creation of animals, robots, weapons, objects, vehicles, starships, trade goods and many other interesting things that players enjoy and that referees use to motivate and challenge players.

## **FILLED WITH ADVENTURE!**

Above all, this universe is filled with adventure.

Characters can own starships and travel to distant worlds. They can undertake literally world-shattering missions whose results depend on their personal courage and resources. Individuals are the key to discovery, progress, and the turning points in history.

Broadly within this universe, there are three types of players:

### **Casual Players**

Anyone can play **Traveller**. The concepts are intuitive: travel, exploration, interaction, negotiation, combat, and all kinds of tasks. Individuals can role-play diverse characters or they can play themselves.

Casual players can be so casual that they know nothing about the game system at all, leaving it to the referee to handle the details.

### **Detailed Role-Players**

**Traveller** provides dedicated gamers the opportunity to role-play complex characters with strong motivations and intricate backgrounds. The **Traveller** system can be as casual or as rich as the participants want it to be.

### **Systems Engineers**

The **Traveller** system provides referees and game masters the materials with which to explore the **Traveller** universe in detail: starship design systems, world generation systems, vehicle description systems, trade and commerce systems, and encounter systems. Each is produced with two specific goals in mind: as a prod to the imagination, and to allow game masters opportunities to create custom equipment or information.

Ultimately, the player behind the character reaches the next level of achievement within the **Traveller** universe: he or she becomes a referee devoted to administering the **Traveller** universe for other players.

# Traveller Uses Dice

**Traveller** uses dice to make outcomes uncertain. There's always a chance that some effort will fail. There are situations where a random answer is more suitable than a choice by the player.

Dice are the randomizers in **Traveller**.

**Traveller uses Six Sided Dice.** Only D6 dice are used in **Traveller**. Sometimes, in order to remain true to the D6 concept, the system contorts D6 die rolls to achieve special results (for example, even distributions from 1 to 10 or 1 to 9). While purists may object, no one else will mind if you use an available D10 or D20.

## BASIC TERMS

The following basic terms apply to dice and die rolls:

### About Dice

**Traveller** consistently addresses dice.

**Die.** The randomizers used in **Traveller** are ordinary six-sided cubic dice marked with sides marked 1 to 6 (with pips or numbers). Die is plural; the singular is Die.

**Die Roll.** The result of rolling one or more dice.

**D.** Abbreviation for dice. In **Traveller**, this is always a six-sided die. Other game systems may use different dice.

**D6.** Another abbreviation for six-sided dice. A die with 3 sides is D3; a die with 10 sides is D10. This terminology reiterates that the dice used are six-sided.

### About Die Rolls

**Traveller** consistently addresses die rolls.

**Roll or Throw.** An instruction to roll dice. For example, Roll 2D instructs the player to roll two dice.

**Check.** An instruction to roll dice and compare the result against a standard. Check <Kilometers> instructs the user to compare 2D versus distance in kilometers; if the result is less than (or equal to) the distance, the roll is successful.

Check is assumed to be 2D unless otherwise stated. Easy Check assumes 1D; Hard Check assumes 3D. Other dice are specified (5D Check Kilometers; 10D Check Hours).

### About Modifiers

**Target Number (or just Target).** The number the player is trying to roll. Some uses of dice call for a specific number to be rolled (Target=5). Others call for a number or less to be rolled (Target=5 or less). Still others call for a number or greater to be rolled (Target=5 or more). In each case, the focus is on a Target Number.

**Mod. Modifier.** A change to the Target Number. A Modifier increases or decreases the Target Number (in contrast to a DM which alters the actual Die Roll).

Mods are primarily used with Target Numbers.

**DM. Die Mod. Die Modifier. Dice Modifier.** A change to the Die Roll. A DM increases or decreases the result of the dice before it is compared to the Target Number (in contrast to a Mod which changes the Target Number itself).

DMs are primarily used on Tables.

## DICE INSTRUCTIONS

**Traveller** routinely calls for specific and sometimes



## BE PREPARED

The referee and each player should have a pool of readily available six-sided dice in a variety of colors:

**Ten Six-Sided Dice** are available for standard die rolls. Actually, any of the dice shown here can be used for standard rolls. Ten dice is sufficient for the most extreme of rolls: 10D Double Hasty Beyond Impossible.

**Two Contrasting Color Dice** are used for Flux rolls. The lighter color is always positive; the darker is always negative.

complex die rolls. In charts especially, these instructions generally take the form 1D, 2D, or Flux.

**D (Capital D)** indicates that a standard six-sided die is used. The number in front of the die tells how many of these dice to roll, and any addition (or subtraction) after the D indicates how the die roll result is changed.

Typical instructions include:

**1D.** Roll one die, producing results 1 to 6.

**2D.** Roll two dice: results 2 to 12 (or 8D: Roll eight dice for results 8 to 48).

**2D - 2.** Roll two dice and subtract 2; results 0 to 10.

**2D + 2.** Roll two dice and add 2; results 4 to 14.

**2D - 7.** Roll two dice and subtract 7. This may produce negative numbers (results from + 5 to - 5).

**D -D (or +D -D).** Roll one die, then roll a second die and subtract it from the first. The roll may produce negative numbers (this throw is identical in output to 2D - 7, or Flux).

**Flux.** Roll one die, then a second die and subtract it from the first. This roll is the same as D-D, but renamed for easier identification. For less confusion, use a light colored die and a dark die; always subtract dark from light.

**Good Flux.** Roll two dice: subtract the smaller from the larger value (if both dice are equal, the result is zero). This roll produces a range from 0 to + 5.

**Bad Flux.** Roll two dice: subtract the larger from the smaller value (if both dice are equal, the result is zero). This roll produced a range from 0 to - 5.

**D/2.** Roll one die and divide by 2. The practice is to always round in favor of the rolling player. This particular roll is also called a **half-die** or **half-dice**. Rarely used.

**(2D +3) x (3D -2).** Roll two dice and add three, then roll three dice and subtract two, and then multiply the two together. This one is probably not used very often.

## MODS VERSUS DMS

There is an important difference between Mods and DMs. The typical **Traveller** usage is **Roll Low**. Situations, challenges, and problems are usually defined as a Target which the player wants to roll equal to or less than.

**A Mod Changes The Target Number.** Mod +3 increases the Target Number by 3 and makes it **easier** to roll lower than the Target; positive Mods are beneficial. Mod -2 decreases the Target Number by 2 and makes it **harder** to roll lower than the Target; negative Mods are detrimental.

**A DM Changes The Die Roll.** DM +3 increases the Die Roll by 3 and makes it **harder** to roll lower than the Target; positive DMs are detrimental. DM -2 reduces the Die Roll by 2 and **makes** it easier to roll lower than the Target; negative DMs are beneficial.

Mods can be applied to a Target Number before the dice

### MOD VS DM (Roll Low)

+ Mod +	Increases Target	= More Success
- DM -	Decreases Die	= More Success
- Mod -	Decreases Target	= Less Success
+ DM +	Increases Die	= Less Success

A Mod is an Asset and an add to the Target Number.

A DM is a change to the Die Roll applied after the roll.

are rolled, producing a direct interaction between the Dice and the Target Number. Applying DMs to the Dice and then comparing with the Target Number is a longer process.

Some players prefer to convert DMs to Mods, creating a final Target number before rolling the dice. The conversion is simple:

A Positive DM is a Negative Mod.

A Negative DM is a Positive Mod.

For example, Don is suddenly confronted with a large beast blocking his way back to his ship. He needs to distract it. He has a backpack he can throw to one side, and a digital camera with a flash. The referee says:

“You need to distract the beast. If you trigger the flash, your Target is 7 on 2D. If you throw the pack at the same time, Mod + 2 (but you can only do that once). If you can time either action with a gust of wind, DM-1.”

**The Step By Step Approach:** Don waits until the referee says there is a gust of wind, and rolls 2D= 8. That's higher than the Target. But wait! He has a Mod + 2, which makes the Target 9 (+ 2 added to 7), and DM-1 which makes the Die Roll=7. He succeeds!

**The Conversion Approach.** Don's Target is 7. Mod + 2 makes the Target=9. DM-1 is the equivalent of Mod + 1 which makes the Target=10. Don waits until the referee says there is a gust of wind and rolls 2D= 8. That is less than his Target=10, and he succeeds.

Conversion also helps the player more easily evaluate the situation. If Don's Target were 1, then Mod + 2 and DM-1 converts the Target to 4. The chance of rolling 4 or less on 2D is very small, prompting Don to look for other ways of distracting the beast.

**Die Roll Revisions.** If a roll fails, some players may argue that a particular Mod or DM was available and unused. The referee can (and should) allow revisions for reasonable Mods and DMs after an unsuccessful Die Roll. If they change the result to success, the result should be allowed. On the other hand, only rarely should the Die Roll itself be rerolled.

Revisions should be permitted only until the next die roll is made. There is no point in reaching back several situations to revise rolls.

## SPECIAL PROCEDURES

The Dice Appendix includes several special procedures.

**Rolling Many Dice.** There are standard procedures for easily rolling 11D or more.

**Flux** shows the Flux die roll and its variations.

The **C+S Table** shows percentage chance of success when using skills and characteristics in tasks and actions.

**Special Throws** shows a variety of predefined die rolls, including **Even Distributions (0 to 9)**, **Even Distributions (0 to 10)**, and **Randomly Determined Characteristics**.



## THE DICE TABLES

To help understand and predict outcomes, the Dice Appendix provides complete descriptions and statistical tables for the die rolls used in **Traveller**.

# Money

The value of objects and labor is measured in Money. The varied systems of money in use across the universe allow individuals to buy and sell, to accumulate wealth, to settle debts, and to acquire objects.

Money spans a range of values: the money needed for one person to survive is often just a rounding error for a giant corporation. The money required to finance and maintain a starship might give its captain a lifetime of luxury on his homeworld, but at the cost of foregoing a lifetime of adventure.

## THE THREE LEVELS OF MONEY

Money is accounted for in three distinct levels, each with its own purpose and level of efficiency.

### Credits (Cr)

The basic personal form of money is the Credit. Prices for most goods and services are expressed in Credits.

One Credit is roughly the value of a short period (a tenth-hour) of unskilled labor.

A down-and-out spacer, stranded on a frontier world along the Imperial border, offers to do odd jobs for the owner of the Lone Star: he is paid several credits for an hour of work. This same spacer uses his pay to buy a cheap but hearty meal: the first he has had in several days.

Credits are available in several forms: coins, currency, precious items, or electrons. Most money includes adequate and cost-effective anti-duplication measures.

### MegaCredits (MCr)

The basic corporate form of money is the MegaCredit (one million Credits). Accounting for large scale transactions, construction of starships, or budgeting for corporate operations is best undertaken in MegaCredits.

One MegaCredit is roughly the value of one day of operations by an average business corporation.

For example, Franklin Armory with factories in the Sword Worlds produces high quality personal armor. It has annual sales of about MCr 350.

### Resource Units (RU)

The basic governmental form of money is the Resource Unit. The RU is a relative unit of value useful for comparison of different governments. The RU is also used in accounting by MegaCorporations. There is no direct correlation between Resource Units and Credits or MegaCredits.

**Wealth Beyond Imagining.** When characters gather to discuss the schemes of plans, the term "aryu" (as in "an aryu scheme," or "this is aryu.") means Wealth Beyond Imagining.

## BARTER

Barter is a direct transaction without the use of money. Such Barter transactions directly trade one type of goods for another; each participant acquires the specific goods they want in a quantity that makes each side equal.

### The Frontier Trader's Ramp

When a trader lands on a frontier world, he can try to barter with the natives using the well-established ramp market technique.

The trader lays out goods he wants to trade: textiles, trinkets, tools, small devices, or other goods he feels will be attractive to the natives.

The natives, in response, lay out goods that they think may be attractive to the trader: woven baskets, carved stone or organic-material totems, pieces of shiny rock (are they diamonds? or just cheap crystals), artifacts, gold nuggets, or whatever they have on hand.

Each side positions its goods across from goods they want. When each is satisfied with what the other has to offer, they nod, or slap the ground, or hoot, or otherwise signal acceptance, and the participants gather up their newly acquired goods (ideally, both being satisfied with their side of the bargain).

## IN-KIND TRANSACTIONS

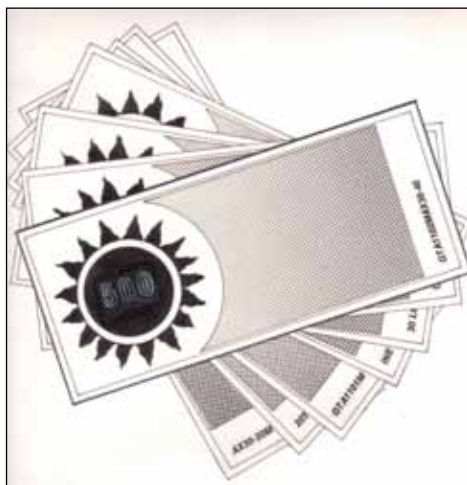
In Kind transactions pay for goods or services with something other than money. In Kind is often for the convenience of the participants.

Some careers (Scouts, Soldiers, Spacers, Marines, and Merchants) provide housing and meals in addition

to ordinary wages, a reflection of the requirement that workers must live aboard ship or at a post.

The arrangement is convenient for both sides: the employer needs workers on the ship or close to the work site; the employee avoids finding quarters or shopping for meals.

Both sides enjoy the luxury of avoiding the accounting details.



# Humanity

Most player characters are **Human**: players already understand the many roles Humans can play. A player who fully understands how to play a Human character can ultimately progress to playing non-Humans.

The standard player character in **Traveller** is Human for convenience in role-playing. The **Traveller5** rules set is built around Human standards and is easily understood by Human players.

## HUMANITY IS A BENCHMARK

The character is a central focus of **Traveller5** as a role-playing game. Because players best understand the abilities and activities of Humans, Humanity is an easily understood benchmark of performance. The rules for vision make sense to a player because he already understands how vision works and what outcomes are reasonable. The rules for strength reflect reality. The rules for accomplishing tasks are understood because the player already understands likely outcomes.

**Beyond Humanity.** A player can expand his role-playing to **Traveller5**'s non-Human options: clones, chimeras, synthetics, robots, artificials, and sophonts are all understandable when compared to the known benchmark: Humanity.

## THE HISTORY OF HUMANITY AND HUMANITI

Humanity evolved on Terra as native hunter-gatherer omnivores with a variety of adaptations (opposed thumb manipulators, relatively large braincases; the use of tools) and occupying a dominant ecological niche.

Humanity began its rise several million years ago as genus *Homo* established itself distinct from apes. Within the genus, a variety of competing sub-species (yet capable of interbreeding) can be distinguished in the fossil record: *Homo habilis* and *Homo rhodesiensis* in Africa, *Homo erectus* in Asia, and *Homo neanderthalensis* in Europe. The various subspecies died out (some as late as 30,000 years ago) to be replaced by a world-spanning *Homo sapiens*.

**About 300,000 Years Ago.** Unknown to the Humans of the time, Terra was visited by one or more missions directed by Grandfather. He (for his own obscure reasons) saw potential in the primitive Humans of Terra and carried away sample populations of anatomically modern Humans (the first of the *Homo sapiens*) as well as *rhodesiensis*, *erectus*, and *neanderthalensis*. Humans proved useful to the Ancients: as trainable organic servants, as independent messengers and technicians, and probably as pets. Many of the Ancient leaders found uses for Humans; they carried them with them to the far corners of Ancient space. When the Ancients destroyed themselves in their cataclysmic Ancient War, they left behind surviving populations of Humans, each to evolve and develop on its own world.

**Traveller** uses the term **Humanity** to identify the species as it evolved on Terra, and **Humaniti** to identify the more extensive species as it exists across many worlds.

**The Result:** Humaniti (some near-identical to Terran Humanity; others greatly different) is a truly pan-galactic species. More than a hundred worlds within Charted Space have native Human populations. More than a hundred worlds beyond Charted Space harbor Human populations (perhaps one in a hundred sectors has a Human world).

## The Major Human Races

There are three major (or important) Human races.

The **Solomani** are the native Human race of Terra. They achieved interstellar drive capability relatively late and found that most of the worlds around them were already settled.

The **Vilani** are the Humans of Vland. The Vilani were the first in their region to develop interstellar drives and used that technology to create an interstellar empire that dominated the region for millennia.

The **Zhodani** are the Humans of Zhdant. They shared their world with surviving Ancients for millennia, until a lingering bio-weapon wiped out their partner race. The Zhodani developed their native psionic abilities and incorporated them into their culture.

**The Minor Human Races.** There are also many minor (or ordinary) Human races, each claiming its own uniqueness based on homeworld or culture. Some are in Charted Space (the Answerin, Azhanti, Geonee, Luriani, Suerrat); others are obscure or relatively unknown; yet others are now extinct, failed branches of the universal Human family tree.

## IMPERIALS

Human characters in **Traveller**, absent any detailed information about their ancestry, are usually **Imperials**: citizens of the Imperium and members of the collective Human race that, despite its differences, dominates the empire.

Over the course of many adventures, each Human character has the opportunity to learn and understand his particular origins and background.

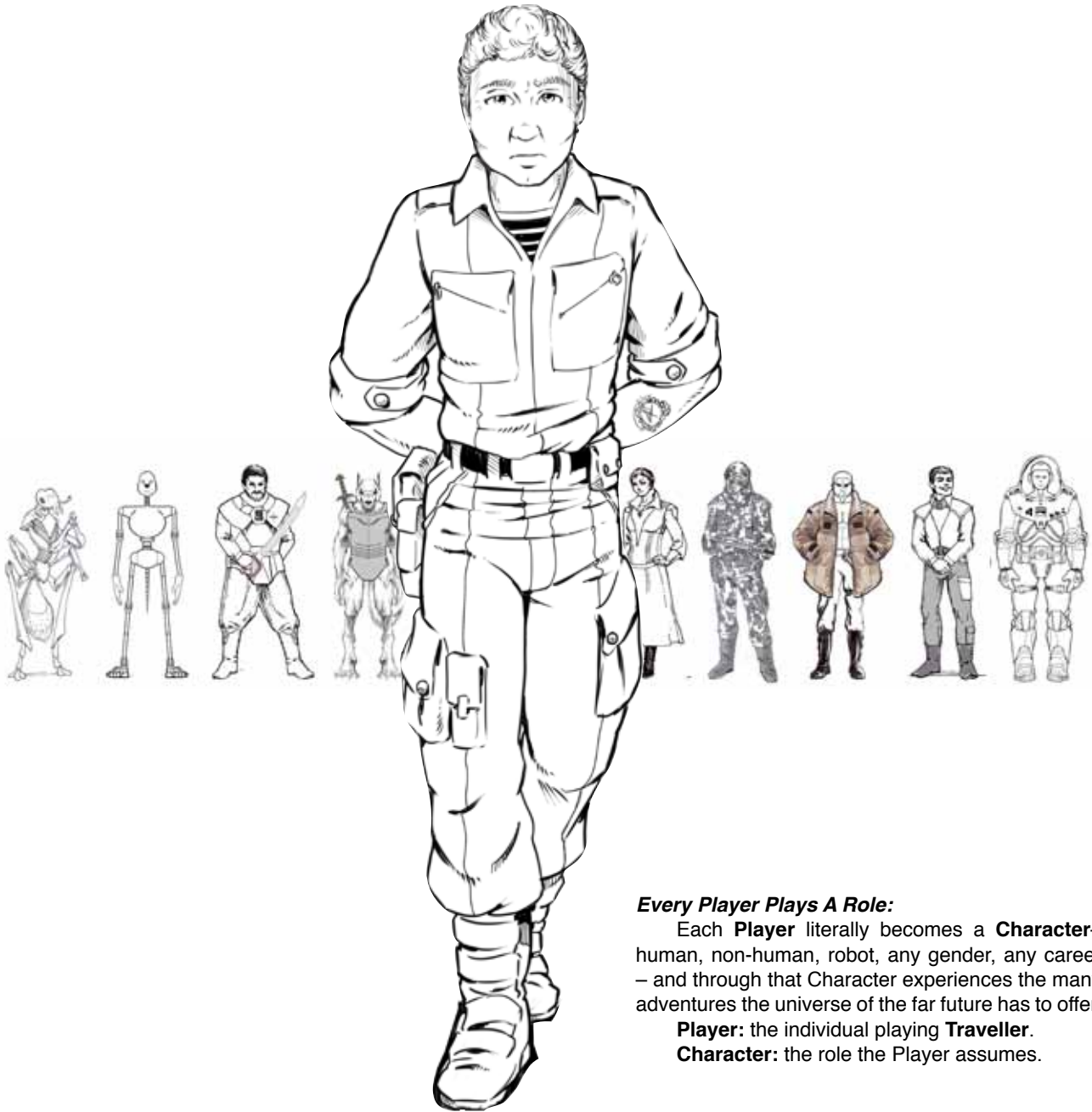
---

## Wolves

There is another Terran-derived sophont that reached the stars: Grandfather's expeditions gathered breeding samples of wolves (*Canis lupus*), and at least one population established itself on its own world: Lair.

---





***Every Player Plays A Role:***

Each **Player** literally becomes a **Character**—human, non-human, robot, any gender, any career – and through that Character experiences the many adventures the universe of the far future has to offer.

**Player:** the individual playing **Traveller**.

**Character:** the role the Player assumes.

# Characteristics Establish A Foundation

Every **Character** has six basic digital values that describe his or her physical, mental, and social abilities. These **Characteristics** establish a foundation for the individuals interaction with the universe. They are gathered into a six-character string (the **UPP Universal Personality Profile**) for easy reference.

Characteristics are basic information about a Character: how strong he is, how smart, how agile, even how important. Each Character has six basic Characteristics: three physical, two mental, and one social. In addition, experience may reveal other obscure Characteristics.

**Characteristics Are Assets.** The central Task Resolution mechanic for **Traveller** is based on Assets: abilities and resources that the individual Character brings to the situation. Characteristics are important as assets which may enable the individual to accomplish his goals.

**Characteristics Are Descriptive.** At even the simplest level, Characteristics provide an understanding of who an individual is. High Strength says a Character is Strong; low Dexterity says a Character is Clumsy; moderate Intelligence says a Character's thinking and reasoning ability is Ordinary.

## CHARACTERISTICS FOR SOPHONTS

**Traveller** describes sixteen different Characteristics. Most characters have six. The specific six are determined by the individual's species.

**Human Characteristics:** The most common type of Character is Human.

The Human characteristics are

- Physical** Strength, Dexterity, Endurance
- Mental** Intelligence, Education
- Social** Social Standing
- Obscure** Sanity, Psi

**Non-Human Characteristics.** It is also possible for Characters to be non-human: sophonts, intelligent aliens from their own worlds and cultures and civilizations. They may be similar to Humans and have Characteristics in common with Humans, or they may be radically different and have Characteristics which Humans do not have. The 16 common Characteristics are shown in the adjacent Characteristics table.

The wide range of Human and non-Human characteristics are integral to the **Traveller** game system; even if a player never plays a non-Human character, he will certainly encounter non-Humans and ultimately need to deal with non-Human Characteristics.

UPP UNIVERSAL PERSONALITY PROFILE						
The Standard Characteristics	C1	C2	C3	C4	C5	C6
Strength	9	A	B	5	6	7
Dexterity						
Endurance						
Intelligence						
Education						
Social Standing						
The Analog Characteristics	Str	Dex Agi Gra	End Vig Sta	Int	Edu Tra Ins	Soc Cha Cas

CHARACTERISTICS					
Char Abb	Characteristic	H	Description	GP	
C1 Str	Strength	H	physical power	S	
C2 Dex	Dexterity	H	hand-eye co-ordination	D	
C2 Agi	Agility	A	body co-ordination	A	
C2 Gra	Grace	A	body-limb co-ordination	G	
C3 End	Endurance	H	resistance to fatigue	E	
C3 Sta	Stamina	A	long-term task persistence	S	
C3 Vig	Vigor	A	short-term fatigue resistance	V	
C4 Int	Intelligence	H	ability to think and reason	I	
C5 Edu	Education	H	achievement level in school	E	
C5 Tra	Training	A	based on cultural heritage	T	
C5 Ins	Instinct	A	based on genetic heritage	I	
C6 Soc	Social Standing	H	large group hierarchy	S	
C6 Cha	Charisma	A	small group hierarchy	C	
C6 Cas	Caste	A	genetic group hierarchy	K	
CS San	Sanity	H	mental health and stability	S	
CP Psi	Psionics	H	extra-sensory mental power	P	

H= Human Characteristic (may be present in non-humans).  
 For a Character to be Human, all Characteristics must be H.  
 A= Analog (non-Human) Characteristic.



## CHARACTERISTIC EQUIVALENCES

Char Abb	Characteristic	Use		
C1 Str	Strength			
C2 Dex	Dexterity		Half-Agi	Half-Gra
C2 Agi	Agility	Half-Dex		Half-Gra
C2 Gra	Grace	Half-Dex	Half-Agi	
C3 End	Endurance		Half-Sta	Half-Vig
C3 Sta	Stamina	Half-End	Half-Vig	
C3 Vig	Vigor	Half-End	Half-Sta	
C4 Int	Intelligence			
C5 Edu	Education		Half-Tra	Ins=4
C5 Tra	Training	Half-Edu		Ins=4
C5 Ins	Instinct	Edu=4	Tra=4	
C6 Soc	Social Standing		Cha	Cas=4
C6 Cha	Charisma	Half-Soc		Cas=4
C6 Cas	Caste	Soc=4	Cha=4	
CP Psi	Psi			
CS San	Sanity			

In most cases, a Character may use an associated Physical Characteristic at half-value; special equivalences apply to Mental and Social Characteristics.

### The UPP

The Characteristics for each Character are shown in the convenient six-digit UPP Universal Personality Profile. The UPP serves as a ready reference to the most fundamental information about a Character.

In the course of an adventure, a Player may encounter individuals variously identified as 777777, AAA777, and 444CCC. A quick glance reveals basic information about physical ability, mental ability, and even social class.

### Referring To Characteristics

Each Characteristic has a name and may be identified in several distinct ways.

**Abbreviations (Abb).** A Characteristic can be abbreviated with its first three letters. Only the initial letter of the abbreviation should be capitalized. For example, Strength is Str (rather than the all-caps STR).

**Genetic Profile (GP).** The GP is a six-letter string (using the initial letters of the Characteristics) which shows the specific six characteristics for a sophont. For example, the Human GP = SDEIES (Str, Dex, End, Int, Ed, Soc). There is a sophont with GP = SASIIK (Str, Agi, Sta, Int, Ins, Cas). The meaning of letters in the GP is position-dependent (S in

## CHECK CHARACTERISTIC

Easy Check **1D =< Characteristic**

Check **2D =< Characteristic**

Hard Check **3D =< Characteristic**

**Non-Humans:** If the Characteristic checked was generated with other than 2D, check Characteristic with the number of Dice used to generate it.

Easy Check uses one less die.

Hard Check uses one more die.

position 1 is Strength, S in position 3 is Stamina). Because two characteristics in position 6 have the initial letter C, use K for Caste. The chapter on Genetics provides more details.

There are 81 different possible Genetic Profiles: from SDEIES through SGVIIK.

**Position Codes (C1 C2 C3 C4 C5 C6).** A Characteristic is also identified by its position in the UPP using the letter C (Characteristic) followed by 1 through 6 (for all sophonts, C1 = Str and C4 =Int). To avoid confusion between a word's ordinary meaning and its use as a Characteristic (such as Strength and strength), a Characteristic may be identified with the format: Position Code = Characteristic Name.

For example, C5 = Training, or C5= Education; C4 = Intelligence, or C3 =Vigor.

### Characteristic Equivalences

Within Position Codes, Characteristics are related and are rough equivalences. The Human Characteristic is the primary; there may be one or more Analog Characteristics.

For example, **Dexterity** is the Human characteristic for co-ordination. Some sophonts instead have **Agility** (which emphasizes overall body co-ordination) or **Grace** (which emphasizes body-limb co-ordination). Agility and Grace are analogs of Dexterity. The C2 characteristics substitute for each other at half-value. A sophont with Grace attempting a Dexterity task would use half-Grace (and a sophont with Agility would use half-Agility). A human attempting a task for Grace would use half-Dexterity (and a sophont with Agility would use half-Agility). Using an analog Characteristic instead of the specified one is almost always working at a disadvantage.

## CHECK CHARACTERISTIC

Characteristics provide a simple mechanism (Check <Characteristic>) for resolving situations. The Tasks chapter has more information on using Characteristics.

**The Check.** Select an appropriate Characteristic and roll 2D against that characteristic: equal or less than the characteristic gives success; any other result is failure. To avoid recurring use of an available high Characteristic, a Character cannot Check Characteristic (with that specific Characteristic) again until two other Characteristics have been used. If only one specific Characteristic is appropriate, each successive use of the same Characteristic rolls with Mod -1.

**Easy Checks and Hard Checks.** For very easy tasks, roll 1D; for very hard tasks, roll 3D.

For example, Spacer Fenric Cayne 68A999 is loading cargo on a Free Trader. One especially large container is blocking a floor access panel. He puts his shoulder to the load and tries to move it. The Referee says Check Strength. The player rolls 2D (=7, which is greater than Fenric's Strength-6; it fails). He can't use Strength again immediately, so instead of pushing, he tries rocking the container. The Referee says Check Dexterity. The player rolls 2D (=7, which is less than Dexterity-8; the container moves).

**Mods.** The Check can be enhanced (or degraded) by circumstantial Mods. For example, Check Strength - Burden, or Check Dexterity - Stability.

### Non-Human Check Characteristic

If the Characteristic being checked was generated with other than 2D,

Check Characteristic with the number of Dice used to generate it. Easy Check uses one less die. Hard Check uses one more die.

### PHYSICAL VS MENTAL VS SOCIAL VS OBSCURE

Characteristics are generally divided into categories: Physical, Mental, Social, or Obscure. Each character has three Physical characteristics, two Mental Characteristics, and one Social Characteristic. The Obscure characteristics may appear as play progresses.

#### Physical Characteristics C1, C2, and C3

The physical characteristics are Strength, Dexterity, Endurance, Grace, Agility, Stamina, and Vigor.

All characters have Strength.

There are three different characteristics for fine physical activity: Dexterity (for humans), Agility, and Grace. Each represents a slightly different physical approach.

There are three different characteristics for resistance to fatigue: Endurance (for humans), Stamina, and Vigor. Each represents a slightly different ability.

#### Mental Characteristics C4 and C5

The mental characteristics are Intelligence, Education, Instinct, and Training.

All sophonts have Intelligence.

There are three different characteristics for learning: Education (for Humans), Training, and Instinct.

#### Social Characteristics C6

The social characteristics are Social Standing, Charisma, and Caste. There are three different characteristics for position in social hierarchy: Social Standing (for Humans), Charisma, and Caste.

#### Obscure Characteristics CS and CP

There are two obscure characteristics: Sanity (CS) and Psionics (CP). Every character has both Sanity and Psionics, although they are not generated until needed.

#### How Many Dice?

Humans (the most common type of Character) roll 2D for each of their six characteristics (making each of the Characteristics usually between 2 and 12). The required dice for the characteristics for non-Humans are covered in their specific descriptions.

## C1 STRENGTH

**Strength (Str).** Strength is physical power and ability: the ability to apply physical force (expressed in kilograms) or carry loads. Every character has Strength.

#### Using C1

The characteristic Strength governs Load and Burden.

**Load And Burden.** Load is the weight (technically the mass) of all objects carried by person. Burden is the per-



ceived load after all modifications. If Burden does not exceed Str in kg, there is no penalty.

Burden (also detailed in the QREBS system chapter) may modify the effective weight or mass of some objects (devices, equipment, weapons). The QREBS Burden Mod may increase or decrease load. Thus the Burden modifier creates Burden by increasing or decreasing Load.

**Carrying.** A character can routinely carry a Burden equal to Strength in kilograms for an unlimited period of time. He can carry a double Burden but functions with C2 - 2 and C3 - 2 until the Burden is shed. He can carry a triple Burden but functions with C2 - 4 and C3 - 4 until the Burden is shed.

Citizen Bill Cobb 789987 has Str=7. He can carry a burden of equipment, weapons, and supplies equal to 7 kilograms as he moves about on his daily activities.

**Transferring.** Transfer is the temporary movement of a Burden from one place to another (often a process of lift, walk a short distance, and drop). A character can transfer a Burden of 5x Strength. Transfer is limited to C3 in minutes every hour for Endurance, every half hour for Stamina, and every two hours for Vigor.

**Lifting.** A character can lift a Burden of 10x Strength for under one minute.

**Dragging.** A character can drag a load of 20x Strength for under one minute.

## C2 DEXTERITY OR AGILITY OR GRACE

C2 is the characteristic which governs fine physical activity and body movement.

**Dexterity (Dex).** Dexterity is body and eye-hand coordination, or fine touch control. It most importantly governs the use of firearms and hand weapons.

**Agility (Agi).** Agility is overall body coordination. Agility is often (but not exclusively) associated with flyers.

**Grace (Gra).** Grace is overall body-limb coordination. Grace is often associated with swimmers.

#### Using C2

The C2 characteristic is used in balance, accuracy (in throwing or weapon use), and in fine manipulation.

**Balance.** When a character risks losing his or her balance, Check C2.

**Climbing.** For an attempt to change elevation by grabbing and holding and pulling oneself upward (or downward). Check Agility (humans thus Check half-Dexterity).

**Accuracy.** If throwing something at a target, Check C2.

**Fine Manipulation.** When a character attempts fine manipulation (operating very small controls, inserting detailed parts into a mechanism), Check Dexterity.

## C3 ENDURANCE OR STAMINA OR VIGOR

C3 is the characteristic which addresses fatigue and resistance to fatigue.

**Endurance (End).** Endurance is personal determination and physical resistance to fatigue.

**Stamina (Sta).** Stamina is personal determination and long-term ability to pursue a task. Characters with Stamina have greater long-term resistance to fatigue, and are in some ways superior to those with Endurance.

**Vigor (Vig).** Vigor is personal determination and short-term ability to resist fatigue. Vigor is an inferior alternative to Endurance. Characters with Vigor have lower overall resistance to fatigue.

### Using C3

The C3 characteristic determines the length and effectiveness of a character's Personal Day, a character's need for sleep, and his ability to perform tasks.

**Exhaustion and Fatigue.** When a character engages in physically exhaustive work (running a great distance; moving heavy loads), Check C3.

**Sprints.** For short distance running, Check Vigor (thus, Humans check half-Endurance).

**Long Distance Running.** In a continued running situation, Hard Check Endurance.

**Hold Your Breath.** A character can Hold His Breath until he fails Check C3 (check every combat round); DM +1 per combat round.

**The Personal Day.** The different C3 characteristics affect the individual's need for sleep and imply the length of the natural day.

## C4 INTELLIGENCE

**Intelligence (Int).** Intelligence is the natural mental ability to think, to reason, and to use logic.

All characters have Intelligence.

### Using C4

The Intelligence characteristic allows a character to be smarter than the player (or less smart than the player). There are times when a player has a character who is smarter than he is (or a player has a character who is less intelligent than he is). Intelligence provides a consistent ability to reason at specific levels without regard to the ability of the player.

**Solving Puzzles.** When a character is confronted with a puzzle, Check Intelligence. The game master manipulates this basic process to reflect harder puzzles, simpler situations, or other complications.

## C5 EDUCATION OR TRAINING OR INSTINCT

C5 is the characteristic which addresses learning and the ability to acquire and use long-term information.

**Education (Edu).** Education is learning based on achievement level of schooling. Education is an equivalent level of schooling (although not necessarily attendance at a school). Education is also a supplement or an alternative to Intelligence. In **Traveller**, they are decoupled: they are unrelated, and it is possible for a very intelligent person to have a low Education (or a very high Education person to have a low intelligence). Sophonts with C5 = Education can be taught skills and knowledges in the traditional Educational environment. The governing skill for the Educational environment is Teacher.

**Training (Tra).** Training is learning based on behavior modification. Training is a predisposition to the learning process based on cultural heritage. Sophonts with C5 = Training learn poorly in the Educational environment; they prosper in special Training courses adapted to their needs. The governing knowledge for the Training environment is Trainer.

**Instinct (Ins).** Instinct is an inborn complex of behaviors comparable to acquired learning. It is based on genetic heritage. Sophonts with C5 = Instinct function poorly in the Education or Training environment and cannot use those institutions (they increase skills through experience).

### Using C5

The C5 characteristic indicates the sum of an individual's abilities available in support of intelligence.

**Finding Basic Facts.** When a character is confronted with a need for basic facts: Check Education. The game master manipulates this basic process to put the correct (or not) information at the disposal of the characters.

**Substituting Edu, Tra, and Ins.** Training and Education substitute for each other at half-value. Ins can be substituted for Edu or Tra with a value of 4. For tasks that require Instinct, Edu or Tra may be used with a value of 4.

**Instinctual Reactions.** A character with Ins, confronted with a task that requires Edu or Tra, reacts instinctively.

For Easy tasks, Easy Check Instinct.

For Average tasks, Check Instinct.

For Difficult tasks, Hard Check Instinct.

For tasks beyond Difficult, roll the number of dice for the task.

**Instinct provides a time advantage.** A character who succeeds in a task using Instinct completes it before anyone else attempting the task using Edu or Tra.

**Instinctual Skills and Knowledges.** Sophonts with C5 = Instinct receive a native store of three instinctual skills or knowledges (but not talents) each with a skill level equal to C5 Instinct.

## C6 SOCIAL STANDING OR CHARISMA OR CASTE

C6 is the characteristic associated with an individual's place in society.

**Social Standing (Soc)** is social position in large group

hierarchy. Social Standing indicates social class and the level of society from which the character comes.

**Charisma (Cha)** is position in small group hierarchy. Charisma reflects a relative social relationship between members of a small group. A low Charisma individual will defer to and follow the leadership of a high Charisma individual.

**Caste (Cas)** is position in genetic group or family hierarchy. In some cases, Caste is established culturally.

### Using C6

The C6 characteristic governs social interactions.

**Bluff.** When conducting a plausible bluff (getting past a guard; convincing a clerk) in general society, Check Social Standing. If the target of the bluff has C6= Charisma, Check Charisma.

**Living Costs.** C6 determines the cost to that individual for basic living. C6 times Cr100 equals the typical cost of monthly support (food, clothes, lodging, basic entertainment). But, if C6= Caste, use half-C6. The Benchmarks and Money chapters have more information about living costs.

**Substituting Soc, Cha, and Cas.** Social can also be used as Charisma at full value, although Charisma uses half-Charisma for Social. Social and Charisma are applied as Caste=4. Caste is applied as Social=4 or Charisma=4.

### Nobility

Nobility is the expected noble rank held by an individual based on Social Standing. Characters with Soc are participants in the widespread social structure of the universe, which includes granted or inherited titles of nobility to those with higher values of Soc. Characters with Cha are at the fringes of the Nobility system: their equivalent Soc equals Cha / 2. Characters with Cas do not participate in the Nobility system; they are culturally or genetically dismissive of such rank, and generally ignore it or seem unaware of it. In the rare event that a character with Cha or Cas receive a Noble rank, it is noted as a skill.

**Gentleman.** The first step in the Nobility is A = Gentleman (Gentlewoman, Gentleperson, Gentlesophont, Gentlebeing, Gentleone, Gentle). Although technically not Noble, Soc = A represents an awakening awareness of the Noble structure and of the individual's potential to be a member of the Nobility.

**Knight.** Soc= B results in a Knighthood. The person can use Sir (or equivalent) as a name prefix and followed by a WorldName. Females may use the prefix Lady. Other (non-human) genders often use the simple prefix The (as in: The Xoral of Albe).

**Baronet and Baron.** A character elevated to Soc = c (lower case) is initially a Baronet. The next increase in Soc remains C (now upper case) but the title increases to Baron (Baroness).

**Marquis.** A character elevated to Soc= D is a Marquis (Marchioness).

**Viscount and Count.** A character elevated to Soc = e (lower case) is initially a Viscount (Viscountess). The next increase in Soc elevates the individual to E (upper case) and the title increases to Count (Countess; or less frequently, Contessa).

**Dukes.** A character elevated to Soc = f (lower case) is a Duke (Duchess). While all Dukes are powerful, some are more powerful than others. The next increase in Soc elevates the individual to F (upper case). The title remains the same, but the noble's power increases.

### The Disruptive Effects of Charisma

Charisma is an alternate to Social Standing. Basically, characters with Charisma squabble and challenge each other in a way that persons with Social Standing would not.

Charisma automatically defers to the leadership of others with higher Cha. Because Cha operates as half-Social Standing, those with Cha generally defer to the leadership of higher Soc. A character with Charisma within 2 of another with Charisma may (but is not required to) challenge the other: if the challenge succeeds, the challenger rises in Cha and the loser has Cha reduced.

To Challenge Charisma.

Difficult (3D) < Characteristic

Opposed (2). Resolves the Challenge in one task.

Challenger selects Characteristic (it must be the same for both). Losers reduce Cha by -1. If Challenger is the winner, his Cha increases to opponent's former Cha.

To Re-challenge Charisma.

Difficult (3D) < Characteristic

Opposed (2). Resolves the Rechallenge in one task.

Loser immediately re-challenges, selecting a different Characteristic. Losers reduce Cha by -1. If Challenger is the winner, his former Cha is restored and increased +1.

### The Isolative Effects of Caste

Characters with Caste are oblivious to their position in the social hierarchy outside their own species. They pay proper attention and deference to those with higher Cas within their species, and treat anyone with any value of Soc or Cha as an equal or inferior.

Characters with Caste are socially inept; if one tries a bluff, he uses Check Social Standing with a value of 4 (and is unlikely to succeed).

## CS SANITY

Sanity is the ability to make reasonable, sound use of the mental characteristics. Low Sanity expresses a disconnect between the reality and the perceptions of the character.

Every character has this obscure (and usually unreferenced) characteristic called Sanity. Characters do not generate Sanity until it is first called for by a situation, encounter, or stimulus. Until then, Sanity is generally unimportant..

For some, Sanity never becomes an issue.

**Universal Sanity Structure.** All sophonts roll Sanity with 2D.

**Recording Sanity.** Sanity is not normally indicated in references to a character. When necessary, it is stated independently as CS= N or San= N.

### Using CS

Sanity may be reduced by crisis or trauma. Reductions



are permanent, but Sanity may be temporarily regained through counseling, or with therapeutic drugs.

**Sanity is Reduced by Crises.** When characters encounter Crises (battles, extreme stress, environmental situations, psionic attacks, drug interactions, and others), there is the chance that Sanity will be reduced.

**Check Sanity.** Failure reduces Sanity -1.

**Sanity= Zero Is Insanity.** When Sanity is reduced to Zero, a character is subject to an automatic Mod (= Flux; rolled new with every use) for every use of Intelligence and C5= Education or C5 = Training (but not C5 = Instinct) and the task becomes Uncertain (1D).

**The Effect of Counselling on Sanity.** Sessions with a Counsellor (Counsellor skill) may increase Sanity (or rather,

reinstate Sanity which has previously been reduced).

**The Effect of Drugs on Sanity.** Drugs exist which prevent reductions in Sanity. Drugs also exist which may increase Sanity.

**Sanity Is Genetic.** The first die of Sanity is recorded as the genetic D.

## CP PSIONICS

Psionics is the ability to use Psionic Abilities.

Nearly every character (that is, every sophont, every intelligent being) has an obscure and usually unreferenced characteristic called Psionics (abbreviated Psi). Characters do not normally generate Psionics until it is first called for by the referee and the situation.

**Universal Psionic Structure.** Nearly all sophonts generate Psionics with 2D +3 - Life Stage. A character tested in infancy for Psi rolls 2D +3. Characters are more likely to be tested in adulthood: a Human character at age 18 (Life Stage 3) rolls 2D +3 -3.

**Recording Psionics.** Psionics is not normally indicated in references to a character. When necessary, it is stated independently as CP=N or Psi=N. State the value in eHex.

**Psionics Is Genetic.** The first die of Psionics is recorded as the genetic D.

**Psi-Immune.** Some few individuals have absolutely no psionic ability and at the same time are totally immune to psionic activity by others. If the 2D of the Psionics roll = 2, the individual is Psi-Immune.

## Using CP

Psionics is an obscure characteristic which remains unknown to the character until it is awakened by a suitable mentor or experience.

---

### Why Different Characteristics?

Different characteristics allows the creation of sophonts with slightly (or not-so-slightly) different abilities. When a character needs to use a characteristic which he does not have, he can use the analog (that he does have) at half-value (usually; there are some exceptions).

For example, a character with Dexterity faces a task that calls for Agility: he can use his Dexterity at half-value (round fractions up). For that particular task, some sophont species with Agility is usually better suited to that task; then again, a Human with Dexterity-10 is still better than a sophont with Agility-4.

---



# The Personal Day

Period	ENDURANCE	STAMINA	VIGOR	Mods
Personal Day	<b>24</b> + Flux Hours	<b>48</b> + Flux Hours	<b>12</b> + Flux Hours	
<b>Optimal</b>	First Endurance Hours	First 2x Stamina Hours	First Vigor Hours	Hasty Mod +1 Cautious Mod +1
<b>Ordinary</b>	Second Endurance Hours	Second 2x Stamina Hours	Ignored (skip to Tired)	No Mods
<b>Tired</b>	Third Endurance Hours	Third 2x Stamina Hours	Second Vigor Hours	Hasty Mod - 1 Cautious Mod - 1
<b>Sleepy</b>	Check Endurance* before any task	Check Stamina* before any task	Check Vigor* before any task	
<b>Required Rest or Sleep</b>	Sleep= Personal Day /3 hours returns to <b>Optimal</b> Sleep= Personal Day /4 hours restores to <b>Ordinary</b> Sleep= Personal Day /6 hours restores to <b>Tired</b>		Sleep= Personal Day /3 hours restores to <b>Optimal</b>	

\* Failure = Character falls asleep for 1D minutes in first instance; 1D hours in second instance.

## ENDURANCE EXAMPLE

Eneri Endurance Dinsha 777777 has End=7. His Personal Day (dictated by genetics and his homeworld) is 24 + Flux hours (=24 +0 =) 24 hours.

Eneri awakens at 0600; his first 7 hours are his Optimal Period. At 1300 his Ordinary Period begins. At 2000 he begins his Tired Period. He works into the evening, at about 2700 he enters his Sleepy Period.

Eneri routinely needs (PD/ 3 =) 8 hours sleep. He retires at 2200, and after 8 hours sleep is refreshed and Optimal at 3000 (0600 the next day).

## Eneri's Long Day

Eneri awakens at 0600 and starts his watch on the bridge at 0800. His watch will end at 1600 (three hours into his Ordinary Period).

His replacement has an attack of food poisoning, and Eneri must work the next 8-hour watch (ending at 2400). He starts his Tired Period at 2000 and the last four hours of his watch he is Tired.

By 2400, it is clear nearly everyone has food poisoning and he will have to staff a third watch. At 2700 he is Sleepy (Check-Endurance before any task). He makes a decision and takes an anti-sleep pill.

## STAMINA EXAMPLE

Nargle Stamina Agash 777777 has Sta=7. Her Personal Day is 48 + Flux hours (=48 +4 =) 52 hours.

Nargle awakens at 0600; her first 14 hours are her Optimal Period. At 2000 she begins her Ordinary Period. At about 3400 (Day 2), she begins a Tired Period. She works into the evening: at about 4800 (midnight Day 2) she enters her Sleepy Period.

Nargle needs (PD/ 3 =) 17 hours sleep. She goes to bed at 3700 (Day 2); after 17 hours sleep, she awakens refreshed and Optimal at 5400 (Day 3).

## Nargle's Long Day

Nargle awakens at 0600 and starts her watch on the bridge at 0800. She will end the watch at 1600.

Her replacement has an attack of food poisoning, and Nargle must work the next 8-hour watch (until 2400).

By 2400, it is clear everyone has food poisoning; she will stand the third watch. At 3200 her third straight watch ends, and no one is yet fully recovered. She starts her fourth watch. By 3400 (Day 2) she is Tired, but she can handle it. The fourth watch ends at 4000 (Day 2); the First Officer has recovered enough to take over. Nargle sleeps in and awakens at 5700 (Day 3).

## VIGOR EXAMPLE

Ssssth Vigor Kshth-Othth 777777 has Vig =7. Its personal day is 12 + Flux hours (=12 - 2 =) 10 hours.

When Ssssth awakens at 0600, its first 7 hours are Optimal. At 1300 it begins a Tired Period (it has no Ordinary Period). At 2000 it begins a Sleepy Period.

Ssssth routinely needs (PD/ 3 =) 3 hours sleep. It takes a quick 3-hour nap at 1800 and awakens Optimal at 2100. It works on projects until 2800, takes another quick 3 hour nap, and awakens Optimal at 3100 (Day 2).

## Ssssth's Long Day

Ssssth wakes at 0600 and starts its watch at 0800. The watch ends at 1600 (3 hours into a Tired Period).

Ssssth's replacement has food poisoning; Ssssth must stand the next 8-hour watch (ending at 2400). It knows it will get Sleepy at about 2000. Surmising that the food poisoning event will continue, it sets alarms for contingencies and takes a 3-hour nap (on duty) from 1800 to 2100. It wakes at Optimal to finish this watch and start the next.

Ssssth works the third watch 2400 to 3200 by scheduling a 3-hour nap some time during the night.



# Characteristics: Physical

## C1 STRENGTH

Str	Equivalent
0	Immobile
1	Incapacitated
2	Very Weak
3	Somewhat Weak
4	Weak
5	Below Average
6	Average
7	Average
8	Average
9	Above Average
A	Strong
B	Quite Strong
C	Very Strong
D	Remarkable
E	Extraordinary
F	Superhuman

**Strength** is the ability to apply physical force. Burdens or Loads are kg and compared to Str.

### Load And Burden

**Load** is weight of all carried objects.

**Burden** is perceived Load after Mods. The QREBS Burden Mod changes Load to Burden. Burden and Load can change from moment to moment.

**Carrying.** If Burden  $\leq$  Str, no penalty.

If Burden  $\leq$  Str x2, then C2 -2 and C3 -2.

If Burden  $\leq$  Str x3, then C2 -4 and C3 -4.

**Transferring** allows lift, short walk, and drop if Burden  $\leq$  Str x 5. Limited to C3 minutes per hour for Endurance, per half hour for Stamina, and per two hours for Vigor.

**Lifting** allows Burden  $\leq$  Str x10 for under one minute.

**Dragging** allows Burden  $\leq$  Str x20 for under one minute.

## C2 DEXTERITY

Dex	Equivalent
0	Paralyzed
1	Quite Clumsy
2	Very Clumsy
3	Clumsy
4	Unhandy
5	Below Average
6	Average
7	Average
8	Average
9	Above Average
A	Adroit
B	Dexterous
C	Very Dexterous
D	Remarkable
E	Extraordinary
F	Superhuman

**Dexterity** is body and eye-hand coordination; involves manipulating and throwing accurately.

### Balance

If at risk for losing balance, Easy Check, Check, or Hard Check C2.

### Accuracy

If throwing at a target, Easy Check, Check, or Hard Check C2.

### Fine Manipulation

If undertaking fine manipulation, (operating very small controls or parts, inserting delicate parts into a mechanism), Check Dexterity.

## C2 AGILITY

Agi	Equivalent
0	Paralyzed
1	Quite Clumsy
2	Very Clumsy
3	Clumsy
4	Unhandy
5	Below Average
6	Average
7	Average
8	Average
9	Above Average
A	Adroit
B	Agile
C	Very Agile
D	Remarkable
E	Extraordinary
F	Superhuman

**Agility** measures overall body coordination and is often associated with flyers. Agility is an analog of Dexterity.

## C2 GRACE

Gra	Equivalent
0	Paralyzed
1	Quite Clumsy
2	Very Clumsy
3	Clumsy
4	Unhandy
5	Below Average
6	Average
7	Average
8	Average
9	Above Average
A	Adroit
B	Graceful
C	Very Graceful
D	Remarkable
E	Extraordinary
F	Superhuman

**Grace** is general body-limb coordination and synchronyn.

It is often associated with swimmers and aquatic sophonts.

Grace is an analog of Dexterity.

## C3 ENDURANCE

End	Equivalent
0	Comatose
1	Very Lethargic
2	Quite Lethargic
3	Lethargic
4	Easily Fatigued
5	Below Average
6	Average
7	Average
8	Average
9	Above Average
A	Above Average
B	Great Endurance
C	High Endurance
D	Remarkable
E	Extraordinary
F	Superhuman

**Endurance** is a measure of personal determination and indicates overall physical resistance to fatigue.

### Hold One's Breath

A character can Hold His Breath until he fails Check C3 (check every combat round); DM +1 per combat round.

## C3 WAKING HOURS

C3 determines the natural day, the need for sleep, and the ability to perform tasks while one becomes progressively more tired.

### Personal Day (PD)

Endurance= 24 hours, Stamina= 48 hours; Vigor= 12 hours.

Varies by Flux.

The need for sleep (and its effects) are addressed in the Personal Day table.

## C3 STAMINA

Sta	Equivalent
0	Comatose
1	Very Lethargic
2	Quite Lethargic
3	Lethargic
4	Easily Fatigued
5	Below Average
6	Average
7	Average
8	Average
9	Above Average
A	Above Average
B	Great Stamina
C	High Stamina
D	Remarkable
E	Extraordinary
F	Superhuman

**Stamina** is a personal determination and long-term task persistence and pursuit. Stamina is an analog of Endurance.

## C3 VIGOR

Vig	Equivalent
0	Comatose
1	Very Lethargic
2	Quite Lethargic
3	Lethargic
4	Easily Fatigued
5	Below Average
6	Average
7	Average
8	Average
9	Above Average
A	Above Average
B	Great Vigor
C	High Vigor
D	Remarkable
E	Extraordinary
F	Superhuman

**Vigor** is a measure of determination, short-term ability to pursue a task, and short term fatigue resistance.

Vigor is an analog of Endurance.

# Characteristics: Mental, Social



## C4 INTELLIGENCE

Int	Equivalent
0	Non-Functioning
1	Very Low
2	Quite Low
3	Low
4	Unimaginative
5	Below Average
6	Average
7	Ordinary
8	Average
9	Above Average
A	Superior
B	Gifted
C	Very Gifted
D	Genius
E	Extraordinary
F	Superhuman

**Intelligence** is the mental ability to think, reason, and use logic.

### Using Intelligence

Confronted with a puzzle: Check Int.

The referee can (and should) manipulate this process to reflect harder puzzles, simpler situations, or complications.

## CS SANITY

San	Equivalent
0	Non-Functioning
1	Borderline
2	Vulnerable
3	Weak
4	At Risk
5	Sane
6	Sane
7	Sane. Normal.
8	Sane
9	Sane
A	Sane
B	Sane
C	Sane

**Sanity** is the ability to make sound, reasonable, productive use of mental characteristics.

## C5 EDUCATION

Edu	Equivalent
0	Absent
1	Illiterate
2	Basic Reading
3	Grade School
4	Dropout
5	High School
6	Some College
7	Associate
8	Bachelor
9	Master
A	Advanced Work
B	Researcher
C	Doctorate
D	Expert
E	An Authority
F	The Authority

**Education** is level of schooling (not necessarily attendance)..

### Using Education

When it is unclear which characteristic (Int or Edu) governs, the game master may declare which one (or either) may be used to resolve the puzzle.

A typical blend is designating one characteristic and applying the other at half as a Mod, for example, Int + Edu/2, Edu + Int/2.

### Substituting C5

Training and Education can be substituted for each other at *half* value, and Instinct can be substituted for either Training or Education at a value of 4.

## C5 TRAINING

Tra	Equivalent
0	Genetic Faults
1	Untrainable
2	Very Slow
3	Slow
4	Slow
5	Below Average
6	Below Average
7	Average
8	Average
9	Average
A	Above Average
B	Above Average
C	Resourceful
D	Very Resourceful
E	Adept
F	Very Adept

**Training** is practice-based ability to use knowledge..

## C5 INSTINCT

Ins	Equivalent
0	Genetic Faults
1	Incapable
2	Very Slow
3	Slow
4	Slow
5	Below Average
6	Below Average
7	Average
8	Average
9	Average
A	Above Average
B	Above Average
C	Resourceful
D	Very Resourceful
E	Adept
F	Very Adept

**Instinct** is the genetic ability to acquire and use knowledge.

A character with Ins, confronted with a task requiring Edu or Tra reacts Instinctually.

**Check Ins.** Success also completes the task before anyone else.

## C6 SOCIAL

Soc	Equivalent
0	Social Outcaste
1	Social Misfit
2	Dregs of Society
3	Lower Low Class
4	Middle Low Class
5	Upper Low Class
6	Low Middle Class
7	Middle Class
8	Upper Middle
9	Low Upper Class
A	Middle Upper
B	Upper Upper
C	Remarkable
D	Extraordinary
E	Extreme
F	Supreme

**Social Standing** is social class or level for the character..

## C6 CASTE

Cas	Equivalent
0	Uncasted
1	Outcaste
2+	(various values)

**Caste** is a genetically determined position within a species structure or hierarchy.

Caste varies with each sophont species which has Caste.

A sophont with Caste is generally oblivious to Social hierarchy outside of Caste.

## C6 SUPPORT

C6 establishes individual cost for basic living. Typical cost of monthly support (food, clothes, lodging, basic entertainment) =

Soc x Cr100  
Cha x Cr100  
Cas x Cr 50

## C6 CHARISMA

Cha	Equivalent
0	Abject Follower
1	Slavish Follower
2	Sycophant
3	Submissive
4	Shy Follower
5	Loyal Follower
6	Follower
7	Typical Member
8	Emergent Leader
9	Social Leader
A	Group Leader
B	Leader
C	Strong Leader
D	VStrong Leader
E	Impressive
F	Compelling

**Charisma** is position within a small group hierarchy.

### Lead or Follow

A low Cha individual defers to and follows leadership of a high Cha individual.

**Conflict.** A character with lower Charisma may challenge a character with higher Charisma.

## C6 NOBILITY

Soc	Equivalent
A	Gentleman
B	Knight
c	Baronet
C	Baron
D	Marquis
e	Viscount
E	Count
f	Duke
F	Duke
G	Archduke
G	Prince
H	Emperor

**Nobility** is the expected or equivalent (not necessarily actual) noble rank based on Social Standing.





Character Generation

# A Characteristics

Character Generation

# B Birthworld and Homeworld

**Start by rolling up a Character**

Assume the character is Human with standard characteristics generated by 2D each. For now, ignore genetics.

Str	Dex	End	Int	Edu	Soc	Psi	San

Roll two dice six times and record the results in the order they are rolled: **Strength**, **Dexterity**, **Endurance**, **Intelligence**, **Education**, and **Social Standing**. Defer rolling for **Psi** and **Sanity** until later; knowing these values are not necessary at this point.

**Homeworld.** Select or determine a Homeworld.

**SELECT A HOMEWORLD (SPINWARD MARCHES)**

D1D2	Code	WorldName	Hex+Sector	UWP	Trade Class
1 1	A	Alell	1706 Spin	B56789C-A	Ph Pa Ri
1 2	B	Boughene	1904 Spin	A8B3531-D	FI Ni
1 3	C	Capital	2118 Core	A586A98-F	Hi Cx
1 4	D	Dorannia	0530 Spin	E42158A-8	He Ni Po
1 5	E	Efate	1705 Spin	A646930-D	Hi In
1 6	F	Feri	2005 Spin	B584879-B	Ph Pa Ri
2 1	G	Magash	0316 Dene	A400976-F	Va Hi Na In Cp
2 2	H	Hefry	1909 Spin	C200423-7	Va Ni
2 3	J	Jenghe	1810 Spin	C799663-9	Ni
2 4	K	Earth	1827 Solo	A867A69-F	Ga Hi
2 5	L	Lakou	0638 Spin	E779454-7	Ni Da
2 6	M	Macene Belt	2612 Spin	B000453-E	As Ni
3 1	N	Knorbes	1807 Spin	E888787-2	Ag Ri An
3 2	P	Preslin	0633 Dene	B430679-C	De Ni Na Po
3 3	Q	Yori	2110 Spin	C560757-A	De Ri
3 4	R	Regina	1910 Spin	A788899-C	Ph Pa Ri
3 5	R	Regina	1910 Spin	A788899-C	Ph Pa Ri
3 6	R	Regina	1910 Spin	A788899-C	Ph Pa Ri
4 1	S	Ruie	1809 Spin	C776977-7	Hi In
4 2	T	Tremous Dex	1311 Spin	B511411-C	Ic Ni
4 3	U	Uakye	1805 Spin	B439598-D	Ni
4 4	V	Vland	1717 Vlan	A967A9A-F	Hi Cs
4 5	W	Wroclaw	0226 Dene	C5667BF-7	Ag Ri
4 6	X	Menorb	1803 Spin	C652998-7	Hi Po
5 1	Y	Yorbund	2303 Spin	C7C6503-9	FI Ni
5 2	Z	Traltha	2834 Spin	B590630-6	De He Ni An
5 3	1	Dentus	2201 Spin	C979500-A	Ni
5 4	2	Vanzeti	0218 Dene	C52A531-C	Wa Ni
5 5	3	Syr Darya	1810 Dene	E55769C-5	Ni Ag
5 6	4	Aramis	3110 Spin	A5A0556-B	He Ni Cp
6 1	5	Rhylanor	2716 Spin	A434934-F	Hi Cp
6 2	6	Rashev	3230 Fore	C8697C4-6	Ri
6 3	7	Ara Pacis	0419 Dene	A437678-B	Ni
6 4	8	Roup	2007 Spin	C77A9A9-7	Wa Hi In
6 5	9	Pax Rulin	2204 Troj	A402231-E	Ic Va Lo Cp
6 6	0	Space	Born In Deep Space		Ds

**HOMEWORLD AND BIRTHWORLD SKILLS**

TC	Trade Classification	Skill
Ab	Data Repository	(no skill)
Ag	Agricultural	Animals
An	Ancient Site	(no skill)
As	Asteroid	Zero-G
Ba	Barren	(no skill)
Co	Cold	Hostile Env
Cp	Subsector Capital	Admin
Cs	Sector Capital	Bureaucrat
Cx	Capital	Language
Da	Dangerous	Fighter
De	Desert	Survival
Di	Die Back	(no skill)
Ds	Deep Space	Vacc Suit +Zero-G
Fa	Farming	Animals
Fi	Fluid	Hostile Env
Fo	Forbidden	(no skill)
Fr	Frozen	Hostile Env
Ga	Garden World	Trader
He	Hellworld	Hostile Env
Hi	High Population	Streetwise
Ho	Hot	Hostile Env
Ic	Ice-Capped	Vacc Suit
In	Industrial	One Trade
Lk	Locked	(no skill)
Lo	Low Population	Flyer
Mi	Mining	Survey
Mr	Military Rule	(no skill)
Na	Non-agricultural	Survey
Ni	Non-industrial	Driver
Oc	Ocean World	Hi-G
Pa	Pre-Agricultural	Trader
Ph	Pre-High Population	(no skill)
Pi	Pre-Industrial	JOT
Po	Poor	Steward
Pr	Pre-Rich	Craftsman
Px	Prison Exile Camp	(no skill)
Pz	Puzzling	(no skill)
Re	Reserve	(no skill)
Ri	Rich	One Art
Tr	Tropic	Survival
Tu	Tundra	Survival
Tz	Twilight Zone	Driver
Va	Vacuum	Vacc Suit
Wa	Water World	Seafarer

**The Arts (Choose One):** Actor, Artist, Author, Chef, Dancer, Musician.

**The Trades (Choose One):** Biologics, Craftsman, Electronics, Fluidics, Gravitics, Magnetics, Mechanic, Photonics, Polymers, Programmer.

Not all TCs shown here are available on the list to the left.

# Characters and Careers

Characters are the central focus of **Traveller**: they are the alter-egos of the players, and all activity is centered on them.

Characters are people: they may be humans, they may be non-human sophonts, or even artificials, robots, or androids. They have quantified abilities which define the range of their possible activities. The *character* is the **Traveller** personality; the *player* is the person engaged in playing the game. **Traveller** presents a vast, diverse, but human-dominated interstellar universe. This chapter addresses character generation with a focus on human character generation. Character generation also applies more-or-less equally to non-humans, including intelligent alien races (sophonts), artificial beings (androids and sophontoids), and robots.

## THE PROCESS

Characters are generated through die rolls that:

Create **Characteristics** as personal physical, mental, and social values that define the individual basic ability to function.

Select **Skills, Knowledges, and Talents** as abilities which enable a character to deal with the universe. Knowledges and Talents are specialized variations of Skills.

Determine **Experience** as the history of the character's life before beginning the game. **Traveller** creates an extensive character prior history detailing a homeworld and chronicling education, one or more careers, and perhaps an avocation.

Record information about a character in detail on the Character Card, and in brief summary in the UPP.

**The Character Card CC** is a blank fillform intended as a ready-reference with extensive information about the character. Throughout the game, the information on the CC is available to the player and the referee.

**The Universal Personality Profile UPP** is a shorthand description of the character's characteristics.

**Terms.** A **Term** is a standard period of four years. The character generation process is divided into 4-year Terms. **Traveller** uses the standard 4-year Term without regard to variation among cultures or societies, or to different world year lengths.

**The Character May Be Non-Human.** This text primarily applies to Humans and most characters will be Human. On the other hand, Character Generation can also be applied to non-Human sophonts.

## A PERSONAL CHARACTERISTICS

A character has six stated personal characteristics reflecting physical, mental, and social abilities.

**The Human Characteristics.** The human Characteristics are Strength, Dexterity, Endurance, Intelligence, Education, and Social Standing. Abbreviate the names with the first three letters of the name (Str, Dex, End, Int, Edu, Soc).

**The Additional Characteristics.** A character also has characteristics labelled Sanity (San) and Psionics (Psi) which are created only as needed.

**Characteristic Code.** The characteristics are also numbered by their position in the UPP and prefixed by C (for Characteristic). The first digit in the UPP is C1 (= Strength), the second digit is C2, the third is C3.

**The UPP Universal Personality Profile.** The six characteristics are recorded in the six-digit string called the Universal Personality Profile; a ready reference for the abilities of the character.

Roll 2D for each characteristic (ignore for the moment that some non-Humans use other die rolls) and record the result in eHex as a UPP.

---

## The 5 Steps of Character Generation

Create a character in the following sequence.

**A. Characteristics.** Generate the six personal characteristics. Defer creating the two additional characteristics.

**B. Homeworld.** Determine the homeworld for the character. For some this is their birthworld; for others this is the world in which they spent their childhood.

**C. Education and Training.** Consider acquiring an advanced education or additional training.

**D. Career.** Select a career and attempt to begin it. If successful, resolve the career; if unsuccessful, attempt a different career. Careers are resolved in terms of four years. Within each term, the character confronts (through die rolls) survival, advancement, and retention; the character receives some number of skills along the way.

Aging may become a consideration.

**E. Muster Out.** Ultimately, the career ends, and the character receives benefits in the form of mementos and savings. It is at this point that the character begins actually adventuring in **Traveller**.

---

## ROLLING THE UPP

Roll	Char	Die	Rolls	Str	Dex	End	Int	Edu	Soc
2D	Strength	4	5 =	9					
2D	Dexterity	5	5 =		10				
2D	Endurance	5	6 =			11			
2D	Intelligence	3	2 =				5		
2D	Education	2	4 =					6	
2D	Social	5	5 =						10
Characteristics =				9	10	11	5	6	10
UPP in Ehex =				9	A	B	5	6	A

For example, player Mitch is creating a new character Eneri Dinsha. The final characteristics are 9-10-11-5-6-10. Mitch translates these values to eHex and produces the UPP = 9AB56A.

**Genetics.** The first die roll for (some) characteristics is **genetic**. It has meaning as the genetic heritage for the individual. Retention of this information is optional but may be of importance later. If this information is not recorded during character generation, it can be recovered with genetic testing (detailed in the **Genetics** chapter).

### Completing The Character Card- The Characteristics

If recording Genetics, note the first die roll for each characteristic as the DNA. Edu and Soc are not genetic and remain blank.

Record the full die rolls under Characteristics and for reference as the UPP.

Record the Organic (or original) Int and Edu.

## B BIRTHWORLDS AND HOMEWORLDS

The world on which a character is born is his **birthworld**. The world on which the character was raised is his **homeworld**. Birthworld and homeworld may be the same or they may be different.

**Homeworld Skills.** World descriptions include Trade Classifications and Remarks (TC&R). A character receives one specified skill for each Trade Classification or Remark from the homeworld.

For example, a character from an Ag Agricultural world automatically receives Animals-1.

## THE UPP UNIVERSAL PERSONALITY PROFILE

The Standard Characteristics (Human)	C1	C2	C3	C4	C5	C6
Strength	<b>9</b>	<b>A</b>	<b>B</b>	<b>5</b>	<b>6</b>	<b>A</b>
Agility or Grace						
Dexterity						
Vigor or Stamina						
Intelligence						
Education						
Training or Instinct						
Caste or Charisma						
Social Standing						
The Analog Characteristics (Non-Human)						
Str						
Dex						
Ag						
Gra						
End						
Vig						
Sta						
Int						
Edu						
Tra						
Ins						
Soc						
Cha						
Cas						

The player inspects the character's birthworld and determines the available birthworld skills. If the player is dissatisfied with the available skills, he may decide the character changed worlds as a child. A new world is determined to be the homeworld, and the available skills dictated by the homeworld are taken instead.

**Birthworlds (or Homeworlds)** are determined by selection, assignment, or random rolls on a list of worlds.

**Other Details.** Homeworld and birthworld information implies other details (the system's star; details of local native life, local climate, preferred atmosphere) which can be created by other procedures in **Traveller**.

**Hidden Pasts.** Some characters want to hide (or perhaps don't know) their pasts. It is common for such a person to claim to be from Erehwemos or Lacipynt and reasonable people understand not to inquire further.

Erehwemos D876543-2 Ag Ni G0 V  
Lacipynt C345678-9 Ag Ni G0 V

**Born At The Starport.** A character born on a world with Trade Classification = Ba Barren or = Di Dieback was born at the local starport.

**Born In Deep Space.** A very few characters are born offworld (roll 2 on 2D). Such a character naturally learns the skills Zero-G and Vacc Suit.

**Neighboring Worlds.** Characters adventuring together probably come from nearby worlds in a stellar region. The **Spinward Marches Homeworld** chart uses the Marches as focus. Referees may produce similar tables suited for their own campaigns.

### Date of Birth

The Referee provides the current date of the beginning of adventuring. The default date (if this information is not otherwise provided) is 001-1105 – the first day of the 1105th year of the Imperial calendar counting from the establishment of the Third Imperium. The general time period is "The Golden Age," the height of the empire's power and influence.

At the end of character generation, subtract the character's age at muster out from 1105 to determine his birth year, and randomly determine the specific birth day from the Imperial Calendar.

Until Character Generation is complete, Birthdate calculation may be deferred.

### Completing The Character Card- Homeworld

Record the Birthworld (and, if different, Homeworld).  
Record the Birthworld and Homeworld Skills.  
Record the Character's Birthdate.

### A Character Thus Far:

Eneri Dinsha 9AB56A. Genetic 4553XX  
from: Regina (1910 Spinward Marches)  
Trader-1 (from Pa)  
Chef-1 (from Ri, selected Chef)  
Age 18. Born 069-1087 (=1105-18, or may be deferred)  
Current Date: 001-1105



## C PRE-CAREER EDUCATION (AND TRAINING)

Characters may improve their initial Edu or Tra.

**Education.** Human characters (and Sophonts with Edu) can pursue traditional Education involving attendance at a school, academy, college, or university. A character may attend one or more schools which may provide additions to Education and new levels of skills.

**Training.** Sophonts with Tra are at a disadvantage in Education (since they use Tra/2 for Edu). They benefit from Training and courses which depend on Tra.

Training involves enrolling in a training process: apprenticeship, mentoring, or a training course. A character may attend one or more such processes, which may provide additions to Training and increases in skills.

On the other hand, it is possible for Humans to pursue Training Courses using Edu/2 in lieu of Training.

**Instinct.** Sophonts with Ins are generally excluded from the Education (or Training) process.

**Later Education or Training.** Characters may suspend career resolution to return to school or training. At the beginning of any term, the character may apply for any Educational Institution or Training, and if accepted substitutes that process for the entire term. Some schools are attended during career resolution (assigned as part of career resolution).

### Educational Waivers

A student attending an Education Institution and who receives an adverse die roll or decision (Prerequisite, Application Check, Pass/Fail Check, Honors) may try for a Waiver. To receive a Waiver, Check Soc or less (2D); Mod minus number of previous waivers rolled (successful or not). Waivers are unique to Education and apply only to Schools and Education (and to the Scholar career, but not other careers).

### The Educational Process

Education is a multi-step process.

If **Pre-Requisites** are met, the character **Applies for Admission**. If successful, the character rolls for **Pass/Fail** for each year of the process. Pass awards one of the available skills; Failure terminates the process (but Waiver may result in reinstatement, although no skill is received). Finally, a character who **Graduates** (who Passes or who has Failure Waived) receives Graduation benefits.

**Major and Minor.** The character attending an Educational Institution must select a Major and a Minor from the appropriate Skill and Knowledge list. A character may select any Major and Minor (but they may not be the same) and

change them each time a new Educational Institution is attended. A character's current Major and Minor are the most recent ones selected.

**Language as a Major or Minor.** When a specific Language is specified as a Major or Minor, it is acquired at double rate and is not restricted by the character's Native language level.

Anglic-speaking Human Saga Emm 656778 Anglic-7 attends college and declare as his Major the common Vargh language Gvegh. He successfully passes four years of college, and receives four levels of his Major. Because Language is acquired at double rate through Education, he now has Gvegh-8.

**Pre-Requisites** are minimums: a value or greater is acceptable.

**Admission.** To Apply (for Admission), a character must Check one of the stated Characteristics. If the roll fails, this institution may not be attended. A failed application consumes one year.

**Pass/Fail.** A character must Pass the required number of times (typically once for each year of attendance). Check the stated Characteristic the stated number of times. Each Success is one year; success in all rolls awards Graduation. Failure ends attendance (subject to Waiver).

**Provides.** Success on the Pass/Fail Check provides the indicated skill or knowledge.

**Duration** is years required for the process.

**How Many Rolls?** shows the number of Pass/Fail Checks for the institution.

**Graduation.** An individual who has passed all years Graduates and receives the Graduation benefits.

EDUCATIONAL INSTITUTIONS	TRAINING INSTITUTIONS
ED5 Trade Schools College or University or Academy Masters Program Professors Program Law School Medical School OTC and NOTC	Apprenticeship Mentoring Training Course

### SUITABLE FOR EITHER EDUCATION OR TRAINING

ANM School  
Flight School  
Command College



# Character Generation

# C Education

This is an overview of the Education process.

(If Edu is already at this level, award Edu+1)

	EDUCATION FOR CHARACTERS	Pre Requisites	To Apply Check	Duration	Pass/	How	Provides:	Graduation	College Academy Academy
					Fail	Many			
Basic	ED5	Edu 4 -	auto	no time	Int	1x		Edu-5	
	Trade School	Edu 5+	Int	1 year	Int or Edu	1x	Major+2		
	Apprenticeship	none	auto*	no time	Tra	1x	Skill+4 or Knowledge+4		
	Mentor	C5= Tra	Int	1 year	Int or Tra	1x	Tra+2		
	Training Course	Tra 5+	Int	1 year	Tra	1x	Skill-2 or Knowledge-2 from School=S		
Higher Education	College	Edu 5+	Int or Edu	4 years	Int or Edu	4x		Edu=8 BA	C
	University	Edu 7+	Int or Edu	4 years	Int or Edu	4x		Edu=9 BA	C
	Service Academy	Edu 6+	Int or Edu	4 years	Int or Edu	4x	Major+1 per Pass and Minor+1 per 2 Passes	C5=8 BA Officer1	M N
	Masters	BA	Int or Edu	2 years	Int or Edu	2x		Edu=9 MA	C
	Professors	MA	Int or Edu	2 years	Int or Edu	2x		Edu=12 Professor	C
	Medical School	Honors BA	Int or Edu	4 years	Int or Edu	4x	Medic-4	Edu=10 Doctor	M
	Law School	Honors BA	Int or Edu	2 years	Int or Edu	2x	Advocate-2	Edu=10 Attorney	L
	Honors	none	auto	simul	Int or Edu	1x	Major+1	Honors Degree	
Military	ANM School	assigned	auto	1 year	C2 or C3	1x	Knowledge-2 from School=ANM		
	OTC	volunteer	auto	simul	Int or Edu	1x	Soldier Skill-1	Army Officer1	
	NOTC	volunteer	auto	simul	Int or Edu	1x	Ship Skill-1	Navy Officer1	
	Flight School	Honors BA	auto	1 year	C2	1x	Pilot-3	Flight Branch	
	Command College	assigned	Int or Edu	1 year	Int or C5	1x	2x Skill-1		

## AVAILABLE SKILLS

	College Academy Academy School					College Academy Academy School					College School School School School					College School School School School								
	C	A	N	S		C	A	N	S		C	S	S	S		S	C	S	S	S	S			
Admin				S	Ship Skills	Astrogator	C	N			Driver	ACV		A			S	Flyer	Aeronautics	C	A	N		S
Advocate	L					Engineer						Automotive	C	A			S		Flapper		A			S
Animals						Gunner		N				Grav		A	N	M	S		Grav		A	N	M	S
Athlete	C					Medic	M	N	M	S		Legged		A			S		LTA		A			S
Broker	C	C				Pilot						Mole		A			S		Rotor		A			S
Bureaucrat	C				Sensors		N		S	Tracked		A		M	S	Winged		A	N		S			
Comms				S	Steward		N		S	Wheeled		A	N	M	S									
Computer				S	Soldier Skills	Fighter			M		Fighter	Battle Dress		A	N	M		Gunner	Bay Wpns			N		
Counsellor	C					Fwd Obs			M	S		Beams		A		M			Ortillery			N		
Designer	C					Hvy Wpns			M			Blades		A		M	S		Screens		A	N		
Diplomat	L					Navigation			M	S		Exotics		A		M			Spines			N		
Driver						Recon			M	S		Slug Throw		A	N	M	S		Turrets			N	M	
Explosives				S	Sapper			M	S	Sprays		A		M		Pilot	Small Craft		A		M	S		
Fleet Tactics		N			The Arts	Actor	C			S	Unarmed		A		M		S	Pilot-ACS			N			
Flyer						Artist	C			S	Engineer	J-Drives			N			S	Pilot-BCS			N		
Forensics	M					Author	C			S		Life Support		A	N		S							
Gambler				S		Chef	C			S		M-Drive			N		S	Animals	Rider		A			S
High-G				S		Dancer	C			S		P-Systems		A	N	M	S		Teamster		A			S
Hostile Env				S	Musician	C			S								Trainer			A	N	M	S	
JOT					The Trades	Biologics	C			S	Sciences	Archeology	C					Seafarer	Aquanautics	C				S
Language	C	N	M	S		Craftsman	C			S		Biology	C						Grav		A	N	M	S
Leader		N	M			Electronics	C			S		Chemistry	C						Boat				M	S
Liaison		N	M			Fluidics	C			S		History	C						Ship				M	S
Naval Arch		N				Gravitics	C			S		Linguistics	C				S		Sub				M	S
Seafarer					Magnetics	C			S	Philosophy	C					Hvy Wpns	Artillery		A		M			
Stealth					Mechanic	C			S	Physics	C						Launcher		A		M			
Strategy		N	M		Photonics	C			S	Planetology	C						Ordnance		A		M			
Streetwise					Polymers	C			S	Psioniology	C						WMD		A	N	M			
Survey				S	Program	C			S	Psychology	C													
Survival				S	Bold= Knowledge-Only skill.						Robotics	C	A	N	M	S								
Tactics		N	M	S							Sophontology	C												
Teacher	C																							
Trader				S																				
Vacc Suit				S																				
Zero-G				S																				

**The Available Educational Institutions**

Education takes six basic forms:

**ED5** is a program to raise low Edu to a minimally acceptable level. Because Edu-5 is the minimum prerequisite for Trade Schools; a character with Edu less than 5 needs to take ED5 to raise his Edu to this minimally acceptable level.

A character with Edu less than 5 can attempt the ED5 program at the start the Education process. Check Int: if successful, Edu is raised to 5. The process can be attempted once. It takes no time. Failure has no other effect.

**Trade Schools** provide vocational education in specific (generally non-academic) skills. Similar schools are available in military service (the ANM Schools and Flight School).

**College** provides a basic college education, resulting in an increase in Edu and in increased levels of his Major and Minor. **University** provides the same benefits as College but is more prestigious; it can also provide a Masters Program leading to a Masters Degree and a Professors Program leading to a professorship. A character attending College or University may also volunteer to participate in **OTC** (Officer Training Corps) or **NOTC** (Naval Officer Training Corps). Often associated with a University are a **Medical School** (to educate medical doctors) and a **Law School** (to educate lawyers and advocates).

A **University Masters Program** requires a Bachelors. A **Professors Program** requires a Masters. **Medical School** or **Law School** requires an Honors Bachelors (all of these requirements can be waived).

**OTC Officer Training Corps** and **NOTC Naval Officer Training Corps** are College or University based courses that produce officers for the armed forces. Success confers a Commission (OTC= Army Officer1; NOTC= Navy Officer1 or Marine Officer1). The character is required to serve one term in the service. At the end of that term, the character may try to continue, or may attempt any other career available. He is in the Reserves.

College or University Honors Graduates who participat-

**SKILLS AND KNOWLEDGES IN EDUCATION**

College	<b>C</b> College or University including Masters and Professors programs.
	<b>L</b> Law School
	<b>M</b> Medical School
Academy	<b>A</b> Military Academy and Military Command College
	<b>N</b> Naval Academy and Naval Command College
School	<b>A</b> Army School
	<b>N</b> Naval School
	<b>M</b> Marine School
	<b>S</b> School including Apprentice, Training Course, and Trade School.

**Young Eneri Dinsha Goes Off To College**

Human character Eneri Dinsha 9AB56A can improve his Education before he starts a career.

He decides on College of Regina because he meets the prerequisite of Edu-5+. He applies by Check Edu (roll 6 or less; he rolls 11) and is rejected. He applies for Waiver (Check Soc; roll 10 or less: he rolls 9) and is admitted.

He will Check Int or Edu (selecting Edu because it is greater) four times during his college career.

**Freshman Year:** Check Edu (roll 6 or less; he rolls 2) and passes.

**College** **Sophomore Year:** Check Edu (roll 6 or less; he rolls 9) and fails. He applies for Waiver (Check Soc; roll 10 or less, Mod-1 for the previous attempt: he rolls 8) and can continue.

**Junior Year:** Check Edu (roll 6 or less; he rolls 8) and fails. He applies for Waiver (Check Soc; roll 10 or less, Mod-2 for the two previous attempts: he rolls 6) and can continue.

**Senior Year:** Check Edu (roll 6 or less; he rolls 11) and fails. He applies for Waiver (Check Soc; roll 10 or less, Mod-3 for the previous attempts: he rolls 5) and yet again can continue.

He selects his Major and Minor from any skill or knowledge marked C in the College column. He selects Psychology as a Major and (based on passing four years of College) receives Psychology-4. He selects Robotics as a Minor and receives Robotics-2.

Eneri volunteers for NOTC and is automatically accepted. Check Edu (roll 6 or less; he rolls 6) and succeeds. He may select a skill labelled Ship Skills. He chooses Pilot.

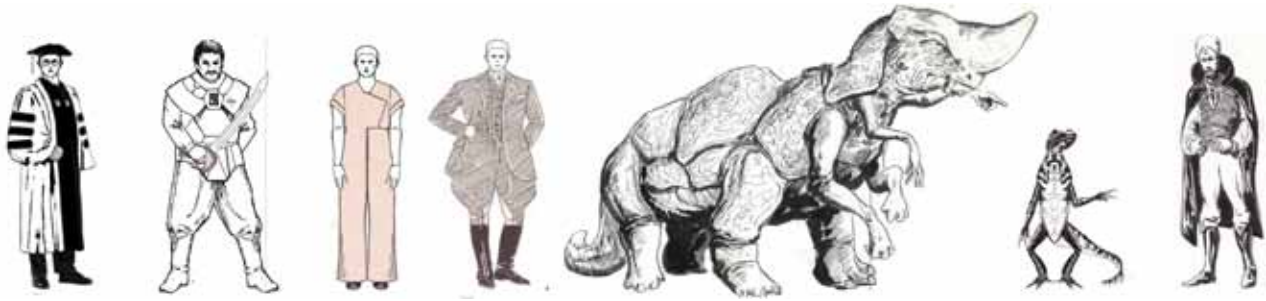
**NOTC** He inquires about Flight School but they tell him he needs an Honors BA. Eneri applies for the Honors program. Check Edu (roll 6 or less; he rolls 9) and fails. He applies for Waiver (Check Soc; roll 10 or less, Mod -4 for the previous attempts: he rolls 11) and is firmly rejected.

With four years of College completed, he graduates with a BA and Edu increased to Edu-8. He is now 9AB58A. He is commissioned O1 Ensign in the Navy. He receives the Automatic Officer Skill Astrogation.

**Flight** He applies for a Waiver of the Honors BA Prerequisite for Flight School (Check Soc; roll 10 or less, Mod-5 for the previous attempts: he rolls 5) and is accepted. He then must Check C2 (roll 10 or less; he rolls 8) and succeeds. He receives Pilot+3.

Eneri Dinsha 9AB58A. Genetic 4553XX from: Regina (1910 Spinward Marches) Trader-1, Chef-1. Psychology-4, Robotics-2, Astrogation-1, Pilot-4. Imperial Navy Ensign O1. Age 23. Born 069-1082 (or deferred)

Current Date: 001-1105 (if CharGen ends now).



ed in OTC or NOTC may attend Flight School.

**Service Academies** (Military Academy and Naval Academy) are Colleges for the armed forces: in addition to a degree, they provide graduates an Army or Navy Commission (a Naval Academy graduate may choose a Marine Commission instead). The character is required to serve one term in the service. At the end of that term, the character may try to continue, or may attempt any other career available (he is in the Reserves).

**Flight School** is an intensive training program to create pilots for naval or military service. The character attends Flight School in the first year of his first term in the Navy, Army, or Marines. Service Academy Honors Graduates may attend Flight School.

**Command College** is a special Military School for higher ranking officers. A Character must attend Command College in the first year of the term after he is promoted to Officer4, provided he successfully Continues. A character who fails Command College may not Continue in the service.

**C5 Education As A Characteristic** reflects the individual's ability in an Educational setting, even if the person does not have the formal documentation that some education provides. For example, a character with Edu=9 can function at the equivalent of a Masters in Educational situations even if he does not have the formal diploma.

### Specific Educational Institutions

Characters who attend schools, colleges, and universities can determine the specific name of the school attended from the Educational Institution Chart.

The information adds to the character's background; there may come a time when a character will meet someone who also attended that school.

**School Rank.** The chart allows determination of the relative rank of schools when compared with others.

### The Training Process

Training takes three forms: Apprenticeship, Mentoring, and Training Courses.

**Apprenticeships.** Apprenticeship takes place before character generation begins (as a retroactive process, before Life Stage 3). The character becomes an Apprentice attached to or assigned to a Trainer.

The Apprentice selects a single Skill or Knowledge identified with an S in the School column; Check Tra once; Success awards Skill-4 or Knowledge-4. The character begins Life Stage-3 with the apprenticed Skill or Knowledge.

### Young Barr Vech Receives Training

Non-human Barr Vech (SDEITS 777777) is native to Syr Darya in Deneb sector. His homeworld imparts to him Animals-1 and Driver-1.

At age 14 decides to apprentice himself to vehicle repair technician. His application (and acceptance) are automatic. His master trains him over the next four years (roll Tra for Pass/Fail = 7 or less; Barr rolls 7 and succeeds) in Vehicle Repair (specifically Automotive); receives Automotive-4 when he begins career resolution at the start of Life Stage-3 (at age 18).

His master imparts to him many times during the apprenticeship some sage advice: "Training is the Key to a Happy Future!" and young Barr takes it to heart. He now asks his master to be his Mentor.

Check Int (roll 7 or less; he rolls 6) and his master assents. The Mentor process itself consists of many discussions accompanied by a variety of tasks for Barr. Check Tra (roll 7 or less; he rolls 3) and after a year, his Mentor agrees that Barr has made substantial progress.

Barr has progressed to 777797. A year has passed (age=19).

Young Barr pursues several Training Courses. He may attempt any skill or knowledge marked S in the School column.

He enrolls in Wheeled. Check Int to enroll (roll 7 or less, he rolls 3). Then Check Tra (roll 9 or less; he rolls 8) and receives Wheeled-2. A year passes (age=20).

He enrolls in Tracked. Check Int to enroll (roll 7 or less, he rolls 6). Then Check Tra (roll 9 or less, Mod -1 for one previous course; he rolls 8) and receives Tracked-2. A year passes (age=21).

He enrolls in Legged. Check Int to enroll (roll 7 or less, he rolls 5). Then Check Tra (roll 9 or less, Mod -2 for two previous courses; he rolls 8) and fails. A year passes (age=22).

The failure affects him and he decides that this period of his life devoted to training is now at an end.

Barr Vech SDEITS 777797. Genetic 5435XX.  
 from: Syr Darya (1810 Deneb)  
 Driver-1, Animal-1.  
 Automotive-4, Wheeled-2, Tracked-2.  
 Age 22. Born 101-1083.  
 Current Date: 001-1105



## THE KNOWLEDGES-ONLY SKILLS

Some skills (Animals, Driver, Engineer, Fighter, Flyer, Gunner, Heavy Weapons, Pilot, Seafarer) include within them several Knowledges. Education or Training can only impart the Knowledges; the Skills themselves are not obtainable in Education or Training.

Animals	Engineer	Heavy Weapons
Rider	Jump Drives	Artillery
Teamster	Life Support	Launcher
Trainer	Maneuver Drive	Ordnance
	Power Systems	WMD

Driver	Fighter	Pilot
ACV	Battle Dress	Small Craft
Automotive	Beams	Spacecraft ACS
Grav	Blades	Spacecraft BCS
Legged	Exotics	
Mole	Slug Throwers	Musician
Tracked	Sprays	Instrument
Wheeled	Unarmed	Other Instrument

Gunner	Flyer	Seafarer
Bay Weapons	Aeronautics	Aquanautics
Ortillery	Flapper	Grav
Screens	Grav	Boat
Spines	LTA	Ship
Turrets	Rotor	Sub
	Winged	

For example, young Kyle Martin (a Human boy 777777) is apprenticed to a vehicle repair technician. His application (and acceptance) is automatic. His master attempts to train him over the next four years (roll Tra for Pass/Fail = Edu/2 = 4 or less; Kyle rolls 7 and fails); Martin is inattentive and ends his Apprenticeship without learning anything. He attributes his later successes to this early failure experience.

**Mentoring.** A sophont who wants (or needs) to increase his C5 Training can attach himself to a Mentor. The process takes two years and increases Tra +2.

**Training Course.** Sophonts with C5=Tra often use Training Courses instead of Colleges and Universities. A focused training course provides intensive hands-on experience in one specific skill or knowledge.

On worlds or in cultures where Training is the predominant characteristic, the need is met through training Institutions (similar to colleges or universities but using different methods adapted to the analog characteristic Training).

On worlds with diverse populations, the Training function is provided within Educational Institutions, which are providers of apprenticeships, mentoring, and training courses.

Each Training Course requires Check Int to enroll, followed by a Pass/Fail Check Tra. A continual series of Training courses imposes its own burden: the Pass/Fail Check Tra is subject to Mod minus the number of Training Courses taken. Failure prohibits additional Training Courses.

Successfully passing a Training Course awards Skill-2 or Knowledge-2.

## D SELECTING AND RESOLVING A CAREER

In the career, a character acquires experience (as Skills and Knowledges against a background of exploits) before beginning adventures in earnest. A character selects one of the available careers (the choice being influenced by the characteristics and current experience). Ultimately a decision based on the player's goals and preferences.

Careers are numbered 1 through 13 to allow random selection (using 2D) of a career; under this system, Craftsman (1) and Functionary (13) are unavailable as initial careers.

The Prior Career provides three important elements:

1. A variety of Skills and Knowledges
2. Some amount of money and equipment.
3. A background of experience.

With these elements in hand, the character is then prepared to adventure in the universe of the far future.

## THE PROCESS

Career Resolution is a multi-step process resolved in Terms of four years each. The process carries the player through the stages of the career: Beginning, Risk and Reward, Rank, and Continue. At each stage, the player rolls for success or failure and notes the resulting consequences.

The process uses a Target Number against which the player rolls 2D: a result equal or less than the Target is successful. Greater than the Target is failure. Some Targets allow Mods (a Mod increases the Target and increases the chance of success). If the requirement is met, the Mod may be used. For example, Mod +2 if Int 6+. If the character is Int 6 or greater, the Target is increased +2.

One cycle of Career Resolution is a 4-year Term.

**Target Numbers.** Target Numbers may be a number (for example, 10, or 5) or Characteristics (named, or as a Position Code); in some cases, the Target is labelled Automatic and does not require a die roll. Position codes allow non-human characters to participate in Career Resolution.

For example, a Characteristic may be identified as Dex: a character with Dexterity must roll Dexterity or less to succeed. A character with Agility must roll half-Agility or less; a Character with Grace must roll half-Grace or less.

The Characteristic may be identified as Position Code

## THE CAREERS

2D	Description	Initial Rank	Officer Rank	Status
1	Craftsman	no rank		
2	Scholar	varies		
3	Entertainer	no rank		
4	Citizen	no rank		
5	Scout	no rank		
6	Merchant	Spacehand0	Merchant1	
7	Spacer	Spacer1	Officer1	Armed Force
8	Soldier	Soldier1	Officer1	Armed Force
9	Agent	no rank		
10	Rogue	no rank		
11	Noble	varies		
12	Marine	Marine1	Officer1	Armed Force
13	Functionary	Functionary0		





# Character Generation

# D Careers

This is an overview of the Career Resolution process.

RISK		Risk Roll	less than or equal to	Controlling Characteristic	Bravery, Caution, or No Mod	AF Branch	Noble Intrigues	Rogue: Terms	AF Operations	Noble Exiles	
1	Craftsman										No Risk Roll
2	Scholar				-Mod						
3	Entertainer										Uses Different System (below)
4	Citizen										No Risk Roll
5	Scout				-Mod						If Risk Roll Fails Injury=
6	Merchant	2D	<	CC	-Mod						Risk Roll - CC +Mods
7	Spacer				-Mod	-Mod			-Mod		
8	Soldier				-Mod	-Mod			-Mod		
9	Agent				-Mod						If Army, Navy, Marines call the Injury a Wound.
10	Rogue				-Mod	-Mod					Prison instead of Injury
11	Noble				-Mod						
12	Marine				-Mod	-Mod			-Mod		
13	Functionary										No Mods

REWARD		Reward Roll	less than or equal to	Controlling Characteristic	Bravery, Caution, or No Mod	AF Branch	Noble Intrigues	Rogue: Terms	AF Operations	Noble Exiles	
1	Craftsman	9D	<	CC	+Mod						Reward Mods use opposite sign from Risk Mods
2	Scholar				+Mod						+Craftsman Skill. +Up to 5 Skill-6
3	Entertainer										Uses Different System (below)
4	Citizen										No Mods
5	Scout				+Mod						
6	Merchant				+Mod						
7	Spacer	2D	<	CC	+Mod	+Mod			+Mod		Medal= Reward Roll
8	Soldier				+Mod	+Mod			+Mod		Medal= Reward Roll
9	Agent				+Mod						
10	Rogue				+Mod	+Mod					
11	Noble				+Mod						
12	Marine				+Mod	+Mod			+Mod		Medal= Reward Roll
13	Functionary										No Mods

Controlling Characteristic										
1	Craftsman	Str	C2	C3	Int					Pick one of the available Charac-
2	Scholar	Str	C2	C3	Int					teristics (any one
3	Entertainer	- Different System -								anywhere in the
4	Citizen	Str	C2	C3	Int					sequence) as the
5	Scout	Str	C2	C3	Int					CC Controlling
6	Merchant	Str	C2	C3	Int					Characteristic for
7	Spacer	Str	C2		Int					the Term. This
8	Soldier	Str		C3	Int					CC cannot be
9	Agent	Str	C2	C3	Int					used again until
10	Rogue*	Str	C2	C3	Int	C5	C6			all of the others
11	Noble		C2	C3	Int	C5				in the sequence
12	Marine	Str			Int					have been used.
13	Functionary		C2	C3	Int	C5				

\*Special Case

## ENTERTAINER FAME AND TALENT

	Fame	Talent
Term 1	=2D	= Talent
Term 2	=Fame +F +F* +F*	= Talent+1 (if Fame Increases)
Term 3	=Fame +F +F* +F*	= Talent+1 (if Fame Increases)
Term 4	=Fame +F +F* +F*	= Talent+1 (if Fame Increases)
Term 5	=Fame +F +F* +F*	= Talent+1 (if Fame Increases)
Term 6	=Fame +F +F* +F*	= Talent+1 (if Fame Increases)

F= Flux. F\*= Optional Flux.

Determine Fame and Talent every Term.

**Comeback:** Reset Fame to 2D; Talent is unchanged. Comeback is possible any number of times (Some entertainers seem like perpetual Comebacks).

C2: a Character must roll his C2 Characteristic (whether Dexterity, Agility, or Grace) or less to succeed.

**Pre-Requisites.** Some Careers have requirements before a character may attempt to Begin.

### To Begin

Roll the Begin Target.

Some Careers allow Retry. If Begin fails, the character may immediately Retry.

If both Begin and Retry fail, this career may not be used. Each failed attempt (both Begin or Retry) takes one year.

### Risk and Reward

Risk and Reward uses a standard sequence.

**Select the CC Controlling Characteristic:** Note the Series of Characteristics Available. The player picks one of these Characteristics (any one anywhere in the sequence) and it becomes the CC Controlling Characteristic: it governs Risk and Reward for the current Term. This Controlling Characteristic cannot be used again until all of the others in the sequence have been used.

**Once Per Term.** Risk and Reward is rolled once per term and reflects all of the activity within the term.

Before rolling for Risk, the Character may (but is not required to) select any Cautious Mod +1 through +9 or any Bravery Mod -1 to -9. This Mod is applied with an opposite sign to the Reward roll.

**The Armed Forces (Soldier, Spacer, Marine) Careers** require Mods for Branch and Operations: these Mods are negative against the Risk Roll and positive against the Reward Roll.

A positive **Mod** increases the chance of succeeding at Risk and failing at Reward; a negative Mod increases the chance of failing at Risk and succeeding at Reward.

The Character rolls for Risk ( $2D \leq \text{Characteristic} + \text{Mods}$ ) and determines the outcome. He then rolls again for Reward ( $2D \leq \text{Characteristic} - \text{Mod}$ ) and determines the consequences.

### If The Risk Roll Fails

The character may be injured (or worse). Reduce the Controlling Characteristic by all negative Mods; ignore any positive Mods. Finally, roll Flux (which may compensate for the injury, or exaggerate it) and apply.

**Unchanged.** If the Controlling Characteristic is at or above its original value, retain the original value. The Character is unharmed.

**Reduced.** If the Controlling Characteristic is reduced, the Character has been wounded and receives a Wound Badge. The Characteristic is permanently reduced.

**Disabled.** If the Controlling Characteristic is reduced by 4 points or more, the Character is disabled and must Muster Out at the end of the Term (and is allowed Double Benefits).

**Dead.** If the Controlling Characteristic is reduced to zero or less, the Character is dead.

For example, Christopher Peers 798B79 selects Strength for Risk and Reward, and he selects Caution Mod +2. He rolls for Risk ( $2D = 10$  versus  $\text{Str} = 7 + 2 = 9$ ) and fails.

There are no negative Mods to apply; roll Flux (= -1) and reduce Str-7 to Str-6.

He rolls for Reward ( $2D = 7$  versus  $\text{Str} = 7 - 2 = 5$ ) and fails. He will try again next Term.

**The Citizen Career** uses a variant of Risk and Reward called **Citizen Life**. Only one roll is made to determine Success or Failure. No Mods are used.

**The Functionary Career** uses a variant of Risk and Reward called **Office Politics**. Separate successive rolls are made for Risk and Reward. No Mods are used.

**The Entertainer Career** focuses on **Fame** and resolves the current level of Fame for the character.

**The Craftsman Career** focuses on the creation of Masterpieces and their attendant impact on personal success.

### Rank, Position and Promotion

The Citizen, Entertainer, Craftsman, Scout, Agent, and Rogue careers have no rank; this procedure does not apply.

**Armed Forces** characters (Army, Navy, Marines) begin with enlisted rank (Army = Soldier1, Navy = Spacer1, Marines = Marine1). Enlisted Promotion (Army Navy Marines). Armed Forces characters roll the Promotion Target. Success increases rank +1.

If Spacer, Soldier, Marine enlisted rank, roll the Commission Target. If successful, the character moves to the Officer rank track and receives Officer1.

Armed Forces Officer characters roll the Officer Promotion Target.

**Merchant** characters begin with an inconsequential rank (= Temp). Merchants with Temp or Rating ranks roll the Rating Target. They may also roll the Officer Target, and if successful, transfer to the Merchant rank track).

Merchants with Officer rank roll for Officer Promotion.

**Scholars** begin with formal rank (Scholar = Scholar1) if they have Edu=8+. Scholars with Scholar1 or higher roll the Scholar Promotion Target. Success increases rank +1.

**Nobles** begin with rank equal to their Social Standing. Nobles use a special procedure. Elevation is Roll High (roll Soc or greater to be Elevated to the next higher Noble rank) and its associated increase in Social Standing (if any).

**Functionaries** begin with a minimal rank (Functionary= Functionary0).

### Acquiring Skills

Characters acquire skills in the course of each Term. The Skill Eligibility table shows the number of skills received.

**Rolling For Skills.** For each skill, roll on the Career Skills Table. The character selects a column and rolls 1D for the specific skill.

Column 1-Personal Skills may always be rolled.

**Space-Soldier-Marine Term Skills.** In Spacer, Soldier, or Marine careers, Term skills (but not commission, promotion, or other skill eligibilities) may be taken on a column of the Skills table corresponding to an Operations result received in the Term.

**Automatic Skills.** Some careers provide automatic skills (for example, a Merchant upon reaching rank Merchant1 receives an automatic skill= Steward). Automatic

---

## Eneri Dinsha 9AB58A Serves The Empire

---

Just out of College and Flight School, the newly commissioned Imperial Navy Ensign begins his required service to the Empire.

Eneri automatically Begins service. He must roll Soc or less to select Branch (roll 10 or less; he rolls 7) and chooses Flight (a Flight School graduate does not automatically receive Branch= Flight). He must choose from Str C2 C3 Int for his first Risk and Reward cycle; he leads with his best: C3 End.

Because Flight School took a year, this first Term is reduced to three years: he rolls 1D three times for Naval Operations (4, 1, 5) for assignments in Patrol, Battle, and Mission. The highest associated Mod is 3.

Risk and Reward uses Endurance-11, Branch Mod -2, Operations Mod -3, and (because he selects it) Caution Mod +2. Risk rolls (11 -2 -3 +2) =8 or less on 2D; he rolls 9 and fails. Endurance-11 reduces by -2 -3 to Endurance-6, and Flux (=+4) back to Endurance-10. He receives a Wound Badge.

Term 1

Reward changes the sign on the Mods and must roll (11 +2 +3 -2) = 14 or less on 2D; he rolls 3 and succeeds again. He will receive a Medal.

He applies the raw Reward roll (3) (and Officer Mod +1) to Medals table line 4 and receives an XS Exemplary Service.

**Promotion.** Eneri is eligible for promotion. He must roll Soc plus Medal Mods (10 +1) =11 or less. He rolls 11 and is promoted to O2 Sublieutenant.

**Continue.** He must roll 7 +Terms (7 +0) = 7 or less to Continue. He rolls 5 and may pursue another term.

**Skills.** Eneri is eligible for 4 skills for the Term and 1 skill because he was promoted. He can consult the columns for 1 Personal, 3 Battle, 4 Patrol/Strike, 5 Siege, 6 Mission. He decides to consult each column once and receives Int +1, Fleet Tactics, Computer, Counsellor, and Diplomat.

---

Sublieutenant Dinsha 9AA68A begins his second term. As an officer, he does not change Branch and is again in Flight.

He must choose from Str C2 Int for his second Risk and Reward cycle; he selects: C2 Dex. He rolls 1D four times for Operations (3, 3, 4, 4) for assignments in Siege, Siege, Patrol, Patrol. The highest associated Mod is 1.

Risk and Reward uses Dexterity-10, Branch Mod -2, Operations Mod -1, and (he again selects) Caution Mod +2. Risk must roll (10 -2 -1 +2) =9 or less on 2D; he rolls 11 and fails. Dex-10 reduced by -2 -1 and Flux (=+3) is unchanged. As Dex is unchanged; he does not receive a Wound Badge.

Term 2

Reward changes the sign on the Mods and must roll (10 +2 +1 -2) = 11 or less on 2D; he rolls 9 and succeeds again. He will receive a Medal.

He applies the raw Reward roll (9) Mod +1 because he is an Officer to the Medals table line 10 and again receives MCFU Meritorious Conduct Under Fire.

**Promotion.** Eneri is eligible for promotion. He must roll Soc plus Medal Mods (10 +1+2) =13 or less. He rolls 4 and is promoted to O3 Lieutenant.

**Continue.** He must roll 7 +Terms (7 +1) = 8 or less to Continue. He rolls 10 and must leave the service.

**Skills.** Eneri is eligible for 4 skills for the Term and 1 skill because he was promoted. He can consult columns 1 Personal, 4 Patrol/Strike and 5 Siege. He elects to consult Personal three times, and the others once each. He receives Str+1, C2 Dex+1, C5 Edu+1, Astrogator-1, and Strategy-1.

---

Eneri Dinsha ABA69A. Genetic 4553XX  
Homeworld: Regina (1910 Spinward Marches)  
Trader-1, Animals-1, Bureaucrat-1  
Psychology-4, Robotics-2, Astrogator-2, Pilot-4. Strategy-1  
Fleet Tactics-1, Computer-1, Counsellor,-1 Diplomat-1.  
Imperial Navy Lieutenant O3.  
Age 31. Born 069-1074 (note it has been pushed back again)  
MCFU-1. XS-1. WB-2.  
Current Date: 001-1105

---

skills are a one-level increase if the skill is already held. If not, the character receives the skill at level-1.

**Contained Knowledges.** Some skills (Animals, Driver, Engineer, Fighter, Flyer, Gunner, Heavy Weapons, Language, Pilot, Seafarer) include within them Knowledges. Acquisition of these skills (except Language which is handled differently) follows a standard pattern: Knowledge, Knowledge, Skill.

A character has always the option of choosing a knowledge (either already possessed or as-yet-unlearned) rather than the skill, up to level-6.

### Continue

At the end of the 4-year Term, the Character must successfully roll (2D) to Continue (or less) in the career. Failure ends Career Resolution: the character must begin adventuring.

**Mandatory Continue.** If the Continue roll is 2 exactly, the character is **required** to Continue in the current Career for a new 4-year term.

Characters in the Reserves (from participation in OTC/NOTC, or Service Academy) who roll an unmodified 2 exactly do not continue in the current career, but return to their military career for the next term, at their previous rank.

**Changing Careers.** A character may avoid the Continue roll by voluntarily ending his service in the current career and selecting a different career for which he is eligible. The decision to change careers is irrevocable and must be made before attempting begin the new career.

A Functionary or Noble cannot change to a new career.

A Character may not change to the Citizen career.

### The Armed Forces

The Armed Forces are Spacers, Soldiers, and Marines, with background information as Branch and Assignment.

**Armed Forces Branch.** Branch is the character's specialization in the service. It defines his probable duties in the service. When the character Begins in a service, select or roll for Branch. A non-officer character may change (reselect or reroll) Branch at the end of each Term. A character who receives a Commission may roll for Branch or keep his current Branch (for Spacers, Crew becomes Line). An Officer may not change Branch.

**Branch** provides a required Mod on Risk and Reward.

**Armed Forces Assignment.** The <Service> Operations table provides assignments for the Armed Forces.

Roll for Assignment four times per Term (for four annual assignments). Each assignment provides a Mod. Determine the highest value for the Term: applied to Risk and Reward.

**Medals.** The primary rewards in the Armed Forces are medals. If the Reward Roll Succeeds, use the unmodified Reward roll to determine the Medal; Mod +1 if an Officer.

For example, Star Marine Captain Sir Mark Poles 98998B participated in the Retreat from Jewell. In this Term, his highest Mods are Protected Forces Mod 2, and one Battle Mod 3. His Controlling Characteristic is Strength-9. He selects Caution Mod-1.

He must roll Risk 9 -2 -3 +3 = 7. He rolls 5, is uninjured and receives a Campaign Ribbon (The Retreat From Jewell).

The signs on the Mods change for Reward, and he must roll Reward 9 +2 +3 -3 = 11. He rolls 9 and succeeds. He consults the Medals table on line 9+ Officer Mod = line 10 and receives MCF Meritorious Conduct Under Fire.

## AGING

Characters reaching Life Stage 5 (Age 34 for Humans) are subject to Aging (on the Life Stages and Aging Tables).

## THE PRIOR CAREERS

Each career is fully described on its own comprehensive page. Once the career is selected, turn to that page and resolve it according to the rules on that page.

Once the career is complete, proceed to Mustering Out.

## E MUSTERING OUT

Mustering Out is a military term, but it captures the concept for characters in non-military careers as well. When characters Muster Out, they are making a change from their prior career to a new life: from the known to the unknown; from the mundane to the adventurous.

Mustering Out counts up the character's belongings (at least the major ones), the money, and the abilities that a character has accumulated through several years of career and notes them as assets for the adventuring situations to come.

Mustering Out produces three types of awards: Automatics, Benefits, and Entitlements.

## AUTOMATICS

When a character ends character generation he may already own specific awards or items.

This step catalogs them.

**Personal Weapons.** A character who has received Fighter-1 or greater owns one personal weapon, which may be any weapon appropriate for the skill held. Note the specific weapon.

This benefit does not apply for skills other than Fighter (that is, not Heavy Weapons or not Gunner; characters do not automatically acquire an AutoCannon).

**Medals.** A character may have received heroism medals, campaign ribbons, and wound badges. Agents may have received Commendations. These physical items (the medals

Member

*Travellers' Aid Society*  
Faithfully Serving Travellers  
Since The Year Zero



Aramais P. Lee  
Erehwemos D876543-2

and the certificates) may be in the individual's possession and the awards are reflected in the character's records.

**Fame.** A character may have Fame based on Career Resolution, or the Fame rules. If the Fame Flux Event has not yet been invoked, it may be invoked here (or not; it can be saved for later).

**Travellers' Aid Society.** The TAS is an NGO Non-Governmental Organization devoted to assisting travellers. It is also a hospitality provider with hotels, restaurants, banking, and library data facilities at most Starports A and B. A character may have a membership in the Travellers' Aid Society.

A **TAS Life Membership** provides one week of free accommodations and one free High Passage per month.

A TAS Life Membership can be purchased for MCr1 (it cannot generally be sold, although the individual can usually resell the Passages he acquires).

Selected individuals are awarded a TAS Life Membership (for example, Award-Winning Scholar, Scout with 3 Discoveries, Craftsman with three perfect Masterpieces, and recipient of the Starburst for Extreme Heroism).

A **TAS Fellow Membership** is a temporary membership in the Travellers' Aid Society. The membership provides one week of accommodations and one High Passage per month (they accumulate if not taken). The grant expires four years after award (at which point accumulated benefits expire).

A TAS Fellowship cannot be purchased, and cannot be sold (although the individual can usually resell the Passages as they are acquired).

**Land Grants.** Any character who has received a Land Grant retains it at Mustering Out.

A Land Grant creates a token annual profit (the amount remaining after expenses have been deducted from income), based on the trade classifications of the world, equal to Cr10,000 per TC Trade Classification. For example, a world classified as Hi In Va with three TCs provides an income of Cr30,000 per year.

A World with no TC generates Cr5,000 per year.

**Masterpieces.** Any character who has created Masterpieces retains them at Mustering Out.

## BENEFITS

Benefits are rewards associated with specific service and are determined by Mustering Out die rolls. Each career has a Mustering Out table.

## Character Generation

# E Muster Out



Muster Out Benefits

## Automatics Subject to Eligibility

Personal Weapons		if Fighter-1+
Medal		Spacer or Soldier
Commendations		Agent
Fame		any
TAS Life Membership	Scholar, Scout, Craftsman, SEH	
Land Grants		Nobles, Scouts
Masterpieces		Craftsman

Muster Out Benefits

## Benefits

per Career Benefit Tables

Financial	Non-Financial
Money	Characteristic Improvements
StarPass	Wafer Jack
High Passage	Forbidden Knowledge
Middle Passage	Knighthood
Low Passage	Directorship
Pension x 2	Proxy
Retirement x 2	Life Insurance
	TAS Fellowship
	TAS Life Membership
	Ship Shares

Muster Out Benefits

## Entitlements

Annual at Life Stage 9

Citizen's Pension	Cr 5,000
Functionary's Pension	Cr15,000
Reserve Pension	Cr 100 per Reserve year
Tenured Professor's Pension	Cr10,000
Armed Forces	Annual beginning at Muster Out
Enlisted Retirement	Cr 2,000 per Active Duty term
Officer Retirement	Cr 3,000 per Active Duty term
<small>(based on minimum 4 terms)</small>	

Muster Out Benefits

## Forbidden

1D Skill	Uncouth in polite society because
1	<b>Fighter</b> accepts weapons and violence as a means of achieving goals.
2	<b>Streetwise</b> implies interaction with the lower or fringe social classes.
3	<b>Stealth</b> accepts covert and illegal actions as a means to achieving goals.
4	<b>Explosives</b> accepts large scale destruction as a means of achieving goals.
5	<b>WMD</b> accepts massive violence as a means of achieving goals.
6	<b>Programmer</b> accepts computer hacking is an acceptable enterprise.

## Medals

Rew	Code	Medal Description	Mod
2	XS	Exemplary Service	+1
3	XS	Exemplary Service	+1
4	XS	Exemplary Service	+1
5	XS	Exemplary Service	+1
6	XS	Exemplary Service	+1
7	XS	Exemplary Service	+1
8	XS	Exemplary Service	+1
9	MCUF	Meritorious Conduct Under Fire	+2
10	MCUF	Meritorious Conduct Under Fire	+2
11	MCG	Medal for Conspicuous Gallantry	+3
12	SEH	Starburst for Extreme Heroism	+4
13	*SEH*	SEH With Diamonds	+5

Rew= Successful unmodified Reward Roll.  
 But, if the character is an Officer, increase +1.  
 Medals (but not Wound Badges) are Mods for Soldier and Spacer Promotion.



	<b>01 Craftsman</b>		<b>02 Scholar</b>		<b>03 Entertainer</b>		<b>04 Citizen</b>	
1D	Money	Benefits	Money	Benefits	Money	Benefits	Money	Benefits
1	Low Psg	Forbidden K	Low Psg	C5+1	Low Psg	C5+1	Low Psg	Low Psg
2	Low Psg	Forbidden K	Low Psg	C5+1	Low Psg	C5+1	Low Psg	Str +1
3	Mid Psg	Wafer Jack	Mid Psg	Wafer Jack	Mid Psg	Wafer Jack	Low Psg	Str +1
4	High Psg	C5 +1	High Psg	Edu +1	High Psg	Edu +1	Mid Psg	Wafer Jack
5	Cr 15,000	Str +1	Cr15,000	Str +1	Cr15,000	Str +1	High Psg	C5 +1
6	StarPass	C2 +1	StarPass	C2 +1	StarPass	C2 +1	Cr 15,000	Str +1
7	Cr25,000	C3 +1	Cr25,000	C3 +1	Cr25,000	C3 +1	StarPass	C2 +1
8	Cr30,000	Int +1	Cr30,000	Int +1	Cr30,000	Int +1	Cr25,000	C3 +1
9	Cr35,000	Ship Share	Cr35,000	Fame +1	Cr35,000	Fame +1	Cr30,000	Int +1
10	Cr40,000	TAS Fellow	Cr40,000	Ship Share	Cr40,000	Ship Share	Cr35,000	Soc +1
11	Cr50,000	Director	Cr50,000	TAS Fellow	Cr50,000	TAS Fellow	Cr40,000	TAS Fellow
12	Cr60,000	TAS Life	Cr60,000	TAS Fellow	Cr400,000	Knighthood	Cr50,000	Ship Share
DM	+Terms	+Terms	+ Scholar Rank	+Terms	+Fame/5	+Terms	+ Terms	+Terms

	<b>06 Merchant</b>		<b>09 Agent</b>		<b>10 Rogue</b>		<b>13 Functionary</b>	
1D	Money	Benefits	Money	Benefits	Money	Benefits	Money	Benefits
1	Cr40,000	Str+1	Low Psg	Ship Share	Cr40,000	Str+1	Cr 5,000	Forbidden K
2	StarPass	C5+1	Low Psg	Forbidden K	StarPass	C5+1	Cr10,000	Str +1
3	StarPass	Wafer Jack	Mid Psg	Wafer Jack	StarPass	Wafer Jack	Cr15,000	Wafer Jack
4	High Psg	C2 +1	High Psg	C5 +1	High Psg	C2 +1	Cr20,000	Str +1
5	High Psg	C3 +1	Cr 15,000	Str +1	High Psg	C3 +1	High Psg	C2 +1
6	StarPass	Life Insur	StarPass	C2 +1	StarPass	Life Insur	StarPass	C3 +1
7	Cr25,000	Ship Share	Cr25,000	C3 +1	Cr25,000	Ship Share	Cr25,000	Int +1
8	Cr30,000	Knighthood	Cr30,000	Ship Share	Cr30,000	Knighthood	Cr30,000	Life Insur
9	Cr35,000	Ship Share	Cr35,000	Life Insur	Cr35,000	Ship Share	Cr35,000	TAS Fellow
10	Cr40,000	Ship Share	Cr40,000	TAS Fellow	Cr40,000	Ship Share	Pension x2	Knighthood
11	Cr50,000	Ship Share	Cr80,000	Fame +2	Cr50,000	Ship Share	Pension x2	Directorship
12	Cr90,000	Knighthood	Cr90,000	Knighthood	Cr90,000	Knighthood	Pension x2	Knighthood
DM	+ Terms	+ Officer Rank	+Terms	+Commends	+ Terms	+ Terms	+ Terms	+ Officer Rank

	<b>5-7-8-12</b>	<b>05 Scout</b>	<b>07 Spacer</b>	<b>08 Soldier</b>	<b>12 Marine</b>	<b>11 Noble</b>		
1D	Money	Benefits	Benefits	Benefits	Benefits	Money	Benefits	Power
1	Low Psg	Ship Share	Forbidden K	Forbidden K	Forbidden K	StarPass*	Forbidden	Proxy (1)
2	Mid Psg	Forbidden K	Str +1	Str +1	Str +1	StarPass*	Str +1	Proxy (2)
3	High Psg	Wafer Jack	Wafer Jack	Wafer Jack	Wafer Jack	StarPass*	Wafer Jack	Proxy (3)
4	StarPass	C5 +1	C5 +1	C5 +1	C5 +1	StarPass*	C5 +1	Proxy (4)
5	Cr30,000	Str +1	Str +1	Int +1	Int +1	Cr100,000	Directorship	Proxy (5)
6	Cr40,000	C2 +1	C2 +1	C2 +1	C2 +1	Cr200,000	C2 +1	Proxy (6)
7	Cr50,000	C3 +1	C3 +1	C3 +1	Life Insur	Cr300,000	C3 +1	Proxy (2D)
8	Retire x2	Ship Share	Int +1	Life Insur	Ship Share	Cr400,000	Int +1	Proxy (2D)
9	Retire x2	Life Insur	Ship Share	TAS Fellow	Directorate	Cr500,000	Ship Share	Proxy (2D)
10	Cr60,000	TAS Fellow	Life Insur	Knighthood	Knighthood	Cr600,000	Life Insur	Proxy (2D)
11	Cr70,000	Fame +2	Knighthood			Cr700,000	TAS Life	Proxy (2D)
12	Cr80,000	Knighthood				Cr800,000	Directorship	Proxy (2D)
DM	+Terms	+Fame/2	+Officer Rank	+Officer Rank	+Officer Rank	+ Terms	+ Terms	+ Terms

## Patent of Nobility

# TRAVELLER<sup>5</sup>

Science-Fiction Adventures

The Lady Seldrian  
Baron of the Marches  
Spin 2005 Feri B584879-B

**One Per Term.** A character is allowed one Mustering Out roll for each term served in Career Resolution. He is allowed one additional roll per Commendation, MCG, or SEH. He is allowed one additional roll if Fame 19+.

Roll 1D + DMs. If the DM is Terms, use the number of Terms served in that Career. If the character later served as a Functionary associated with that Career, add those Functionary Terms to the DM. If the roll is greater than the maximum value on the table, use the maximum value instead.

The DM for Terms is optional on the part of the player. Duplicate benefits may be rerolled.

### Which Table and Column?

Use the Mustering Out Table corresponding to the Career for the time spent in that career. For example, Eneri Dinsha served one term each as a Merchant (Term 1), an Entertainer (Term 2), and finally as a Functionary (Term 3). He makes one roll on the Merchant Table, one roll on the Entertainer Table (DM +1 because he served one Term in that career), and one roll on the Functionary Table (DM +1 because he served one Term in that career).

A character with a roll allowed by Fame-19+ may select which career-dictated table to use.

**Which Column?** Character may select either the Money column or Benefits column for each roll.

### Types of Benefits

The Career Resolution Process ends with the accumulation of Mustering Out benefits.

**Money.** Cash represents travel allowances and personal savings. Money is shown on a separate column.

**Passages.** Passages represent commercial interstellar starship travel allowances provided by a former employer.

**StarPass** is a multi-use pass for Middle Passage valid for one year after first use. It has a value of Cr250,000.

**High Passage** is first-class luxury starship accommodation providing passage from the current starport to the ship's next port of call. It has a value of Cr10,000.

**Middle Passage** is second-class starship accommodation providing passage from the current starport to the ship's next port of call. It has a value of Cr8,000.

**Low Passage** is economy-class starship transportation, providing passage in Cold Sleep from the current starport to the ship's next port of call. It has a value of Cr1,000.

**Pension x 2** doubles the Pension the character receives from the career. Each doubling is of the original Pension: the first x2 doubles the Pension, the second x2 triples the pension, the third x2 quadruples the original Pension.

**Retirement x 2** doubles Retirement Pay. Each doubling is of the original Retirement Pay. The first x2 doubles the Retirement Pay, the second x2 triples the Retirement Pay, the third x2 quadruples the original Retirement Pay.

**Characteristic Improvements.** Characteristic Improvements represent a final recognition of personal improvement based on the individual's career and experience.

Characteristic Improvements applied to Genetic Characteristics are recessive.

Characteristics for Humans cannot exceed 15. If a skill award or benefit elevates a characteristic beyond 15, that benefit is lost.

Characteristics for non-Humans cannot exceed the Dice for the Characteristic +6 (if Strength is generated with 2D, then the maximum for Strength for the sophont species is  $12+6=18$ ).

If the improvement is C6+1 and for the character C6=Caste, the benefit is lost.

**Wafer Jack.** A Wafer Jack is a cyber implant allowing use of skill or personality wafers and providing direct access to computer systems.

**Knighthood.** The character receives a Knighthood (= Soc B if the character has C6=Soc).

A character without C6=Soc (with C6=Caste or C6=Charisma) still receives the benefits of Knighthood (the name prefix Sir and a level of prominence in society), he, she, or it just doesn't really care.

A Career Skills Table C6+1 may increase Soc to B or higher. A Knighthood raises any value of Soc to B; if the character is already Soc 11+, he receives Soc +1 instead.

In the Spacer, Soldier, and Marine careers, Knighthood is only available to Officers. A non-officer receives Soc +1 (even if it advances Soc to 11 or beyond). A character with Soc = 11+ already receives Soc +1 instead.

**Life Insurance** archives a personality scan and DNA (or equivalent) sample during the Mustering Out Process. When notice of death reaches the archive, it enables the creation of a Clone and Implantation of the character's personality. Notice that unless updated, the replacement clone will revert to the memories and skills recorded at Mustering Out.

Life Insurance may be purchased: the premium is MCr1 to start a policy and Cr100,000 to update.

A **Directorship** is an appointment to the Board of Directors of a large corporation. It is largely ceremonial, requiring only annual attendance at Board meetings.

A Directorship provides an annual payment of Cr36,000, high level access to business executives, and deferential treatment at company facilities. Create a name for the Company involved: for example: the <worldname> Corporation.

**Forbidden Knowledge** refers to a skill or knowledge that is not, should not, or cannot, be mentioned in polite society (polite society defined as groups with average Soc-8 or above). Each receipt provides skill-1.

For example, a familiarity with the use of machineguns (Fighter) is not mentioned in polite conversation.

**Ship Shares.** A ship share represents a fractional ownership in a starship. It may be redeemed upon Mustering Out, or it may be retained and redeemed at some later date.

A **Proxy** is a delegation of power (to vote in the Moot, the imperial legislative assembly) by one Noble to another. The Proxies a Noble holds indicates his Political Power.

Nobles uninvolved in the political process transfer their voting rights to a political Noble for financial or other considerations. A Proxy has a value of about Cr100,000 per year.

### **Duplicate Benefits**

A result that duplicates a previous (unwanted or unusable) benefit may be rerolled until a different benefit is received, for example: Wafer Jack, TAS Member, Knighthood.

### **ENTITLEMENTS**

A character may be eligible for specific Entitlements (Retirement Pay, Disability Pay, or Pensions).

**Getting Paid.** Any Entitlement may be collected at any Travellers' Aid Society office (at smaller offices, it may take a few days). Entitlements are paid in advance: the payment is made on the first day of retirement and annually thereafter.

A retired Spacer or Marine can collect his Entitlement at a Naval Base. A retired Scout can collect his entitlement at a Scout Base or Way Station.

**Duplicate Entitlements:** A character may receive duplicate Entitlements (for example, a Reserve and a Functionary pension, or both Military and Professor's retirement pay).

**Cashing Out.** Any Entitlement can be cashed out for a lump sum equal to five years of payments.

### **Pensions**

Pensions are available for Citizens, Functionaries, Reservists, and Professors. A pension begins when a character reaches Life Stage 9 Retirement (= age 66 for Humans).

**Citizen's Pension.** Any character who has been a

Citizen or Functionary for at least one Term is eligible for a Citizen's Pension. A Citizen receives Cr5,000 per year; a Functionary receives Cr15,000 per year (which replaces a Citizen's pension, if any).

**Reserve Pension.** A character who served in the Reserves receives an annual Reserve Pension (= Cr100 per year served in the Reserves).

**Professor's Pension.** A tenured Professor receives a Professor's Pension of Cr10,000 per year.

### **Retirement Pay**

Soldiers, Spacers, and Marines who served on active duty (not the reserves) for at least 4 terms are eligible for Retirement Pay based on total combined terms served.

Retirement begins when the individual ends his career activity and begins adventuring.

**Enlisted Retirement.** A Soldier, Spacer, or Marine who has served at least 4 terms receives an annual payment of Cr2,000 per term in the service.

**Officer Retirement.** A Soldier, Spacer, or Marine who has served at least 4 terms (and who musters out as an Officer) receives annually Cr3,000 per term in the service.

### **Disability Muster Out**

Some careers (Scholar, Scout, Merchant, Spacer, Soldier, Agent, Marine) include a provision for Disability Muster Out. When Risk Failure produces an Injury or Wound which reduces the Controlling Characteristic by 4 or more points, the character is Disabled.

**Muster Out at Term End with Double Benefits.** The Character may not continue. Double Benefits is twice the count of Benefits (rather than two of each Benefit).

**Dying During Character Generation.** If the Controlling Characteristic is reduced to zero or less, the Character is dead (and all efforts in this particular character creation process are lost).

---

## **Creating Personal Characters**

Create the Character you want to play with friends.

Pick and choose abilities that are important and interesting.

Use randomness for the rest.

*(with appreciation to John Wick).*

---





# Character Generation Checklist

## A GENERATE CHARACTERISTICS

### The Six Human Characteristics

- Strength
- Dexterity
- Endurance
- Intelligence
- Education
- Social Standing

### If Non-Human,

Generate Proper Characteristics

### Create the UPP

Record Genetic UPP

## B DETERMINE A HOMEWORLD

As assigned by the Referee

As selected by the Player

Randomly from a world list

Randomly created.

### Note World Details

UWP, Name and Location

### Select HomeWorld Skills

### Name The HomeWorld

## C EDUCATION AND TRAINING

Note possibility of Waivers

### Basic Education

ED5 (no time required)

Trade School (Major, Honors)

### Basic Training

Apprenticeship (before age 18;)

Mentor (+2 to Tra)

Training Course (Major; Honors)

### Advanced Education

College (4 years, Major + Minor)

University (4 years, Major + Minor)

Academy (4 years, Major + Minor)

Honors Program

OTC/NOTC

Flight School

Masters Program

Professors Program

Medical School

Law School

### In-Career Education Options

For Spacer, Soldier, Marine

ANM Schools

Command College

in first term after promotion to

O4, if Continue is successful.

### For Each School Attended

Note School Name and Rank

## D SELECT CAREER

01 Craftsman

02 Scholar

03 Entertainer

04 Citizen

05 Scout

06 Merchant

07 Spacer

08 Soldier

09 Rogue

10 Agent

11 Noble

12 Marine

13 Functionary

## 01 CRAFTSMAN

Begin is Automatic (not a first career):

IF two Skill-6+ and Craftsman-1

Create A Masterpiece

Master Points=

CC = Str C2 C3 Int

plus Craftsman Skill

plus up to FIVE skill-6+

vs 9D

Determine Skill eligibility; take Skills

Roll Craftsman x2 to Continue

If No, end Career

Note Muster Out benefits

## 02 SCHOLAR

Note possibility of Waivers

Begin vs Edu or Tra

Failure = 1 year no retry

Automatic if Edu= 8+. =Scholar1

Roll Risk & Reward vs C1 C2 C3 C4

Roll Scholar Promotion

Roll Tenure if Scholar3 and Edu 10+

Determine Skill eligibility; take Skills

Roll Edu or Tra to Continue.

Mod +1 per Pub

If No, End Career

Note Muster Out benefits

## 03 ENTERTAINER

Determine Current Talent (=2D)

Assign Initial Fame = Talent

Roll to Begin

Actor vs C2 C3

Artist vs C3 Int

Author vs Int C5

Dancer vs C2 C3

Musician vs C2 C3

Chef vs C2 Int

Failure = 1 year. No Retry

In Term 1

Determine Skill eligibility; Skills

Roll Fame to Continue

If No, end career

In Term 2+

Determine Fame Change

First Flux Roll

(optional) Second Flux Roll

(optional) Third Flux Roll

Add all Fluxes to Current Fame

If Fame increases, +1 Talent

Determine Skill eligibility; Skills

Roll Fame to Continue

If No, end career

Note Muster Out benefits

## 04 CITIZEN

Begin Citizen Life is Automatic

(may not transfer to Citizen)

Roll Citizen Life vs Str C2 C3 Int

1st Citizen Life Success =

Citizen Life Job Skill-4

2nd Citizen Life Success =

Citizen Life Hobby Skill-4

Failure produces

no Job or Hobby Skills

Determine Skill eligibility; take Skills

Roll 10 - to Continue

If No, end Career

Note Muster Out benefits



## 05 SCOUT

Roll 6 or less to Begin  
Retry vs C5  
Select Courier Duty  
to avoid Risk and Reward  
Roll Risk & Reward vs C1 C2 C3 C4  
Determine Skill eligibility; take Skills  
Roll Int to Continue  
If No, end Career  
Note Muster Out benefits

## 06 MERCHANT

Begin as Temp is Automatic  
Begin as Spacehand  
Roll vs Dex  
Begin as Merchant Officer  
Roll vs Int  
Roll Risk & Reward vs C1 C2 C3 C4  
Roll Officer Promotion vs Terms x2  
Roll 4th Officer Commission vs Int  
Roll Temp or Rating Promotion vs 9-  
Determine Skill eligibility; take Skills  
Roll Str to Continue  
If No, end Career  
Note Muster Out benefits

## 07 SPACER

Roll to Begin vs Int  
Select Branch  
use Mod for R&R  
Roll Naval Operations 4 x  
use highest Mod for R&R  
Roll Risk & Reward vs Str C2 C3 Int  
Branch Mod  
Naval Ops Mod  
Roll Officer Promotion vs Soc  
plus Medals Mods  
Roll Commission vs C3  
Roll Enlisted Promotion vs C2  
Plus WB Mods  
Determine Skill eligibility; take Skills  
Roll 7- to Continue  
If No, end Career  
Note Muster Out benefits

## 08 SOLDIER

Roll to Begin vs Str  
Select Branch  
use Mod for R&R  
Roll Operations 4 x  
use highest Mod for R&R  
Roll Risk & Reward vs Str C2 C3 Int  
Roll Officer Promotion vs Soc  
plus Medals Mods  
Roll Commission vs Soc  
Roll Enlisted Promotion vs C2  
Plus WB Mods  
Determine Skill eligibility; take Skills  
Roll 7- to Continue  
If No, end Career  
Note Muster Out benefits

## 09 AGENT

Roll to Begin vs C3  
Roll for Undercover Assignment  
Select one Skill from  
Undercover Assignment Career  
Roll Risk & Reward vs Str C2 C3 Int  
Determine Skill eligibility; take Skills  
Roll Str to Continue  
Mod + Terms  
If No, end Career  
Note Muster Out benefits

## 10 ROGUE

Select CC Controlling Characteristic  
to apply throughout career  
Roll for Scheme Career  
Roll Risk & Reward vs CC  
Mod + Terms  
Determine Skill eligibility; take Skills  
Roll CC to Continue  
Mod + Terms  
If No, end Career  
Note Muster Out benefits

## 11 NOBLE

To Begin is Automatic if Soc B+  
Roll Return& Intrigue vs C2 C3 Int C5  
Mod minus Intrigues  
Mod + Exiles  
Determine Skill eligibility; take Skills  
Roll Soc+ to Continue  
If No, end Career  
Note Muster Out benefits

## 12 MARINE

Roll to Begin vs Str  
Select Marine Branch  
use Mod for R&R  
Roll Marine Operations 4 x  
use highest Mod for R&R  
Roll Risk & Reward vs Str C2 C3 Int  
Branch Mod  
Marine Ops Mod  
Roll Officer Promotion vs Edu  
plus Medals Mods  
Roll Commission vs C3  
Roll Enlisted Promotion vs C2  
Plus WB Mods  
Determine Skill eligibility; take Skills  
Roll Str to Continue  
If No, end Career  
Note Muster Out benefits

## 13 FUNCTIONARY

Roll to Begin vs Total Terms x3  
(not a first career)  
Roll Office Politics vs Str C2 C3 Int  
No Mods  
If Risk fails, may not Continue  
If Risk Succeeds, may Continue  
If Reward fails, no Promotion  
If Reward succeeds, Promotion  
Determine Skill eligibility; take Skills  
Note Muster Out benefits

## E MUSTER-OUT BENEFITS

Select Benefits  
Note all sophonts start Aging Checks  
at Life Stage 5 (= Age 34 for  
Humans). Catch up on these  
Checks if necessary.

**F Start Adventuring!**



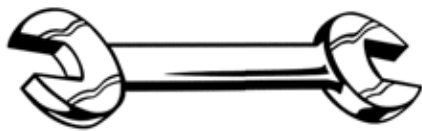
Merchant 1st Officer    Mirani Citizen    Imperial Spacer    Imperial Soldier    Vilani Baronet    Quarantine Agent    Aslan Merchant    Merchant Engineer    Imperial Agent    Soldier Private



Marine Sergeant    Citizen    Imperial Scout    Soldier Private    Imperial Baroness    Citizen Enforcer    Suerrat Citizen    Casilldan Craftsman    Entertainer



Scholar Professor    Rogue    Imperial Able Spacer    Imperial Marquis    Virushi Agent    Bwap Functionary    Zhodani Noble



# CRAFTSMAN

## THE CRAFTSMAN'S PASSION

The focus of a Craftsman's activity is creating Masterpieces within his craft. He does not roll Risk and Reward.

The Controlling Characteristic governs creating the current Masterpiece (and cannot be used again until all of the others have been used as well).

**Master Points.** In each Term, the Craftsman totals available Master Points (which will be used toward the current Masterpiece). Roll 9D for Master Points or less for success in creation. If the Craftsman cannot show at least 40 Master Points, he cannot attempt a Masterpiece (treat as Failure).

## A CRAFTSMAN CAREER

To Begin Automatic\*

Masterpiece Str C2 C3 Int

Continue Craftsman x2

\*if TWO skill-6 and Craftsman-1

## B SKILL ELIGIBILITY

Per Term 4

Per Success 3+ Craftsman-1

Per Failure 1+ Craftsman-1

## D MUSTER OUT

1D	Money	Benefits
2	Low Psg	Forbidden K
3	Mid Psg	Wafer Jack
4	High Psg	C5 +1
5	Cr 15,000	Str +1
6	StarPass	C2 +1
7	Cr25,000	C3 +1
8	Cr30,000	Int +1
9	Cr35,000	Ship Share
10	Cr40,000	TAS Fellow
11	Cr50,000	Director
12	Cr60,000	TAS Life
	DM +Terms	+Terms

## MASTERPIECE VALUE

Points	Value
40	150,000
41	160,000
42	170,000
43	180,000
44	190,000
45	200,000
46	210,000
47	220,000
48	230,000
49	240,000
50	250,000
51	260,000
52	270,000
53	280,000
54	290,000
55	600,000
56	620,000
57	640,000
58	660,000
59	680,000
60	700,000
61	720,000
62	740,000
63	760,000

Perfect Masterpiece

## Character Generation

# Craftsman 01

**Craftsman:** A skilled creator. An artisan. A master of a trade, manual art, or the practical application of a science. Master Builder. Craftsperson. Craftsophont. Craftsbeing. Artificer.

## CREATING A MASTERPIECE

Master Points	Controlling Characteristics Craftsman Skill Up to FIVE Skills at level 6+ (or Knowledges at level-6) (but not languages)	Must total at least 40 Master Points
	Roll	

9D < Master Points

**Creation Attempt Fails:** Receive Craftsman +1 (consider learning from experience).

**Creation Attempt Succeeds:** A beautiful Masterpiece has been created. Name an object capable of being carried by the Character, and created using the Skills applied.

A Perfect Masterpiece has 55 or more Master Points.

Q R E B S

--	--	--	--	--

1 to 10

-5 to +5

Allocate the Master Points to QREBS (for the ranges -5 to +5, -5 = 1 point; +5 = 11 points). If all QREBS values are set at the Maximum, excess Master Points can be allocated equally in excess of +5

## The Value of a Masterpiece

The Craftsman has spent most of three years conceiving and creating the Masterpiece. Simple living expenses and cost of labor (=Cr25 an hour for 6000 hours) puts the cost of the Masterpiece at Cr150,000. The Masterpiece can be sold at Cr150,000 plus Cr10,000 per Master Point over 40. A Perfect Masterpiece (=55 points or more) sells for Double (= Cr600,000 or more).

**Vintage Masterpieces.** A Masterpiece increases in value about 1% per year (simple interest), but are subject to Flux (in percent) when sold.

## C CRAFTSMAN SKILLS

1D	1 Personal	2 Academic	3 Travel	4 General	5 Business	6 Vocation	7 Avocation	1D
1	Str +1	Major *	Seafarer	Animals	Liaison	Naval Architect	Animals	1
2	C2 +1	Major *	Navigation	Comms	Comms	One Art	One Art	2
3	C3 +1	Minor *	Hostile Environ	Computer	Bureaucrat	New Trade***	One Science	3
4	Int +1	Minor *	Flyer	Designer	Diplomat	New Trade***	Athlete	4
5	C5 +1	One Trade	Driver	Designer	Leader	One Trade	Medic	5
6	C6 +1**	One Trade	Vacc Suit	Designer	Trader	One Trade	One Trade	6

\*If the character does not have a Major/Minor this benefit is lost. \*\*If the character has C6=Caste, this benefit is lost.

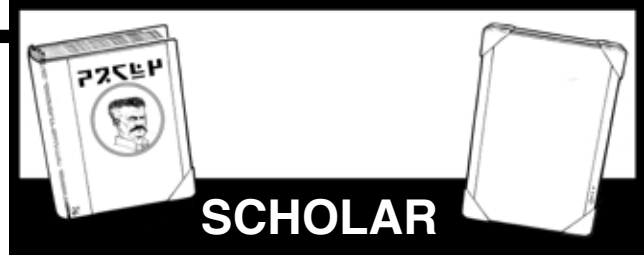
\*\*\*Any Trade not already held; if all are already held; this benefit is lost.



# Character Generation

# 02 Scholar

**Scholar:** A master of an area of knowledge or academic study. A knowledgeable person. A learned person. Teacher. Lecturer. Professor. Researcher. Scientist. Expert.



### SCHOLARS

The focus of a Scholar's life is Research and Publication. He works to complete Research and Publish results.

### THE SCHOLAR'S MAJOR

A Scholar has an area of interest and expertise called his Major, accompanied by a companion area of knowledge called his Minor. Every Scholar has a Major and a Minor. If no degree (and an associated Major and Minor) then select any Skill or Knowledge from the Skills List.

**Scholar Position and Promotion.** A character with Edu 8+ is automatically Scholar1 to Begin. Promotion is possible only those with Edu 8+.

A character with Edu 7 or less is an **Amateur Scholar**. He can resolve Risk and Reward, but cannot be Promoted.

A non-human character with C5= Tra is a **Non-Traditional Scholar**. He can resolve Risk and Reward, but cannot be Promoted. A character with C5= Ins cannot become a Scholar.

**Tenure.** Scholar with Edu 10+ may apply for Tenure upon reaching Scholar3 and in every Term in which the Character is Scholar3; Promotion beyond Scholar3 not possible without Tenure).

**Waivers.** An adverse die roll or decision (in Research, Publication, Promotion, Tenure, or Continue) may be waived. Check Soc (2D); Mod minus previous waivers (successful or not).

### SCHOLAR RISK & REWARD

	Risk	Reward
	Research	Publication
Success	Research Completed	Research Published
Failure	Incomplete with Injury	Publication Rejected
Select Caution, Bravery, or No Mod.		

Roll for Risk against CC+ Mods.  
**Research Failure:** Research can be dangerous. Reduce CC by negative Mods and Flux (CC may not be increased). If CC is reduced by 4 or more, then he is disabled. Muster Out at Term end with Double Benefits.  
**Research Success:** Unharmred.

If Research Complete, roll for Publication against CC+ (opposite sign) Mods.  
**Publication Failure:** Publication Rejected.  
**Publication Success:** Add one Publication to personal record.  
If Publication Roll is 4 less than Characteristic, it is <Award-Winning> and counts as TWO.

### A SCHOLAR CAREERS

- To Begin (Edu 8+) Automatic
- To Begin Edu or Tra
- Risk & Reward Str C2 C3 Int
- Promotion (Edu 8+) Int\*
- Tenure Pub x3
- Continue Edu\* or Tra\*
- Comment \*+Mod per Pub

### B SKILL ELIGIBILITY

- Per Term 4
- Promoted 1
- Research Success Major +2

### D MUSTER OUT

1D	Money	Benefits
1	Low Psg	C5+1
2	Low Psg	C5+1
3	Mid Psg	Wafer Jack
4	High Psg	Edu +1
5	Cr15,000	Str +1
6	StarPass	C2 +1
7	Cr25,000	C3 +1
8	Cr30,000	Int +1
9	Cr35,000	Fame +1
10	Cr40,000	Ship Share
11	Cr50,000	TAS Fellow
DM	+ Scholar Rank	+Terms

### TABLE OF SCHOLAR RANKS

Lev	Rank / Title
X	Non-Traditional Scholar
0	Amateur
1	Lecturer <of Major>
2	Instructor <of Major>
3	Assistant Professor <of Major>
4	Associate Professor <of Major>
5	Professor of <Major>
6	Distinguished Pteacher <of Major>
X=	if C5= Tra. Rank= 0
0=	Edu less than 8
1=	Automatic if Edu 8+.
3=	Eligible for Tenure

### C SCHOLAR SKILLS

1D	1 Personal	2 Academic	3 Travel	4 General	5 Conflict	6 Vocation	7 Avocation	1D
1	Str +1	Major *	Seafarer	Survey	Fighter	Admin	Seafarer	1
2	C2 +1	Major *	Navigation	Astrogation	Fighter	Language	One Art	2
3	C3 +1	Minor *	Hostile Environ	Hostile Environ	Stealth	One Science	One Science	3
4	Int +1	Minor *	Flyer	Survival	Flyer	Comms	Athlete	4
5	C5 +1	One Trade	Driver	Animals	Gunner	Starship Skill	Medic	5
6	C6 +1**	One Trade	Vacc Suit	Bureaucrat	Sensors	Bureaucrat	One Trade	6

\*If the character does not have a Major/Minor this benefit is lost. \*\*If the character has C6=Caste, this benefit is lost.  
A Scholar may always take a skill in his Major or Minor instead of from this table.



# Entertainer 03



**Entertainer:** A Performer. A person who participates in the Arts. Actor. Artist. Thespian. Writer. Poet. Bard. Dancer. Storyteller. Shugilii. Singer. Musician. Chef.

### SELECT A SPECIALTY

- 1 **Artist.** Painter. Sculptor.
- 2 **Actor.** Voice. Broadcaster.
- 3 **Author.** Writer. Reporter. Poet.
- 4 **Dancer.** Choreographer.
- 5 **Musician.** Singer. Bard.
- 6 **Chef.** Smell Artist. Osmancer.

### TALENT

Talent is the performance aspect of the Entertainer's specific skill and knowledge and may be substituted for the Skill and Knowledge when performing. Talent for Entertainers (a level of ability in one of the Arts) should not be confused with the Skill and Knowledge-oriented non-human Talent.

### FAME

F=	Descriptor
0	Unknown
1	Parent
2	Close Family
3	Extended Family
4	Neighborhood
5	Town
6	City
7	Large City
8	Regional
9	Continental
10	World
11	World Complex
12	World System
13	Inner System
14	System
15	Greater System
16	Outer System
17	Two Systems
18	Many Systems
19	Subsector
20	Sector
21	Domain
22	Domains
23	Many Domains
24	Empire
25	Beyond Empire
26	Several Empires
27	This Spiral Arm
28	Many Spiral Arms
29	The Galaxy
30	Several Galaxies
31	Many Galaxies
32	The Universe
33	Present Reality
34	All Past Realities
35	All Future Realities
36	All Reality

## A ENTERTAINER CAREER

- Begin Actor C2 or C3
- Begin Artist C3 or Int
- Begin Author Int or C5
- Begin Dancer C2 or C3
- Begin Musician C2 or C3
- Begin Chef C2 or Int
- Risk & Reward Talent
- Continue Fame

## ENTERTAINER FAME AND TALENT

	Fame	Talent
Term 1	=2D	= Talent
Term 2	=Fame +F +F* +F* =	Talent+1 (if Fame Increases)
Term 3	=Fame +F +F* +F* =	Talent+1 (if Fame Increases)
Term 4	=Fame +F +F* +F* =	Talent+1 (if Fame Increases)
Term 5	=Fame +F +F* +F* =	Talent+1 (if Fame Increases)
Term 6	=Fame +F +F* +F* =	Talent+1 (if Fame Increases)

F= Flux. F\*= Optional Flux.

Determine Fame and Talent every Term.

**Comeback:** Reset Fame to 2D; Talent is unchanged.

Comeback is possible any number of times.

## B SKILL ELIGIBILITY

- Per Term 4
- If Fame Increases 2 and Talent+1

## D MUSTER OUT BENEFITS

1D	Money	Benefits
1	Low Psg	C5+1
2	Low Psg	C5+1
3	Mid Psg	Wafer Jack
4	High Psg	Edu +1
5	Cr15,000	Str +1
6	StarPass	C2 +1
7	Cr25,000	C3 +1
8	Cr30,000	Int +1
9	Cr35,000	Fame +1
10	Cr40,000	Ship Share
11	Cr50,000	TAS Fellow
12	Cr400,000	Knighthood
13	Cr500,000	TAS Life
DM	+Fame/3	+Terms

## THE ENTERTAINER'S GOAL

An Entertainer's success depends entirely on his reputation: on Fame.

Before Begin (to evaluate potential for a career), roll initial Fame and Talent (with one 2D roll; they are equal). Higher Talent is better.

At the start of each Term, events in the Entertainer's career may change Fame. Roll Flux up to three times (the first is required; the second and third are optional). If Fame increases, increase Talent +1.

## STAGE NAME

An Entertainer with Fame 10+ should create a stage name. If Fame 12+ it may be a single name.

## C ENTERTAINER SKILLS

1D	1 Personal	2 Academic	3 Travel	4 General	5 Business	6 Vocation	7 Avocation	1D
1	Str +1	Major *	Zero-G	Survey	Broker	Broker	One Art	1
2	C2 +1	Major *	Vacc Suit	Survival	Trader	One Art	One Art	2
3	C3 +1	Minor *	Pilot	Hostile Environ	Advocate	Language	One Trade	3
4	Int +1	Minor *	Astrogator	Animals	Liaison	Admin	Athlete	4
5	C5 +1	One Trade	Sensors	Bureaucrat	Diplomat	One Art	Medic	5
6	C6 +1**	One Trade	Starship Skill	Navigation	Bureaucrat	Bureaucrat	One Trade	6

\*If the character does not have a Major/Minor this benefit is lost. \*\*If the character has C6=Caste, this benefit is lost.

\*\*\*Any Trade not already held; if all are already held; this benefit is lost.



## Character Generation

# 04 Citizen

**Citizen:** One loyal to the state. An Employee, Civilian, Clerk, Resident. A Commoner. A member of the masses. An ordinary person.



## CITIZEN

### CITIZEN LIFE

The focus of the Citizen is participation in local society, with an ordinary job and ordinary interests.

#### If Citizen Life Succeeds...

First Success provides a Job, randomly on Citizen Life Skills and Knowledges with Skill-4 (later receipts are Skill-1). Second Success provides a Hobby selected from Citizen Life Skills and Knowledges with Skill-2 (later receipts are Skill-1).

Once determined, Job and Hobby cannot be changed. In subsequent Terms, successes alternate between Job or Hobby skill levels.

#### If Citizen Life Fails...

The Citizen continues the term stuck in a dull, boring, unfulfilling life (with no Job or Hobby skills), hoping that someday things will be different.

### CITIZEN LIFE

Citizen Life Roll	
Success	First= Job-4
	Second= Hobby-2
	Third= Job-1
	Fourth= Hobby-1
	Fifth= Job-1
	Sixth= Hobby-1
	Seventh= Job-1
	Eighth= Hobby-1
Failure	No Job or Hobby Skills

### A CITIZEN CAREERS

To Begin Auto  
Citizen Life Str C2 C3 Int  
Continue

### B SKILL ELIGIBILITY

Per Term 4  
Job per table  
Hobby per table

### D MUSTER OUT

1D	Money	Benefits
1	Low Psg	Str +1
2	Low Psg	Str +1
3	Mid Psg	Wafer Jack
4	High Psg	C5 +1
5	Cr 15,000	Str +1
6	StarPass	C2 +1
7	Cr25,000	C3 +1
8	Cr30,000	Int +1
9	Cr35,000	Soc +1
10	Cr40,000	TAS Fellow
11	Cr50,000	Ship Share
DM	+Terms	+Terms

### E CITIZEN SKILLS AND KNOWLEDGES

A	B	1	2	3	C	4	5	6
1	ACV	Comms	High-G	Steward	Ordnance	Naval Arch		
2	JOT	Rider	Sensors	Fwd Obs	Survival	Streetwise		
3	LTA	Spines	Flapper	Seafarer	No Skill	Astrogator		
4	WMD	Leader	Tracked	Engineer	Computer	Navigation		
5	Chef	Survey	Animals	Fluidics	Bay Wpns	Explosives		
6	Mole	Dancer	Tactics	Launcher	Magnetics	Jump Drive		
1	Grav	Artist	Turrets	Teamster	Photonics	Counsellor		
2	Boat	Legged	Teacher	Designer	Vacc Suit	Submersible		
3	Ship	Sapper	Unarmed	Engineer	Artillery	Aeronautics		
4	Wing	Driver	Exotics	Language	Craftsman	Aquanautics		
5	Recon	Gunner	Stealth	Musician	Gravitics	BattleDress		
6	Actor	Blades	Trainer	Strategy	Forensics	Electronics		
1	Flyer	Zero-G	Animals	Maneuver	Biologics	Hostile Env		
2	Pilot	Author	Liaison	Polymers	Ortillery	Power System		
3	Rotor	Broker	Athlete	Advocate	Automotive	Life Support		
4	Admin	Trader	Fighter	Computer	Bureaucrat	Slug Thrower		
5	Beams	Sprays	Wheeled	Diplomat	Heavy Wpns	Fleet Tactics		
6	Medic	Gambler	Screens	Mechanic	Programmer	Spacecraft		

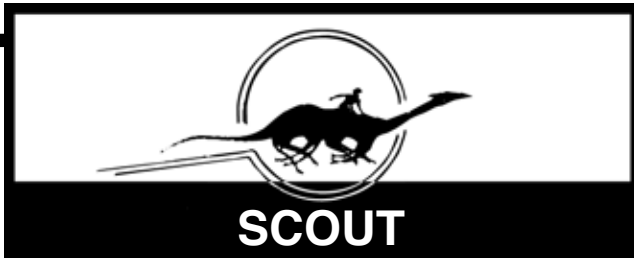
Roll three dice for a specific Skill or Knowledge: Roll A (reroll if >3), then roll B, and finally top row C (reroll if >3).

### C CITIZEN SKILLS

1D	1 Personal	2 Academic	3 Travel	4 General	5 Business	6 Vocation	7 Avocation	1D
1	Str +1	Major *	Seafarer	Admin	Advocate	One Art	One Art	1
2	C2 +1	Major *	Navigation	Broker	Broker	One Science	One Science	2
3	C3 +1	Minor *	Hostile Environ	Computer	Trader	One Trade	JOT	3
4	Int +1	Minor *	Flyer	Animals	Liaison	Driver	Athlete	4
5	C5 +1	One Trade	Driver	Bureaucrat	Counsellor	Bureaucrat	Medic	5
6	C6 +1**	One Trade	Vacc Suit	Trader	Teacher	Computer	One Trade	6

\*If the character does not have a Major/Minor this benefit is lost.

\*\*If the character has C6=Caste, this benefit is lost.



**Character Generation**

---

**Scout 05**

---

**Scout:** One engaged in exploration, mapping, or development of a territory. Explorer. Courier. Hunter. Messenger. Runner. Prospector.



**THE SCOUT'S LIFE**

The Scout's life is consumed with long voyages beyond the borders of civilization: the risk-filled flights just may discover that one world in a thousand that holds great reward.

**THE SCOUT'S DUTIES**

The Scout is a solitary representative of the empire's exploration service.

**Explorer Duty.** The Scout is given a small ship, a hold full of supplies, and dispatched to seek out and explore new worlds. The assignment is a long and lonely one, filled with danger but also with great potential.

Some assignments include surveying existing systems and worlds within the Empire to update charts and the Empire's knowledge of its territory.

**Courier Duty.** Scouts may also be assigned as couriers: carrying messages and data between worlds (both within and outside the Empire). A Scout may avoid the Risk and Reward rolls by volunteering for Courier Duty.

**A SCOUT CAREERS**

To Begin	Str or C2 or C3
Citizen Life	Str C2 C3 Int
	Continue Int

**B SKILL ELIGIBILITY**

If Courier Duty 4
If Explorer Duty 8

**SCOUT RISK & REWARD**

	Failure	Success
Risk	Injury	Uninjured
Reward	No Reward	Discovery

**SANITY**

Because of the long-term isolation that a Scout must endure, reduce San= -1 for each TWO Terms served.

Select Caution, Bravery, or No Mod.

Roll for **Risk** against CC+ Mods.  
**Risk Failure:** Reduce CC by negative Mods and Flux (CC may not be increased). If CC is reduced by 4 or more, then he is disabled. Muster Out at Term end with Double Benefits.  
**Risk Success:** Unharmred.

Roll for **Reward** against CC+ (opposite sign) Mods.  
**Reward Failure:** No Reward.  
**Reward Success:** The Scout discovers a valuable new world or a valuable feature on a known world (a Discovery), receives a Land Grant, and Fame +1.

**D MUSTER OUT**

1D	Money	Benefits
1	Low Psg	Ship Share
2	Mid Psg	Forbidden K
3	High Psg	Wafer Jack
4	StarPass	C5 +1
5	Cr30,000	Str +1
6	Cr40,000	C2 +1
7	Cr50,000	C3 +1
8	Retire x2	Ship Share
9	Retire x2	Life Insur
10	Cr60,000	TAS Fellow
11	Cr70,000	Fame +2
12	Cr80,000	Knighthood
DM	+ Terms	+Fame/2

**C CITIZEN SKILLS**

1D	1 Personal	2 Academic	3 Courier	4 Exploration	5 Business	6 Vocation	7 Avocation	1D
1	Str +1	Major *	Comms	Survey	Diplomat	Survey	One Art	1
2	C2 +1	Major *	Language	Survival	Sensors	Flyer	One Science	2
3	C3 +1	Minor *	Computer	Hostile Environ	Trader	Language	Seafarer	3
4	Int +1	Minor *	JOT	Animals	Teacher	Starship Skill	Athlete	4
5	C5 +1	One Trade	Gunner	Vacc Suit	Fighter	Engineer	Medic	5
6	C6 +1**	One Trade	Starship Skill	Navigation	Streetwise	Comms	One Trade	6

\*If the character does not have a Major/Minor this benefit is lost.

\*\*If the character has C6=Caste, this benefit is lost.





## Character Generation

# 06 Merchant

**Merchant:** The operator of a [star/space] ship engaged in trade and commerce. Trader. Free Trader. Broker. Entrepreneur. Shopkeeper (rarely).



### THE MERCHANT SERVICE

Much of interstellar commerce depends on the humble Free Trader: the independent merchant which jumps from world to world in search of small cargos to buy cheaply and resell profitably. Along the way, these small ships carry vital parcels, news, and passengers to the backwaters of the galaxy.

**The Merchant's Goal.** Every Merchant is working toward a specific goal: a ship. Risk and Reward for a Merchant are focused on accumulating ownership shares in a merchant starship.

### A MERCHANT CAREER

To Begin 4th Officer	Int
To Begin Spacehand	Dex
To Begin Temp	Auto
Risk & Reward	Str C2 C3 Int
Officer Promotion	Terms x2*
Officer Commission	Int
Rating Promotion	Dex*
Continue	Str

\*Mod +3 if Int 8+.

Temp may attempt Officer Commission and Rating Promotion within the same Term.

Rating may attempt Officer Commission and Rating promotion within the same Term.

Officer may attempt Officer Promotion.

### B SKILL ELIGIBILITY

Per Term 4  
Promotion 1  
Automatic Skills by Rank

### C MERCHANT SKILLS

1D	1 Personal	2 Academic	3 Space Travel	4 Trade	5 Business	6 Vocation	7 Technical	1D
1	Str +1	Major *	Astrogator	Broker	Computer	Broker	One Art	1
2	C2 +1	Major *	Pilot	Trader	Trader	Admin	One Science	2
3	C3 +1	Minor *	Medic	Diplomat	Driver	Language	Computer	3
4	Int +1	Minor *	Sensors	Admin	Advocate	Starship Skill	Comms	4
5	C5 +1	One Trade	Steward	Steward	Steward	JOT	Medic	5
6	C6 +1**	One Trade	Gunner	Trader	Comms	Vacc Suit	One Trade	6

\*If the character does not have a Major/Minor this benefit is lost.

\*\*If the character has C6=Caste, this benefit is lost.

### MERCHANT RISK & REWARD

	Failure	Success
Risk	Injury	Uninjured
Reward	No Reward	Ship Shares

Select Caution, Bravery, or No Mod.

Roll for Risk against CC+ Mods.  
**Risk Failure:** Reduce CC by negative Mods and Flux (CC may not be increased). If CC is reduced by 4 or more, then he is disabled. Muster Out at Term end with Double Benefits.

**Risk Success:** Unharmed.

### Escalating Ship Shares

Ship Share Rewards are awarded equal to the receipt number.

First	1 Ship Share
Second	2 Ship Shares
Third	3 Ship Shares
Fourth	4 Ship Shares
Fifth	5 Ship Shares
Sixth	6 Ship Shares

Roll for Reward against CC+ (opposite sign) Mods.

**Reward Failure:** No Reward.

**Reward Success:** Every Reward gives the character Ship Shares, redeemable toward ownership of a ship upon mustering out (a typical merchant ship is 10 to 20 shares).

### D MUSTER OUT

1D	Money	Benefits
1	Cr40,000	Str+1
2	StarPass	C5+1
3	StarPass	Wafer Jack
4	High Psg	C2 +1
5	High Psg	C3 +1
6	StarPass	Life Insur
7	Cr25,000	Ship Share
8	Cr30,000	Knighthood
9	Cr35,000	Ship Share
10	Cr40,000	Ship Share
11	Cr50,000	Ship Share
12	Cr90,000	Knighthood
DM	+ Terms	+ Officer Rank

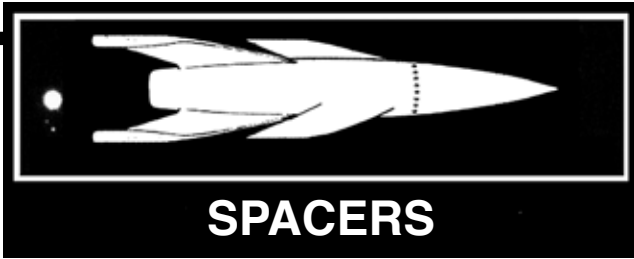
### TABLE OF MERCHANT RANKS

Rank / Title	Auto Skill
RX Temp	
R0 Spacehand	
R1 Steward Apprentice	Steward
R2 Drive Helper	Engineer
M1 Fourth Officer	Steward
M2 Third Officer	Engineer
M3 Second Officer	Astrogator
M4 First Officer	Pilot
M5 Captain	
M6 Senior Captain	

R-Ranks are Ratings (or Enlisted).

M-Ranks are Officers.

Temp is casual or untrained.



# SPACERS

## Character Generation

# Spacer 07

**Spacer.** Someone who serves in a [space] navy or works on an armed (star) ship. Naval Officer. Naval Rating. Sailor (archaic).

### THE SPACER CAREER

The Navy protects and defends the space between the worlds: the space lanes that sustain the empire.

**Determine Branch and Mod.** Officers may not change Branch; Enlisted may select a new Branch upon Promotion.

**Operations.** Spacer rolls 4 times per Term for Operations; select the highest Mod from the four. Resolve ANM School as Education.

### A SPACER CAREER

To Begin	Int
Select Branch	Soc
Risk & Reward	Str C2 Int
Officer Promotion	Soc*
Officer Commission	C2
Rating Promotion	C2*
Continue	Str

\*+Medals and WB Mods

### B SKILL ELIGIBILITY

Per Term	4
Commission	1
Promotion	1
Automatic Skills	by Rank

### D MUSTER OUT

1D	Money	Benefits
1	Low Psg	Forbidden K
2	Mid Psg	Str +1
3	High Psg	Wafer Jack
4	StarPass	C5 +1
5	Cr30,000	Str +1
6	Cr40,000	C2 +1
7	Cr50,000	C3 +1
8	Retire x2	Int +1
9	Retire x2	Ship Share
10	Cr60,000	Life Insur
11	Cr70,000	Knighthood
DM	+Terms	+Officer Rank

**Resolve Risk & Reward.** Select mod for Bravery, Caution, or No Mod. Add Branch and Operation Mods.

### SPACER RISK & REWARD

	Failure	Success
Risk	Wound Badge Wounded	Campaign Ribbon Unharmmed
Reward	No Reward	Campaign Ribbon Medal

Select Caution, Bravery, or No Mod plus Branch and Operations Mods.

Roll for **Risk** against CC+ Mods.

**Success:** Receive Campaign Ribbon.

Character is unharmmed.

**Failure:** Reduce CC by negative Mods and Flux (CC may not be increased). If reduced by 4 or more, then Disabled. Muster Out at Term end with Double Benefits.

Roll for **Reward** against CC+ (using opposite sign) Mods.

**Success:** Campaign Ribbon and consult Medals table.

**Failure:** No Reward.

### ENLISTED NAVAL RANKS

Rank / Title	Auto Skill
R1 Spacehand	Fighter
R2 Able Spacer	
R3 Petty Officer Second	
R4 Petty Officer First	Gunner
R5 Chief Petty Officer	Sensors
R6 Master Chief Petty Officer	

Automatic Skills (Officer or Enlisted):  
if Medical Branch= Medic-1  
If Technical Branch= any Trade.

### OFFICER NAVAL RANKS

Rank / Title	Auto Skill
O1 Ensign	Astrogator
O2 Sublieutenant	
O3 Lieutenant	Engineer
O4 Lt Commander*	Pilot
O5 Commander	
O6 Captain	Leader
O7 Admiral	

\*Command College in Year 1 of next Term (if Continue).

### C SPACER SKILLS

1D	1 Personal	2 Shore Duty	3 Battle	4 Patrol/Strike	5 Siege	6 Mission	7 Technical	1D
1	Str +1	Major *	Fighter	Astrogator	Computer	Diplomat	One Art	1
2	C2 +1	Major *	Fleet Tactics	Fleet Tactics	Strategy	Admin	One Science	2
3	C3 +1	Minor *	Pilot	Computer	Counsellor	Language	Athlete	3
4	Int +1	Minor *	Starship Skill	Starship Skill	Gunner	Starship Skill	Medic	4
5	C5 +1	One Trade	Gunner	Gunner	Gunner	Liaison	Zero-G	5
6	C6 +1**	One Trade	Sensors	Sensors	Sensors	Comms	One Trade	6

\*If the character does not have a Major/Minor this benefit is lost.

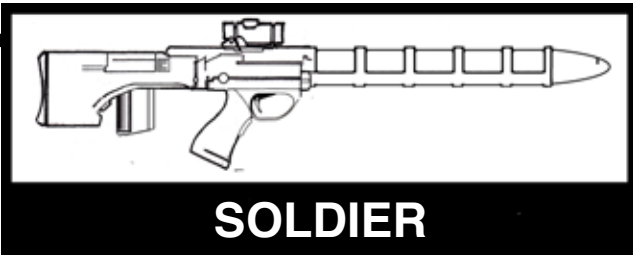
\*\*If the character has C6=Caste, this benefit is lost.



## Character Generation

# 08 Soldier

**Soldier.** One who serves in a fighting force or in an army. Trooper. Fighter. Man-at-arms. Warrior. Hero. Amazon. Militiaman. Combatant. Mercenary.



## SOLDIER

### THE SOLDIER CAREER

Soldiers defend civilization; they are the peacekeepers and guardians of government and society.

**Determine Branch and Mod.** Officers may not change Branch; Enlisted may select new Branch on Promotion.

**Operations.** Rolls 4 times per Term for Operations; select the highest Mod of the four. Resolve ANM School using Education.

### A SOLDIER CAREER

To Begin	Str
Select Branch	Soc
Risk & Reward	Str C3 Int
Officer Promotion	Soc*
Officer Commission	C3
Enlisted Promotion	C3*
Continue	End

\*+Medals and WB Mods

### B SKILL ELIGIBILITY

Per Term	4
Commission	1
Promotion	1
Automatic Skills	by Rank

### D MUSTER OUT

1D	Money	Benefits
1	Low Psg	Forbidden K
2	Mid Psg	Str +1
3	High Psg	Wafer Jack
4	StarPass	C5 +1
5	Cr30,000	Int +1
6	Cr40,000	C2 +1
7	Cr50,000	C3 +1
8	Retire x2	Life Insur
9	Retire x2	TAS Fellow
10	Cr60,000	Knighthood
DM	+Terms	+Officer Rank

### ARMY BRANCH

1D	Officer	Mod
1	Infantry	1
2	Infantry	1
3	Artillery	1
4	Cavalry	1
5	Protected	2
6	Protected	2
7	Technical	0
8	Medical	0

DM +2 if Edu 10+

### ARMY OPERATIONS

1D	Operation	Mod	DM By Branch
1	Combat	2	
2	Combat	2	Protected +0
3	Peace Keeper	1	Infantry +1
4	Mission	2	Cavalry +3
5	ANM School	0	Medical +4
6	Combat	3	Artillery +5
7	Peace Keeper	1	Technical +6
8	Mission	2	
9	Base	0	

1D+Branch DM plus +2 if Edu 10+

**Resolve Risk & Reward.** Select Bravery, Caution, or No Mod.

### SOLDIER RISK & REWARD

	Failure	Success
Risk	Wound Badge Wounded	Campaign Ribbon Unharmd
Reward	No Reward	Campaign Ribbon Medal

Select Caution, Bravery, or No Mod plus Branch and Operations Mods.

Roll for **Risk** against CC+ Mods.

**Success:** Receive Campaign Ribbon.

Character is unharmd.

**Failure:** Reduce CC by negative Mods and Flux (CC may not be increased). If reduced by 4 or more, then Disabled. Muster Out at Term end with Double Benefits.

Roll for **Reward** against CC+ (using opposite sign) Mods.

**Success:** Campaign Ribbon and consult Medals table.

**Failure:** No Reward.

### ENLISTED SOLDIER RANKS

Rank / Title	Auto Skill
S1 Private	Fighter
S2 Corporal	
S3 Sergeant	Heavy Weapons
S4 Staff Sergeant	Leader
S5 Master Sergeant	
S6 Sergeant Major	

Automatic Skills (Officer or Enlisted):

if Medical Branch= Medic-1

If Technical Branch= any Trade.

### OFFICER SOLDIER RANKS

Rank / Title	Auto Skill
O1 2nd Lieutenant	Leader
O2 1st Lieutenant	
O3 Captain	
O4 Major*	Tactics
O5 Lt Colonel	
O6 Colonel	Leader
O7 General	

\*Command College in Year 1 of next Term (if Continue).

### C SOLDIER SKILLS

1D	1 Personal	2 Base	3 Combat	4 Peacekeeper	5 Occupation	6 Mission	7 Technical	1D
1	Str +1	Major *	Fighter	Admin	Fighter	Soldier Skill	One Art	1
2	C2 +1	Major *	Vacc Suit	Fighter	Vacc Suit	Liaison	One Science	2
3	C3 +1	Minor *	Fighter	Hostile Environ	Driver	Language	Explosives	3
4	Int +1	Minor *	Stealth	Animals	Stealth	Soldier Skill	Medic	4
5	C5 +1	One Trade	Leader	Liaison	Heavy Wpns	Computer	Seafarer	5
6	C6 +1**	One Trade	Tactics	Navigation	Sensors	Tactics	One Trade	6

\*If the character does not have a Major/Minor this benefit is lost.

\*\*If the character has C6=Caste, this benefit is lost.



# Character Generation

# Agent 09



## AGENT

**Agent.** The authorized representative of a government, organization, or company. Operative. Diplomat. Emissary. Deputy. Negotiator. Enforcer. Paladin.

### AGENT MISSIONS

The focus of the Agent is Missions: accomplishing the needs of a controlling organization. Each is one Term in length: two years Undercover in a different career (investigating, gathering information, preparing); followed by two years completing the Mission.

Roll for Undercover Assignment. Select (not Roll) one skill from the skill tables of that Career.

### A AGENT CAREER

To Begin C3  
Risk & Reward Str C2 C3 Int  
Continue Str  
\*Mod +Terms

### B SKILL ELIGIBILITY

Per Term 2  
Undercover 1  
Successful Mission 4

### D MUSTER OUT

1D	Money	Benefits
1	Low Psg	Ship Share
2	Low Psg	Forbidden K
3	Mid Psg	Wafer Jack
4	High Psg	C5 +1
5	Cr 15,000	Str +1
6	StarPass	C2 +1
7	Cr25,000	C3 +1
8	Cr30,000	Ship Share
9	Cr35,000	Life Insur
10	Cr40,000	TAS Fellow
11	Cr80,000	Fame +2
12	Cr90,000	Knighthood
DM	+Terms	+Commends

### AGENT RISK & REWARD

	Failure	Success
Risk	Injured	Safe
Reward	No Reward	Commendation

Select Caution, Bravery, or No Mod. Roll for Risk against CC+ Mods.

**Risk Failure:** Reduce CC by negative Mods and Flux (CC may not be increased). If CC is reduced by 4 or more, then he is disabled. Muster Out at Term end with Double Benefits. **Risk Success:** Safe.

Roll for Reward against CC+ (opposite sign) Mods.

**Reward Failure:** No Reward.

**Reward Success:** The Agent is recognized with a Commendation: official documents which express the appreciation of the organizations involved.

### AGENT UNDERCOVER ASSIGNMENT

		C			
A	B	1	2	3	
1	1	Army Enlisted	Private	Corporal	Sergeant
1	2	Army Officer	First Lieutenant	Captain	Major
1	3	Marine Enlisted	Corporal	Sergeant	Master Sergeant
1	4	Marine Officer	Captain	Force Commander	Coronel
1	5	Navy Enlisted	Able Spacer	Petty Officer First	Master Chief
1	6	Navy Officer	Lieutenant	Commander	Captain
2	1	Scholar	Amateur	Lecturer	Instructor
2	2	Scholar	Asst Professor	Professor	Dist Professor
2	3	Entertainer	Musician	Actor	Dancer
2	4	Entertainer	Artist	Author	Chef
2	5	Citizen	Roll on Citizen Life Skills for Job		
2	6	Citizen	Roll on Citizen Life Skills for Hobby		
3	1	Merchant	Engineer	Astrogator	Steward
3	2	Merchant	Pilot	Freightmaster	Counsellor
3	3	Scout	Courier	Courier	Courier
3	4	Scout	World Discover		
3	5	Noble	Knight	Baron	Marquis
3	6	Functionary			

Roll three dice for a specific Skill or Knowledge: Roll A (reroll if >3), then roll B, and finally top row C (reroll if >3) if required.

### C AGENT SKILLS

1D	1 Personal	2 Academic	3 Travel	4 Mission	5 Conflict	6 Vocation	7 Avocation	1D
1	Str +1	Major *	Zero-G	Survey	Fighter	Any Knowledge	One Art	1
2	C2 +1	Major *	Vacc Suit	Survival	Soldier Skill	Admin	One Science	2
3	C3 +1	Minor *	Pilot	Hostile Environ	Flyer	Language	Athlete	3
4	Int +1	Minor *	Starship Skill	Animals	Stealth	Starship Skill	Medic	4
5	C5 +1	One Trade	Gunner	Bureaucrat	Gunner	Forensics	Seafarer	5
6	C6 +1**	One Trade	Sensors	Navigation	Streetwise	Comms	One Trade	6

\*If the character does not have a Major/Minor this benefit is lost.

\*\*If the character has C6=Caste, this benefit is lost.



## Character Generation

# 10 Rogue

**Rogue:** A scoundrel, rascal, or deceiver. Knave. Scamp. Bandit. Highwayman. Pirate. Corsair. Brigand. Privateer. Thief. Robber. A Non-Conformist.



### A ROGUE CAREER

To Begin	CC
Risk & Reward	CC*
Continue	CC*

\*Mod +Terms.

### B SKILL ELIGIBILITY

Per Term	2
Failed Scheme	1
Successful Scheme	4
In Prison	2

Term Skills from Rogue Skills table.

**In Prison:** Prison Skills from the Rogue Skills table column 1 or 2 only. Receives ONLY Prison Skills (not Term or Scheme Skills).

### D MUSTER OUT

1D	Money	Benefits
1	Cr40,000	Str+1
2	StarPass	C5+1
3	StarPass	Wafer Jack
4	High Psg	C2 +1
5	High Psg	C3 +1
6	StarPass	Life Insur
7	Cr25,000	Ship Share
8	Cr30,000	Knighthood
9	Cr35,000	Ship Share
10	Cr40,000	Ship Share
11	Cr50,000	Ship Share
12	Cr90,000	Knighthood
DM	+Total Terms	+Total Terms

### THE ROGUE

A Rogue focuses on a Scheme: a plan to amass at the expense of others.

In each Term, the Rogue masterminds a Scheme (from the Rogue Schemes table).

A Rogue selects one Controlling Characteristic (Str C2 C3 Int C5 C6) which is then used throughout his career (not just the Term).

### ROGUE SCHEMES

1D	Career	Value
1	Craftsman	Cr200,000
2	Scholar	Cr100,000
3	Entertainer	Cr300,000
4	Citizen	Cr 50,000
5	Scout	one Ship Share
6	Merchant	one Ship Share
7	Spacer	Cr100,000
8	Soldier	Cr 50,000
9	Agent	Cr100,000
10	Rogue	Cr100,000
11	Noble	Cr500,000
12	Marine	Cr 50,000
13	Functionary	Cr100,000

Create a DM to apply to the 1D Roll (any value from 0 to 7) which then defines the six possible scheme careers.

A Rogue may select for his Scheme (rather than roll) any previous career.

### ROGUE RISK & REWARD

	Risk	Reward
Failure	Prison for (sum of negative Mods + Flux) years at the start of the next Term (may be zero; maximum 4). Fame +1 (actually Infamy). Payoff (if any) is halved	No Reward
Success	Unharmed	Payoff= <b>V x (1+CC-R+Mods)</b> V= Value of Scheme CC= Controlling Characteristic R= Reward Die Roll Mods= Mods for Reward
	Roll R&R CC +Mods	Roll R&R CC +(opposite sign) Mods
	Select Caution, Bravery, or No Mod and Mod+Terms.	

### C ROGUE SKILLS

1D	1 Personal	2 Academic	3 World Travel	4 Space Travel	5 Business	6 Vocation	7 Avocation	1D
1	Str +1	One Science	Driver	Starship Skill	Trader	Advocate	One Art	1
2	C2 +1	Major *	Flyer	Pilot	Broker	Counsellor	One Science	2
3	C3 +1	Minor *	Hostile Environ	Engineer	Computer	Language	Athlete	3
4	Int +1	One Art	High-G	Zero-G	JOT	Leader	Soldier Skill	4
5	C5 +1	One Trade	Vacc Suit	Vacc Suit	Teacher	Streetwise	Starship Skill	5
6	C6 +1**	Gambler	Navigation	Astrogator	Fighter	Comms	One Trade	6

\*If the character does not have a Major/Minor this benefit is lost.

\*\*If the character has C6=Caste, this benefit is lost.



**Character Generation**

**Noble 11**

**Noble.** One with a higher rank in a social class or political system. Ruler. Chief. Politician. Archon. Scion. Dilettante. Heir. Heiress. Aristocrat. Royal.

**NOBILITY**

Nobility is constantly involved in a contest for greater power.

**Exile** is a banishment to the edges of the empire orchestrated by political enemies. If not in Exile, ignore Return.

A Noble may not pursue another career after this one.

**A NOBLE CAREER**

To Begin	Automatic*
Risk & Reward	C2 C3 Int C5**
Elevation	By Intrigue
Continue	7

\*if Soc B+.

**B SKILL ELIGIBILITY**

Per Term 4  
When Elevated 2

**D MUSTER OUT**

1D	Money	Benefits	Power
1	StarPass*	Forbidden	Proxy (1)
2	StarPass*	Str +1	Proxy (2)
3	StarPass*	Wafer Jack	Proxy (3)
4	StarPass*	C5 +1	Proxy (4)
5	Cr100,000	Directorship	Proxy (5)
6	Cr200,000	C2 +1	Proxy (6)
7	Cr300,000	C3 +1	Proxy (2D)
8	Cr400,000	Int +1	Proxy (2D)
9	Cr500,000	Ship Share	Proxy (2D)
10	Cr600,000	Life Insur	Proxy (2D)
11	Cr700,000	TAS Life	Proxy (2D)
12	Cr800,000	Directorship	Proxy (2D)
DM	+Total Terms	+Total Terms	+Total Terms

\*Upgraded to High Passage as a courtesy.

**C NOBLE SKILLS**

1D	1 Personal	2 Academic	3 Travel	4 General	5 Political	6 Vocation	7 Technical	1D
1	Str +1	Major *	Driver	Advocate	Liaison	Capital ***	One Art	1
2	C2 +1	Major *	Flyer	Counsellor	Strategy	Admin	One Science	2
3	C3 +1	Minor *	Pilot	Bureaucrat	Tactics	Language	Athlete	3
4	Int +1	Minor *	Starship Skill	Liaison	Diplomat	Starship Skill	Soldier Skill	4
5	C5 +1	One Trade	High-G	Leader	Advocate	Bureaucrat	Starship Skill	5
6	C6 +1**	One Trade	Zero-G	Leader	Leader	Comms	One Trade	6

\*If the character does not have a Major/Minor this benefit is lost. \*\*If the character has C6=Caste, this benefit is lost.

\*\*\*Capital= World Knowledge (of world of highest held noble Land Grant) (value= 1D).

**NOBLE RETURN & INTRIGUE**

	Return Roll only if in Exile	Intrigue Roll only if <b>not</b> in Exile
Failure	Continued Exile; may not attempt Intrigue	Exile
Success	Return from Exile	<b>Elevation:</b> Roll Soc or greater (no Mods but possibly Flux) to rise to the next higher Noble rank and its increase in Social Standing (if any).

Roll R&R CC +Mods  
Mod= -Successful Intrigues. Mod= +Times Exiled.

**Flux.** Once in the Noble Career after a successful Intrigue, invoke Flux as a Mod on Elevation roll.

**Land Grants.** Each increase in Soc during CharGen awards a Land Grant.

**Fame.** Nobles have a Base Fame equal to 1.5 times Soc.

**NOBLE LAND GRANTS**

Soc Noble	Where?	Preferred World	Hexes MW	other
A Gentleman			any	any 1
B Knight	homeworld		any	1 1
c Baronet	one system	Pre-Ag or Pre-Ri		2 2
C Baron	one system	Ag or Ri		4 4
D Marquis	one subsector	Pre-Ind		8 8
e Viscount	one subsector	Pre-Hi		16 16
E Count	one sector	In or Hi		32 32
f Duke*	one sector	Importance*=4+		64 64
F Duke*	one sector	Capital**		128 128
G Archduke	one domain		any	256 256
H Imperial Family	in the empire		any	256 256
H Emperor	in the empire		any	256 256

\*but not a Capital. \*\*Subsector or Sector Capital.

Nobles receive Land Grants associated with their fiefs. Each noble title confers a Land Grant. Each Hex generates a profit equal to Cr10,000 per Trade Classification per year.

A Hex with no TC generates Cr5,000 annually.



## Character Generation

# 12 Marine

**Marine.** One who serves in a naval infantry unit. An elite fighter. A commando. Special Forces. A soldier in naval service serving aboard a starship.



## MARINE

### THE MARINE CAREER

Marines are the elite defenders of the Empire..

**Branch.** Determine Marine Branch and its Mod. Officers may not change Branch once selected; Enlisted may select a new Branch upon Promotion.

**Operations.** Roll 4 times per Term for Operations; select the highest Mod from the four. Resolve ANM School as Education.

### A MARINE CAREER

To Begin	Str
Select Branch	Soc
Risk & Reward	Str Int
Officer Promotion	Soc*
Officer Commission	C3
Enlisted Promotion	Str*
Continue	Str

\*+Medals and WB Mods

### B SKILL ELIGIBILITY

Per Term	4
Commission	1
Promotion	1
Automatic Skills	by Rank

### D MUSTER OUT

1D	Money	Benefits
1	Low Psg	Forbidden K
2	Mid Psg	Str +1
3	High Psg	Wafer Jack
4	StarPass	C5 +1
5	Cr30,000	Int +1
6	Cr40,000	C2 +1
7	Cr50,000	Life Insur
8	Retire x2	Ship Share
9	Retire x2	Directorate
10	Cr60,000	Knighthood
DM	+Terms	+Officer Rank

**Resolve Risk & Reward.** Select Bravery, Caution, or No Mod.

### MARINE BRANCH

1D	Officer	Mod
1	Infantry	1
2	Infantry	1
3	Artillery	1
4	Cavalry	1
5	Protected	2
6	Commando	2
7	Technical	0
8	Medical	0

DM +2 if Edu 10+

### MARINE OPERATIONS

1D	Operation	Mod	DM By Branch
1	Combat	2	Commando +0
2	Combat	2	Protected +1
3	Peace Keeper	1	Infantry +2
4	Mission	2	Cavalry +3
5	ANM School	0	Medical +4
6	Combat	3	Artillery +5
7	Peace Keeper	1	Technical +6
8	Mission	2	
9	Garrison	0	

1D + Branch DM plus +2 if Edu 10+

### MARINE RISK & REWARD

	Failure	Success
Risk	Wound Badge Wounded	Campaign Ribbon Unharmd
Reward	No Reward	Campaign Ribbon Medal

Select Caution, Bravery, or No Mod plus Branch and Operations Mods.

Roll for **Risk** against CC+ Mods.

**Success:** Receive Campaign Ribbon.

Character is unharmed.

**Failure:** Reduce CC by negative Mods and Flux (CC may not be increased). If reduced by 4 or more, then Disabled. Muster Out at Term end with Double Benefits.

Roll for **Reward** against CC+ (using opposite sign) Mods.

**Success:** Campaign Ribbon and consult Medals table.

**Failure:** No Reward.

### ENLISTED MARINE RANKS

Rank / Title	Auto Skill
S1 Private	Fighter
S2 Lance Corporal	
S3 Sergeant	Heavy Weapons
S4 Staff Sergeant	Tactics
S5 Master Sergeant	Leader
S6 Sergeant Major	

Automatic Skills (Officer or Enlisted):

if Medical Branch= Medic-1

If Technical Branch= any Trade.

### OFFICER MARINE RANKS

Rank / Title	Auto Skill
O1 2nd Lieutenant	Leader
O2 1st Lieutenant	
O3 Captain	
O4 Force Commander*	Tactics
O5 Lt Colonel	
O6 Colonel	Leader
O7 Brigadier	

\*Command College in Year 1 of next Term (if Continue).

### C MARINE SKILLS

1D	1 Personal	2 Garrison	3 Combat	4 Peacekeeper	5 Occupation	6 Mission	7 Technical	1D
1	Str +1	One Trade	Fighter	Vacc Suit	Fighter	Soldier Skill	One Art	1
2	C2 +1	Major *	Fighter	Fighter	Fighter	Survival	One Science	2
3	C3 +1	Minor *	Soldier Skill	Hostile Environ	Flyer	Language	Explosives	3
4	Int +1	Gambler	Soldier Skill	Stealth	Stealth	Gunner	Medic	4
5	C5 +1	Athlete	Leader	Leader	Leader	Leader	Seafarer	5
6	C6 +1**	One Trade	Tactics	Tactics	Heavy Wpns	Fighter	One Trade	6

\*If the character does not have a Major/Minor this benefit is lost.

\*\*If the character has C6=Caste, this benefit is lost.



# FUNCTIONARY

Character Generation

# Functionary 13

**Functionary:** One who holds an office or position of trust or performs a particular function; an official. Inspector. Bureaucrat. Manager. Supervisor. Administrator.

## FUNCTIONARIES

The focus of a every Functionary is Office Politics and its associated efforts to preserve and expand the power of a specific office.

Each Functionary is charged with supervising or managing the operations of a bureaucracy. The natural consequence of Office Politics is promotion for Success and job loss for Failure.

### A FUNCTIONARY CAREERS

To Begin Auto  
Office Politics C2 C3 Int C5  
Continue Office Politics

### B SKILL ELIGIBILITY

Per Term 4  
Per Promotion 1

### D MUSTER OUT

1D	Money	Benefits
1	Cr 5,000	Forbidden K
2	Cr10,000	Str +1
3	Cr15,000	Wafer Jack
4	Cr20,000	Str +1
5	High Psg	C2 +1
6	StarPass	C3 +1
7	Cr25,000	Int +1
8	Cr30,000	Life Insur
9	Cr35,000	TAS Fellow
10	Pension x2	Knighthood
11	Pension x2	Directorship
DM	+ Terms	+Officer Rank

Automatic: Gold Watch  
(Value= 100 x Terms as Functionary)  
Automatic: Directorship if Rank F6+.

### WHAT TYPE OF FUNCTIONARY?

The Functionary position is usually associated with a prior career: a soldier finds a position in the civilian defense establishment; a scholar becomes an educational administrator; a merchant becomes a functionary at a starport or trade administration, an entertainer becomes part of the sales and marketing arm of the local entertainment industry, a scout becomes a civilian at a Scout Base.

The Functionary character must identify with which prior career his position is associated.

Note that a noble may not become a Functionary.

### Not A First Career

Functionary is never a first career.

### FUNCTIONARY RANKS

Rank / Title	Auto Skill
F0 Clerk	Bureaucrat
F1 Supervisor	
F2 Senior Supervisor	Admin
F3 Manager	Bureaucrat
F4 Senior Manager	
F5 Assistant Director	
F6 Director	
F7 Nth UnderSecretary*	
F8 Secretary	

\* N= 1D (ie: 3rd UnderSecretary).

Scholar F6 =College President.  
Entertainer F6 =Association Director.  
Merchant F6 =Starport Warden.  
Rogue F6 =Bank President.

### OFFICE POLITICS

	Failure	Success
Risk	Cannot Continue	Must Continue
Reward	Not Promoted	Promoted

Roll for Risk against CC. No Mods are used for Office Politics.

**Risk Failure:** Functionary career ends. The character may not Continue.

**Risk Success:** Functionary may continue in the career.

Roll for Reward against CC

**Reward Failure:** Functionary is not promoted.

**Reward Success:** Functionary is promoted one rank.

### C FUNCTIONARY SKILLS

1D	1 Personal	2 Academic	3 World Travel	4 General	5 Business	6 Vocation	7 Avocation	1D
1	Str +1	Major *	High-G	One Trade	Advocate	Advocate	One Art	1
2	C2 +1	Major *	Vacc Suit	One Art	Broker	Comms	One Science	2
3	C3 +1	Minor *	Driver	One Science	Trader	Language	Athlete	3
4	Int +1	Minor *	Flyer	Any Skill***	Teacher	Admin	Designer	4
5	C5 +1	One Trade	Navigation	Bureaucrat	One Trade	Bureaucrat	Seafarer	5
6	C6 +1**	One Trade	Seafarer	Leader	Driver	Comms	One Trade	6

\*If the character does not have a Major/Minor this benefit is lost. \*\*If the character has C6=Caste, this benefit is lost.

\*\*\*from Citizen Life Skills and Knowledges.





## Character Generation

# L Land Grants

Land Grants are awards of territory given by the government in recognition of political power or important works.

### IMPERIAL FIEFS

Nobles of the Imperium receive, as part of their grant of title, a fief: a Noble Land Grant expressed as hexes on world geodesic maps.

The first hex in any grant is on the Noble's homeworld. All subsequent hexes are randomly allocated. For each hex on a mainworld, a noble is also allowed one hex on a non-mainworld in the same system.

The Imperium prefers grants to worlds with high potential for development: those with Atmos 2-9, Hydrographics 4-8 (with proper development the world can become In, Ri, or Ag).

**Land Grants are cumulative.** Each title confers its own Land Grant. A Knight elevated to Baronet receives the Baronet Grant in addition to his Knight grant.

**Income.** A Land Grant is a source of income: each hex of a Land Grant produces annually Cr10,000 per Trade Classification of the world (if no Trade Classifications, then Cr5,000).

For example, recently knighted Sir Richard of Hefry (Trade Classifications

### THE AWARD OF LAND GRANTS

Land Grants are awarded by the Emperor to Nobles and to Explorer-Discoverers.

**Nobles** receive Lands as part of their Patent of Nobility.

**Explorers** receive Land Grants in recognition of their discoveries.

Ni Va) has a Land Grant of one Terrain Hex on Hefry producing an income of Cr20,000 annually, and a companion Land Grant on a minor world (no Trade Classifications) somewhere else in the system producing Cr5,000 annually. The income is not especially great, but it has helped him through hard times more than once.

### NOBLE PROXIES

Every Noble has the right to vote in the legislative body of the Imperium: the Moot. Because of the great distances within the empire, it is impractical for every noble to attend and participate in every session. Indeed, most nobles never attend sessions of the Moot.

**Weighted Voting.** The votes of Nobles are weighted according to their rank (= Soc minus 11); thus, a Baron or Baronet has one vote, a Duke has four votes.

**Assignable Proxies.** Most nobles assign their right to vote to a trusted colleague. Those nobles in the Moot who hold many proxies are powerful politicians with the ability to grant great favors, assign incomes from the Imperial treasury, or ( in a negative sense)

inflict great harm to their enemies.

A Proxy is assignable to any other Noble of equal or greater rank. It is revocable at the end of any calendar year, and renews automatically if not revoked. A Noble who enters the Moot while in session automatically revokes his Proxy and may participate and vote in the deliberations of the Moot (although he will be expected to repay his Proxy fees).

**Values.** A Proxy is worth about Cr100,000 per vote. Thus, a Baron with one vote can expect a powerful politician to pay annually about Cr100,000 for his proxy.

**Complications.** The entire matter of proxies is complex. For characters far from the Capital, proxies are seen only as a source of income; for those actively involved in politics, they are a matter of constant negotiation and intrigue.

### DISCOVERER LAND GRANTS

The Imperium makes Land Grants to the discoverers of new worlds.

**Inside The Imperium.** The Land Grant operates much like a Noble grant. Most such grants were made long ago, but there are few discoverable worlds now available inside the empire.

**Outside the Imperium.** The Land Grant can be actualized only if and when the world is admitted to the Imperium, or when it attains client-state status. Until then, the holder of a Discovery Land Grant can travel to the world and (attempt to) take possession of the actual land and develop it.

Many Discovery Land Grants have been made over the centuries, and most have lain in safe deposit boxes for generations, waiting for the time when the world enters the Imperium.

Until actualized, such grants produce no income. They are often sold by heirs for pittances.

### NOBLE LAND GRANTS

Soc Noble	Where?	Preferred World	Hexes		other
			MW		
A Gentleman			any	any	1
B Knight	homeworld		any	1	1
c Baronet	one system	Pre-Ag or Pre-Ri	2	2	
C Baron	one system	Ag or Ri	4	4	
D Marquis	one subsector	Pre-Ind	8	8	
e Viscount	one subsector	Pre-Hi	16	16	
E Count	one sector	In or Hi	32	32	
f Duke*	one sector	Importance*=4+	64	64	
F Duke*	one sector	Capital**	128	128	
G Archduke	one domain	any	256	256	
H Imperial Family	in the empire	any	256	256	
H Emperor	in the empire	any	256	256	

\*but not a Capital. \*\*Subsector or Sector Capital.

Nobles receive Land Grants associated with their fiefs. Each noble title confers a Land Grant. Each Hex generates a profit equal to Cr10,000 per Trade Classification per year.

A Hex with no TC generates Cr5,000 annually.

### NOBLE VOTING

Votes	Total Value
no votes	
1	Cr100,000
1	Cr100,000
2	Cr200,000
3	Cr300,000
3	Cr300,000
4	Cr400,000
4	Cr400,000
5	Cr500,000
6	Cr600,000



# Aging A

Characters naturally grow old and as they do they experience the effects of Aging.

## THE AGING PROCESS

Aging affects a character's physical and mental characteristics, ultimately reducing them to zero and bringing on inevitable in death.

Characters are immune to Aging for roughly the first half of their lives. Once Aging begins, it occurs every four years on the character's birthday.

## NORMAL AGING

Physical Aging affects all of the Physical Characteristics.

Mental Aging affects some of the Mental Characteristics.

Human Physical Aging affects Strength, Dexterity, and Endurance. It begins at age 34 (the beginning of Life Stage 5 Peak) and is resolved as an Aging Check.

Human Mental Aging affects Intelligence. It begins at age 66 (the beginning of Life Stage 9- Retirement) and is resolved as an Aging Check.

Sophont Physical Aging affects the Physical Characteristics C1 Strength, C2 Dexterity Agility Grace, and C3 Endurance Stamina Vigor. It begins at the beginning of Life Stage 5- Peak) and is resolved as an Aging Check.

Sophont Mental Aging affects Intelligence and Instinct (if present). It begins at the start of Life Stage 9- Retirement and is resolved as an Aging Check.

## THE AGING CHECK

The Aging Check determines if a characteristic is reduced by aging.

**Every Four Years.** The Aging Check is resolved every four years on the character's birthday. The Crisis is rolled for each applicable Characteristic.

To Feel Age Effects (The Aging Check)

2D < Life Stage

Success inflicts the effects of age on the character.

(A character wants to FAIL this action).

If the Aging Check imposes an effect, the characteristic is reduced -1.

If one Characteristic is reduced to 0, it is reset to 1.

If two Characteristics are reduced to 0, the character suffers a major illness and must spend four weeks in rest and recuperation. The two characteristics are each reset to 1.

If three Characteristics are reduced to 0, the character suffers an extremely major illness and must spend four months in rest and recuperation. The three characteristics are each reset to 1. The second time three characteristics are reduced to 0, the character dies.

## CLONE AGING

The Forced Growth Cloning process (for Relicts, Guests, and Meds) accelerates the aging pattern of the individual:

Clone Physical Aging begins at Life Stage 4 (one stage earlier than the original sophont);

Clone Mental Aging begins at Life Stage 8 (also one stage earlier than the original sophont).

On the other hand, Natural and Offspring clones are not subject to accelerated clone aging, and they age normally.

## TRADITIONAL LIFESPAN

Traditional Lifespan is the sum of the lengths of the Life Stages. For example, Humans have a 2-year infancy and nine stages of 8 years each. The traditional lifespan for humans is 74 years (although certainly some may live longer, and some may live shorter lives).

## THE STAGES OF LIFE

No	Life Stage	Human Years	Terms
0	Infancy	0- 1	1/2
1	Childhood	2- 9	2
2	Adolescence	10-17	2
3	Young Adult*	18-25	2
4	Adult	26-33	2
5	Peak	34-41	2
6	Mid-Life	42-49	2
7	Senior	50-57	2
8	Elder	58-65	2
9	Retirement	66-71	2

\*typical start of adventuring

## LIFE STAGES

Characters pass through a series of Life Stages from infancy to old age. After Infancy, each Life Stage is two terms (8 years; this may differ for non-humans).

These stages include:

**0. Infant.** A helpless infant under the care of an adult caregiver. All sophonts have an approximately 2-year-long infancy.

**1. Child.** An immature member of a family group receiving basic education.

**2. Teen.** A gender-mature individual not yet fully responsible in society. The first two years of this Life Stage are the period of Gender maturity. Cadet characters are generated and begin play at the beginning of year 3 of Teen. (=12 for Humans).

**3. Young Adult.** A mature individual with full social responsibilities. Traditional adventuring begins at Young Adult (=18 for Humans).

**4. Adult.** A full member of society.

**5. Peak.** An individual at the height of physical and mental abilities. Physical Aging begins at Peak (= 34 for Humans).

**6. Mid-Life.** An individual about half way through a typical life span.

**7. Senior.** An experienced individual.

**8. Elder.** An individual at the greatest levels of personal achievement.

**9. Retirement.** An individual living on the fruits of his prior labors. Mental aging begins at Retirement (= 66 for Humans).



**Character Generation**

**S Ship Shares**

One possible benefit from a career is one or more ownership shares of a ship.

A character may receive one or more Share Shares in the course of character generation.

A character can redeem Ship Shares for a ship appropriate to his career experience. Some acquired ships are provided on loan; others are available as purchases.

**Eligibility.** Ships become available based on a career connection.

**Loaned Ships.** Some ships can be acquired on loan, subject to basic eligibility requirements. The Ship Shares are expended when the loan is made. The loaned ship cannot be sold or mortgaged and is subject to occasional assigned missions by the organizational owner.

**Purchased Ships.** Virtually any ship (although usually Merchants or Corsairs) can be acquired with Ship Shares: one Share acquires 25 tons of the ship (thus, a 200-ton Free Trader requires 8 Ship Shares to acquire full control). Fewer than the required shares may be used, with the remainder financed and subject to monthly payments. Several characters with Ship Shares may pool their resources to acquire a ship, and they take ownership in proportion to their shares.

**Scout/Courier** **1**  
**Ship Share**




**any ex-Scout**

**Lab Ship** **3**  
**Ship Shares**




**any ex-Scholar**

**Corvette**  
**any ex-Navy Officer** **3**  
**Ship Shares**

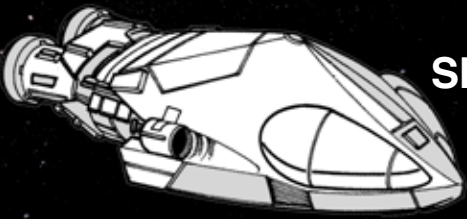


**Corsair** **1**  
**Ship Share**



**any character per 25 tons**

**Yacht** **3**  
**Ship Shares**



**any Noble (Soc B+)**  
**any Fame 17+**

**Trader** **any character** **1**  
**Ship Share**



**per 25 tons**



## Character Generation

# Fame

# F

Determine the fame of characters during the Career process, and after.

### FAME

Fame is the level of recognition or respect society (or specific subdivisions of society such as the military) holds for an individual. Fame is not a guarantee of instant recognition; it is the likelihood that a search of documents or databanks will return information about the individual (and fame may reflect infamy or notoriety).

**Fame Stacks.** A character's Fame is the sum of all Fame points received to 20; beyond 20, only the highest Fame applies.

**Expressing Fame.** Fame is noted as Fame-<level>. A world famous Entertainer has Fame-10: name recognition anywhere on the

### CALCULATING FAME

Current Fame for an individual is based on a variety of accomplishments. For example, Rogue with one Failed Scheme (and no other applicable factors) has Fame = 1 x 3 = 3.

#### FAME

Description	Eligibility	Mult
1 Craftsman	Masterpieces	x 3
1 Craftsman	Perfect Masterpieces	x 5
2 Scholar	=Rank	
2 Scholar	=Publications	
3 Entertainer	detailed under Career	
4 Citizen	no intrinsic Fame	
5 Scout	Discoveries	x 4
6 Merchant	=Rank	
6 Merchant	Ship Owner	= 1D
Army	Officer Rank *	
Marine	Officer Rank *	
Navy	Officer Rank *	
Wound Badge	x 1	
MCUF	x 1	
MCG	x 3	
SEH	x 8	
*SEH*	x 10	
9 Agent	=Commendations	
10 Rogue	Successful Schemes	x 2
10 Rogue	Failed Schemes	x 3
11 Imperial Noble	Soc	x1.5
11 Imperial Noble	Per Exile	+1
*Armed Forces Enlisted = no Fame.		
If NO other eligibility, 1D		
xN = N Fame points per occurrence.		

#### FAME

F=	Descriptor
0	Unknown
1	Parent
2	Close Family
3	Extended Family
4	Neighborhood
5	Town
6	City
7	Large City
8	Regional
9	Continental
10	World
11	World Complex
12	World System
13	Inner System
14	System
15	Greater system
16	Outer System
17	Two Systems
18	Many Systems
19	Subsector
20	Sector
21	Domain
22	Domains
23	Many Domains
24	Empire
25	Beyond Empire
26	Several Empires
27	This Spiral Arm
28	Many Spiral Arms
29	The Galaxy
30	Several Galaxies
31	Many Galaxies
32	The Universe
33	Present Reality
34	Past Realities
35	Future Realities
36	All Reality

### MEDALS

A successful Reward roll in the Armed Forces provides a Medal in recognition. The table uses the unmodified Reward roll from Risk & Reward.

For example, Eneri Dinsha rolls 9 for Reward and is successful. He receives MCUF.

#### MEDALS

Rew	Code	Medal Description	Mod
2	XS	Exemplary Service	+1
3	XS	Exemplary Service	+1
4	XS	Exemplary Service	+1
5	XS	Exemplary Service	+1
6	XS	Exemplary Service	+1
7	XS	Exemplary Service	+1
8	XS	Exemplary Service	+1
9	MCUF	Meritorious Conduct Under Fire	+2
10	MCUF	Meritorious Conduct Under Fire	+2
11	MCG	Medal for Conspicuous Gallantry	+3
12	SEH	Starburst for Extreme Heroism	+4
13	*SEH*	SEH With Diamonds	+5

Rew= Successful unmodified Reward Roll.

But, if the character is an Officer, increase +1.

Medals = Mods for Soldier and Spacer Promotion.

**Wound Badges.** If the Soldier, Spacer, or Marines Risk Roll fails, the character is wounded and receives a Wound Badge (WB). The number after the WB indicates the number of times it has been received.

Rough and tumble Marine Sergeant Brett Boze-man seems to get wounded every term; after four terms, he has Wound Badge-4 (and perhaps a prosthetic eye).

### COMMENDATIONS

Commendation is determined by the Risk and Reward Rolls for Agents.

If the Reward Roll Succeeds, subtract the Reward Roll from the Controlling Characteristic (ignore any Mods) and record the Commendation in the format shown on the Commendation Table.

<Undercover Career> Commendation-N

N= C-R = the Controlling Characteristic (without Mods) minus the Reward Die Roll (for Agents).

### The Fame Flux Event

Any character may choose (once during Character Generation or after adventuring begins) to add Flux to Fame.

# Background Information for Characters

Characters have greater depth than a mere list of numbers and skills. The beginnings of this background are provided by the Background tables.

Much of the information about characters is digital: discrete values and skill levels.

A more abstract and subjective set of information is the character's background: his origins and motivations; the organizations with which he has served, and the small pieces of information or significant objects which have accumulated over time.

## The Background Tables

Specific tables are provided for each career to identify significant details of character background. Each character should consult each table once (and the Educational Institutions table once for each school attended).

The information is available privately to the player and may be revealed as needed or as appropriate.

**Referee Discretion.** The Referee may create alternate, custom, or edited information and provide it instead.

**Variable Data.** Some results on the Background tables include the opportunity for variable data: a variety of possible entries. Variable data is identified by <braces>; when present, substitute randomly generated or deliberately selected information. <World> indicates any reasonable World Name; <Surname> indicates any reasonable personal name.

Other variable data is similarly generated.

## Using The Tables

The five tables include:

**Educational Institutions** provide ideas for the names of schools, colleges, and universities. Educational institutions give insights into character's previous activities.

When characters discuss their educations, it is natural to compare the schools attended and their relative merit. To that end, each school is ranked; higher values are better; when two schools are compared, their relative rank provides an indication of their importance and comparative worth.

For each educational institution attended, roll 1D once on the appropriate Table (and then roll for the institution's rank) and record the information.

**Life Motivations** provide concepts or situations which ultimately motivate a character. As time passes, the Referee may reveal through events or activities more about this motivation. In addition, the player may also take a hand in expanding on the concepts. Roll 1D once on the appropriate Table and record the information.

## THE BACKGROUND TABLES

Description	Contents
1 Educational Institutions	Possible schools
2 Life Motivations	One for each career.
3 Acquired Secrets	One for each career.
4 Former Organizations	One for each career.
5 Important Events	One for each career.

**Important Events** indicate background events which shaped the experience of the character.

Roll 1D once on the appropriate Table and record the information.

**Former Organizations** indicate companies, military or naval organizations, or other associations in which a character has served. Although a character may have served in many different organizations during the course of a career, it is best to concentrate on one which was a profound influence.

Roll 1D once on the appropriate Table and record the information.

**Acquired Secrets** indicate background or latent information which may ultimately inspire action by a character.

A Secret is some object or thing the character finds in his possession: it may be something in his files, or taken from the bottom of a drawer, or a memento. The significance of the object is controlled by the referee in the course of later events.

A Secret is a spark for an adventure. Its description is just enough to direct the adventurers' attention toward some goal. The Secret has some importance; it is generally shared or discussed only with comrades who can be trusted, and even then only incompletely.

Some secrets are family knowledge, passed down from generation to generation; others are learned in the course of adventuring. Roll 1D once on the appropriate Table and record the information.

## ENERI DINSHA'S CAREER MEMORIES

Eneri Dinsha attended the College of Regina (rank=2D=7; an average sort of school). He attended Imperial Navy Flight School (Regina) with rank=2D=9 which is above average.

While in the Navy, he hears stories from his fellow spacemen and adopts a Life Motivation to travel to the Human homeworld Terra.

Similarly, during his service in the Navy he acquires a captured corsair banner (which may hold a secret).

He notes a former organization with which he served: the 843 Escort Squadron.

Finally, he notes an important event during his career: he has war stories from the Pursuits at Intarnen.



# 01

## ED5

1D	School	Rank= Inconsequential
1	<City> School District	
2	<City> Independent School System	
3	<City> School District	
4	<Province> Academy	
5	<Province> Alternative Schools	
6	<Province> Education Company	

# 02

## Trade School

1D	School Name	Rank= 1D
1	Acme Trade School	
2	Institute of <Skill>	
3	<Company> School of <Skill>	
4	Standardized <Skill> Qualification Program	
5	<Company> Institute of <Skill>	
6	Certified <Skill> Course	

# 03

## College

1D	School Name	Rank = 2D
1	<City> College	
2	College of <World>	
3	<World> College	
4	<Province> Provincial College	
5	Imperial College of <World>	
6	Peoples College of <World>	

# 04

## University

1D	School Name	Rank= 3D
1	<World> University	
2	University of <World>	
3	Imperial University of <World>	
4	<World> Orbital University	
5	The <Color> Institute	
6	All- <World> University	

# 05

## Medical School

1D	School Name	Rank = 2D
1	<World> University Medical School	
2	University of <World> Medical School	
3	Imperial University of <World> School of Medical Arts	
4	<World> Orbital Medical University	
5	The <Color> Institute of Medicine	
6	All- <World> University Medical School	

# 06

## Law School

1D	School Name	Rank = 2D
1	<World> University Law School	
2	University of <World> School of Law	
3	Imperial University of <World> School of Advocacy	
4	<World> Orbital Legal University	
5	The <Color> Institute of Law	
6	All- <World> University Law School	

# 07

## Naval Academy

1D	School Name	Rank = 2D
1	<Sector> Naval Academy	
2	<Subsector> Naval Academy	
3	<World> Naval Academy	
4	<World> Continental Naval Academy	
5	<World> Continental Naval Academy	
6	<World> Reserve Naval Academy	

# 08

## Military Academy

1D	School Name	Rank = 2D
1	<Sector> Military Academy	
2	<Subsector> Military Academy	
3	<World> Military Academy	
4	<World> Continental Military Academy	
5	<World> Continental Military Academy	
6	<World> Reserve Military Academy	

# 09

## Flight School

1D	School Name	Rank = 2D
1	Imperial Navy Flight School (<Sector>)	
2	Imperial Navy Flight School (<Subsector>)	
3	Imperial Navy Flight School (<World>)	
4	Advanced Mission Flight School (<World>)	
5	Special Mission Flight Program (<Sector>)	
6	Imperial Navy Combat Flight School (<Subsector>)	

# 10

## Command College

1D	School Name	Rank = 2D
1	Imperial Command and General Staff College	
2	Imperial College of Military Command	
3	Imperial College of Naval Strategy	
4	Imperial Command College (<Armed Force>)	
5	Imperial War College	
6	Imperial College of Military Studies	

# 11

## Training Course

1D	Course Name	Rank = 1D
1	<City> <Skill> Training Course	
2	<City> Education Company <Skill> Course	
3	<Color> Training System (<Skill>)	
4	<Province> Academy <Skill> Training	
5	<Province> School of <Skill>	
6	<Province> Education Company <Skill> Course	

# 12

## ANM School

1D	School Name	Rank = 1D
1	Subsector <Armed Force> <Skill> Course	
2	Imperial <Armed Force> <Skill> School	
3	Imperial <Armed Force> <Skill> Course	
4	Sector <Armed Force> <Skill> Course	
5	Imperial <Armed Force> <Skill> Training Course	
6	Imperial <Skill> Course	



### 01 Craftsman's Passion

- 1D Significant Pursuit
- 1 Craftsman is dedicated to a charitable cause.
  - 2 Craftsman is a champion of rights for <subject>.
  - 3 Craftsman believes in pursuing perfection.
  - 4 Craftsman is disillusioned with material rewards.
  - 5 Craftsman must right a long-forgotten wrong.
  - 6 Craftsman must find a Master Piece sold long-ago.

### 02 Scholar's Research Topic

- 1D Research Title
- 1 A Preliminary Survey of the Literature of <Major>
  - 2 Aspects of the Elementary Philosophy of <Major>.
  - 3 A Detailed Bibliography of <Major>.
  - 4 The Impact of Data from <WorldName> on <Major>
  - 5 Toward an Alternate Basic Theory of <Major>.
  - 6 Disasters in the Application of <Major>.

### 03 Entertainer's Passion

- 1D Personal Goal
- 1 To perform on every world in <subsector>.
  - 2 To perform for the ruler of <world>.
  - 3 To become most popular (Fame-19) in the subsector.
  - 4 To become most popular (Fame-20) in the sector.
  - 5 To win the <World> Prize for <Arts>
  - 6 To perform on <Homeworld>.

### 04 Citizen's Motivation

- 1D Personal Motivation
- 1 Citizen has suffered a terrible personal loss.
  - 2 Citizen is discontent with his personal situation.
  - 3 Citizen has a significant personal unfilled need.
  - 4 Citizen has witnessed events which prove dangerous.
  - 5 Citizen has suffered a social embarrassment.
  - 6 Citizen has retired to a life of travel.

### 05 Scout's Passion

- 1D Goal
- 1 To find the fabled Golden World.
  - 2 To find the fabled Robotopolis.
  - 3 To discover a Garden World.
  - 4 To acquire a Jump-4 Scout Ship.
  - 5 To acquire a Hop Drive.
  - 6 To find a certain backwater moon in Illeish sector.

### 06 Merchant's Goal

- 1D Goal
- 1 To establish a trader route in Aramis subsector.
  - 2 To establish a trader route across the Zhodani border.
  - 3 To establish a trade base on the Aslan border.
  - 4 To acquire a Jump-2 Far Trader.
  - 5 To acquire a Hop Drive.
  - 6 To establish a trading outpost beyond the border.

### 07 Spacer's Life

- 1D Interruption
- 1 To travel the sectors of the Deneb Domain.
  - 2 To visit Capital.
  - 3 To travel to the Human homeworld Vland.
  - 4 To travel to the Human homeworld Terra.
  - 5 To travel to the Human homeworld Zhdant.
  - 6 To visit every world in the Spinward Marches.

### 08 Soldier's Life

- 1D Title
- 1 To retire with an Estate on <World>.
  - 2 To retire with a Free Trader.
  - 3 To retire with a Farm on <World>.
  - 4 To settle down on <World>
  - 5 To become a C Starport Warden somewhere.
  - 6 To retire with a Ranch on <World>.

### 09 Agent's Long-Term Mission

- 1D Mission
- 1 To eradicate piracy.
  - 2 To eliminate psionics in the Empire.
  - 3 To pursue corruption in <MegaCorporation>
  - 4 To total elimination of <belief>.
  - 5 To achieve revenge for a past wrong.
  - 6 To redeem the family name the family name.

### 10 Rogue's Long-Term Goal

- 1D Goal
- 1 To own a remote estate on <World>.
  - 2 To own an estate on a world in the Sword Worlds.
  - 3 To terraform <Homeworld>.
  - 4 To own the Land Grant to <World> Mines.
  - 5 To acquire a Barony on <World>.
  - 6 To acquire the Bank of <World> and ...

### 11 Noble's Concerns

- 1D Mission
- 1 To eradicate piracy in <Subsector>.
  - 2 To remove the corrupt nobles in <Subsector>.
  - 3 To locate and neutralize spies in <Subsector>.
  - 4 To establish peace along the Imperial border.
  - 5 To rise to the next level of Nobility.
  - 6 To accumulate a substantial fortune.

### 12 Marine's Life

- 1D Title
- 1 To retire with an Estate on <World>.
  - 2 To retire with a Free Trader.
  - 3 To retire with a Farm on <World>.
  - 4 To settle down on <World>
  - 5 To become a C Starport Warden somewhere.
  - 6 To retire with a Ranch on <World>.

**01 Craftsman's Acquisitions**

1D	Description
1	A key and a map.
2	An Imperial Credit printed on ordinary paper.
3	Packet of seeds marked "Fountain of Youth" Plant.
4	An AAB Archive Access code.
5	A wafer with Knowledges to construct a Jump-6 drive.
6	An interesting set of tools.

**03 Entertainer's Misfiled Notes**

1D	Description
1	A book banned by the Imperial bureaucracy.
2	The fabled never-released epic video by <Writer>.
3	An unpublished script for a musical comedy.
4	Handwritten Ultimate Melody (some wrong notes?).
5	Smell Artist <Name>'s private recipe book.
6	Samples of sound responsive paint.

**05 Scout's Information File**

1D	Description
1	The location of a First Empire advanced depot.
2	Location of a wrecked battleship.
3	The only copy of a report on faulty Scout ship drives.
4	A technique that increases Power Plant output 20%.
5	A simple device that disables Maneuver drives.
6	Co-ordinates for a world beyond the frontier.

**07 Spacer's Souvenir Locker**

1D	Interruption
1	Precise performance specifications on Jump Drives.
2	An item stock number not in the central catalog.
3	Co-ordinates of an unexplored world.
4	A captured corsair banner.
5	A prototype hull breach patch.
6	The navigation module from a Zhodani frigate.

**09 Agent's Files**

1D	Mission
1	A deck plan map of the Duke's yacht.
2	The co-ordinates of a fabled "graveyard of lost ships."
3	A shipyard priority building code.
4	The script for a potential hit drama.
5	StdDGR-16 Standard Disposable Gauss Rifle -16
6	A complete set of false identity papers.

**11 Noble's Collection**

1D	Mission
1	A high priority code for Army procurement.
2	A crudely drawn map labeled <World>.
3	Blank patent of nobility for the Baron of <World>.
4	A crudely drawn map labeled <World>.
5	Sophont skull tagged <World> 430k years?
6	A bio-sample marked <World> Anagathic?

**02 Scholar's Accumulated Trivia**

1D	Description
1	A reference to an unobtainable scholarly paper.
2	Detailed readings predicting flare timing for <Star>.
3	Computer access codes for University of <World>.
4	A planetquake predictor.
5	Detailed readings predicting flare timing for <Star>.
6	A sample from a long-ago field expedition.

**04 Citizen's Casually Acquired Information**

1D	Description
1	A data wafer with an encryption code scribbled on it.
2	Ownership documents for a company on <World>.
3	A set of rare early empire coins.
4	A claim tag for a locker at <World> Starport.
5	A small stasis capsule.
6	A jacket once worn by the Emperor.

**06 Merchant's Travel Notes**

1D	Description
1	Encryption key creation formulas for <Merchant>.
2	A bearer bank account number on <World>
3	A clicker that seems to open every ship it visits.
4	Confidential ship schedules for <Company>
5	A ship share certificate marked "Special".
6	A face image of a pirate from <Subsector>.

**08 Soldier's Memento Pouch**

1D	Title
1	A seawater-stained shirt flecked with gold.
2	Strange Zhodani automatic pistol.
3	Co-ordinates on an unexplored world.
4	An Aslan warrior's personal dagger.
5	A combat drug that restores Sanity.
6	The location of a fabled lost temple on <World>.

**10 Rogue's Randomly Acquired Items**

1D	Title
1	A small rock with strange engraved markings.
2	Images of a secret Imperial starship.
3	Time and place co-ordinates several years from now.
4	The location of a secret Nuclear Weapons depot.
5	A 10,000 share certificate for a corporation.
6	A bearer Proxy for the Moot.

**12 Marine's Souvenir Pouch**

1D	Title
1	A Marine dress dagger with a secret compartment.
2	A controller for a Cutter.
3	The location of an abandoned Rule of Man depot.
4	A wafer with Fighter-12.
5	An unusual bio-scanner.
6	Location of a First Empire Senior Dreadnought.





# 01 Craftsman

1D	Organization
1	The Craftsophont's Guild of <Sector>.
2	The Arts, Crafts, and Skills Organization of <World>.
3	The Imperial Crafts Certification Society.
4	Lagash and Sibs, Master Piece Brokers.
5	Imperial Art Curators on Reference.
6	<Skill> Craftsmen's Society of <World>.

# 03 Entertainer

1D	Organization
1	Cirque de Sirkas Travelling Circus.
2	<Arts Skill> Promotion Society.
3	Interstellar <Arts Skill> Society.
4	University of <World> Visiting Artist Program
5	<World> Museum of <Arts Skill> Studio
6	Naasirka Entertainment Division

# 05 Scout

1D	Activity
1	Imperial Survey 2.3
2	Spinward Marches Sector Survey
3	Deneb Sector Survey
4	Expeditionary Survey of the Vargr Worlds
5	Exploratory Survey of the Coreward Sectors
6	The Core Expeditions

# 07 Spacer

1D	Organization
1	<World> Cruiser Squadron
2	<3-digit> Escort Squadron
3	<4-digit> Ortilery Squadron
4	<2-digit> Attack Squadron
5	Long Range Squadron <Letter>
6	<1-digit> Joint Battle Squadron

# 09 Agent

1D	Employing Organization
1	The Anti-Piracy Commission.
2	Anti-Corruption Section, Naasirka
3	Vemene Turkeria Security Organization
4	Imperial Office of Calendar Compliance
5	Argushiigi Admegulasha Bilanidin
6	Aashner Sirkaa Nek

# 11 Noble

1D	Unit
1	Moot Committee for the Eradication of Piracy
2	Select Moot Committee for Naval Affairs
3	ad hoc Committee on Exotic Supernovae
4	Domain Committee for Frontier Security
5	Moot Committee on Psionic Threats
6	Imperial Committee on Robotic Rights

# 02 Scholar

1D	Educational Institution
1	<City> College
2	College of <World>
3	<World> College
4	Imperial University of <World>
5	The <Color> Institute
6	All- <World> University

# 04 Citizen

1D	Company
1	<World> <Skill> Company
2	Acme <Skill> Corporation
3	<Surname> Company
4	Imperial <Skill> Corporation
5	Skill Division, <World> Corporation
6	<Skill> Consulting Naasirka

# 06 Merchant

1D	Company
1	<Sector> Agency
2	<World> Express
3	<Surname > Shipping
4	<Shipname>
5	<Subsector> Lines
6	<Surname > Orbital Express

# 08 Soldier

1D	Unit
1	<World> Peace Keeping Force
2	<Number> Lift Infantry Regiment
3	<Number> Armored Regiment
4	<Number> Lift Cavalry Squadron
5	<Number> Admin Battalion
6	<City> Artillery Regiment

# 10 Rogue

1D	Title
1	
2	
3	Select a Former Organization
4	from another table based on
5	the Rogue Scheme Career.
6	

# 12 Marine

1D	Title
1	<World> Peace Keeping Force
2	<Number> Lift Infantry Regiment
3	<Number> Armored Regiment
4	<Number> Lift Cavalry Squadron
5	<Sector> Special Reaction Force
6	<Number> Artillery Regiment



# 01 Craftsman

1D	Event
1	Second Place, Master Piece Competition <World>.
2	Mentored by Master Craftsperson <Surname>.
3	Perfect Masterpiece No 1 Stolen.
4	Perfect Masterpiece No 1 Destroyed by fire.
5	Accusations that Masterpiece No. 1 is a copy.
6	Moved from <World> To <World>.

# 02 Scholar

1D	Educational Institution
1	Lectured at <Service> Academy on <World>
2	Former school department closed for budget reasons.
3	Rejected in application for College President.
4	Served four years as Dean of <Major>
5	Accusations of Plagiarism.
6	Accusations of culturally repugnant behaviour.

# 03 Entertainer

1D	Organization
1	Command Performance for the Marquis of <World>.
2	Awarded <Arts> Prize of <World>.
3	President of the <Arts> Society of <Subsector>
4	Expelled from the <Arts> Society of <Subsector>.
5	The Spectacular Performance on <World>.
6	The Disastrous Performance on <World>.

# 04 Citizen

1D	Motivation
1	Economic Disaster on <Homeworld>.
2	Personal Discontent with Life on <Homeworld>.
3	Social Disgrace on <Homeworld>.
4	Social Unrest on <Homeworld>.
5	Environmental Changes on <Homeworld>.
6	Natural Disaster on <Homeworld>.

# 05 Scout

1D	Goal
1	Project Sigma
2	Grand Survey 2.23
3	The Spinward Border Survey
4	The Processing Project at Encyclopediopolis
5	The <Sector> Interim Survey
6	The Core Expedition

# 06 Merchant

1D	Title
1	The Emergency Run to <Sector>
2	The Tradewar in <Subsector> Subsector
3	The <World> Run
4	The Colony Route from <World>
5	Evacuating the Second Continent on <World>
6	Smuggling Plague Meds to <World>

# 07 Spacer

1D	Organization
1	The Orillery Campaign at <World>
2	The Skirmishes at <Gas Giant>
3	The Pursuits at <Star>
4	The Quarantine of <Star>
5	The Battle of <World>
6	The Standoff at <Star>

# 08 Soldier

1D	Unit
1	The Mistake at <Gas Giant>
2	The Assault On <World>
3	The Undeclared War at <World>
4	The Peace Keeping Operations In <City>
5	The Trench War at <World>
6	The Bloody Campaign In <City>

# 09 Agent

1D	Mission
1	Eliminate corruption at the Starport on <World>.
2	Eliminate starship hijackings on <Subsector>.
3	Identify corruption in the courts of <World>.
4	Provide false information to data thieves.
5	Provide misleading information to foreign agents.
6	Clandestinely destroy foreign base.

# 10 Rogue

1D	Title
1	
2	
3	Select an Important Event from another table based on the Rogue Scheme Career.
4	
5	
6	

# 11 Noble

1D	Important Intrigues
1	The <Element> Affair.
2	The <World> Scandal.
3	The Judgment Against <Name>.
4	<Surname>'s Palace.
5	<Surname>'s Secret Exile.
6	The <Name> Commission.

# 12 Marine

1D	Title
1	The Final Battle on <World>
2	The Retreat From <World>
3	The <World> Expedition
4	The Uprising on <World>
5	The Invasion of <World>
6	The Boardings in <World> System



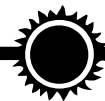
Record and preserve the details of a **Human** character using this Character Card T5-001.

CHARACTER CARD			UPP		Str	Dex	End	Int	Edu	Soc
Name			Gender							
Current Rank and Service			Birthdate		Birthworld					
Career Experience			Breathes Air-7		Homeworld					
			Personal Equipment			Stage00		Age		Terms
						Infancy		0-1		½
						Stage01		Child		2-9
						Stage02		Teens		10-17
						Term03		YA		18-25
						Stage04		Adult		26-33
						Stage05		Physical Aging Starts		Peak
								34-41		2
						Stage06		Mid-Life		42-49
						Stage07		Senior		50-57
						Stage08		Elder		58-65
						Stage09		Mental Aging Starts		Retired
								66+		
Characteristics SDEIES		Senses VHST		Skills						
C1	Str 2D=	Energy	Vision String							
		Vision	V-16-RGB							
C2	Dex 2D=	Vibration	Hearing String							
		Hearing	H-16-9382							
C3	End 2D=	Volatiles	Smell String							
		Smell	S-10-2							
C4	Int 2D=	Contact	Touch String							
		Touch	T-06-2							
C5	Edu 2D=	Aware	Aware String							
C6	Soc 2D=	Percept	Percept String							

**Human Character Card** **Front T5-001**

CHARACTER CARD (Back)			DNA=		Str	Dex	End	Int	Edu	Soc
Sophont Descriptor										
Human from										
Education or Training		Physical Aging	Mental Aging							
		begins Age 34	begins Age 66							
		Overview			Medals and Commendations					
		HBS-T-AN-LN-N								
		Symmetry								
		Bilateral								
		Head						San		
		Head-Brain-Senses								
Sound	Certifications	Torso						Light		
G		Torso								
F		Limbgroup1						D		
E		Arms with Hands						U		
D		Limbgroup2						S		
<<C		none						P		
<<B		Limbgroup3						B>>		
<<A		Legs						G>>		
<<9		Limbgroup4						R>>		
<<8		none						C		
<<7		Tail						A		
<<6		None						N		
5		Skeleton			Species Scent			I		
4		Bony Interior			HUM-			F		
3		Skin	Fluids	Organic		Edu=		X		
2		Skin	Blood	Int=						

**Human Character Card** **Back T5-001**



Record and preserve the details of a **non-Human** character using this Character Card T5-002.

CHARACTER CARD		UPP		Str	Dex	End	Int	Edu	Soc	
Name		Gender								
Current Rank and Service		Birthdate		Birthworld						
Career Experience		Breathes		Homeworld						
		Personal Equipment			Stage00		Age Terms			
					Infancy		1/2			
					Stage01		Child			
					Stage02		Teens			
Characteristics		Senses		Skills			Stage03			
C1 Str		Energy					YA			
Str ___ D=		Vision String					Stage04			
C2 Dex Agi Gra		Vibration					Adult			
Dex ___ Gra ___ D=		Hearing String					Stage05 Physical Aging Starts			
C3 End Sta Vig		Volatiles					Peak			
End ___ Sta ___ Vig ___ D=		Smell String					Stage06			
C4 Int		Contact					Mid-Life			
Int ___ D=		Touch String					Stage07			
C5 Edu Tra Ins		Aware					Senior			
Edu ___ Tra ___ Ins ___ D=		Aware String					Stage08			
C6 Soc Cha Cas		Percept					Elder			
Soc ___ Cha ___ Cas ___ D=		Percept String					Stage09 Mental Aging Starts			
								Retired		

**Non-Human Character Card** **Front T5-002**

CHARACTER CARD (Back)			__NA=		Str	Dex	End	Int	Edu	Soc
Sophont Descriptor										
Education or Training		Physical Aging begins Age ___	Mental Aging begins Age ___							
		Overview			Medals and Commendations					
		Symmetry								
		Head						San		
Sound		Torso						Light		
G										
F		Limbgroup1						D		
E								U		
D		Limbgroup2						S		
<< C								P		
<< B		Limbgroup3						B >>		
<< A								G >>		
<< 9		Limbgroup4						R >>		
<< 8								C		
<< 7		Tail						A		
<< 6								N		
5		Skeleton			Species Scent			I		
4								F		
3		Skin		Fluids	Organic Int=		Edu Tra Ins ___ =		X	
2										

**Non-Human Character Card** **Back T5-002**

# Life Pursuits and Experience

Characters can designate specific areas of interest in their lives and improve them over time.

A **Life Pursuit** is a skill emphasis: a statement that a specific skill is priority for a specific character. It may be a job, hobby, or some other area of importance. A **Certificate** is a formal statement that a character can succeed at specific tasks.

Together, these two concepts allow a character to improve his store of skills through Experience.

## LIFE PURSUITS

Life Pursuits express a personal skill emphasis. A **Life Pursuit** is a brief statement about a specific job or hobby or interest, defined by a Title, Primary Skill, Required Characteristic, C+S, and (optional) Secondary Skills.

Life Pursuit  
Descriptive Title  
Characteristic. Skill. C+S=12.  
Commentary.

The **Title** of the Life Pursuit is a job title or occupation (a few words of description may be included). The **Primary Skill** is the most appropriate skill, knowledge, or talent for the Life Pursuit; a **Required Characteristic** is the one most applicable to the use of the Primary Skill.

One or more Secondary Skills (including Knowledges and perhaps Talents) may be stated. For example,

Life Pursuit  
Neurosurgeon Doctor in interstellar service.  
Medical. Dexterity. C+S=12.

Life Pursuit  
Competitive Weight Lifter.  
Athlete. Strength. C+S=12.

A character with Medical and Dexterity can have this Life Pursuit if the sum of Medical and Dexterity is at least 12.

**Required C+S.** The required C+S for a character's first Life Pursuit is 12; enough to succeed at an Average task 100% of the time. The required C+S increases +1 in each additional Life Pursuit. A character's third Life Pursuit re-

---

### Life Pursuit: Analyst

Life Pursuit  
Analyst [Skill]  
[Skill]. Intelligence or Education. C+S=12.

An Analyst gathers information over time and distills it into specific conclusions and recommendations.

---

John Smith is an Analyst in the mundane world and wants his character Eleri Dinsha to be the same. The Referee defines a Life Pursuit to meet the need.

---

quires C+S= 12+ (3-1) = 14. Only the Primary Skill value is used in C+S.

**How Many Life Pursuits?** Life Pursuits are important interests or abilities. While it is possible to have dozens of Life Pursuits, they would not then express important interests. Most characters should have three or four Life Pursuits.

**For Reference.** A player may ask about a particular Life Pursuit ("What's involved in being a Concert Pianist?"). The Game Master records a Life Pursuit and marks it "For Reference." Players may then decide if they want to use that Life Pursuit.

Life Pursuit (For Reference)  
Concert Pianist  
Dexterity. Music. C+S=12.  
Primary Instrument = Piano.

**A Hobby.** An otherwise unqualified character may make one Life Pursuit his hobby even if he does not have the required C+S. It is labeled Hobby.

Life Pursuit (Hobby)  
Concert Pianist  
Dexterity. Music. C+S=12.  
Primary Instrument = Piano.

**Shifting Priorities.** A Character can shuffle the priorities of his Life Pursuits from time to time by consulting with the Referee and indicating the new information.

**The Value Of A Life Pursuit.** Life Pursuits show the areas that a character cares about in his life. When a Life Pursuit skill is used, the character is allowed Mod +1.

## CERTIFICATES

A Certificate is a formal statement (and an important piece of paper testifying) that a character can succeed at specific tasks. Expressed as <Type> Certificate of <Skill>, it shows that the character has successfully passed an examination (in game time, under the direction of the Referee) in the Skill.

Certificates are the basis for employment decisions (many occupations state a Certificate requirement). They reflect documented competency in specific skills, talents, or knowledges. They are often requirements for employment.

## Taking The Test

A character takes a certificate test by showing up at a testing center, paying a fee, and succeeding at the test task.

Most large cities have testing centers (although there is rarely a centralized testing location). Trade skills are tested at Labor halls, Sciences are tested at Universities, Military skills are tested at Army bases. Naval skills are tested at Navy bases.

**The Tests.** The standard tests for Certificates specify the Skill being tested and its associated Characteristic (as specified by the Referee).

Tests are time-limited; Cautious is not an option.

## Certificate Types

There are four types of certification:

**Qualified.** A Qualified individual has met the minimum requirements of a skill. He must show the ability to succeed at an Easy task. When a job or vocation states a skill-related job title, a character must generally be Qualified in order to be hired. A character with a Qualified Certificate is a Novice.

To Show Skill for Qualified Certificate (Absolute 1 hr)  
Easy (1D) < Characteristic + Skill

**Competent.** A Competent individual is qualified to perform many tasks within a skill. He must show the ability to succeed at a Difficult task.

To Show Skill for Competent Certificate (Absolute 1 hr)  
Difficult (3D) < Characteristic + Skill

**Experienced.** An Experienced individual is qualified to perform most tasks within a skill. He must show the ability to succeed at a Formidable task.

To Show Skill for Experienced Certificate (Absolute 1 hr)  
Formidable (4D) < Characteristic + Skill

**Master.** A Master individual is qualified to perform virtually all tasks within a skill. He must show the ability to succeed at a Staggering task.

To Show Skill for Master Certificate (Absolute 1 hr)  
Staggering (5D) < Characteristic + Skill

**Cramming.** A character may study prior to the test (the goal is Good Flux as a Mod). Thus, a character with C+S within 5 of the required value can benefit from cramming the night before the test.

To cram for a test  
Difficult (3D) < Characteristic + Skill  
Study materials required.  
Success allows Good Flux Mod on Certificate Test

## TEST LOCATIONS

	Career	Location
1	Craftsman	depends
2	Scholar	depends
3	Entertainer	depends
4	Citizen	depends
5	Scout	Scout Base
6	Merchant	Starport A
7	Spacer	Naval Base
8	Soldier	Army Base
9	Agent	depends
10	Rogue	depends
11	Noble	depends
12	Marine	Naval Base
13	Functionary	depends
	Sciences	University
	Trades	Labor Hall
	depends=	various

**Repeating Tests.** Each subsequent test-taking requires a Mod -1 (the first retake = Mod -1; the second retake requires Mod -2). This process discourages characters from taking tests for which they are not qualified.

## The Value Of A Certificate

Employment in standard career job descriptions requires an appropriate Certificate.

For example, in the hiring process, a prospective employer does NOT inquire, "What is your skill level in Astrogation?" Instead, he asks to see the character's Astrogation Certificate and evaluates it (Qualified, Competent, Experienced, or Master) and whether to hire the potential employee on that basis.

For example, a player-character may be hiring an Astrogator for his Free Trader. The referee generates (or selects from a suitable list) a series of job candidates the player evaluates them.

The reasonable procedure is to compare their Astrogation Certificates.

There is potential for an unqualified fluke. A character can conceivably perform well on a high level test and qualify for Experienced (or even Master) with a relatively low skill level.

Record Certificates with the name of the skill and the proper label (for example, Astrogator- Qualified).

## EXPERIENCE

Characters continue to improve their abilities throughout their lives. The Experience process is the mechanism for this improvement.

**Assumptions.** The expected standard is that a character will gain one skill a year through experience. Time is tracked for each character, and the character has a birthday.

## The Process

In the course of play, after each session, the referee reviews the events and notes for each player the Life Pursuit Skill best used during the session. This may reflect some negotiation as the referee and players discuss what they feel was the best use for each player. Record this information.

Every year, on the character's birthday, the character reminisces about his activities over the past 365 days and reviews the Best Used skills. From this review, one skill will become obvious or prominent. The character receives an increase of +1 level in that prominent skill.

**Alternatives.** Substitute the last day of the calendar year for the character's birthday and review for all characters at one time.

## Negative Experience

The passage of time reduces some aspects of a character's store of knowledge. At the same time that Experience is determined, apply the following negative Experience.

Every 4th year, reduce a character's World Knowledges by -1 (if he has not spent significant time on those worlds).

# Genetics

The characteristics of **Traveller** characters have a generated component and an inherited component. The inherited (or genetic) component can be passed from generation to generation by characters.

The inherited components (the genes) of the personal characteristics enable a player to create characters in other historical milieux with demonstrable links to the player's primary character. They also allow characters to create children through which they can continue role-playing after the demise of the original character. Genetics also allows the creation of clones.

## IMPORTANT TERMS

The following terms are important for the understanding of genetics.

**Gene.** The individual inherited value for a genetic characteristic. Human Strength is generated with 2D: the first die (1-6) is the inherited part of Strength and that value is the Gene. The second die (1-6) is the developed Strength based on experience and environment. A normal Gene has a value from 1-6. Higher and lower values can occur through mutation or geneeering. A Gene with a value of 0 is defective.

**Genetic Characteristic.** A characteristic which has some basis in genetics. Strength is a genetic characteristic because part of it is determined by genetics; Education is NOT a genetic characteristic because genetics does not determine Education.

**Genetic Profile.** The initial letters of the characteristics for a species. For humans (with Str Dex End Int Edu Soc) this is SDEIES. One Genetic profile is identical to another Genetic Profile if both have identical Genetic elements; it disregards non-genetic elements.

For example, SDEIES and SDEITC are genetically identical. SAVIIC and SAVIIS are genetically identical. SGSITS and SGSIIS are not genetically identical.

**DNA.** A variation of the UPP which shows the values for Genes.

**Inherited D.** Non-genetic characteristic positions are shown as X. For identification purposes, the DNA string is preceded by the letters DNA.

Since some sophont genetics are based on variants of DNA, the string may instead be preceded by 1NA, 2NA, 3NA, 4NA, 5NA or 6NA (the number indicating the number of participating genders for the species), or MNA (= 1NA), DNA (=2NA), or TNA (=3NA). For convenience, the term DNA also means all of the alternative terms.

For example, the digit in the C1 position of DNA is the Strength Gene.

**Inherited D.** The portion of a characteristic which is determined by genetics. Also called a Gene.

**Generated D.** The portion of a characteristic which is not a Gene or Inherited D.

## THE BASIC PRINCIPLES OF GENETICS

Characteristics are generated with one or more dice.

For humans, Strength is generated with 2D. For some non-humans, Strength may be generated with 1D, 2D, 3D, or even 4D.

The first D rolled for a genetic characteristic is the Gene for that characteristic. The remaining D for the characteristic represent training, experience, and environment.

For example, human Strength characteristic is generated using 2D: 1D is the genetic component inherited from generation to generation. The other 1D is the generated component and rolled on 1D when the character is created. For example, human Eneri Dinsha inherits a Strength gene =4 from his father. When Eneri is generated, the player rolls 1D =3 for Strength =7.

**Creating Characters Without Using Genetics.** When creating characters (for example for the first time) without genetics, all the required dice are rolled normally. The Genes can be determined later or as necessary through Genetic Testing.

**Genes.** Genes can be inherited from parents and passed on to the offspring. Genes are used when creating clones.

**Mutation and Genetic Engineering.** Each Gene is originally generated with 1D. It may increase or decrease as a result of mutation or genetic engineering. A Gene with a value of 0 is defective.

**The Genetic Characteristics.** A Genetic Characteristic is genetically inheritable.

The Physical Characteristics C1 C2 and C3, Intelligence C4 and Instinct C5 are genetic characteristics. Caste C6 may (or may not) be genetic.

Education C5, Training C5, and Social Standing C6 are not genetic.

If the character has Caste or Charisma and it is marked

GENETIC TERM EXAMPLES						
	C1	C2	C3	C4	C5	C6
Genetic Profile=	<b>S</b>	<b>D</b>	<b>E</b>	<b>I</b>	<b>E</b>	<b>S</b>
DNA=	<b>3</b>	<b>2</b>	<b>4</b>	<b>6</b>	<b>X</b>	<b>X</b>
Die Rolls=	<b>4</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>5+6</b>	<b>6+6</b>
UPP=	<b>7</b>	<b>8</b>	<b>9</b>	<b>A</b>	<b>B</b>	<b>C</b>
This table shows genetics for Humans.						

## GENETIC CHARACTERISTICS INHERITABILITY

	Genetic		Possibly		Non-Genetic	
C1	Str	-	-	-	-	-
C2	Dex	Gra	Agi	-	-	-
C3	End	Vig	Sta	-	-	-
C4	Int	-	-	-	-	-
C5	Ins	-	-	-	Edu	Tra
C6				Cas*	Cha*	Soc

\* Caste and Charisma may be Genetic or Non-Genetic.

Genetic for that species (in a detailed description of that sophont), it is Genetic; otherwise, it is not.

### DNA (or MNA, and others)

Genes for a character are recorded as DNA (a six-digit UPP string preceded by DNA- (non-genetic components are shown as X). For example, human Eleri Dinsha has DNA 4456XX.

**Alien DNA.** The name DNA (Di-ribo Nucleic Acid) refers to the double helix self-replicating molecule. DNA is a double because it has components supplied by two genders.

If genetic components are supplied by more than (or less than) two genders, then the proper name for DNA changes. For ease of reference, DNA in a general sense includes all the other possible NA structures.

The six-gendered Plexxan would show its Gene sequence as 6NA-5346X9 (note the 9 in position C6 indicates the Plexxan have a genetic Caste structure).

**1D Characteristics.** If Sophont Generation dictates that a characteristic is rolled with 1D, then all of that value is the Gene, and there is no Generated D.

**Gene Contributions By Non-Humans.** If the parents are non-human sophonts, then variations are possible based on Gender.

For any gender with two or more components, the appropriate Gene is selected from the available values of all possible parents. However, Neuter Gender is always ignored and cannot contribute a Gene. Bearer Gender can contribute a Gene (during the bearing process). Gender One in the Solitaire Gender Structure always contributes all of the Inherited D.

### DETERMINING THE VALUES FOR GENES

The values for Genes can be determined during characteristic generation, or later through Genetic Testing.

**During Character Creation.** Ideally, when a new char-

### HUMAN AND ALIEN DNA

Gender	Genetic Component					
Solitaire	1NA	-	-	-	-	-
Dual	-	2NA	-	-	-	-
FMN*	-	2NA	-	-	-	-
EAB	-	-	3NA	-	-	-
Group**	1NA	2NA	3NA	4NA	5NA	6NA

\* because Neuter does not participate.

\*\* dependent on the number of participating Genders.

The Genders are further detailed in Sophonts.

acter is created, the first D rolled is the Gene and should be recorded on the character's Genetics Card.

For example, when the human character Gustav Windhoek is generated, the player rolls 2D for Str producing 3 and 4. The first D rolled (3) becomes the Strength Gene. When sophont Plexxan is generated (with 3D for Str), the player rolls 5, 4, and 3. The first D rolled (5) is the Strength Gene.

**Genetic Testing.** If Genes were not recorded during characteristic generation, they may be determined through Genetic Testing.

Genetics Testing is a formal process under the guidance of a referee: the player rolls 1D for each Genetic characteristic and enters the values on the Genetics Card. The referee takes care to avoid contradictions (such as: the Gene becoming greater than the present characteristic; the Gene less than necessary to produce the present characteristic).

### Obvious Genetic Values

Some genetic values can be deduced. Examples are shown below, other values can be logically deduced as well.

**Characteristic Created With 1D.** If a characteristic is created with 1D, then its entire value is a Gene.

**2D Value = 2.** The Gene = 1.

**2D Value = 12.** The Gene = 6.

**3D Value = 3.** The Gene = 1.

**3D Value = 18.** The Gene = 6.

### CREATING HUMAN OFFSPRING

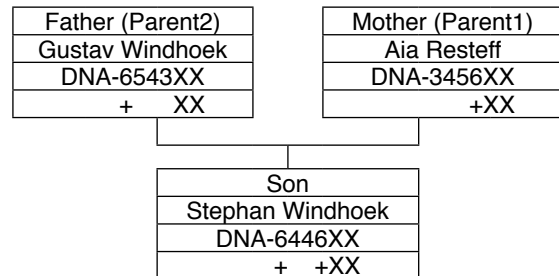
When two Human characters mate and generate a child, that child character randomly acquires the Gene of a characteristic from one of his parents.

For example, two human parents mate and have a single child. For each of Strength, Dexterity, Endurance, and Intelligence, a random roll determines if the Gene comes from the father or the mother. In this example, assume the roll result alternates father and mother as the donor.

On this genetic base, the player for Stephan Windhoek rolls for the complete UPP. Since humans roll 2D for characteristics, Genes are determined by genetics; the Generated D is rolled with 1D by the player to create the final UPP.

**Creating Parents.** It is also possible to create parents for an existing character. Given an existing DNA-, random rolls are used to determine which Genes were received from which parent. Those which were not genetically determined are created by random die rolls.

**Recording Genes.** The parentage of DNA can be





marked with subscripts. For example, Stephan Windhoek's DNA can be written DNA-6<sub>2</sub>4<sub>1</sub>4<sub>2</sub>6<sub>1</sub>XX (his mother is Parent1 and provides subscript-1; his father is Parent2 and provides subscript-2).

### CREATING SOPHONT OFFSPRING

When the appropriate number of sophont characters mate and generate a child, that child character randomly acquires the Gene of a characteristic from one of his parents.

**Excluded Parents.** A Neuter does not participate in the reproductive process and does not contribute genes.

### Contributing Genes

Each eligible parent has the opportunity to contribute each Gene. Assign to each parent a number from 1 to 6 corresponding to the individual's gender. Roll 1D to determine the contributing parent; if the die roll does not correspond to a parent, reroll.

**Some Genes are Gender-Linked.** They are automatically transmitted to Same-Gender children; they are never transmitted to Different-Gender children.

**Some Genes are Caste-Linked.** They are automatically transmitted to Same-Caste children; they are never transmitted to Different-Caste children.

### HOW MANY OFFSPRING?

The number of children produced by a sophont family can vary widely, and depends greatly on the number of genders the stability of the population, and the general and infant mortality rates.

### MUTATIONS

Genes can change due to mutations. Mutations can make Genes Dominant or Recessive, or increase or decrease their values.

Roll on the Mutations Table during UPP creation for each possible Gene. Mutation may convert a parent's Gene from an existing Recessive to Standard and make it available for contribution (although it may not ultimately be selected).

### HOW MANY OFFSPRING?

Flux	Gender=1FE	2MA	3NB	4	5	6
-5	Litter	Litter	Litter	Litter	Litter	Litter
-4	Litter	Litter	Litter	Litter	Litter	Litter
-3	Child	Child	Child	Child	Litter	Litter
-2	Child	Child	Child	Child	Child	Litter
-1	Child	Child	Child	Child	Child	Child
0	Child	Child	Child	Child	Child	Child
+1	Child	Child	Child	Child	Multi	Multi
+2	Child	Child	Child	Multi	Multi	Multi
+3	Child	Child	Multi	Multi	Multi	Multi
+4	Multi	Multi	Multi	Multi	Multi	Multi
+5	Many	Many	Many	Many	Many	Many

\* All Genders, not just participating Genders.

Litter= Good Flux. Multi= 1D infants. Many= Hundreds

1FE= Gender1. Female. Egg Donor.

2MA= Gender2. Male. Activator.

3NB= Gender3. Neuter. Bearer.

Dominant applied to a Recessive makes it Standard. Recessive applied to a Dominant makes it Standard.

A Gene can be reduced to zero and represents a defective Gene or genetically transmitted disease.

Genes can be increased above 6.

**Other Effects:** Dominant Genes are always selected over Standard or Recessive Genes. If more than one Dominant Gene is available from parents, one of the Dominants is selected randomly.

Recessive Genes are never selected if Standard or Dominant Genes are available. If only Recessive is available, one of those available is selected randomly.

**Mutation Risk.** Individuals subject to high levels of radiation or hazardous chemicals are considered High Risk and have a greater chance of mutation.

High Risk individuals are those who have been exposed to situations which have a higher likelihood of inducing mutations. They include starship Engineers (because of long-term exposure to drive radiation), non-natives on worlds with tainted atmospheres, and non-natives on worlds with high energy stars (type O B A and F).

This table is used for each Gene when it is transmitted to an offspring.

Solitaire gender rolls on the Solitaire column in addition to the Standard or High Risk column.

### GENEERING

Genes can be edited using a variety of medical techniques. Gene editing (Geneering) is one rationale behind Acquired Characteristic Increases in Character Generation.

For a variety of reasons (including game balance), edited genes are Recessive.

Character generation increases in characteristics which meet this criterion: an individual who receives genetic change in C1, C2, C3, C4, or Instinct has that Gene marked Recessive. That does not prevent such a Recessive from later becoming Standard or even Dominant through various mutations.

### CLONING

A clone is an individual created using the Genes from one single parent. A clone is the same gender (and genetic Caste) as the parent.

Although a clone begins with the Genes of the one parent, it then rolls Generated D normally. Thus, several clones with the same Genes may exhibit a variety of final UPPs.

### CROSS SPECIES INTERACTIONS

There is no common ancestor for all life in the universe. Life has evolved independently from the primordial soup on many, many worlds. Nevertheless, parallel evolution has produced life forms which are similar in biochemical and genetic structure.

There are, therefore, many different possible structures for genetic transmission of inherited characteristics. The human structure is DNA. Other conceivable structures involve alternate combinations of amino acids, triple helices, quadruple helices, and more.

**The Genetic Profile.** The initial letters of the charac-

teristics for a species create the Genetic Profile. The human Genetic Profile is number 30: SDEIES. There are 81 different possible combinations in the Profile, representing the 81 possible Genetic processes governing life forms.

Many others are also conceivable (envisioning even other details of Characteristics), but they are omitted from this discussion.

**Alien versus Similar.** Two organisms or species which share the same Genetic Profile are similar. Two organisms or species which have different Genetic Profiles are alien.

**Interspecies Fertility.** Members of two distinct species are inter-fertile (and can create children) if they both have the same Genetic Profile and the same Nucleic Acid structure (ie, DNA, 4NA, etc). The result of inter-species fertility is chimera.

Interspecies fertility creates offspring which share some of the details of each species: senses, body structure, and other elements. In the majority of cases, such offspring is non-viable. When it is viable, it is often sterile. When viable and non-sterile, it breeds true with other viable, non-sterile.

**Bacterial or Microbial or Viral Infection.** Bacteria, microbes, and viruses can be assigned a Genetic Profile based on the world on which they appear (and equal to the Genetic Profile for the native sophonts from the world, or generated randomly). Such Genetic Profiles may have three additional symbols: M for Microbe, X (to include Viruses), and Z (for Unknown) scattered through a Genetic Profile. For example, MMMMMM is a relatively harmless bacteria; XXXXXX is a relatively harmless virus; SDEMMM is some sort of agent which can infect organisms which have Genetic Profile SDE???. An agent with Z in a place in the GP can infect any

organism. The degree of infection corresponds to the degree of similarity of the agent and the organism.

For example, agent MDEMMM can infect Genetic Profiles SDEIES and SDEITK but not SAVIEK or SGSIEK. Sagent MDEMZZ can infect any organism.

Non-infectious disease can be caused by alien bacteria. The bacteria do not attack the victim organism, but its presence produces toxins which burden the victim.

**INHERITANCE**

Social or cultural (or both) rules and circumstances govern inheritance of C5, C6, and Money.

**Inheritance of the Learning Characteristics**

Instinct is genetic. Education and Training are not.

**Inheritance of the Social Characteristics**

The Social characteristics can be inherited, but they are transmitted socially rather than genetically.

**Social Standing.** The children of parents with Social Standing inherit a value one less than the highest Social Standing held by the parents. Upon the death of the higher (or highest) Social Standing parent, one child inherits that parent's Social Standing.

**Charisma.** Charisma may be inherited or assigned..

**Caste.** Caste may be inherited or assigned.

**Inheritance of Money**

Children routinely inherit the assets of their parents when the parents die. The details of inheritance are prescribed by local culture, law, and by the Referee.

**THE GENETIC PROFILES**

01 SAEIEC	10 SASIEC	19 SAVIEC	28 SDEIEC	37 SDSIEC	46 SDVIEC	55 SGEIEC	64 SGSIEC	73 SGVIEC
02 SAEIEK	11 SASIEK	20 SAVIEK	29 SDEIEK	38 SDSIEK	47 SDVIEK	56 SGEIEK	65 SGSIEK	74 SGVIEK
03 SAEIES	12 SASIES	21 SAVIES	30 SDEIES	39 SDSIES	48 SDVIES	57 SGEIES	66 SGSIES	75 SGVIES
04 SAEIIC	13 SASIIC	22 SAVIIC	31 SDEIIC	40 SDSIIC	49 SDVIIC	58 SGEIIC	67 SGSIIC	76 SGVIIC
05 SAEIIK	14 SASIIK	23 SAVIIK	32 SDEIIK	41 SDSIIK	50 SDVIK	59 SGEIIK	68 SGSIIK	77 SGVIK
06 SAEIIS	15 SASIIS	24 SAVIIS	33 SDEIIS	42 SDSIIS	51 SDVIIS	60 SGEIIS	69 SGSIIS	78 SGVIIS
07 SAEITC	16 SASITC	25 SAVITC	34 SDEITC	43 SDSITC	52 SDVITC	61 SGEITC	70 SGSITC	79 SGVITC
08 SAEITK	17 SASITK	26 SAVITK	35 SDEITK	44 SDSITK	53 SDVITK	62 SGEITK	71 SGSITK	80 SGVITK
09 SAEITS	18 SASITS	27 SAVITS	36 SDEITS	45 SDSITS	54 SDVITS	63 SGEITS	72 SGSITS	81 SGVITS

**THE GENDER SYMBOLS**

Solo	Gender Two	Gender Three	Gender Four	Gender Five	Gender-Six	Gender Alt One	Gender Alt Two	Gender Alt Three	Strange
Female	Male	Neuter	Egg Donor	Activator	Bearer	Gender Alt Four	Gender Alt Five	Gender Alt Six	Bizarre



**Genetics**

**G1 Human Genetics**

**SPECIAL GENE CODES**

Code	Description	Explanation
+	Dominant	Selected before Standard.
[ ]	Blank	Selected before Recessive.
-	Recessive	Selected if no other choice.
G	Gender-Linked	Automatic to same gender children Never to different gender children.
X	Not Genetic	Characteristic is not genetic.

**GENETIC CHARACTERISTICS INHERITABILITY**

	Genetic						Non-Genetic	
C1	Str	-	-	-	-	-	-	-
C2	Dex							
C3	End							
C4	Int	-	-	-	-	-	-	-
C5		-	-	-	-		Edu	
C6							Soc	

Inheritability varies by species.

**HUMAN MUTATION TABLE**

Flux	Standard	High Risk
- 6	- 2 Dominant	- 6 Recessive
- 5		- 5 Recessive
- 4	- 1 G-Linked	- 4 Recessive
- 3	Recessive	- 3 Recessive
- 2	-	- 2 Recessive
- 1	-	- 1
0	-	-
+1	-	-
+2	-	-
+3	Dominant	-
+4	+1 G-Linked	+1
+5		+2 Dominant
+6	+2 Dominant	+3 Dominant

This table is used for each Gene when it is transmitted to an offspring.

**G-Linked.** The Gene becomes Gender Linked.

**Recessive.** The Gene becomes Recessive (if the Gene is currently Dominant, it becomes Standard).

**Dominant.** The Gene becomes Dominant. If the Gene is currently Recessive, it becomes Standard).

**+N. - N.** The Gene value is increased or decreased.

Record and preserve the genetic details of any **Human** character using this Genetics Card T5-004.

<b>GENETICS HUMAN</b>														
Family Name														
UPP Current Genetic Dominance	Individual Name			Gender			<b>F</b>	Individual Name			Gender			<b>M</b>
	C1	C2	C3	C4	C5	C6	C1	C2	C3	C4	C5	C6	UPP Current	
													UPP Genetic	
													UPP Dominance	
UPP Current Genetic Dominance	Individual Name			Gender			<b>3NB</b>	Individual Name			Gender			<b>4</b>
	C1	C2	C3	C4	C5	C6	C1	C2	C3	C4	C5	C6	UPP Current	
													UPP Genetic	
													UPP Dominance	
UPP Current Genetic Dominance	Individual Name			Gender			<b>5</b>	Individual Name			Gender			<b>6</b>
	C1	C2	C3	C4	C5	C6	C1	C2	C3	C4	C5	C6	UPP Current	
													UPP Genetic	
													UPP Dominance	

**Genetics Human** **T5-004**



# Non-Human Genetics

# G2

## NON-HUMAN MUTATION TABLE

Flux	Standard	Solitaire Gender	High Risk
- 6	- 2 Dominant	- 2 Dominant	- 6 Recessive
- 5	- 2 C-Linked	- 2 C-Linked	- 5 Recessive
- 4	- 1 G-Linked	- 1	- 4 Recessive
- 3	Recessive	- 1	- 3 Recessive
- 2	-	Recessive	- 2 Recessive
- 1	-	-	- 1
0	-	-	-
+1	-	-	-
+2	-	Dominant	-
+3	Dominant	+1	-
+4	+1 G-Linked	+1	+1
+5	+1 C-Linked	+2 C-Linked	+2 Dominant
+6	+2 Dominant	+2 Dominant	+3 Dominant

This table is used for each Gene when it is transmitted to an offspring. Solitaire gender rolls on the Solitaire column in addition to the Standard or High Risk column.

**G-Linked.** The Gene becomes Gender Linked.

**C-Linked.** The Gene becomes Caste Linked (ignore if the species has no Caste).

**Recessive.** The Gene becomes Recessive (if the Gene is currently Dominant, it becomes Standard).

**Dominant.** The Gene becomes Dominant. If the Gene is currently Recessive, it becomes Standard).

**+N. - N.** The Gene value is increased or decreased.

## SPECIAL GENE CODES

Code	Description	Explanation
+	Dominant	Selected before Standard.
[ ]	Blank	Selected before Recessive.
-	Recessive	Selected if no other choice.
G	Gender-Linked	Automatic to same gender children Never to different gender children.
K	Caste-Linked	Automatic to same caste children Never to different caste children.
X	Not Genetic	Characteristic is not genetic.

## GENETIC CHARACTERISTICS INHERITABILITY

	Genetic			Possibly			Non-Genetic	
C1	Str	-	-	-	-	-	-	-
C2	Dex	Gra	Agi	-	-	-	-	-
C3	End	Vig	Sta	-	-	-	-	-
C4	Int	-	-	-	-	-	-	-
C5	Ins	-	-	-	-	Edu	Tra	-
C6				Cas	-	Soc	Cha	-

Inheritability varies by species.

Record and preserve the genetic details of any **non-Human** character using this Genetics Card T5-005.

GENETICS NON-HUMAN														
Family Name														
UPP Current UPP Genetic UPP Dominance	Individual Name			Gender			1FE	Individual Name			Gender			2MA
	C1	C2	C3	C4	C5	C6		C1	C2	C3	C4	C5	C6	
														UPP Genetic
														UPP Dominance
UPP Current UPP Genetic UPP Dominance	Individual Name			Gender			3NB	Individual Name			Gender			4
	C1	C2	C3	C4	C5	C6		C1	C2	C3	C4	C5	C6	
														UPP Genetic
														UPP Dominance
UPP Current UPP Genetic UPP Dominance	Individual Name			Gender			5	Individual Name			Gender			6
	C1	C2	C3	C4	C5	C6		C1	C2	C3	C4	C5	C6	
														UPP Genetic
														UPP Dominance

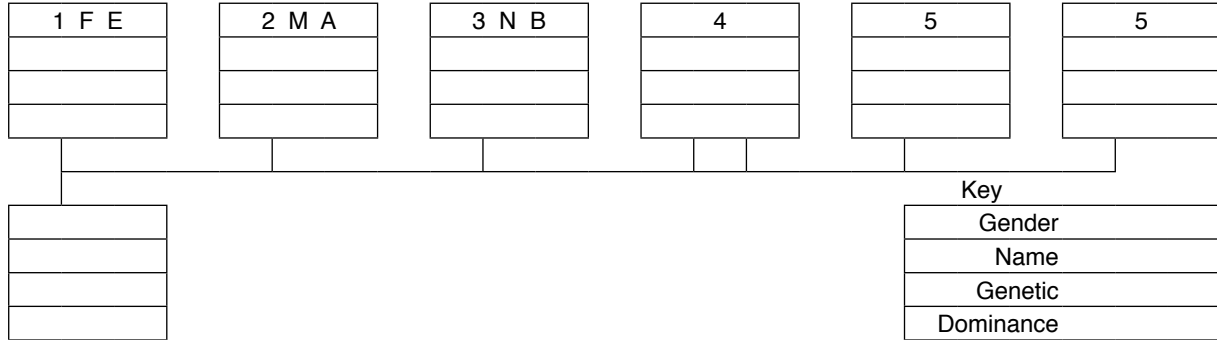
Genetics Non-Human T5-005



Genetics

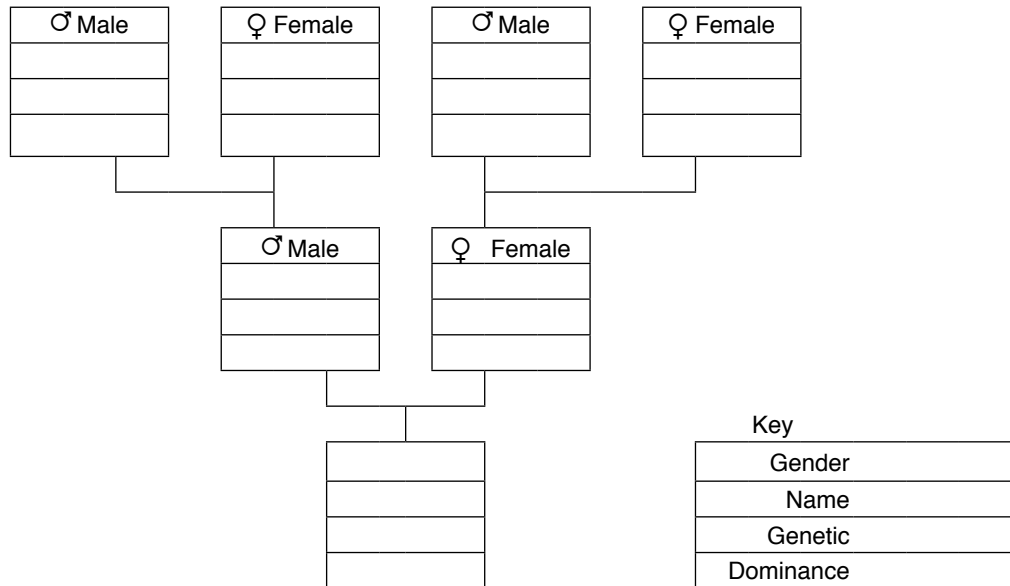
# G3 Genetic Trees1

### UNIVERSAL GENETIC TREE (ONE GENERATION)



For each participating individual, enter Gender, identifying Name, and Genetic UPP and any Dominance Codes.  
 Create the Offspring's Genetic UPP by applying the Dominance Codes, and then randomly selecting the remaining available Genetic Characteristics

### HUMAN GENETIC TREE (THREE GENERATIONS)



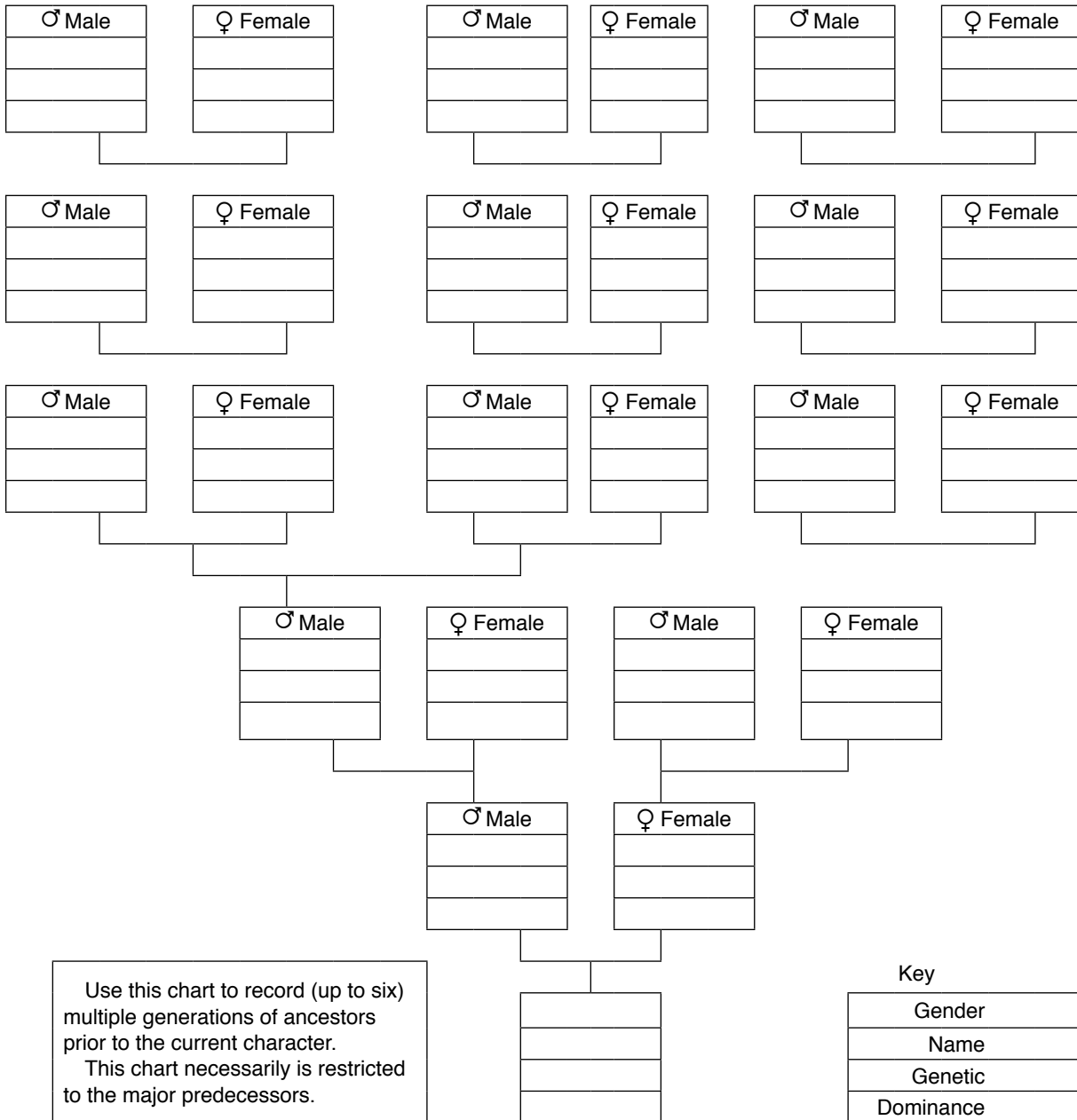
For each participating individual, enter Gender, identifying Name, and Genetic UPP and any Dominance Codes.  
 Create the Offspring's Genetic UPP by applying the Dominance Codes, and then randomly selecting the remaining available Genetic Characteristics.



# Genetics Trees2

# G4

## HUMAN GENETIC TREE (MULTIPLE GENERATIONS PARTIAL)



For each participating individual, enter Gender, identifying Name, and Genetic UPP and any Dominance Codes. Create the Offspring's Genetic UPP by applying the Dominance Codes, and then randomly selecting the remaining available Genetic Characteristics.



## Chimera

# 18 Creating Chimeras

Use this checklist to control creation of Natural or Geneered Chimeras. The processes are nearly identical; differences (only) for Natural Chimeras are shown. Create a blank Sophont Creation Card for the Chimera being generated.

### GENEERED

1. Select **Two Sophont Creation Cards**
  - A. with identical Genetic Profile and Nucleic Acid.
  - B. Identify them as Pattern1 and Pattern2.
2. **Allocate Basic Information** from the SCC.
  - A. Niche and Subniche. Enter <Geneered Chimera>.
  - B. Native Environment / Locomotion. Select.
  - C. Breathes. Select.
  - D. Genders. Select.
  - E. Castes. If present, Select.
  - F. Racial Scent.
    - Combine the Pattern1 PON and Pattern2 PON.
3. **Characteristics and Characteristic Dice.**
  - Select from the available entries.
4. **Senses.**
  - Select from available entries (including blanks).
5. **Body Structure.**
  - Select from the available entries.
  - Symmetry
  - Head
  - Torso
  - Limbgroups 1-2-3-4
  - Tail
  - Skeleton
  - Skin
  - Body Fluids
6. **Life Stages.** Select from the available patterns.
  - Recalculate Life Expectancy
7. **Card Back.**
  - Insert information for Gender Structure
  - Insert information for Caste Structure.
8. **Analyze for Viability.**

### NATURAL

1. Select **Two Sophont Creation Cards**
  - A. with identical Genetic Profile and Nucleic Acid.
  - B. Identify them as Pattern1 and Pattern2.
2. **Allocate Basic Information** from the SCC.
  - A. Niche and Subniche. Enter <Chimera>.
  - B. Native Environment / Locomotion. Select.
  - C. Breathes. Randomly select.
  - D. Genders. Randomly select.
  - E. Castes. If present, randomly select.
  - F. Racial Scent.
    - Combine the Pattern1 PON and Pattern2 PON.
3. **Characteristics and Characteristic Dice.**
  - Randomly select from the available entries.
4. **Senses.**
  - Randomly select available entries (including blanks).
5. **Body Structure.**
  - Randomly select from available entries.
  - Symmetry
  - Head
  - Torso
  - Limbgroups 1-2-3-4
  - Tail
  - Skeleton
  - Skin
  - Body Fluids
6. **Life Stages.** Randomly select from available patterns.
  - Recalculate Life Expectancy
7. **Card Back**
  - Information for Gender Structure
  - Information for Caste Structure
8. **Analyze for Viability.** Discard non-viable Chimeras.

**Identical Genetic Profile=** All Genetic components of the Profile are the same. For example, SDEIES and SDEITC are identical because C5 Education and C6 Social Standing are not Genetic and C5 Training and C6 Charisma are not Genetic.

**Viability.** Obvious viability faults include lack of useful senses or lack of useful limbs. Less obvious faults include short life spans or abilities not well-adapted to intended conditions.

**The Technology Of Geneered Chimeras.** Geneering is practical at TL 14.

### THE NEW SOPHONT CREATION CARD

The final information on the Sophont Creation Card is filed.  
Proper identifying information should be added as necessary.

# Chimeras

A **chimera** is a hybrid of two or more distinct species, produced naturally or through geneering. Chimeras are distinguishable from **clones** (duplicates created from existing genetic templates), **synthetics** (a blend of biological and non-biological processes), and **robots** (truly mechanical or non-organic beings).

A Chimera (pronounced ky-MEER-ah, for those with Edu 6 or less: CHIM-er-ah) is the result of significant or substantial genetic mixing; it may be natural or geneered.

## NATURAL CHIMERA

is the result of interspecies fertility producing offspring which share details of each species. Offspring may be non-viable or sterile. If viable and non-sterile, it breeds true with other viable, non-sterile individuals. Two distinct sophont species are inter-fertile if they both have the same Genetic Profile. Such matings are rare and may need to overcome interface obstacles (perhaps through in vitro fertilization).

Natural Chimeras have natural organic bodies, natural brains, and naturally formed personalities. They function in all respects as a natural sophont. Natural Chimerism may explain a character's specific abilities or characteristics.

## GENEERED CHIMERA

combine aspects of two or more distinct species. Genetic engineers combine genetic features from existing species

(not necessarily both sophonts) to create a new organism.

For example, the Imperial Planetary Development Agency could customize colonists by geneering an existing sophont which breathes Air-3 to add high Strength, high Endurance, and Vision in IR bands.

## THE DETAILS OF CHIMERA

Minor genetic editing to remove minor disabilities or produce minor cosmetic enhancements is commonplace. When significant genetic material from other organisms is grafted onto a being, the result is a chimera.

Chimeras can be cloned.

Chimeras can be characters.

**Viability.** The geneering process may produce a non-viable result. For example, the random selection of head and torso between the two precursors may result in no brain. Such efforts are failures.

**Aging.** Chimeras age according to the hybrid Life Stages structure on the Sophont Creation Card.

**Reproduction.** Chimeras reproduce normally under the same circumstances as their pattern.

**Injuries and Healing.** Chimeras can be injured in the same way as their pattern sophont. They heal the same way.

**Identifying Marks and Controls.** The chimera creation process itself imposes no special identifying markings or control codes.

## PLAYING CHIMERAS

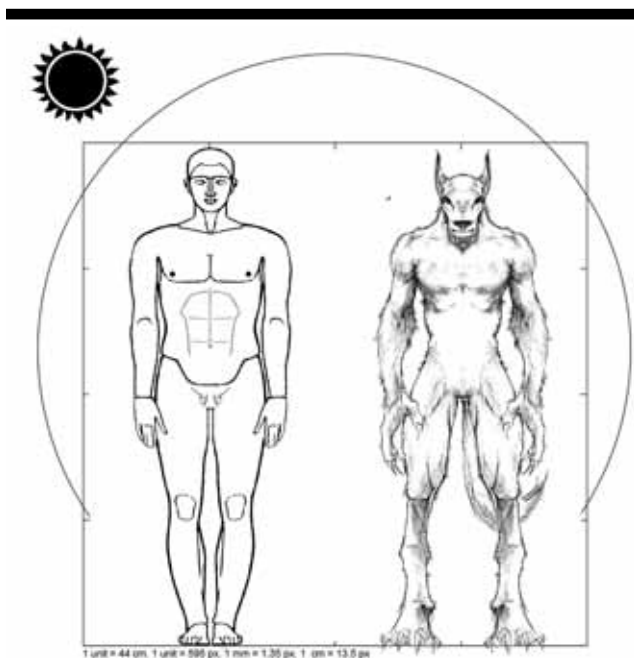
A Chimera can be played like any other sophont. The details of its location and origins are created as necessary.

## ARE VARGR CHIMERAS?

The Vargr are an intelligent Major Race created by the Ancients through genetic manipulation of Terran carnivore/chasers at about the same time humans were scattered from Terra to the stars. Researchers have confirmed that Vargr are genetically derived from family Canidae and almost certainly genus Canis (that is, wolves or proto-dogs).

**The Unanswered Question:** Did the Ancients so completely understand molecular biology that they simply wrote new genes to insert into Earth's proto-dogs? Or, did those Ancient genetic engineers do what modern geneers do? Did they take the nearest available compatible genes for hands, and upright stance, and increased intelligence?

**Are Vargr Human-Wolf chimeras?**



The Vargr of Lair (Kneng-3 [G5 V] A8859B9-F)



# Synthetics

---

A **synthetic** is an organic- or biologically-based artificial being manufactured according to a master template or blueprint. Synthetics blend biological and non-biological processes (the specific proportion may vary). For example, a synthetic may use biological processes to produce energy but have a mechanical pump to circulate blood. Synthetics are distinguishable from **clones** (duplicates created from existing genetic templates), **chimeras** (the result of genetic engineering), and **robots** (truly mechanical or non-organic beings).

## Just How Synthetic Is Synthetic?

Many organic sophonts have mechanical or non-organic components (replaced teeth, replaced joints or bones, prostheses, a heart pacemaker, an insulin pump). Many robots have organic-based components (smell processors, organic brains). The generally accepted guidelines are:

A being (natural, clone, or chimera) remains organic despite the replacement of body components with non-organic parts if the majority of functions are organic.

A robot remains robotic with up to one-third organic components. The most common organic component for a robot is an organic brain.

A synthetic (or semi-organic) lies between organic and robotic.

Sophontoids appear externally similar to their pattern, but they are internally and macroscopically different. Internal processes, organs, and fluids are independently designed using alternative methodologies.

A semi-organic is incapable of reproduction (or is not normally produced capable of reproduction).

## TERMINOLOGY

Several terms differentiate between various types of synthetic beings:

**Synthetic.** An artificial being blending organic (living) and mechanical (non-living) elements. Synthetic refers to the general class of created beings between natural and robotic.

**Android.** Specifically, a synthetic human. Technically, android is a synthetic male human; a synthetic female human is a gynoid. The distinction is rarely made.

**Sophontoid.** A synthetic sophont. Sophontoid is an expansion of the word android to encompass all sophonts rather than just humans.

**Semi-Organic.** A combination of organic and mechanical components. Literally, half-organic. A synonym for synthetic when applied to beings. Semi-organic refers to the nature of components or devices which blend organic and non-organic elements. A semi-organic brain adds electronics to an organic brain to enhance its capabilities.

## TYPES OF SYNTHETICS

There are three general types of synthetics: Faux, Organic Devices, and Sophontoids.

### Faux (Imitation Animals)

A Faux (one is pronounced Foe; several together is Foes; they are spelled the same either way) (characters with

C5= 6 or less say Fox) is an imitation animal; a semi-organic simulacrum (plural = simulacra) of a non-intelligent being.

For example, a synthetic guard dog can be produced with greater survivability than a biological dog; a synthetic transport beast may be superior to a horse or mule.

Imitation animals have some organic and some mechanical components. They are directed by semi-organic brains and implanted personalities.

**Using Imitation Animals.** Imitation animals are encountered in the course of ordinary events. They may be beasts of burden, or pets, or they may populate territories as ornamental scenery.

### Organic Devices

An Organic Device is a synthetic object which performs some activity using biological processes.

For example, a semi-organic voice amplifier may have superior qualities when compared to an electronic amplifier. Other examples are: small room cleaners, intruder sensors, a water filter/purifier, and lawn trimmers.

Organic devices have some organic and some mechanical components. They are directed by semi-organic brains and implanted (rudimentary) personalities.

**Encountering Organic Devices.** Organic Devices are commonly encountered in the course of ordinary events; they may be commonplace, and they can often be ignored.

## Sophontoids

A Sophontoid is a semi-organic imitation of a sophont. It is an artificial sophont built for specific purposes (for example, cheap labor under special or extreme conditions).

For example, a company may decide to create a low-cost imitation human. Based on an existing human, the android (the human sophontoid or humanoid) has the general human body structure, but makes use of a cheaper mechanical pump to circulate body fluids. It is controlled by a circuitry-enhanced animal-derived brain.

Sophontoids have semi-organic bodies, semi-organic brains, and implanted personalities.

**Playing Sophontoids.** Sophontoids may be characters.

## THE TECHNOLOGY OF SYNTHETICS

Effective Cloning and Forced Growth are foundations for the organic components of synthetic; these technologies cluster around TL-13. Mechanical and electronic components are available at earlier levels.

## SEMI-ORGANICS

Semi-organic is used with Faux and Organic Objects. Intelligent semi-organics are called sophontoids. There is usually no purpose to non-sophontoids as characters; sophontoids, however, can be quite interesting.

**The Vat.** The production facility for semi-organics is some sort of biological factory. Sophontoids have a particular (even instinctual) reverence for their native factory; they commonly (if inaccurately) call it their **vat**.

## Production

Semi-Organics are produced at a factory using a set of master plans or master drawings.

**Manufacture.** Semi-Organics are manufactured. When they leave the vat they are in final operable form, fully trained, and fully capable of fulfilling their intended functions.

**Reproduction.** Semi-Organics cannot reproduce.

**Cloning.** Because some components are non-biological, semi-organics cannot be easily cloned.

## Injuries and Healing

Semi-Organics can be injured in the same way as other biological beings.

Semi-Organics usually have an outer covering (skin) capable of healing. Organic internal organs can also heal; and they can be cloned for replacement. Non-organic components which are damaged require repair or replacement.

## THE DETAILS OF SOPHONTOIDS

Sophontoids are produced at a factory using a set of master plans or master drawings. The commonly used term for a sophontoid factory is vat. The concept that sophontoids are actually grown in a vat is inaccurate but nonetheless widespread.

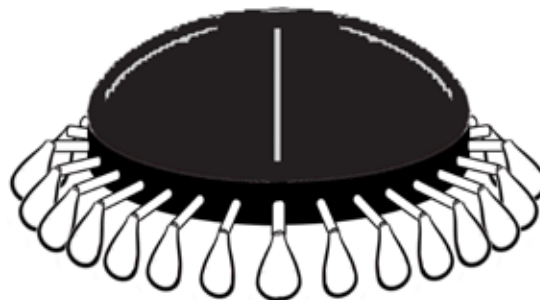
**Manufacture.** Various components are grown or fabricated, and the sophontoid comes to life with the installation of the semi-organic brain. They begin life in adult form, fully trained and capable of performing their intended duties.

Before leaving the factory, a sophontoid receives a

---

## HOW THEY BUILD SYNTHETICS

---



---

## NAASIRKA-REGINA NR1000

---

The marketing department of Naasirka Regina (a well-known synthetics manufacturer) has identified an economic for a small semi-organic room cleaner. The company selects a common mouse as the starting point and begins the process. The rudimentary mouse personality is recorded; the mouse is cloned several hundred times, and the personality is re-implanted. The mice are trained on basic tasks (obeying instructions, avoiding people and moving objects). These multiple personalities are then recorded, edited, and integrated to create a basic mouse personality with the best of the learned behaviors.

**The Semi-Organic Body.** To meet the specifications, a semi-organic body is designed, tested, and manufactured. It includes a self-healing outer skin, multiple retractable legs for stability, basic sensors to detect edges and prohibited areas, and a pouch to store dust and floor dirt.

An organic power system takes nutrient from a nest fixture and to deposit waste in the pouch.

**The Nest.** For storage when not in operation, each body is self-programmed to build a neat and compact nest from accumulated detritus, with locations for refuse and nutrients. The process includes genetically programmed self-satisfaction at its maintenance.

as The nest contains each and as a source

**The Semi-Organic Brain.** The mouse personality is implanted in the semi-organic brain. Because the personality is derived from the original of the cloned brain, the personality implant is permanent.

## The End Product

The Naasirka-Regina NR1000 cleaning system consists of a floor level nest for one or more cleaners dedicated to keeping floors clean and shiny. The cleaners stay out of sight whenever people are present; only when the room is empty do they come out and work. The cleaners collect dirt and dust in their internal pouches and empty them into a central receptacle in the nest. They sort larger objects (coins, small parts) from the pouch into an accessible Lost & Found bin. The cleaners subsist on a special nutrient fluid available only in the nest (refillable quarterly).

**Other Features and Restrictions.** The NR1000 has a 10-year useful life. The cleaners are available in a variety of colors, including licensed sports team themes.

Naasirka-Regina provides periodic upgrades to the implanted personalities (which are self-installing in the nest).

---

## SOPHONTOID IDENTIFYING MARKINGS

Flux	Obvious (Skin) Markings	Unobtrusive Markings
- 5	Spots Overall	Tattoo- Hidden
- 4	Conspicuous Patterns	Tattoo- Inconspicuous
- 3	Blotches	Minor Differences
- 2	Multiple Marks	Internal RFID
- 1	Prominent Mark	Internal Scannable Chip
0	Pigmented Skin	Local ID marking
+1	Patterned	Verbal Trigger
+2	Subtly Patterned	Touch Point Disable
+3	Subtly Colored	Scent Trigger
+4	Unpigmented	Visible Pattern Trigger
+5	Transparent Skin	IR Hotspot

A Batch Sophontoid has BOTH one Obvious Marking and one Unobtrusive Marking.

A Premium Sophontoid has one Unobtrusive Marking.

## SOPHONTOID CONTROL STRUCTURES

Flux	Non-Standard Behavior or Requirement	When
- 5	Accumulated Waste Residue Flush	annually
- 4	Organic Chemical Supplements	daily
- 3	Dietary Supplements	daily
- 2	Hormone Supplements	monthly
- 1	Eats (Requires) spoiled or substandard foods	
0	Eats (Requires) a specific geneered food	
+1	Internal Energy Cell Recharge	daily
+2	Internal Energy Cell Recharge	weekly
+3	Tailored scent input	weekly
+4	Coded Bright Light Incapacitation	
+5	Coded Sound Pattern Incapacitation	

Sophontoids have one Control Structure.

## SOPHONTOID COST

KCr =	C1 *	C2 *	C3 *	C4
Use		Agi /2, Gra /2	Vig /2 Sta *2	

Included in cost are skill levels equal to (C1+C2+C3+C4)/2:  
Behavior and control codes= 2 levels.

Hobby= 1 level.

Usable Skills= remainder.

The base cost in KCr of a sophontoid is the product of its first four UPP digits. Agi, Gra, and Vig are calculated at half value. Sta is calculated as double.

## THE FOUR CONCEPTS OF SYNTHETICS

To promote synthetics as safe within the community and responsive to the needs of users, synthetics should have a series of compulsions that promote proper behavior.

Synthetics should have a no-harm compulsion.

Synthetics should have an obedience compulsion.

Synthetics should have self-preservation compulsion.

Synthetics should have a work-ethic compulsion.

All compulsions are adjustable to reflect mission, ownership, community, and social standards.

basic education or training for behavior, implanted control codes, and skill levels. They are then tested and those which do not meet this level of quality or achievement are terminated as substandard (or sometimes sold as surplus; some even escape).

A sophontoid has no memory of events prior to leaving the factory. Its first memory is of the final production chamber at the factory immediately prior to being sent into the world.

**Reproduction.** Sophontoids are incapable of individual reproduction. Some sophontoids are the product of a profit-making organization with little access to, or knowledge of, their native factory. Other sophontoids have acquired access to their factory and control its central reproduction policies.

Sophontoids may have external gender characteristics, or they may lack any specific gender characteristics.

Semi-organics cannot be cloned using normal processes; their organic components may be cloned; distinct components may have distinct genetic structures, each of which must be cloned separately; finally, non-organic components must be manufactured and added.

**Sanity.** Sophontoids naturally receive a characteristic Sanity equal to 2D.

Experience has shown that sophontoids are more likely to retain Sanity if they have a hobby: one skill level is assigned by a random roll on the Citizen Life table.

## Injuries and Healing

Sophontoids can be injured in the same way as their pattern sophont.

Sophontoids have an outer covering (skin) capable of healing. Organic internal organs can also heal. Non-organic components which are damaged require repair or replacement.

A sophontoid brain is manufactured and semi-organic.

## Identifying Marks and Control Codes

Local law level and culture determine the markings and control codes for sophontoids.

**Markings.** Markings are applied at the factory. Sophontoids have markings which allow them to be identified as sophontoids. Batch sophontoids have one obvious marking and one unobtrusive marking (as a backup or confirmation). Premium sophontoids, intended to blend more fully into society, have one unobtrusive marking.

For example, a sophontoid may be created to eat marginal foodstuffs (spoiled foods, bulk cellulose, common non-food plants), or specially formulated foods (spiked with exotic chemicals). A sophontoid may require biological process supplements (to support or drive internal processes).

**Control Codes.** Control codes are installed at the factory. Every sophontoid has an installed control code. Although the original intent was that such codes be secret, integration of sophontoids into society means that each sophontoid probably knows the control code that applies to him.

## CREATING SOPHONTOIDS

Sophontoids are created by the factory according to a model or pattern which details the values for its characteristics. Typically, sophontoids are created in "batches" of about

100. Sophontoids from the same batch have a special bond and consider themselves brothers (or sisters or sibs).

Creating a sophontoid involves determining what values best emulate the pattern.

**Available Characteristics.** The sophontoid manufacturing process creates characteristics C1 C2 C3 and C4. Characteristics C5 and C6 are “empty” and set to 0.

**The Process.** The producing factory creates a pattern or master plan for the sophontoid characteristics where the sum of the characteristics C1 C2 C3 C4 equals 3.5 times the dice rolled for those characteristics in the sophont pattern.

For example, a factory chooses to produce a laborer android based on a human pattern. A human character has C1 C2 C3 C4 for a total of 8 dice (= 8 \* 3.5) = 28 points. The factory allocates Str= 10 Dex= 6 End= 8 Int= 4. Edu and Soc remain at zero.

The members of the batch then receive a standard set of skills equal to half of their characteristic points. Two levels provide basic behavior and control codes. One level is a sanity-supporting hobby; the remainder are the usable skill set: about 11 skill levels.

**Batch-Produced Sophontoids**

The factory routinely produces sophontoids in batches of about 100 based on market orders or perceived market needs. Identify the market need for the sophontoid (for example, laborer, servant, soldier).

The total skill levels equals Characteristics/2 (three are consumed by control codes and hobby).

**Premium Sophontoids**

The factory produces high quality sophontoids in groups of about 10 based on specific orders. Identify the market need for the sophontoid (for example, astrogator, librarian, bodyguard). Otherwise identical to a batch-sophontoid, it receives 5 additional skill levels at a surcharge of KCr500,000.

**Other Factories, Other Processes.** Other sophontoid produces may use other schemes to produce their products.

**Randomly Encountered Sophontoids.** Any randomly generated sophont can conceivably be a sophontoid.

**Calculating Costs for Sophontoids**

Determine the cost for a sophontoid based on its UPP.

A sophontoid’s base cost is the product of its UPP digits, in KCr. Agl, Gra, and Vig are calculated at half value. Sta is calculated as double.

A sophontoid SDEI 2222 costs about KCr16.

A sophontoid SDEI 7777 costs about KCr2,401.

A sophontoid SDSI 7777 costs about KCr4,802

A sophontoid SAVI 7777 costs KCr600.

A sophontoid SDEI CCCC costs KCr20,736.

**Raw Materials.** The cost of raw materials in inconsequential; the artificial may be an intelligent artificial human, or hippopotamus, or a whale without any real effect on the final cost.

**Special Equipment.** To this base cost is added any other equipment that makes up its frame – for instance, if it has a powered armor exoskeleton with an integrated weapon, that is added to the base cost.

**EXAMPLE SOPHONTOID COSTS**

	Str	Dex	Agi	Gra	End	Vig	Sta	Int	Skills= Skills	Hobby	KCr	Occupation
Batch	7	7			7			7	12	Driver-9. Wheeled-2		
Batch	9	9				10		5	12	Fighter-9. Slug-Thrower-2.		
Batch	5	5				5		5	12	Fighter-5. Admin-3. Slug-Thrower-2. Medic-2.		
Batch	5		8				8	8	12	Admin-6. Bureaucrat-5.		
Batch	5	8			8			7	12	Chef-7. Teacher-2. Medic-2.		
Batch	8	8			6			6	12	Fighter-7. Slug-Thrower-2. Unarmed-2.		
Batch	12			5		5		6	12	Fighter-9. Unarmed-2.		
Batch	6		6			6		12	12	Broker-6. Trader-5.		
Batch	7			5		5		11	12	Computer-2, nine Knowledges-1.		
Premium	10	9			9			10	17	Astrogator-9. Pilot-7.		
Premium	9	10			10			9	17	Engineer-10. Jump-2. Small-Craft-2. Pilot-2		
Premium	10	8				8		12	17	Sensors-7, Gunner-7, Turret-2.		
Premium	12	7			7			12	17	Mechanic-6. Gravitic-5. Electronic-5.		
Premium	10			8		8		10	17	Anglic-12, Vilani-12, Trokh-11, Zhedtl-11.		
Cheap	7		6		7			5	10	Mechanic-5. Electronic-4.		
Cheap	4		4			4		4	6	Bureaucrat-5		

Base cost of a sophontoid is the product of its first four UPP digits, in KCr.

Agl, Gra, and Vig are calculated at half value. Sta is calculated at double value.

# Clones

---

A **clone** is a sophont genetically identical to a single or donor parent sophont. It has the same genes as its parent. Clones fill important social, economic, and medical functions in society. Clones are distinguishable from **synthetics** (a blend of biological and non-biological processes), **chimeras** (the result of genetic engineering), and **robots** (truly mechanical or non-organic beings).

The concept of clone embodies an organic reproduction or recreation of a single individual. The genes of the original are used to create one or more duplicates.

## CLONE TYPES

There are five general types of clones:

**Natural.** Clones occurring naturally.

**Offspring.** Clones produced as children.

**Relict.** Clones intended to replace dead individuals.

**Guest.** Clones produced to provide cheap labor.

**Med.** Clones produced to provide medical parts.

## NATURAL CLONES

occur without the intervention of technology.

Identical twins are natural clones (of each other rather than of a parent). The children of Solitaires (sophonts with only one gender) are natural clones. Natural clones are birthed as children and proceed naturally through all life stages.

For example, citizens Andrew Boulton and Penny Williams meet, fall in love, and marry. After a suitable period, they have their first child. Actually, their first child turns out to be two: identical twins. Identical twins are natural clones of each other.

For example, Knuma is a Dantonite from Thestraurora (Tickstrap 7 [A3 V]). This species has a single gender (=Solitaire). Knuma has a litter of four pups, each genetically identical to the parent. They are natural (offspring) clones.

Natural Clones have natural organic bodies, natural brains, and naturally formed personalities.

### Playing Natural Clones

Two or more players may decide to play identical sibs: twins, triplets, litter mates. A single set of characteristics is created for the natural clones, and each player takes his individual character through the character generation process.

## OFFSPRING CLONES

are deliberately created clones intended as children of individuals. They are typically created for an individual driven by a need to have offspring, but who does not care to involve other parents in the creation process. For example, a Neuter does not normally participate in child creation; it could create a child through cloning. The offspring of the Solitaire gender are natural clones (and offspring clones).

Offspring clones are birthed as children and then proceed through all normal life stages.

For example, Merchant Captain Alexander Jamison travelled the starlanes and never settled down; co-incidentally he has never found a suitable mate. As he approaches Life Stage 5, he feels (and acts on) his instincts to have a family. He visits a doctor's office on Regina and makes the necessary arrangements. Nine months later, he returns to Regina and takes delivery of his new son. The first few years are both harrowing and exciting, but the ship's crew lends its help and soon Jamison's son Ank is a junior member of the crew, helping with cargo handling, food preparation, and eventually helping on the bridge.

Ank Dinsha is an offspring clone.

For example, a Neuter in the gender structure Female-Male-Neuter does not normally participate in reproduction and child creation; it could create a child through cloning.

Offspring Clones have natural organic bodies, natural brains, and naturally formed personalities. Offspring clones progress normally through childhood.

Offspring clones are usually the same gender as the parent. Geneering may alter this result.

### Playing Offspring Clones

A player whose character has reached Life Stage 9 may decide to continue adventuring as an offspring clone of the original character.

## RELICTS

are deliberately created clones intended to replace an existing individual (typically one who is dead or incapacitated). The pattern provides genetic material samples and a personality, memory, and skill recording.

Relicts are not created until the pattern has died or disappeared. When a pattern dies, a relict is force-grown to Life Stage 3 and implanted with the pattern's recorded personality (including memories and skills).

A relict preserves memories and is an effective duplicate or replacement for the pattern.

For example, Duke Adawulf of Efate knew he was living a dangerous life when hostilities started in the Spinward

Marches; he quite responsibly bought life insurance. In the last days of the enemy assault, Adawulf held off the enemy at the portico of his estate as his staff made their escape. After several hours, he was killed when Zhodani artillery levelled the palace. His loyal butler gathered up a few scraps of the Duke, and after the war ended, notified the insurance company. About a year later, the Duke made his appearance at a party in his honor, but with no memories of the past three years.

Relicts have force-grown organic bodies, cloned brains, and implanted personalities.

### Playing Relicts

Life Insurance activates a Relict when a verified report of death or disappearance is made to the company. The activated Relict has the memories and skills of the original and becomes owner of the original's property.

### GUESTS

(as in Guest Workers) are deliberately-created clones intended to be cheap laborers. A suitable pattern provides genetic material samples, and a personality / skill recording.

Guests are force-grown from genetic material samples and implanted with an edited recorded personality and skills (but not memories). A guest is a skilled duplicate of the pattern, lacking only the memories of the original.

For example, during the Second Frontier War, Zhodani and Imperial forces repeatedly held, lost, and retook strategic positions on Arden. Thousands of soldiers on both sides were killed. By chance, a non-human prospector Zognar and crew were in the Arden system and saw a chance for profit in midst of all this destruction; they collected cell samples and brainscans from several dozen of the dead (some were actually not quite dead when the samples and scans were

taken). The result was a bonanza: dead soldiers became guest security guards and bodyguards; dead technicians became guest factory workers; a dead doctor became a series of sorely-needed medical staffers. Zognar made a fortune.

For example, Morio Nakamura grew up on Boughene, the child of prospectors in the copper-rich Swalian Mountains; he was the operator of a small copper mine for more than 40 years. Both strong and smart, he was good at what he did and he enjoyed his work. When Naasirka opened a much larger mine, it needed more skilled workers than the planet could provide, and they struck a deal with Morio: in return for his cell samples and brainscan, they provided him with a new cloned body and bought out his mine for enough to support him in luxury for the rest of his life.

Naasirka's Nakamura Copper Mine (they named it after him) is staffed by a workforce of strong smart Nakamura clones, each implanted with the proper skills and a personality which enjoys its work. Naasirka's cost-benefit analysis was confirmed: it was cheaper to create a clone workforce than to recruit, transport, and train hundreds of offworlders.

Guests have force-grown organic bodies, cloned brains, and edited implanted personalities (an edited recording of the original personality).

Guests are typically sterilized when created.

### Playing Guests

A character may be a Guest. Although memories are supposed to be edited out of the personality, the process sometimes fails.

### MEDS

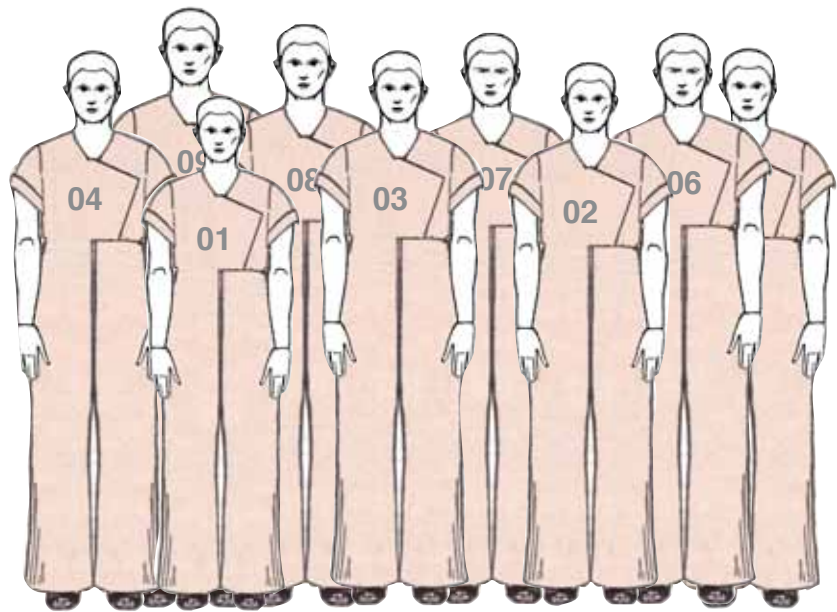
(as in Medical Clones) are clones deliberately created as reserves of medical replacement parts. When a pattern requires medical repair parts, a med is force-grown to Life

---

## THE NINE CLONES OF FILIS TEN

Filis	777777	= Pattern
	3333XX	= Genetic
Filis01	444777	= minimum
Filis02	455777	
Filis03	484777	
Filis04	599777	
Filis05	566777	
Filis06	685777	
Filis07	757777	
Filis08	884777	
Filis08	899777	
Filis09	999777	= maximum

Nine randomly generated clones of Filis Ten (includes the minimum and maximum possible UPPs)



## THE TECHNOLOGY OF CLONING

	TL	Cloning
High	12	Personality Recording And Editing.
Vhigh Tech	13	Cloning. Forced Growth. Wafer Technology.
	14	Geneering. Temporary Personality Transfer.
Xhi	15	Mindwipe. Pattern Personality Re-Implant.
	16	Artificial Intelligence.
	17	Permanent Personality Transfer.

Stage 3 and then used to provide replacement parts.

After a terrible groundcar accident, Spyke Alpha and his bride Majack Sierra both lay in autodocs with extensive injuries. Spyke was 62 years old: the doctors took tissue samples and force grew a completely new clone body over about 18 weeks. When it was ripe, they implanted his brainscan into the new (18 year-old) body and allowed the old one to expire. Majack is 58 and her injuries are confined to the left leg. Doctors could have removed the leg and replaced it with a temporary mechanical; then when the clone body was ripe, replaced the mechanical with a clone leg and finally destroyed the remainder of the clone body. Instead, they implanted her brainscan into the new (18-year-old) body and destroyed the old one. Or did they?

### Playing Meds

Meds are rarely played. The occasional med may escape its force-growth chamber.

### THE DETAILS OF CLONES

Clones may be characters.

### Genetic Duplication

Clones are not exact duplicates of an existing sophont (the pattern) since only the genetics are duplicated. Cloning duplicates the genetic values of the pattern and dice create the remainder of each characteristic. For each characteristic, the remainder (the other dice) are rolled normally. Non-genetic characteristics have a value of zero (for example, C5=Education).

For example, the original Filis Ten 777777 has each characteristic created with 2D. For each characteristic, the first D was 3 and the second D was 4. Filis' genetic UPP is 3333XX. When creating nine clones of Filis, the non-genetic D is rolled individually. Implanting Filis' personality provides the Edu and Soc. Each of the clones "thinks" she is Filis Ten. Some of them will remember different Strength or Dexterity and soon realize that she is not the original. Others may each persist in each believing she is the original and the records are somehow wrong.

**Clone Intelligence.** A clone possesses its native (genetic) Intelligence. The Forced-Growth process does nothing to increase that intelligence so a clone freshly made has only genetic intelligence.

**Personality Implants.** Once fully grown, a clone is implanted with its personality which provides it C4 C5 and C6.

**Natural Life Stages.** Natural and Offspring Clones proceed through the Life Stages in ordinary time. They generate C5 normally. They generate C6 according to the specific non-genetic inheritance rules.

**Forced Growth.** It is possible to speed up the growth of organics. A Metabolic Chamber (the device for creating clones) can accelerate growth to about one year per week.

**Natural Gestation Periods.** If a gestation period is necessary for a non-human, calculate it using sophont size as a percentage of 52 weeks. For example, a Size 72 Human has a pregnancy of (72% of 12 months) = 8.6 or (round to) 9 months. A Size 50 Sophont has a pregnancy of (50% of 9 months) = 4.5 months. Some parents prefer that the pregnancy proceed in a laboratory, and some prefer it be forced-growth.

### Natural Or Forced-Growth?

Natural Clones and Offspring Clones mature naturally. They pass through each Life Stage in real time. Relicts and Guests would be relatively useless concepts if they could not be rapidly made available. Clones can be force-grown in a Metabolic Chamber (at one year per week) to Life Stage 3.

A Force-Grown clone body has no developed personality. Without a personality implantation, it has C5=0 and C6=0.

### Aging

Cloning accelerates the aging pattern of the individual.

Physical aging begins at Life Stage 4 (one stage earlier than the original pattern sophont). Age is the biological age of the newly produced body. Physical aging applies to characteristics C1 C2 C3.

Mental aging begins at Life Stage 8 (also one stage earlier than the pattern). Mental aging applies to Intelligence.

Natural and offspring clones are not subject to accelerated clone aging.

### Reproduction

Natural and Offspring Clones and Relicts reproduce normally under the same circumstances as their pattern. Guests are typically sterilized during the force-growth process.

### Injuries and Healing

Clones can be injured in the same way as their pattern sophonts. They heal in the same way as well.

### Identifying Marks and Controls

The clone creation process itself imposes no special identifying markings. Natural and Offspring clones are almost never given unique or identifying markings.

**Relict Markings.** A Relict may be given an unobtrusive marking for identification purposes (typically a tattoo); obvious markings would frustrate the purpose of a Relict.

**Guest Markings.** A Guest may be given markings for identification purposes. Guest markings are usually visually obvious (large tattoos).

**Med Markings.** A Med is typically unmarked (perhaps a discrete tattoo to help identify its intended recipient).

Characters face a variety of obstacles and challenges... Characters resolve these many challenges with tasks: Success allows characters to continue their travels and to move on to the next situation; Failure makes characters re-try, or try other tasks instead, or even abandon their current efforts and go in a totally new direction.

Tasks dictate the success or failure of the characters' endeavors. They allow specific activities to be resolved consistently whenever, wherever, or however, they occur. It is the responsibility of the players behind the characters to analyze a variety of possible tasks and decide on the best course of action.

**Many Tasks Are Skipped.** Many potential tasks can be skipped because their resolution would slow down the game without providing any additional drama. The referee determines which situations actually call for resolution and which can be assumed to be completed without difficulty or mishap.

**Skills, Talents, and Knowledges.** The terms Talent and Knowledge are special cases or variations of Skill.

**The Purpose Of The Traveller Task System.** The **Traveller** task system provides a means of resolving situations; the details of those situations in light of the tasks, skills, and characteristics become the basis for the story-telling aspects of **Traveller** adventures.

## THE SYNERGY OF SKILL AND CHARACTERISTIC

The **Traveller** task resolution system considers together the character's personal aptitudes and individual skills. Characteristic represents a base of natural ability, Skill represents experience, learning, and practical knowledge. For example, different Characteristics interact with a Skill differently: Dexterity and Medical determine success as a surgeon; Education and Medical determine success in diagnosis. A high Dexterity and low Education character might still make a good surgeon; a low Dexterity and high Education character might make a good diagnostician; a high Dexterity and high Education character makes a good well-rounded (and probably more successful) Doctor.

## AN OVERVIEW OF TASKS

Tasks are important actions whose results have an effect on the characters and their endeavors.

Tasks may be provided in the text of published adventures; they may be stated in the game rules; sometimes they may need to be provided by the referee, fragmentarily or definitively.

**Assets.** The Skills, Knowledges, Talents, Characteristics, and Modifiers used in a task are all Assets. Asset may refer to any of these specific terms, or to all of them collectively.

**Creating Tasks.** Knowing an activity, the referee determines the appropriate Assets to be considered. The referee also decides the difficulty of the task which determines the number of dice to be rolled.

To succeed, the player then must roll the Target Number (total of the Assets) or less on the dice dictated by difficulty.

**Based on Skill and Characteristic.** Tasks are resolved based on a specific skill and/or a specific characteristic. The combination of the two provides the basis for task resolution.

**Duration.** Duration may be included where the time element is important (such as deadlines or inexorable circumstances). When not of especial importance, duration is optional.

**Special Results.** In addition to the ordinarily expected results, some tasks may produce unusual or extraordinary effects: spectacular failure or spectacular success with correspondingly more powerful results.

---

## MANY TYPES OF TASKS

**Cooperative Tasks.** Two or more characters perform the task.

**Opposed Tasks.** Two or more characters compete to resolve the same task.

**Tasks Without Skill** based on characteristics and one or more other factors.

**Tasks Without Characteristic** based on skill and other factors.

**Actions (Tasks Without Skill Or Characteristic)** reflecting the use of the senses, or other common activities available to most individuals.

**Arcane Tasks** akin to tricks or special knowledge.

**Uncertain Tasks** in which the exact outcome of the task remains in doubt.

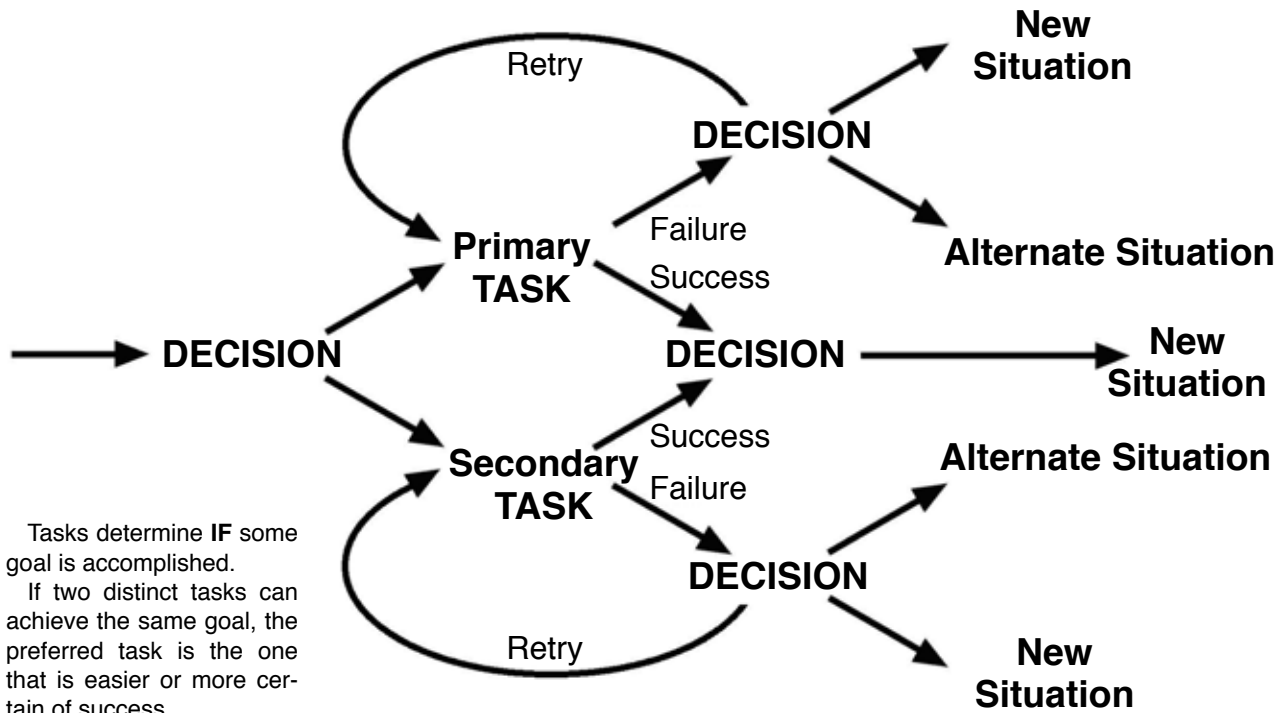
**Tests and Certifications** reflecting academic or aptitude tests of proficiency.

**Special Circumstances** such as divided attention or multi-tasking, and consequences.

---



# THE TASK CYCLE



# THE TASK FORMAT

Die Roll

Assets (Target Number)

$$nD < \boxed{\phantom{00}} + \boxed{\phantom{00}} + \boxed{\phantom{00}} + \boxed{\phantom{00}}$$

Die Roll      <=      Characteristic      Skill      Mods1      Mods2

**Roll Low:** The Task succeeds if the Die Roll is equal or less than the total of all Assets.  
 The Left Arrow < Symbol is read as Less Than Or Equal To.

## MANY APPROACHES TO TASKS

## TASK DIFFICULTIES

		Difficulty Level	Dice	Hasty	Cautious
<b>Task Phrase:</b>		Eas	*		
To accomplish an important activity (duration).		Eas	1D	2D	1D
<b>Task Statement:</b>		Ave	2D	3D	1D
Difficulty (nD) <	Assets	Dif	3D	4D	2D
Difficulty (nD) <	Char	For	4D	5D	3D
Difficulty (nD) <	Char +Mods1	Sta	5D	6D	4D
Difficulty (nD) <	Char +Mods1 +Mods2	Hop	6D	7D	5D
Difficulty (nD) <	+Skill	Imp	7D	8D	6D
Difficulty (nD) <	+Skill +Mods1	Bey	8D	9D	7D
Difficulty (nD) <	+Skill +Mods1 +Mods2	Difficulty levels may be increased in Hasty or decreased in Cautious tasks. * Usually automatic.			
Difficulty (nD) <	Char +Skill	<b>Cautious.</b> Time required is Doubled. Difficulty -1D.			
Difficulty (nD) <	Char +Skill +Mods1	<b>Hasty.</b> Time required is Halved. Difficulty +1D.			
Difficulty (nD) <	Char +Skill +Mods1 +Mods2	<b>Extra Hasty.</b> Time completes before any other competing task. Difficulty +2D.			
<b>Task Comments:</b>		<b>Dangerous.</b> May injure the task user.			
appropriate comments about the task.		<b>Destructive.</b> May damage an associated device.			

---

## DEFINITIONS OF IMPORTANT TERMS

---

The following terms are used in resolving tasks:

**Assets.** Skills, Characteristics, and Modifiers used in a task are all Assets. Asset may refer to any of these specific terms, or to all of them collectively.

**Characteristic.** The individual character's Characteristic most closely associated with the skill being used in the task.

**Die Roll.** Die roll is the result of the use of the dice. The number of dice used is dependent on the Difficulty.

**Difficulty.** The expression of how hard the task will be to complete.

**Knowledge.** A body of information based on a field of science or experience. A Knowledge is a variant form of Skill.

**Mods. Modifiers.** Modifiers are additions or subtractions reflecting local conditions. Modifiers may include weather, environment, distractions, and other elements.

**Skill.** The individual character's Skill being used to accomplish the task. The term Skill often includes Knowledges and Talents.

**Talent.** A personal ability not generally possible for a Human, but possible for some non-humans. A Talent is a variant form of Skill. Talent is not used in the sense of fine art ability (such as a talent for music).

**Target Number.** The Target Number is the sum of all Assets used in the Task. The player must roll the Target Number (or less) on the Dice in order to succeed.

**Task Cycle.** The process of evaluating which tasks to undertake.

---

### THE UNIVERSAL TASK FORMAT

Tasks are expressed in a standard format (the Universal Task Format or UTF) containing the important elements of the specific situation. The UTF consists of a task phrase, a task statement, and any task comments. A typical task should be stated as with these three elements on three succeeding lines. A typical task is

To do something [optional: time].  
Difficulty (nD) < Assets  
[comments]

Or, in more specific terms,

To repair a grav vehicle (1D hour).  
Difficult (3D) < (Dex + Gravitics) + 1 for Tools (required)  
Probably takes several hours.

#### The Task Phrase

The Task Phrase states the specific purpose of the task. It is stated as an infinitive verb phrase (i.e. "To" followed by a verb and any modifying words). It effectively states what the character wants to do.

If a task phrase requires more than one line, it is probably too complex and should be broken into two or more separate tasks.

The Task Phrase may contain Duration (in parentheses) and state the time the task generally takes to accomplish. This information is optional, and may often be ignored.

#### The Task Statement

The Task Statement shows the specific information which is required to resolve the task. Task resolution is based on a difficulty level, a skill and/or a characteristic, and modifiers.

The sum of the asset (the characteristic and skill and all applicable modifiers to the right of the < ) is the Target Number. The player must roll equal to or less than the target number to succeed at the task.

**Task Modifiers.** Some situations may call for the incorporation of modifiers in the task resolution. Modifiers may

be positive or negative numbers. Positive modifiers enhance the chances for successful completion of a task; negative modifiers reduce the chance of success.

**Task Difficulties:** The difficulty of a task indicates how many dice are rolled to resolve the situation. The greater the difficulty, the more dice are used to resolve it.

#### The Task Comments

The Task Comments include any supplementary information about the task. It states if the task is Cooperative, Uncertain, or Opposed. It states if the task is Hasty or Cautious. It includes any modifiers which did not fit in the Task Statement. It includes any additional information which may help in understanding the activity and its resolution.

### RESOLVING TASKS

The referee tells the players the required skill and characteristic and difficulty level. The players (those whose characters are present) discuss who will attempt the task and how. The player behind the character determines the target number and then personally rolls the dice and compares it with the target number. Low rolls are better. If the die roll is equal to or less than the target number, the task is successful (on the other hand, if the die roll is greater than the target number, the task fails).

For example, Eneri Dinsha (777777 Communications-2) is on the world surface and trying to use a communicator to warn an approaching pinnacle.

To establish comm contact with a pinnacle crew.  
Average (2D) <(Edu + Communications) + Environ

It's an ordinary day; the Environ Mod is 0. The target number is (Edu + Comm = 7 + 2 = ) 9, Eneri must roll 9 or less on 2D. He rolls 7, which means he succeeds in accomplishing the task.

Several days later, the same task comes up again. This time, the Referee rolls on the Comms Environ column of the Mods Table: -3 Equipment Glitch. The target number is (Edu + Comm + Environ = 7 + 2 -3 = ) 6, which Eneri must roll or less on 2D. He rolls 7, which now means he fails.

## THE CHARACTERISTICS

	Non-Human	Human	Non-Human	
C1		Strength		C1
C2	Agility	Dexterity	Grace	C2
C3	Stamina	Endurance	Vigor	C3
C4		Intelligence		C4
C5	Training	Education	Instinct	C5
C6	Charisma	Social Standing	Caste	C6
CS		Sanity		CS
CP		Psi		CP

## CHARACTERISTICS

One of the Assets for Tasks is Characteristics. Characters have characteristics as recorded in their UPP (Universal Personality Profile).

Humans have the six standard characteristics: Strength, Dexterity, Endurance, Intelligence, Education, and Social Standing.

Sophonts (that is, non-humans) may have (but do not necessarily have) analog characteristics.

Characteristics on the same line are Analog Characteristics. They are similar in nature. For example, Agility, Grace, and Dexterity all reference similar abilities.

If a Task calls for a Characteristic which the user does not have, then the user can substitute the corresponding Analog Characteristic at half value. For example, a strange task commonly used by the Dranfians of Fogel-6 (who have Agility rather than Dexterity) may call for Agility. A human attempting the task can substitute Dexterity at half value (round fractions up).

## SKILLS

One of the Assets for Tasks is Skills. Characters have skills representing their abilities in specific fields of endeavor. Each skill corresponds to approximately one year of education, training, or experience in that field.

**Skills, Knowledges, and Talents.** The general term Skill encompasses the more specific terms Knowledge and Talent.

A **Skill** is a broad familiarity or expertise in a specific field. Skills generally (but not always) correspond to a job title: the Skill called Astrogator refers to the expertise necessary to perform the job of Astrogator.

A **Knowledge** is an academic set of facts, or an area of specialization. Some Knowledges are subsets of a Skill (the Knowledge Pistol is a subset of the Skill Gun Combat); other Knowledges are stand-alone sciences (Archeology is a Knowledge).

A **Talent** is a skill which is generally only available to non-humans (and not necessarily to all non-humans). The Talent PhotoMem (having a photographic memory) is a skill which some sophonts can learn or have naturally. It is not a skill which most humans acquire.

## Describing Skills

A skill is expressed as a skill name followed by a level. For example, Electronics-3 is level 3 of Electronics skill. The players and referee often express this skill level as Electron-

ics-3 or Level-3 of Electronics.

Skills are very broad in their scope and should be broadly applied to tasks.

**Default Skills.** Generally, a task cannot be attempted if the character does not have the requisite skill. But all characters have Level-0 of a set of basic skills (the Default Skills).

There are times when characters need to accomplish tasks for which they do not have the required skill. Any character may attempt a task which specifies a Default Skill, even if the character himself does not have that skill. Skill level is 0 (zero) and the This Is Hard! Rule applies.

For example, Eneri Dinsha (777777 Pilot-2), while driving a groundcar, hits a patch of slippery road.

To avoid an accident

Average (2D) < Dex + Ground Craft

Eneri has no specific skill in Ground Craft, but it is a Default Skill. He can attempt the task with Dex 7 + Skill-0. The difficulty of the task is increased from Average to Difficult. He must roll 7 or less on 3D.

On the other hand, Eneri finds a bomb planted in the ground car. Explosives is not a Default Skill; Eneri cannot (or usually would not) even attempt to defuse it.

Compare two otherwise equal characters, one of whom has the required skill-2, and the other does not have the default skill, but can use it as skill-0. Both have characteristic-7. Skilled has C+S=9, and for an Average (2D) task has an 83% chance of success. Unskilled has C+S=7 and under the TIH! Rule must resolve an Average task as Difficult (3D); he has a 16% chance of success.

## This is Hard! (TIH!)

If a task requires more dice than the character has applicable skill levels, then increase the difficulty one level. For example, a character with Skill-2 trying a Difficult task (3D) finds that "This Is Hard!" Task difficulty increases one level to Formidable (4D).

Jack of All Trades can be used as a shield against the effects of the This Is Hard! Rule. If Skill plus JOT is equal to or greater than the number of dice being rolled on a task, then the TIH! rule does not apply. But, JOT does not directly increase the skill level used for task resolution.

The risk of Spectacular Failure is increased when using the TIH! Rule (see that section in these rules).

## TASKS, SKILLS, AND CHARACTERISTICS

Tasks use skills in a variety of ways.

**Tasks Without Skill.** There are some tasks where an appropriate skill does not exist. A phantom, default Skill (always =3) is used as a placeholder for Skill. For example, lifting a large object depends primarily on Strength; there is no specific skill for lifting. In such cases, the task is expressed and resolved based on the characteristic alone.

To lift a large object into position.

Difficult (3D) < Str + 3

No skill involved.

There may be a problem or enigma which the characters must resolve in order to move forward. Once they have the clues or evidence necessary, there are times when the adventure is best played out with the character (rather than the player) solving the puzzle. For example, the player may be very smart, but the character may not be.

To puzzle out a problem (3 hours)  
 Staggering (4D) <Int + 3  
 Uncertain (2D)

**Tasks With Skill Only.** There are some tasks where the important consideration is skill alone; the influence of a characteristic being minimal. A phantom Characteristic (=7) is used as a placeholder for Characteristic. For example,

To convince a buyer that goods are acceptable.  
 Average (2D) < 7 + Broker

To convince a buyer that goods are acceptable.  
 Difficult (3D) < 7 + Broker +Quality -5  
 Quality (if not specified) = Flux

In each case, Intelligence or Education has a minimal effect: the quality of the goods speaks for itself; Broker merely allows the character to say the right words at the right time.

**Tasks With Optional Skill.** There are some tasks where the foundation is a characteristic, and while a skill could improve performance that skill is not necessary. The word Optional is used after the skill name.

To leap a 1.5 meter gap  
 Easy (1D) < Str + Athletics (optional)

To leap a 3.0 meter gap  
 Average (2D) < Str+ Athletics (optional)

To leap a 4.5 meter gap  
 Formidable (4D) < Str + Athletics (optional)

To leap a 6.0 meter gap  
 Staggering (5D) < Str + Athletics (optional)

A person could make a running broad jump and it is primarily based on Strength. Skill adds to the possibility of success (and to the distance jumped), but there is no penalty for not having the skill.

This particular type of task is in contrast to resolving a task with default skill. A Task With Optional Skill omits the phantom Characteristic.

## DURATION

Tasks take time.

### Ignoring Duration

In many cases, the amount of time that a task takes is of no consequence and is ignored. The referee can decide that the task will take a reasonable amount of time, and that dealing with duration will only slow down the action.



To Force Open A Stuck Hatch  
 Average (2D) < Str  
 No Skill Involved.

### Including Duration

When duration is important, the task should state how long it will take to attempt the task (even if it is unsuccessful).

**Absolute Duration.** If the duration of a task always takes the same length of time, it should state Absolute.

To take a standard aptitude test (2 hrs Absolute).  
 Staggering (4D) <Int +Edu  
 If successful, rank (on the test) is = task die roll.

Note that the lower the task roll, the better the rank on the test. Here, the range of scores is 24 (worst) to 4 (best).

Absolute duration (as on a timed test) passes whether the task succeeds or fails.

**Variable Duration.** Some durations cannot be accurately forecast. The task may have a duration of minutes, hours, or even days, or more.

The standard times for variable duration are 10 minutes, an hour, a day, and a week.

Rarely is a single task duration more than 10 hours; if a longer time seems appropriate, break the task into components. These durations can be multiplied: for Two Weeks, resolve 1 week twice = 2 to 22 days.

Variable duration is resolved even if the task failed.  
 For example,

To Replace A Flat Tire (Variable 10 minutes)  
 Average (2D) < Strength + Driver

The task may takes as little as (10 -5 = ) 5 minutes or as long as (10 + 5 = ) 15 minutes, but it averages 10 minutes.

**Randomized Duration.** Some durations may vary randomly. If the circumstances dictate, divide Duration by 10 and multiply by 3D.

**Hasty Tasks:** Sometimes tasks need to be finished

## STANDARD VARIABLE DURATIONS

About 10 Minutes ( 10 + Flux Minutes)	5 to 15 minutes.
An Hour (60 + Flux x 10 Minutes).	10 to 100 minutes.
All Day (10 + Flux Hours).	5 to 15 hours.
A Week (6 + Flux Days).	1 to 11 Days.
A Month (6 + Flux Weeks).	1 to 11 Weeks.

quickly. The player can specify hasty.

The time to complete the task is halved whether it succeeds or fails. In an opposed task, success completes the task before any non-Hasty opponents. The difficulty of the task is increased one level (Average becomes Difficult, etc.).

When an Uncertain task (detailed later in this chapter) is resolved as Hasty, the number of Uncertain dice is increased by +1).

**Extra Hasty.** Sometimes even hasty is not enough, and a truly hurried attempt is needed. A character may specify a task is extra hasty.

The time to complete the task is significantly shorter than normal. If successful, the task is completed before any others attempting tasks at the same time. In an opposed task, success completes the task before any non-Extra Hasty opponents.

The difficulty of the task is increased two levels (Average becomes Formidable, etc.).

When an Uncertain task (detailed later in this chapter) is resolved as Extra Hasty, the number of Uncertain dice is increased by +2).

The Extra Hasty mechanic can be used in any time-sensitive situation.

**Cautious:** Sometimes, deliberate effort is more important than time. If the players feel that they need to accomplish a task more carefully than normal, they can specify task as Cautious.

The time to complete the task is **doubled**. In an opposed task, success completes the task after any non-Cautious opponents.

The difficulty of the task is decreased one level (Difficult becomes Average). A referee may allow a task to be declared Cautious in order to decrease its difficulty.

A character can be Cautious up to one level of decreased difficulty (there is no Extra Cautious provision).

Uncertainty is unaffected by declaring a task Cautious.

### Cautious interacts with This Is Hard!

TIH! In some circumstances increases the Difficulty of a Task even as Cautious reduces the Difficulty of Tasks. A player can (if time permits) declare Cautious when faced with a TIH! Task. For example, Eneri Dinsha 777777 does not have Vacc Suit skill, and he needs to use a Vacc Suit to cross from one ship to another. Since Vacc Suit is a Default skill, he can use it at Skill-0.

To put on and wear a vacc suit.

Average ( 2D ) < Dex + Vacc Suit

Because the task requires more dice than Eneri has skill levels, he says This is Hard! Its difficulty increases +1D to Difficult (3D).

Eneri needs to roll 7 or less on 3D. He does what any

reasonably smart person would do. He takes his time, trying to remember that training video he saw long ago. He declares the Task Cautious, and takes twice as long to get ready. Difficulty reduces back to Average (2D).

Eneri now needs to roll 7 or less on 2D.

**Uncertain Hasty or Cautious Tasks.** When an Uncertain task is resolved as Hasty or Extra Hasty, the number of Uncertain dice increases as the number of levels of difficulty increases. When an Uncertain task is resolved as Cautious, the number of Uncertain dice does not change.

**Restrictions.** Some tasks cannot be sped up (or slowed down); they should not be declared Hasty or Cautious tasks.

## SPECIAL TYPES OF TASKS

Some tasks reflect special situations which require non-standard methods of resolution. These include Cooperative, Opposed, Uncertain, and Arcane tasks.

### Cooperative Tasks

More than one character may actively cooperate in performing a single Cooperative task. Each individual cooperating contributes his (or her) skill level, while one character contributes the characteristic.

The Task Comment will say Cooperative (N Skill) indicating how many characters may participate (N is the number of characters) and that the skill from each will be counted.

A Task Comment may instead say Cooperative (n Characteristic) indicating how many characters may participate (N equals the number of characters) and that the characteristic from each will be counted.

Typically cooperation can be used to sum Physical characteristics (three characters can pool their Strengths to lift an object that only one would not be able to), but not Mental (three characters with Int-9 cannot create a committee to solve a problem that requires Int-20) or Social Characteristics (three Barons of Soc-C cannot take the place of the Emperor).

If the task is successful, all participants succeed; if it fails, all participants fail.

To camouflage a vehicle from searching police.

Difficult (3D) < Int +Stealth

Cooperative (3 Stealth).

In this task, up to three participants may add their skill levels together in the resolution of this task. The character with the highest Skill (of those involved) contributes the associated characteristic.

To lift a large log off a vehicle

Difficult (3D) < Str

Cooperative (5 Str).

This task requires strength alone (no skill). Up to 5 characters can participate.

To write a musical (2D months)

Formidable (3D) <Int +Author + Music

Cooperative (2 Music +Author)

This task joins the diverse skills of two writers into a

project to write a musical. Only the highest Characteristic is counted, but each counts all of his or her applicable skills.

When creating cooperative tasks, the referee should set the difficulty level as if only one individual is attempting the task. In the log-lifting example, the difficulty reflects one person trying; additional people help accomplish the task.

Note that the Referee can specify (based on circumstances) that “only the Highest Characteristic” or “only the Highest Skill” can be used.

### Opposed Tasks

Characters in direct competition may jointly participate in an Opposed task, with the result determining who succeeds (and who fails). Each participant rolls to resolve the task, with the lowest result succeeding.

The Task Comment will say Opposed (n) indicating how many characters may participate (n equals the numbers of characters). The lowest result is successful, provided that result is a success result; all other participants fail (regardless of the quality of their results).

To win a race.

Difficult (3D) < Str +Athletic

Opposed. Resolves the race in one task.

A more extended resolution of a race determines the loser of a specific round. The highest result (provided that result is unsuccessful) is the loser and is eliminated from the brawl. If no one is unsuccessful, repeat the task.

To resolve one round (or lap) of a competition.

Difficult (3D) < Str + Athletic

Opposed. Resolves one round of the competition.

### Uncertain Tasks

There are tasks in which the results are uncertain. Uncertain tasks conceal their results from the players in a specific manner, and allow the players to make some deductions as to the task result.

An Uncertain Task Comment will say Uncertain (nD), when n is the number of dice the game master rolls. The remaining dice are rolled by the player. There may be instances where the die roll result is low enough for the player to understand that the task was successful, or is high enough to understand that the task was a failure. In some instances, however, the results will remain uncertain.

The game master and the players assume that the uncertain dice have a result of 3 each. If, based on the rolls by the player plus 3 for each Uncertain die, the result would produce success, then the game master announces that the task was successful; if the result would produce failure, then the game master announces failure. The game master secretly notes the actual results and administers them as necessary.

For example, Eneri Dinsha (777B77, Stealth 5) has to get into the Regina fusion power plant in order to stop a terrorist plot.

To sneak past a guard into a fusion power plant.

Staggering (5D) < Int + Stealth

### Uncertain (1D)

The player rolls 4D and the game master rolls 1D. Eneri needs to roll 12 or less on 5D. In the worst possible case, Eneri rolls 12 on 4D, and the uncertain roll is not required; Eneri is unsuccessful in his bluff. In the best possible case, Eneri rolls 6 or less on 4D, and even if the Uncertain die is 6, the task is successful.

However, if, based on Eneri's roll of 4D the result is still uncertain, the game master rolls the uncertain die and notes its result. The uncertain results are announced based on an assumed result of 3. Perhaps the guard accepted the fake ID and the bluff worked. Or perhaps the guard recognized the fake ID and accepted the bluff with a straight face, only to sound the alarm later? The game master knows what can happen, but the players remain uncertain as they walk forward deeper into the fusion powerplant.

When an Uncertain task is resolved as Hasty, the number of Uncertain dice increases as the number of levels of difficulty increases. For example, If an Average difficulty Uncertain (1D) task becomes Hasty, difficulty increases 1 level to Difficult (3D) and Uncertainty becomes 2D.

The Uncertain die roll is part of the total difficulty die roll. For an Uncertain (2D) Formidable (4D) task roll, the player rolls 2D and the game master rolls 2D.

When an Uncertain task is Cautious, the number of Uncertain dice does not change.

### Arcane Tasks

An Arcane task is a trick, a special procedure, or a process not generally available to other characters.

Arcane tasks are owned: they are acquired by a character and may only be attempted by the owner. They may not be sold, traded, or otherwise exchanged.

A character becomes an owner of the task and knows how to do it only after being awarded the task by the referee. Other characters with the same or similar level of skill do not necessarily know how to do this arcane task.

For example, most jump drives spend a variable time in jump (generally between 150 and 185 hours). A starship Engineer may have acquired (at some time in her career) the Arcane task of tuning the jump drive to spend minimum time (150 hours) in jump.

To tune the jump drive to minimum time in jump (1 hour)

Difficult (3D) < Edu + Drives

Arcane.

The Arcane task still requires skill, and may still fail when attempted.

### Dangerous and Destructive Tasks

A task may be identified as Dangerous, or Destructive, or both Dangerous and Destructive.

A **Dangerous Task** carries the possibility that the user will be injured if the task fails.

A **Destructive Task** carries the possibility that a device used in the task will be damaged if the task fails.

### SPECIAL APPROACHES TO TASKS

Tasks may require special circumstances or preparation

before being attempted.

**Training, Practice, and Rehearsal.** Preparation for a task through rehearsal (usually used with Performance), practice (used with Athletics), training (from an expert), or studying (cramming before a test or exercise) can be used as a die modifier. The modifier depends of the situation, but such modifiers range from 1 to 3.

To cram for a test  
Difficult (3D) < (Characteristic + Skill)  
Study materials required.  
Success allows Good Flux Mod on Test

To practice for a task  
(the same requirements as the true task)  
Success produces Good Flux. If multiple practices are attempted, only the best Mod is used.

**Tools and Equipment.** Many tasks cannot be performed without tools or equipment. Tasks may specify specific tools or types of equipment required.

To surgically remove an appendix  
Hopeless (6D) < (Dex + Medical)  
Only household instruments available.

To surgically remove an appendix  
Average (2D) < (Dex + Medical)  
Surgical suite and equipment required.

Tool availability and use may be assumed in the course of describing the task... weapons, levers, screw drivers. On the other hand, strange tools, or situations where tools may not be present should be addressed in the comments line.

## SPECTACULAR RESULTS

Sometimes the task result is Spectacular: outcome is more than "You succeed." Or "You fail." Spectacular may be positive or negative. A spectacular result implies three things:

### Spectacular Success

A task result may be almost perfect. Spectacular Suc-

---

## SPECTACULAR RESULTS

**Beyond The Normal Description.** An element of chance which goes beyond the normal description of a task. For example, a spectacular result to a task to repair a piece of equipment reflects that very small chance that the task will go very right (and something else is corrected as well) or very wrong (and a vital part is dropped down a drain).

**Beyond The Normal Task.** The spectacular result reaches beyond the narrowly focused task itself. For example, when an automobile accident avoidance task succeeds, the accident is avoided; a spectacular success talks of narrow escapes, brilliant maneuvering, and heart-pounding effects on the participants.

**Independent of Skill.** Even the most skilled of characters can experience spectacular failure and even the least skilled of characters can experience spectacular success.

---

cess achieves the goal of the task and provides some extra benefit beyond what was expected, and not necessarily directly connected to the task at issue.

**Three Ones.** If the actual dice roll includes 3 ones (but not possible on 1D or 2D) the result is a Spectacular Success (even if the result would otherwise be a failure). The task succeeds. The task produces the results desired and positive consequences as well.

For example, citizen computer technician Charles "Buzz" Van Sickle 596B77 Computer-3 is hired for a routine but Difficult (3D) computer search at a local factory that happens to be next door to a clandestine imperial communications monitor. He rolls a 3 (that is: 1-1-1). The search not only succeeds (and his employers are happy to pay his fee); he also spectacularly stumbles on the planetary communications grid master system password.

### Spectacular Failure

A task result may be terribly bad. Spectacular Failure not only fails to achieve the goal of the task, but produces some negative consequences (an injury to the characteristic being used; a cost in money, or to reputation; or damage to the tools or equipment being used). Spectacular Failure requires some long-term detrimental consequences to the Characteristic or the Skill used in the associated task.

**Three Sixes.** If the actual dice roll includes 3 sixes (not possible on 1D or 2D), the result is a Spectacular Failure. The task fails to produce the results desired, and it produces negative consequences.

For example, citizen computer technician Charles "Buzz" Van Sickle 596B77 Computer-3 is hired for a routine but Difficult (3D) computer search at a local factory that happens to be next door to a clandestine imperial communications monitor. He rolls 18 (that is: 6-6-6). The search not only fails, it spectacularly sets off security alarms, and as he steps out of the office, several enforcers whisk him off to an interrogation chamber. Even though Buzz's search was entirely innocent, he spends several hours explaining himself.

### Spectacularly Interesting

It is possible (if the task calls for 6 or more dice) to roll both 6-6-6 and 1-1-1. The result is a Spectacularly Interesting situation involving both Spectacular Success and Spectacular Failure (and a sign that the referee should make situation a rousing, interesting event for all concerned).

### Spectacularly Stupid

If C+S is less than the number of dice being rolled, the task cannot ordinarily be successful. Some characters will desperately try such a task in hope of Spectacular Success.

There is a chance (although vanishingly slight) that the result will indeed be spectacular.

### Spectaculars and Uncertainty

If an Uncertain task creates a spectacular visible result (3 ones or 3 sixes rolled by the player) Spectacular is imposed normally. If an Uncertain task creates a spectacular invisible result (some of the 3 ones or some of the 3 sixes rolled by the Referee), the Referee must secretly impose a

Spectacular result.

For example, the crew of Imperial Close Escort Gazelle, limping away from a skirmish with the Zhodani, needs to jump to safety. With glitches in the ship's computer, they have the coordinates for the Jump-4 but need to confirm them.

To manually confirm Jump-4 calculations  
Staggering (5D) < Edu + Astrogator  
Uncertain (1D)

Astrogator The Hadwon (a talented non-human from Core sector) 7777A7 Astrogator-3 must roll 13 or less on 5D (of which the referee will roll 1D). In four parallel universes, the task is rolled:

**Universe1.** The Hadwon rolls 4D (= 1, 1, 5, 1) and the referee rolls 1D (= 3). The calculation is a visible Spectacular Success (it succeeds, even if the Uncertain die were a 6). The (character) Astrogator knows the results are right despite the uncertainty. As the jump is triggered, an enemy ship suddenly appears and is caught in the jump field: fragments of that ship contain important intelligence materials.

**Universe2.** The Hadwon rolls 4D (= 1, 1, 5, 6) and the referee rolls 1D (= 1). The calculation is an invisible Spectacular Success (the die rolls look like a failure; the Uncertain die makes it a Spectacular Success). The Astrogator has every reason to believe that the calculations do not confirm the jump coordinates, and he aborts the jump. They switch to passive mode to avoid detection and start to recalculate. The crew staffing scanners detects an enemy task force near the plotted jump point: it would have ambushed them just before they triggered jump.

**Universe3.** The Hadwon rolls 4D (= 6, 6, 6, 1) and the referee rolls 1D (= 2). The calculation is a visible Spectacular Failure. The Astrogator knows the results are totally wrong despite matching with the computer output. They find that the ship's computer is fried and outputting total garbage.

**Universe4.** The Hadwon rolls 4D (= 6, 6, 5, 1) and the referee rolls 1D (= 6). The calculation is an invisible Spectacular Failure. The astrogator knows the results are wrong since the task failed. They begin the calculations from the beginning and only gradually discover that the ship's computer is outputting garbage.

## SPECIAL CONSIDERATIONS

Several aspects of tasks necessitate special attention.

**Jack of All Trades:** One special skill confers on a character the ability attempt almost any task. A person with Jack of All Trades can use that skill in place of any other skill. The skill level used is two less than the level of Jack of all Trades skill held (but never less than 0). When Jack of All Trades is used with an effective level of 0, the process is the same as for a Default skill (that is, the This Is Hard! Rule Applies).

Jack of All Trades can also be used as a shield against the This Is Hard! Rule. If Skill plus JOT is equal to or greater than the number of dice being rolled on a task, then the TIH! rule does not apply. But, JOT does not directly increase the skill level used for task resolution.

**Divided Attention:** When a character attempts more than one task at once, the associated characteristic is

halved. For example, a sniper aiming a weapon and giving orders would fire with half dexterity (the order giving task is Easy and probably succeeds anyway).

**Distractions.** Distractions are typically Modifiers on the Task Phrase.

**Sometimes Easy Tasks Can Fail:** When the sum of the skill level and the associated characteristic is less than 6, even an Easy task can fail. Rolling for resolution of the task reflects that even Easy tasks can fail for a character with very low skill and characteristic.

## FRAGMENTARY TASKS

Some texts refer to tasks without fully specifying them, either because of space constraints, or to allow the game master greater flexibility. In such cases, the essentials of the task as shown in parentheses.

For example, a checklist may indicate a series of actions and include task details without completely specifying the tasks involved. For example, there might be an entry in a checklist like:

- A. Encounter non-operating equipment.
- B. Recognize that a problem exists.
- C. Determine Cause of Problem  
(Average < Mechanics + Strength, Uncertain).

In many tasks, the requirement to the left of the < is the sum of a skill and a characteristic (abbreviated C+S). For an Average (2D) task to succeed, the player must roll C+S or less on 2D; for a Difficult (3D) task to succeed, the player must roll C+S or less on 3D. The game master can create a task by simply specifying skill and characteristic and difficulty. For example,

"The polarizer is malfunctioning. Use Electronics and Dexterity for a Difficult task."

The players discuss among themselves who is best suited for this task, and that individual attempts it.

## CREATING TASKS

The referee in **Traveller** is often called upon to create tasks as situations arise. The process for creating tasks is:

### 1. Express the Task Phrase

State specifically and clearly the action that the players want to perform. The phrase should be no more than one line, and should encompass one specific action.

If important, the time to attempt the task should be stated. It may be no time at all, or irrelevant (in which case, time is ignored), or it may range from 10 minutes to several hours. Typically, one task will take no more than a day.

### 2. Express the Task Statement

Determine the skill required to perform the task, and state the characteristic associated with that skill in this form: (characteristic + skill).

Determine any modifiers which may apply to the task (such as darkness, weather, computer model). Positive mod-



## DIFFICULTY BENCHMARKS

Level	C+S	Difficulty	Success
Unskilled	7	Easy*	58%
Novice	8	Average 2D	72%
Competent	11	Difficult 3D	63%
Experienced	13	Formidable 4D**	84%
Master	18	Staggering 5D	60%
Master	18	Impossible	9%

\*increased to Average; uses TIH! \*\* if Cautious.

ifiers increase the chances of success; negative numbers decrease the chance of success.

It is possible for both positive and negative modifiers to be stated. If a significant number of modifiers are to be stated, shift them to the Task Comments.

Determine the difficulty level of the task. Using the Task Difficulty Table, state the difficulty level of the task. Be sure to include the number of dice to be thrown in parentheses.

### 3. Express The Task Comments

Indicate if the task is Cooperative, Opposed, or Uncertain. Indicate if the task is an Action. Indicate any additional modifiers which did not fit on the Task Statement line.

### Deciding On Difficulty Levels (Benchmarks)

The referee, when creating tasks, needs to determine the difficulty level for a specific task based on a variety of circumstances. Using the following guidelines, a referee can set the difficulty at or somewhat below the levels shown:

A **reasonable** characteristic is in the range: 6-7-8-9.

**Usually** is defined as more than half of the attempts.

An unskilled individual (using a skill-0) with reasonable characteristics should be able to usually complete an Easy task. C+S=7. TIH! increases Difficulty to Average (2D).

A novice (skill-1 or so) with reasonable characteristics should be able to usually complete an Average task. C+S=8

A competent professional (skill-3 or so) with reasonable characteristics should be able to complete a Difficult task. C+S=11

An experienced expert (skill-6 or so) with reasonable characteristics should be able to complete a Formidable task if he pays attention and is careful in his work. C+S=13.

An extremely skilled master (skill-9 or so) with reasonable characteristics should be able to usually complete a Staggering task, and occasionally to attempt the Impossible and succeed. C+S=18

### Tests and Certificates

Characters can document their abilities by taking tests or obtaining certifications.

**Tests.** Characters can take tests of their skills (and knowledges, and talents). Passing the proper test allows the character to record an appropriate level of ability.

**Certificates.** The difficulty of the test determines the certification the test provides:

### WORKING WITH TASKS

When working with tasks, note the following points:

**Don't Overdo Pre-defined Tasks.** Published tasks define the levels of difficulty when resolving adventures. If there is no pre-defined task available, it is the responsibility of the referee to create an appropriate task or set of tasks.

**The Role Of The Referee:** The referee must administer the task system in a way that produces realistic resolutions. The referee can impose results and modifiers, bring in or apply other skills or characteristics, or change difficulty levels in order to make the resolution of tasks more realistic.

### AN UNDERSTANDING OF TASKS AND DIFFICULTY

A task addresses the probability that a character can successfully undertake some action, based on a skill and its associated characteristic. The **base number** is the characteristic; the added skill achieves two objectives: it allows the task to be undertaken, and it raises the percentage chance of success. For example, a Difficult (3D) task requiring Skill with an associated characteristic of Dexterity.

To manipulate a component into position.

Difficult (3D) < Dex + Mechanical

Dexterity-7 implies a base chance of 29% of accomplishing the task; but untrained, uneducated, inexperienced Dexterity alone is not enough: Skill is required. Skill-1 establishes the chance of success as 43%. Skill-2 increases that chance to 57%. Skill-5 increases that chance to 82%.

Dexterity-9 and Skill-3 produces the same chance of success as Dexterity-7 and Skill-5. Native Dexterity makes up for a lower level of skill. On the other hand, Dexterity-3 and Skill 9 also has the same chance of success as Dexterity-7 and Skill-5. Skill makes up for a lower level of Dexterity.

**Default Skill.** The skill may be a default skill. Dexterity-7 implies a base chance of success of 29%. If the character has no skill and must resolve based on a default skill, difficulty increases one level (based on This Is Hard!), making the base chance of success 3%. The character has some small chance of succeeding. A smart player can make the task Cautious, reducing difficulty to Formidable (4D) and the chance of succeeding increases to 16%.

**The Skill Eligibility Benchmark.** One level of skill represents roughly one year of training or experience. A person with Skill-1 has about one year of exposure to and use of the skill. Skill-8 has about eight years of such exposure.

**Knowledges.** Individuals may have applicable Knowledge in addition to Skill. Where applicable (and allowed by the Referee), Knowledge may be a usable mod in a Task.

**Aptitudes (Using The C+S Chart).** Judging a character based strictly on skill level can be misleading. Instead, characters can be evaluated based on aptitudes: the probability that a character can accomplish a task. To determine a character's aptitude add the associated characteristic and the skill level (producing C+S) and consult the proper column for task difficulty on the Chance of Task Success Table. The reading is the percentage chance of success the character has in this specific task.

---

**WHEN TASKS FAIL**

Ultimately, a task determines if a character can succeed in activities that they believe are necessary to their plans. When tasks fail, or fail repeatedly, the characters (and the players behind them) must search in role-playing fashion for tasks at which they can succeed.

**Consequences.** For any but the most ordinary of tasks, failure carries with it potential consequences.

The most obvious consequence is that the activity cannot be completed, or the fruits of the task are not achieved.

Task failure has consequences in addition to the simple lack of success. The individual may receive an injury or wound.

If the Task is **Dangerous**, the task roller may receive a greater injury.

If the Task is **Destructive**, the equipment involved may be damaged or destroyed.

---

**MISHAP**

When a Task fails, roll

Flux + Reliability

If negative, the user suffers an Severity= Easy Injury accompanied by Diagnosis= 1D.

Use Reliability (from QREBS) for a device used in the task; otherwise R=0.

---

**DANGEROUS**

When a **Dangerous Task** fails, roll

Flux + Safety

If negative, the user suffers an Severity= Flux + Safety roll. If greater than Difficulty of the original task, convert to 0= no effect.

Use Safety (from QREBS) for a device used in the task; otherwise S=0.

---

**DESTRUCTIVE**

When a **Destructive Task** fails, roll

Flux + Safety

If negative, the user suffers an Severity= Flux + Safety roll. If greater than Difficulty of the original task, convert to 0= no effect.

Use Safety (from QREBS) for a device used in the task; otherwise S=0.

---

**S DAMAGE SEVERITY**

- 1D Difficulty
- 1 Easy 1D
- 2 Average 2D
- 3 Difficult 3D
- 4 Formidable 4D
- 5 Staggering 5D
- 6 Hopeless 6D
- 7 Impossible 7D
- 8 Beyond 8 D
- 9 Destroyed

---

**D DIAGNOSIS SEVERITY**

- 1D Difficulty
- 1 Easy 1D
- 2 Average 2D
- 3 Difficult 3D
- 4 Formidable 4D
- 5 Staggering 5D
- 6 Hopeless 6D
- 7 Impossible 7D
- 8 Beyond 8 D
- 9 Destroyed

---

**IA IMMEDIATE ACTION DAMAGE CONTROL****Check Double Skill (2D)**

Use any appropriate skill. Success converts the damage to Severity= Easy 1D and the component remains operable.

Not Possible if Damage above 6D

---

**FA FIRST AID DAMAGE CONTROL****Check Double Medical (2D)**

For an injury, the victim (if still conscious) or a comrade may devote one Round to Check Double Medical (2D).

Success reduces an injury or wound by 1D.

Not Possible if Injury above 6D

---

**INJURY**

Injury reduces personal Characteristics (usually the Characteristic used in the Task first). If injury reduces one Characteristic to zero, apply remaining Injury to other Characteristics.

Injury may be non-physical: it may affect the Mental or even the Social Characteristics.

If total Injury reduces only one Characteristic to more than zero, the Injury heals naturally in about a week.

---

**ACTIONS**

Task-like activities which do not depend on skills or characteristics are Actions. An action is expressed like a task, but the Task Statement is more free form. It indicates the information which will be compared against the difficulty level.

---

**THE SENSE ACTION**

Sense actions (Vision, Hearing, Smell) evaluate circumstances to determine if a specific sense, in a specific situation, succeed in seeing or hearing (or otherwise) some object.

The Senses are resolved as Actions. Two types of Action are possible: At Range, and In Contact.

**At Range.** When senses operate at a distance (Vision, Hearing, Awareness, Perception), the Action takes account of Range by using D6 equal to the range number (Vshort=1, Short =2, etc and a range table is provided).

**In Contact.** When senses operate in contact (Touch, Smell), range is ignored and the Action is based on 2D.

**Sense Actions** are detailed under **The Senses**.

---

**THE AGING ACTION**

Characters age as time passes. Aging is consulted at the beginning of each Term once aging begins.

Aging is resolved with the Aging Action.

To Age  
Average (2D) < Life Stage

Success inflicts the effects of age on the character. A character wants to FAIL this action.

For example, at Life Stage 5, a character rolls for each of the physical characteristics: If the result is 5 or less on 2D, the characteristic is reduced by -1 (in this case, failure to age is a benefit for the character).

**Aging** is detailed within **Character Generation**.



## Three, Seven, And Eleven Learn Explosives

Consider three characters: **Three** (with low Dex 3); **Seven** (with an average Dex 7), and **Eleven** (with high Dex 11). Each character is otherwise fairly average and has a UPP 7X7777 (X = Dexterity).

Dexterity (Dex) measures fine-manipulation ability: someone with Dexterity-2 is very clumsy; someone with Dexterity-12 is very adroit. The characteristic expresses a character's -potential to perform tasks which require Dexterity: high Dexterity is much more likely to succeed when attempting a task which requires Dexterity.

Explosives governs the use of explosive and demolition devices; it is often associated with Dexterity. When a character contemplates career skills, a low dexterity character should rightly decide that skill is not appropriate.

Explosives is not a Default skill.

### Three Characters Learn Explosives

Three, Seven, and Eleven all consider learning Explosives. Eleven has the best aptitude for the skill, but because Explosives is not a Default skill, without training he is unable to safely interact with explosives; Three has the worst aptitude. All three attend a class on explosives; all three successfully complete the training, and all three receive Explosives-1. They begin their work activities with Explosives.

To disarm a simple device.  
Easy (1D) < Dex + Explosives

Each character must roll equal to or less than Dex + Explosives on 1D. When Eleven tries the Easy task, he automatically succeeds (Dex 11 plus Explosives-1 = 12, and the worst roll possible on 1D is only 6). When Seven tries the Easy task, she automatically succeeds (Dex 7 plus Explosives-1 = 8, and the worst roll possible on 1D is only 6). Three is at a disadvantage: his low Dexterity 3 plus Explosives-1 = 4 means that even on this Easy task, he has a 33% chance of failure. They move on to more challenging work:

To disarm a complex device.  
Average (2D) < Dex + Explosives

Each character must roll equal to or less than Dex + Explosives on 2D. They each say "This Is Hard!" and the difficulty of the task increases one level to Difficult (3D). Eleven tries this now-Difficult task (Dex 11 plus Explosives-1 = 12) and succeeds 74% of the time. Seven tries this now-Difficult task (Dex 7 plus Explosives-1 = 8) and succeeds 26% of the time. Three knows (or should know) better than to try this now-Difficult task (his low Dexterity 3 plus Explosives-1 = 4 means that on 3D, he has only a 2% chance of success).

Now they try a hard task:

To disarm a booby-trapped device.  
Difficult (3D) < Dex + Explosives

Each character must roll equal to or less than Dex + Explosives on 3D. Because all three characters have Explosives-1 and the task requires 3D, they each say "This Is Hard!" and the difficulty of the task increases one level to Formidable (4D). When Eleven tries this now Formidable task (4D), he succeeds 34% of the time (Dex 11 plus Explosives-1 = 12). When Seven tries this now Formidable task, she succeeds 5% of the time (Dex 7 plus Explosives-1 =

8). Actually, Seven uses common sense and she makes the task Cautious, decreasing difficulty one level to Difficult (3D); she succeeds 26% of the time. Three knows better (or should now know better) than to try this now Formidable task (his low Dexterity 3 plus Explosives-1 = 4 means that he has a less than 1% chance of success). Spectacular Failure happens if the roll is three 6's. Each of these characters has about a 1% chance of Spectacular Failure; and about a 1% chance of Spectacular Success regardless of skill.

**More Explosives Training.** Three may decide that regardless of his aptitude, he wants to be a Explosives Expert and he pursues nine years of study and practice and eventually reaches the same level of achievement as Eleven (since Dex 3+ Explosives-9 is the same as Dex 11 and Explosives-1 when considering the Dexterity-based bomb defusing aspect of Explosives). Moreover, Three no longer faces the This Is Hard! Rule, and is actually better than Eleven at Difficult or higher tasks.

If Eleven made no improvements in his skill, and Three made these major improvements, then Three would certainly be more of an expert, with more knowledge, theoretical experience, and even practical experience.

Eleven (C+S=12) and Three (C+S=12) are equally proficient at Easy tasks (with 100% chance of success).

Then their abilities start to diverge.

On an Average (2D) task, Three has a 100% chance of success; Eleven treats it as Difficult (3D): 74% success.

On a Difficult (3D) task, Three has a 91% chance of success; Eleven treats it as Formidable (4D): 34% success.

On a Formidable (4D) task, Three has a 74% chance of success; Eleven treats it as Staggering (5D) 10% success.

**Using Other Characteristics With Explosives.** Other characteristics can be used with a skill. Three might be a clumsy genius (735AC9). With his Explosives-1 skill, he would still be well-suited to the following tasks.

To identify a booby-trapped package:  
Average (2D) < Int + Explosives

To recognize the characteristics of the explosive used:  
Difficult (3D) < Edu + Explosives

Three can still be a useful character on a Explosives Team... but the teammates know they should not let him actually touch the bombs. When partnered with Eleven (a bit of a dunce at 7B7536), they make a good team with Three telling Eleven which wires to cut.



## Three, Seven, And Eleven Join The Star Fighter Corps

Three characters: **Three** (with low Dex 3); **Seven** (with an average Dex 7), and **Eleven** (with high Dex 11). Each is otherwise average with UPP 7X7777 (where X is Dexterity). The occasional opponent is an average UPP 777777 with Small Craft-3. After training in deep space fighters (the skill is Small Craft): Eleven has the best aptitude; Three has the worst. All three ultimately receive Small Craft-3.

They set out on a routine mission with their deep space fighters:

### Preflight Tasks

To perform a preflight check on a deep space fighter.  
Easy (1D) < Edu + Small Craft

All three have Edu 7. Edu-7 + Small Craft-3 = 10). Using one die, success is guaranteed. An unskilled individual can't attempt this task because Small Craft is not a default skill).

### Launch Tasks

To launch/take-off a deep space fighter.  
Average (2D) < Dex + Small Craft

Eleven tries this Average task; he automatically succeeds (Dex 11 + Small Craft-3 = 14; the worst roll possible on 2D is still 12). Seven tries this task, she succeeds 92% of the time and fails 8% of the time (Dex 7 plus Small Craft-3 = 10, and the possible rolls extend up to 12). Three knows better than to try this task (his low Dexterity 3 plus Small Craft-3 = 6 means that he has an 42% chance of failure). Three has gotten this far because he is cautious. He declares this task Cautious which shifts it to Easy and he succeeds.

### Transit/Travel Tasks

To travel to a destination in a deep space fighter.  
Easy (1D) < Dex +Small Craft

All three individuals have Edu 7, which in conjunction with Small Craft-3 requires a roll of 10 or less. Using one die, success is guaranteed.

### Maneuver Tasks

To maneuver against an opponent in a space fighter.  
Average (2D) < Dex +Small Craft  
Opposed (2). Success gives Advantage-3 in Dogfight.

Success in this task depends on the skill of the opposing deep space fighter. Eleven is more likely to succeed than Seven, who is more likely to succeed than Three. Success gives Advantage-3 in the ensuing dogfight.

Three begins maneuvering (Dex-3 + Small Craft -3 = 6; he rolls 7 and fails. His opponent (Dex-7 + Small Craft-3 = 10 rolls 7) succeeds). The opponent receives Advantage-3 in the upcoming dogfight. Seven begins maneuvering (Dex-7 + Small Craft-3 = 10; he rolls 7 and succeeds. His opponent with Dex-7 + Small Craft-3 = 10 rolls 7 and succeeds). Neither pilot has the lowest roll; neither receives Advantage. Eleven begins maneuvering (Dex-11 + Small Craft -3 = 14; he rolls 7 and succeeds. His opponent with Dex-7 + Small Craft-3 = 10 rolls 7 and succeeds). Neither pilot has the lowest roll; neither receives an advantage.

### Dogfight Tasks

To dogfight an opposing deep space fighter  
Average (2D) < Dex +Small Craft + Advantage  
Opposed (2). Success allows an attack by the fighter.

Three begins the dogfight (Dex-3 + Small Craft -3 = 6; he rolls 7 and fails. His opponent (Dex-7 + Small Craft-3 + Advantage-3 = 13 rolls 7) succeeds. The opponent can make an attack on Three. Seven begins the dogfight (Dex-7 + Small Craft-3 = 10; he rolls 7) and succeeds. His opponent (Dex-7 + Small Craft-3 = 10 rolls 7) succeeds. Neither pilot has the lowest roll; neither achieves attack position. Eleven begins the dogfight; because of his Dexterity, he elects Hasty. The task becomes Difficult (Dex-11 + Small Craft -3 = 14; he rolls 11 on 3D and succeeds. His opponent with Dex-7 + Small Craft-3 = 10 rolls 7 and succeeds). Eleven was Hasty and the opponent was not; Eleven may attack the opponent (and opponent may attack Eleven) BUT, if Eleven's attack succeeds, then opponent may not attack.

### Mission Profile/ Attack Tasks

To attack a target with a deep space fighter  
Average (2D) < Dex +Small Craft  
A successful attack drives off the defender.

Three's maneuvering has not put him into a position to attack. He aborts the mission and begins his return (depriving his opponent of an opportunity to attack him). Neither Seven nor her opponent are in a position to attack. They continue to maneuver against each other. Eleven is in a position to attack (Dex 11 plus Small Craft-3 = 14; he rolls 7 and drives off the opponent).

### Other Activities

Seven and Eleven are still in position to maneuver and attack. Eleven has driven off his opponent and can shift to a new opponent. Three has started back to base.

### Landing Tasks

To return to base with a deep space fighter.  
Average (2D) < Dex +Small Craft

Three declares his return Cautious (thus Easy) and automatically succeeds. Seven does the same. Eleven is cocky; he resolves the task as Average and automatically succeeds (Dex 11 plus Small Craft-3 = 14; the worst roll possible on 2D is still 12). He returns to base first.

Only highly-skilled characters should be deep space fighter pilots. Others are better suited to support or tasks, or to missions which allow additional training or rehearsal.



# Skills

## SKILLS, KNOWLEDGES, AND TALENTS

A **skill** is a statement of ability based on a job, vocation, or interest. A **knowledge** is a body of information based on a field of science or experience. A **talent** is a personal ability not generally possible for a human, but which may be possible for some specific non-humans.

**Benchmarks.** One level of a skill or knowledge or talent represents about one year of experience, education, or training. A character with Skill-4 has four years of experience in that skill; Knowledge-3 is the equivalent of three years of instruction or practical experience with that field of knowledge.

64 Skills		Defaults, Talents, Personals, and Intuitions	Many Knowledges	
<b>Skills</b>	<b>Starship Skills</b>	<b>Default Skills</b>	<b>Animals</b>	<b>Heavy Weapons</b>
Admin	Astrogator	Actor	Rider	Artillery
Advocate	Engineer	Artist	Teamster	Launcher
Animals	Gunner	Athlete	Trainer	Ordnance
Athlete	Medic	Author		WMD
Broker	Pilot	Comms	<b>Driver</b>	<b>Pilot</b>
Bureaucrat	Sensors	Computer	ACV	Small Craft
Comms	Steward	Driver	Automotive	Spacecraft ACS
Computer		Fighter	Grav	Spacecraft BCS
Counsellor	<b>Trades</b>	Turrets	Legged	
Designer	Biologics	Mechanic	Mole	<b>Seafarer</b>
Diplomat	Craftsman	Steward	Tracked	Aquanautics
Driver	Electronics	Vacc Suit	Wheeled	Grav
Explosives	Fluidics			Boat
Fleet Tactics	Gravitics	<b>Talents</b>	<b>Engineer</b>	Ship
Flyer	Magnetics	Compute	Jump Drives	Sub
Forensics	Mechanic	Empath	Life Support	
Gambler	Photonics	Hibernate	Maneuver Drive	<b>The Sciences</b>
High-G	Polymers	Hypno	Power Systems	Archeology
Hostile Environ	Programmer	Intuition		Biology
JOT		Math	<b>Fighter</b>	Chemistry
Language	<b>Arts</b>	MemAware	Battle Dress	History
Leader	Actor	Memorize	Beams	Linguistics
Liaison	Artist	MemPercept	Blades	Philosophy
Naval Architect	Author	MemScent	Exotics	Physics
Seafarer	Chef	MemSight	Slug Throwers	Planetology
Stealth	Dancer	MemSound	Sprays	Psionicology
Strategy	Musician	Morph	Unarmed	Psychohistory
Streetwise		Rage		Psychology
Survey	<b>Soldier Skills</b>	SoundMimic	<b>Flyer</b>	Robotics
Survival	Fighter		Aeronautics	Sophontology
Tactics	Forward Obs	<b>Personals</b>	Flapper	
Teacher	Heavy Wpns	Carouse	Grav	<b>Specialized</b>
Trader	Navigator	Query	LTA	Career: Academia
Vacc Suit	Recon	Persuade	Rotor	Career: Army
Zero-G	Sapper	Command	Winged	Career: Navy
				Career: <Name>
		<b>Intuitions</b>	<b>Gunner</b>	World: Capital
		Curiosity	Bay Weapons	World: Regina
		Insight	Ortillery	World: <Name>
		Luck	Screens	[others are possible]
			Spines	
			Turrets	

The list of Skills including Personals and Intuitions, is complete; there are no others available.

The lists of Knowledges and Talents are advisory; many different and additional Knowledges and Talents are possible.

# Skills Define Abilities

Skills are quantifications of each individual character's abilities. Skill is a broad label which is further divided into Skills, Knowledges, and Talents. Each has its own usages and restrictions.

**Skills are areas of expertise.** A character who has a skill is capable of acting within that area. For example, someone with Medic can reasonably be expected to attempt (and sometimes or often succeed) in medical situations. In the general role-playing sense, characters often do things that do not involve tasks but do involve skills. For example, a starship owner will probably not hire an astrogator who does not have Astrogator. There is no task involved, but having the specific skill is nevertheless important.

**Skills are Assets in the Resolution of Tasks.** A character with a specific skill can attempt tasks that someone without skill is not even permitted to try.

## IN THIS CHAPTER

The skills that characters may learn are covered in this chapter alphabetically. Each entry shows the skill name. If the skill is a cluster or cascade skill, that notation is made.

**The Skill List.** The Skill List shows the available skills.

**Task Examples.** Because skills are intimately bound up in tasks, many of the entries in this chapter include examples of tasks using the skills. These examples are not exhaustive... they are shown as guides to proper usage and to encourage the creation of similar tasks for specific situations.

## SKILLS

Skills are the primary means by which characters do things in Traveller. Each character has a variety of skills, and the higher a skill rating, the more expert the character is with that skill. With training, any character can eventually become proficient at any skill.

**Benchmarks.** One level of a skill theoretically represents one year of experience, education, or training in that skill. An individual with Skill-4 has four years of education, training, or experience in that skill. In general, a character receives one level of some skill in each year of his or her life.

**Skill Format.** Each skill is usually a one or two word name (alas, although Jack of All Trades is a four word name, it is often abbreviated to JOT). Skills are always capitalized (for example, Pilot). Skills are numerically rated by levels from 1 (or sometimes 0) to 9 or more. Any skill attached to a character should show that character's numerical level as well as the name (for example, Pilot-4).

**Recording Skills.** For simplicity and completeness, all skills (other than the universal Default skills) are recorded on the individual's character records.

## Default Skills

There are some situations that an unskilled character will not try: disarming bombs; flying high performance aircraft. And there are some things that unskilled characters may decide to try: painting a picture; shooting a gun.

Default skills represent this base of activity that even an

untrained person may be willing to attempt.

A skill identified as a default skill may be used by any character. The skill level used is 0 (zero); other penalties also apply when resolving a task using a default skill. But, the chance of success is still better than if the task were not attempted at all.

Default skills are sometimes called Level-0 Skills.

The standardized Default Skills are automatically available to all characters.

**Unique Default Skills.** In addition to the standardized and widely available Default skills, every character may have a personal area of interest (perhaps a hobby).

An individual who does not already have a hobby (available to Citizens and Functionaries) can, after Career Resolution but before beginning adventuring, designate one skill as a Hobby. It becomes a Default skill-0.

A Hobby cannot be an existing default skill or a skill already held by the character.

## Training, Ability, and Technology Level

Individuals come from a variety of technological backgrounds in the Traveller universe. The abilities conferred by skills are relatively tech level independent. That is to say,





### Weapons Skills

Weapon and combat skills are included in this chapter, but the text here deals primarily with other than combat.

Details of personal combat are in *Personal Combat*.

The details of space combat are in *Starship Combat*.

an individual with an appropriate skill is experienced in the repair and maintenance of specific devices, and he understands their basic principles. When he encounters a device at a higher (or lower) tech level, he probably can puzzle out its use, maintenance and repair, especially if the appropriate manuals or technical supplies are available.

For example, Rollan Burriss is native to a TL-6 environment and has Ground Craft-4. Much of his experience is with TL-6 Ground Vehicles. Later in his life, he gets a job fixing cars... and he is equally competent fixing TL-4, TL-6, and TL-9 ground cars. He has access to diagnostic equipment, repair manuals, tools, and parts. Faced with an instrument malfunction on the ground car, he might **repair** the instrument itself on the TL-4 vehicle. On the TL-6 vehicle, he could **replace** it. On the TL-9 vehicle, the manuals tell him the diagnostic codes which **self-repair** the instrument. The value of his skill, independent of tech level, is his ability to diagnose the problem and implement the solution.

### Knowledge is the Foundation of Skill

Some skills include within them several Knowledges (Animals, Driver, Engineer, Fighter, Flyer, Gunner, Heavy Weapons, Language, Musician, Pilot, Seafarer).

Acquisition of these skills (except Language which is handled differently) follows a standard pattern:

Knowledge, Knowledge, Skill.

#### Knowledge - Knowledge - Skill

First Receipt of Skill=	Skill-0. Knowledge-1
Second Receipt of Skill=	Skill-0. Knowledge-2
Third Receipt of Skill=	Skill-1. Knowledge-2
Fourth Receipt of Skill=	Skill-2. Knowledge-2

Exception: Knowledge acquired through Education increases without affecting Skill.

#### Skill, Knowledge, and Talent Maximums

Skill-15	as applicable,
Career Knowledge- 6	Skills, Knowledges, and Talents
World Knowledge- 6	may be stacked in Tasks but
Talent-15	not in Checks.

The character initially learns a subset of the skill (a knowledge), then more knowledge, and finally the full skill.

The first two instances a character receives one of these Skills (typically in Character Generation), he instead receives one of the Skill's contained Knowledges. When (or If) the character acquires the skill the **third** time, he receives the Skill at level-1. Until then, he has the Knowledges but only Skill-0 (reflecting some familiarity with the overall Skill, but a concentration in the Knowledges).

It is possible to acquire a Knowledge directly (generally through Education or Training); there is no corresponding progression to a Skill.

**Choosing Knowledge Instead.** A character who receives a Skill may always choose one of its contained Knowledges instead. However, since a Skill includes ability in all of its contained Knowledges, this choice is less than optimal.

For example, Spacer Lloyd Cramer spent his early years (in Character Generation) in the Navy and learned Engineer. The first time he received Starship Skill he selected Engineer, and then selected a Knowledge (he chose J-Drive). The second time he received Starship Skill, he again selected Engineer, and again had to select a Knowledge (this time, he chose M-Drive). The third time he received Starship Skill, he selected Engineer; this time he received Engineer-1. Somewhat later, he attended an ANM School. Engineer is not listed, so he selected M-Drive.

He has available for Task Resolution J-Drive-1, M-Drive-2, and Engineer-1. Since Skills and Knowledges stack, he can resolve most Engineer tasks at level-1, but he can resolve J-Drive tasks at level-2, and M-Drive tasks at level-3. No matter how far Lloyd progresses, he will always be better at J-Drive and best at M-Drive (unless, at some point, he attends another school).

This process reflects the natural specialization of the Education process: a character learns a specialization first (and that specialization always gives an advantage in that area of interest).

### KNOWLEDGES

A knowledge is a body of information based on a field of science, training, or experience. For example, Chemistry reflects the body of knowledge of theoretical and practical chemistry. The maximum level of a Knowledge is 6.

**Career Knowledges.** A character who has served in a career receives Knowledge equal to the number of terms served (to a maximum of 6).

Eneri Dinsha served four terms in the Scouts: he has Knowledge Scout-4.

**World Knowledges.** A character who has spent time on a world receives Knowledge equal to the number of terms he has lived there (but a maximum 6). World Knowledge declines over time: reduce this value -1 every Term (four years) once adventuring begins.

Citizen Eneri Dinsha has lived all his life on Egareva. When he begins adventuring at age 34 (8 terms counting from age 2 through 34), he had Knowledge Egareva-6 (capped at 6 although it represents 8 terms of experience). After a lifetime of adventuring (7 more terms) is 62 and ready to retire. He returns to his Egareva; his knowledge of his



homeworld is (6 minus 7 =) Egareva-0. He finds that the planet of his birth and youth is strangely alien and foreign. He has second thoughts about retiring.

**Education Knowledges.** In the Education system, it is not possible to acquire Animals, Driver, Engineer, Fighter, Flyer, Gunner, Heavy Weapons, Language, Pilot, or Seafarer directly; Education provides only the contained Knowledges.

**The Sciences.** Some characters have the opportunity to learn a specific Science through the Education process. Sciences are limited to a maximum level of 6.

For example, Professor Unsag Vornia 9679BA specializes in the study of planets, and has achieved the maximum Planetology-6 (reflecting about six years of study). An additional year of study or experience requires specialization: (Gas Giant-1 or RadWorld-1, or StormWorld-1, or some other specialized knowledge); he focusses on Gas Giant-1. He can address most planet-related situations with Planetology-6, and a gas giant-related situation with knowledge-7.

**Knowledges Are Recorded Like Skills.** When noting the Knowledges that a Character has, they are recorded in the same way Skills are: the knowledge name plus the level.

### Stacking Knowledges and Skills

Although Knowledge levels are limited to a maximum of 6, they can be stacked with other knowledges and with skills. A character with Engineer-7 and Power Systems-4 has a skill level of 7 and can use that ability when dealing with most starship drives. He has a specialization in Power systems, which gives him a total skill level of 11 when dealing with Power Systems.

### TALENTS

A talent is a personal ability not generally possible for a human, but which may be possible for some specific non-humans. For example, SoundMimic (the ability to exactly reproduce sounds); or Math (the native ability to perform detailed or extensive mathematical calculations).

The maximum level for a specific Talent is usually 15.

### SPECIALS

The Specials are universally-available abilities related to interactions with other people (the Personals), and with the environment in general (the Intuitions). They are used by characters in their interactions with other (non-player) characters, and to solve puzzles.

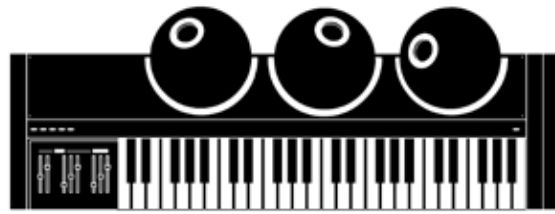
### The Personals

The Personals are used in personal interactions: they indicate the probable reaction of an individual when approached by a player character. For example, Query governs the response of a non-player character to questions from a character. The four interaction personals are:

**Carouse** is a general enjoyable social activity, paraphrased as "Let's Have A Good Time!" The character uses it to get to know others better.

**Query** is an information-gathering activity devoted to obtaining information or perhaps the performance of some discretionary duty, paraphrased as "Tell Me About X."

**Persuade** is a convincing activity devoted to obtaining a



### Musical Instrument Skills

A character receiving Musician designates any reasonable Musical Instrument as part of his skill: the player and the referee can discuss and describe the specific Instrument the player learns (perhaps the Denebian sitar, the Occipitan nose flute, or the grav pulse synthesizer).

decision from someone, paraphrased as "You Should Do X."

**Command** is a leadership activity; it leaps past Persuade to issuing direct orders, paraphrased as "I Require You To Do X." Its goal is an action (or reaction, or inaction).

### The Intuitions

There are three Intuitions: **Insight**, **Luck**, and **Curiosity**. Characters from time to time are awarded values for these Intuitions by the referee in the current session and cannot be accumulated.

**Curiosity** is the serendipitous acquisition of information.

**Insight** relates to the processing of information.

**Luck** relates to forcing favorable outcomes.

### CHECK SKILL

Skills provide a simple mechanism (Check <Skill>) for resolving situations. The mechanism equally applies to Knowledges and Talents. The Tasks chapter has more information on using Skills, Knowledges, and Talents.

**The Check.** Select an appropriate Skill and roll 2D against that skill: equal or less than the skill gives success; any other result is failure. To avoid recurring use of an available high Skill, each successive use of the Skill rolls with an increasing Mod -1.

**Easy Checks and Hard Checks.** For very easy tasks, roll 1D; for very hard tasks, roll 3D.

**Check Double Skill.** Because skills typically range in value from 1 to 6, a more appropriate effort for many situations is Check Double Skill.

**Automatic Failure.** Without regard to skill levels, any of the Checks fails on the highest possible roll. 1D fails on 6; 2D fails on 12; 3D fails on 18.

### CHECK SKILL

Easy Check **1D =< Skill (or Double Skill)**

Check **2D =< Skill (or Double Skill)**

Hard Check **3D =< Skill (or Double Skill)**

**Check Skill** automatically fails on the highest possible result (1D fails on 6; 2D fails on 12; 3D fails on 18).

Check Knowledge or Talent may be used instead of Skill.

Skill, Knowledge, and Talent may not be combined.



# THE SKILLS

Skills are the primary means by which characters do things in **Traveller**. Each character has a variety of skills, and the higher a skill rating, the more expert the character is with that skill. With training, any character can eventually become proficient at any skill.

The Skill descriptions here provide insights into their application and their use with tasks. The descriptions are not exhaustive, and the Referee has considerable flexibility in applying them to game situations.

## ACTOR

Actor (Act, Acting, Drama) is expertise in the dramatic arts, including an ability to adopt a personality or role, to convince an audience of a viewpoint, and to convey a wide range of emotion while involved in the role or part.

Characters with Actor have learned to conceal their true selves, their motives, and their emotions while manipulating an audience into believing whatever persona or emotion they are portraying.

**Actor is a Default Skill.** Most people can play rudimentary roles when called upon. All characters have Actor-0.

### Playing Roles

Actor allows an individual to assume a role and to convince others of the validity or truth of that role.

To portray a role in a play.  
Difficult (3D) < Edu + Actor  
A true actor is always striving for Spectacular Success, (and dreads Spectacular Failure).

The elements of the task can be varied: Difficulty and Characteristic may be changed.

### Mimicry

Actor allows a character to mimic or imitate personality traits with enough realism that they are convincing to the ordinary observer.

To mimic the mannerisms of a well-known person  
Difficult (3D) < Dex + Actor

It is easier to mimic a well-known figure because the audience more easily recognizes the specific mannerisms.

### Deception

Acting allows a person to deceive others by concealing true emotions and projecting false (but appropriate) ones. Acting allows successful lying (both in words and in actions).

To impersonate the actions of someone.  
Difficult (3D) < Dex + Actor

This task addresses the impersonation itself. Others should address proper papers, disguise, or knowledge.

To impersonate the appearance of a specific person.  
Difficult (3D) < Dex + Actor  
Requires disguise or costume.

### Acting In General

Acting is about playing roles (primarily for entertainment). An Actor takes on a part, which may be within a stage, voice, or video production, or may be a component of a live action event.

**Acting Tasks.** Acting tasks benefit from rehearsal. Many acting tasks are hasty and few are cautious.

**Related Skills.** Actor is one of the six Arts (Actor, Artist, Author, Chef, Dancer, and Musician).

## ADMIN

Admin (Administration, Management) is skill in the management of resources, setting policy, and communicating policy to members of the organization. Admin is the ability to function within an organized structure: a company, a corporation, a crew, a team, a governmental agency, or a military unit, with an emphasis on directing resources toward the achievement of organization goals.

Characters with Administration understand the problems organizations (and organization staff) face, and have an ability to work using an existing structure and available resources. A character with Administration understands how to talk to clerks and functionaries and how to motivate them to put forth their best efforts.

To submit a project proposal to the Scout Service  
Average (2D) < Int + Admin

To submit a project proposal to the Imperial Navy  
Difficult (3D) < Int + Admin

The difference between the two proposals is arbitrary.

### Admin in General

Administration governs management of organizations.

**Admin Tasks.** Admin tasks often depend on other applicable skills. It is the joining of Admin with another skill that best achieves the stated goal.

**Related Skills.** Admin is the management of resources and involves setting policy and communicating policy to

members of the organization. Bureaucrat is the understanding of standardized procedures within an organization, and the ability to interpret and follow those procedures. Leader is the ability to express power without regard to position within an organization.

## ADVOCATE

Advocate (Advocacy, Law, Legal, Attorney, Lawyer) is skill in formulating and presenting logical and emotional arguments on behalf of themselves and others, primarily in a legalistic setting. Advocate is expertise in the controlling codes of behavior within society. The character has an education in, and familiarity with, the law and its interpretation. While specific details of law vary from world to world and from jurisdiction to jurisdiction, the concept of law is a constant, and the available models under which it is expressed is naturally limited. The individual knows the foundational concepts of law and how they can be applied in a variety of situations.

Characters with Advocate have the ability to formulate and present logical and emotional arguments on behalf of themselves and others; the power of such arguments uses Advocate skill as a Mod on the situation task..

### Law 101

The character knows in what forms laws may be expressed, and how they are created, enforced, and interpreted. Since law must be recorded and somehow made available to those it applies to if it is to be effective, the person knows how to research available resources in order to make judgments on what is legal and illegal and how to make arguments in favor of each position.

**Documents.** The individual knows how to prepare documents in support of legal activity.

**Legal Arguments.** The individual knows how to frame arguments on one side of a dispute in order to achieve the best advantage.

**Legal Advice.** The individual can provide reasonable advice about the best way to proceed in a legal matter.

**Negotiation.** The individual is able to negotiate an agreement between two parties.

To negotiate a contract between two parties  
Formidable (4D) < Edu + Advocate  
Opposed (2).

**Court Hearings.** The individual can appear before courts, hearings, tribunals, and commissions to argue a case on behalf of a client.

To argue a case in court.  
Difficult (3D) < Int + Advocate  
Opposed (2).

**Related Skills.** Advocate and Counsellor are related skills. Advocate is the ability to formulate and present logical and emotional arguments on behalf of themselves and others, primarily in a legalistic setting. Counsellor typically provides assistance in personal or interpersonal matters.

## ANIMALS

Animals is skill in working with animals: their use them for sport, recreation, business, or other enterprises.

Characters with Animals can understand animal behavior and see how it can be used to their benefit.

Animals includes Teamster, Rider, and Trainer.

**Skill Acquisition.** Animals follows a standard pattern: Knowledge, Knowledge, Skill. The character initially learns a subset of the skill (a knowledge), then more knowledge, and finally the full skill.

### Rider

The individual knows how to ride animals.

To ride a well-trained riding animal  
Easy (1D) < Dex + Rider

To ride a wild animal  
Staggering (5D) < Dex + Rider

Cautious can reduce difficulty level, which is the same as ensuring the animal is docile and the activity is calm.

**Showmanship.** The individual is able (at higher levels of skill) to perform feats of greater difficulty involving animals.

To ride fast  
Average (2D) < Str + Rider

To perform intricate maneuvers while riding  
Formidable (4D) < Dex + Animals

### Teamster

The individual knows how to handle animals serving as beasts of burden, pack animals, or hitched to wagons.

To drive a wagon (animal drawn).  
Average (2D) < End + Teamster

### Animal Trainer

The individual knows how to train animals to do various tasks. Animals may be domesticated or wild.

Domesticated animals have a long history of association with sophont masters; they are bred in captivity and some of their wild nature has been eliminated from their gene pool.;

To train a domesticated animal to defer to the trainer.  
Difficult (2D) < Tra + Trainer

The animal accepts the trainer as a superior companion. It will not attack unless provoked.

To train a domesticated animal to obey the trainer.

**Actor**  
**Admin**  
**Advocate**  
**Animals**

## ANIMALS

Rider  
Teamster  
Trainer

Difficult (3D) < Tra + Trainer

The animal accepts the trainer as its master. It will engage in training situations. The task is attempted at the beginning of each training session (DM +1 per session; restart with each failure; eventually it becomes automatic).

To train a domesticated animal to a simple task.

Difficult (3D) < Tra + Trainer

A simple task (a basic trick or response) is the basis of all animal training. Complex responses are built from a series of simple responses.

Wild animals have no familiarity with sophont masters. The training process remains the same, but requires a much more proficient trainer.

The trainer must be a Craftsman.

The difficulty of the training tasks increases four levels of difficulty (from Difficult to Impossible).

### Sophont Trainer

Sophont characters with C5= Training do not learn well from teachers (and from Teacher skill). They have more success learning from Trainers (using Trainer).

Characters with Trainer have the ability to impart knowledge to other characters who have C5 = Tra, and to a lesser extent, to characters who have C5= Edu.

To teach (train) a skill to one student (1 year)

Difficult (3D) < Tra + Trainer

To teach (train) a skill to one C5= Edu student (1 year)

Formidable (4D) < Tra + Trainer

Specify the skill being taught (the trainer must have at least one level higher in the skill being taught). The student receives +1 level after one year of training. The student need not begin the course with any skill level in the skill being trained.

To train a skill to a class of students (1 year)

Difficult (3D) < Tra + Trainer

Each student must roll Tra or less to receive the skill (thus, a student with C5= Edu uses Edu/2 for Tra).

**Enhancements to Trainer.** The chance of success of the training task may be improved by a variety of enhancements.

For example, Linguistics can be used when teaching Language.

The skill received is in place of the experience skill increase for the year. The advantage is that the skill received may be a totally new one to the student.

Notice that Training is a Knowledge (within Animals) used as a skill. Trainer is the equivalent of Teacher when the student characteristic C5= Training.

### Animals in General

Animals is primarily about interaction with non-sophont domesticated creatures. The skill is generally of little use with wild animals (although Trainer can be used as Wild Ani-

mal Tamer). Animals is a relatively one-way communication between the character and the subject.

**Related Skills.** Animal Trainer and Teacher are related skills. Teacher is the ability to impart knowledge to characters who have C5= Edu. Trainer is the ability to impart knowledge to characters who have C5= Tra.

## ARTIST

Art (Artist) is ability to create works of fine art, including an ability to create or capture visual images, and to reproduce images through drawing, painting, or sculpture, and to convey both emotional and realistic content in their works.

Characters with Artist have learned the details of image capture and reproduction in its many different modes (drawing, painting, sculpture, photography, and video), and indicates a natural ability in the creation of fine art. Art includes a familiarity with art works, art styles, and art history.

**Artist is a Default Skill.** Most people are able to draw or sketch rudimentary images when called upon. All characters have Artist-0.

**Supplies and Equipment.** Most tasks assume that the artist has a proper supply of supplies and equipment. Special needs (supplies from all natural source, or from appropriate tech levels) are the subject of separate acquisition quests.

### Art History

The individual knows the general history of fine art, including the major artists of historical periods. Individual knowledge will vary with the background of the character.

To properly identify a major piece of art

Average (2D) < Education + Artist

### Art Technique and Style

The individual is experienced in the use of art materials and media. He understands styles and techniques and can copy them with some degree of faithfulness.

All artists create copies or imitations in order to learn appropriate techniques. A useful exercise is to copy an existing piece of art brushstroke for brushstroke (or chisel mark for chisel mark). To the untrained eye, such a work looks "original."

To create a work in a specified style and technique.

Formidable (4D) < Dexterity + Artist

To identify a copy in a specified style and technique.

Difficult (3D) < Education + Artist

### Creating Works Of Art

The individual has talent in the field of fine art and can produce works of art which have value to the consuming public.

To create a Work of Art (1 month)

Formidable (4D) < Dexterity + Artist

### Art Forgery

Art forgery is a deliberate copy of an existing work, or a

## Animals Artist Astrogator

deliberate new creation in an existing style specifically created to defraud the viewer or buyer.

An Art Forgery is labeled by the difficulty of its detection (Difficult or easier are usually called Copies): An Easy Copy, A Formidable Forgery. A Hopeless[ly Difficult] Forgery.

A Forgery can be detected at one level of difficulty lower using appropriate Education and Skill.

Although Forgery is usually encountered in the world of Art, it can extend to other areas using the same concepts: Counterfeiting, Forgery of Signatures, Forgery of Paperwork.

To create a Difficult Copy of a Painting  
Difficult (3D) < Dexterity + Artist

To detect a Difficult Copy of a Painting  
Average (2D) < Education + Artist

To create a Formidable Forgery of a Sculpture  
Formidable (4D) < Dexterity + Artist

To detect a Formidable Forgery of a Sculpture  
Difficult (3D) < Education + Artist

**Forgery Masterpieces.** A Craftsman with the appropriate skill (Artist for Art Forgery) can create a Masterpiece forgery, which (if Perfect) is near undetectable).

**Art is Primarily Visual.** Art depends on the sense of Vision. A character without Vision defaults to expressing any Artist skill as Sculpture.

Non-human senses (vision in range bands other than RGB, alternate hearing, more sensitive touch, and other) influence how non-humans see (or sense) Art. An artwork which is beautiful in RGB may look sloppy in other wavelength triads: PSU or INA.

**Related Skills.** Artist is one of the six Arts (Actor, Artist, Author, Chef, Dancer, and Musician).

## ASTROGATOR

Astrogator (Astrogation) is skill in the determination of present location and course planning to a selected destination in an interplanetary or interstellar setting.

Characters with Astrogator are responsible for planning and plotting starship and spacecraft courses and ensuring that correct information is available to the pilot and crew as they need it. They are trained in the use of astrogation computer programs and the interpretation of long-range data provided by the ship's sensor system.

### Calculating Jumps

The difficulty of calculating Jumps is based on distance .

To calculate an interstellar jump-1.  
Easy (1D) < Int + Astrogator  
Uncertain (1D)

To calculate an interstellar jump-2.  
Average (2D) < Int + Astrogator  
Uncertain (1D)

To calculate an interstellar jump-3.

Difficult (3D) < Int + Astrogator  
Uncertain (1D)

The dice for difficulty of the interstellar jump calculation equals the distance in parsecs (Jump-1 difficulty is 1D; Jump-6 Difficulty is 6D).

Math (the Talent) is a Mod on Astrogation tasks.

**Confirming Jump Calculations.** The difficulty of manually confirming the jump calculation is one level higher than the automated calculation difficulty.

To manually confirm jump-1 calculations (24 hours).

Average (2D) < Edu + Astrogator  
Uncertain (1D).

Confirming applies only to Jump; confirmation is not possible (and omitted) for astrogation beyond parsecs.

For example, Arv Dinsha 888888 Astrogation-3 plots his ship's jump to a system two parsecs away. Jump-2 makes it an Average 2D task (1D Uncertainty). Arv must roll (8+3 =) 11 or less on 2D. He rolls 1D (=6); the Referee secretly rolls the Uncertain die (=6). Assuming the Uncertain roll is 3, the Referee says: you have your final Jump input. Arv thinks the situation through (Hmm, if Uncertain=6, the calculations will be wrong) and decides to manually confirm the figures.

Confirmation will take 24 hours and Difficult 3D (1D Uncertainty). He needs to roll (8+3 =11) on 3D. He rolls 2D (=5); the Referee rolls the Uncertain die. In this case, even if the Uncertain die is 6, Arv succeeds in confirming the figures. If they were correct, the Referee would tell him they are confirmed. In this case, the Referee tells him there is an error; the calculations are not confirmed. Arv needs to start over.

**Related Skills.** Astrogator is space-based interplanetary and interstellar course charting; it is tedious and laborious, even when aided by computers and sensors. Navigator is world-based direction-finding. Survey is world-based terrain analysis and identification.

---

### The Fantastic Drives

Astrogation calculations are based on Drive Potential (Jump Number in parsecs) and is the number of dice required for the task. Fantastic drives have difficulty based on distance in increments of Drive Potential.

For example, Hop Drive achieves distance at 10 parsecs per Hop number: Hop-3 (Drive Potential-3) produces a 30-parsec Hop. Astrogation difficulty reflects the Hop number: Difficult (30D).

Astrogation has two components: the calculation aspect associated with feeding the proper information into the starship controls, and the planning/ advising aspect associated with determining appropriate destinations and courses.

Note that there are levels where successful Astrogation and confirmation almost certainly cannot be done.

---

**Starship Skills.** Astrogator is one of the seven Starship skills (Astrogator, Engineer, Gunner, Medic, Pilot, Sensors, and Steward).

## ATHLETE

Athlete (Athletics) is skill in sports-related physical activity and competition, and with extensive or vigorous physical activity, and with sports competition.

Characters with Athletics have an understanding of physical training and conditioning. They know the best way to use physical characteristics in order to maximize results, and to minimize the potential for injury. The individual can maintain his physical characteristics in peak condition, and is better able to use them in vigorous or stressful situations.

Athletics is about personal physical development: nurturing and using the personal physical characteristics.

**Athlete is a Default Skill.** Most people are able to participate in athletics at a rudimentary level; essentially all characters have Athlete-0.

### Physical Conditioning

Athletics includes an understanding of the physical characteristics and how to maintain and improve them (this pursuit is independent of the Experience system).

To increase C1 Strength (1 year)  
(3D) < Athlete

### Physical Activity

Athletics can improve a character's chance of success at various physical activities.

**Ordinary Physical Barriers.** Barriers are expressed qualitatively (Easy, Average, Difficult) rather than quantitatively (1 meter high, 2 meters high). The qualitative description directly expresses the difficulty to be expected.

To vault a[n Easy] wall  
Easy (1D) < Str + Athlete

To Vault a Difficult Wall  
Difficult (3D) < Str + Athlete

## AUTHOR IDEAS

Flux	Imagination	Idea
-5	Idiotic	Derivative
-4	Foolish	Boring
-3	VDull	Dull
-2	Dull	Uninspired
-1	Pedestrian	Unoriginal
0	Ordinary	Ordinary
+1	Sharp	Novel
+2	Pretty	Ingenious
+3	VClever	Innovative
+4	Creative	Imaginative
+5	Genius	Truly Inspired

Roll Flux twice: combine the two results to create a description of the concept or idea: -4 and -2 = Foolish and Uninspired; +3 and -4 = Vclever but Boring.

To leap Formidable trench  
Formidable (4D) < Str + Athlete

Eneri Dinsha (777777 Athlete-0), running from a squad of enforcers, comes upon an Easy fence. Without a thought, he runs to the fence and tries to leap it. The Referee allows +1 for running; he needs to roll (Str = 7 plus Running = 1) = 8 or less one one die to succeed. He rolls 5 and clears the fence.

He immediately encounters a second Average fence, higher than the first, and he is no longer running. He needs to roll (Str = 7 plus no Mod for Running) = 7 or less on 2D to succeed.

### Organized Sports

Athletics includes a familiarity with organized sports, including the techniques of team management and coaching to win. The individual knows the rules and details of most popular sports.

For example, Swimming is governed by Athlete (but its favored Characteristic is Grace; Humans have a natural disadvantage against sophonts who are natural swimmers).

For example, Gymnastics is governed by Athlete (but its favored Characteristic is Agility; Humans resolve Gymnastics with Dex/2).

### Coaching

The individual is able to direct others in athletics, providing them with strategy, tactics, advice, and encouragement which moves them to excel.

Coaching is independent of physical characteristics.

## AUTHOR

Author (Writer, Writing) is ability in the literary arts. Author is ability to create written works (whether intended to be read, spoken, or heard). The primary concern of Author is the skilled use of language to convey thoughts, ideas, and images in ways which resonate with an audience.

Characters with Author have an ability to tell stories, recording them in some form for later distribution. Higher levels of writing skill represent greater proficiency in the craft of story telling.

**Author is a Default Skill.** Most people are able to write basic narratives when required. All characters have Author-0.

### Creating Entertainment

The "writing" aspect of this skill (in the sense of keyboarding or recording) is the least of the ability; the important aspect is the ability to tell a story and be entertaining while doing so.

**The Idea.** The basic idea for created entertainment is generated with two Flux rolls: it produces two Mods applied to its implementation.

An ordinary person can roll for an Idea once every quarter. An Author can roll for an idea once per week. Discard unsuitable ideas.

To write a novel (one year).  
Formidable (4D) < Int + Author + Imagination +Idea

To write a newspaper article (several hours)  
Difficult (3D) < Int + Author + Imagination + Idea  
To write an advertisement (an hour)  
Average (2D) < Int + Author + Idea + Imagination

Author is about creating (entertaining) stories.

**Related Skills.** Author is one of the six Arts (Actor, Artist, Author, Chef, Dancer, and Musician).

## BIOLOGICS

Biologics (Biologic) is concerned with devices based on living matter. Example biologic devices include grown hull panels, interior shock absorbers, water purifiers, carbon dioxide scrubbers, and motion sensors.

Characters with biologics are skilled in the maintenance, repair, and construction of biologic devices. Biologics conveys an understanding of the principles of device construction and repair.

**Fundamental Knowledge.** The individual has a basic grasp of what the field of biologics is and how it can be applied to the world in general. He understands basic concepts, units of measure, and safety procedures. He is familiar the basic tools of Biologics and as a matter of course carries with him rudimentary tools which allow basic fault diagnosis.

**Advanced Tools.** The individual has a familiarity with sophisticated tools of Biologics and how to use them for Biologics maintenance and repair.

**Diagnosis and Repair.** The individual's skill and experience allows him to reach basic conclusions about biologic equipment and whether it is functioning properly (or if not, the probable cause of the fault). The individual can attempt to repair biologic equipment which he has previously diagnosed as malfunctioning.

**Construction.** The individual can assemble biologic components into operating pieces of equipment (assuming components and an appropriate design is on hand).

**Device Design.** The individual can design devices which make use of Biologics if he also has Designer.

**Related Skills.** Biologics and Biology are related. Biology is the broad knowledge of the study of life processes; Biologics is the practical skill in creating and using customized biological processes.

**Biologics is one of the ten Trades.** A trade is a skilled practice of a practical occupation. An individual with skill in one of the Trades is a skilled worker (as opposed to an unskilled worker). The ten Trades are Biologics, Craftsman, Electronics, Fluidics, Gravitics, Magnetics, Mechanic, Photonics, Polymers, and Programmer.

## BROKER

Broker is skill in the marketing of goods, and represents an understanding of the business of buying and selling.

Characters with Broker act as agents for the owner of goods (and may act for themselves); when the sale takes place, the broker receives a commission.

To find a buyer for goods.  
Difficult (3D) < Int + Broker

## Trade and Commerce

Broker is used in the Trade and Commerce process.

Broker is about negotiating the best deal between a buyer and a seller. In its simplest form, the Broker transaction entails very little work while earning a commission. The value of the broker is the knowledge and expertise he provides when problems or exceptions arise.

Broker is a Mod (equals half Broker Skill, rounded up) on the Actual Value Table (to a maximum of Broker-4). Brokers receive 5% of the final sale price per DM. Broker tasks are essentially administrative in nature; very little physical activity is required, and even communications associated with the situation can be automated or handled through appropriate interfaces.

**Related Skills.** Broker and Trader are related skills. Broker is the ability to bring together a seller and a buyer based on interpersonal interactions and an understanding of relative values of goods. Trader is the ability to independently appraise and value goods.

## BUREAUCRAT

Bureaucrat (Bureaucracy) is skill in the standardized procedures within an organization, and the ability to interpret and follow those procedures.

Characters with Bureaucrat are able to analyze an organization and determine how best to use its standardized procedures to accomplish personal objectives.

**Bureaucratic Regulations (BR).** Large organizations maintain a bureaucratic book of regulations (BR) which details how any specific situation should be handled bureaucratically. The Book is a Mod to tasks which involve the



**Athlete  
Author  
Biologics  
Broker  
Bureaucrat**

bureaucracy. When an organization becomes important in Traveller situations, the referee must determine the relative value of the Book. When an organization becomes prominent in Traveller situations, the game master must determine the relative value of the Book. Roll flux; it is appropriate to have a distinct value for each world. BR = +5 is more lenient in its outcomes than BR = - 5.

Record the Book for future use; this value is not necessarily known to the characters (although it may become apparent over time).

Specific organizations as published or administered by the Referee may have predefined values for their BR.

To Get A Permit

Difficult (3D) < Soc + Bureaucrat + BR + Mod2

**Related Skills.** Bureaucrat is the understanding of standardized procedures in an organization, and the ability to interpret and follow those procedures. Admin is the management of resources and involves setting and communicating policy to members of the organization. Leader is the ability to express power without regard to organization position.

## CHEF

Chef (Cook, Shugili, Food Artist, and Osmancer) is the ability in the culinary arts. Chef is expertise in food preparation, including the ability to conceive and create tastes and smells for a variety of audiences.

Characters with Chef have learned the foundations of food preparation and transcended it to achieve attractive tastes and smells.

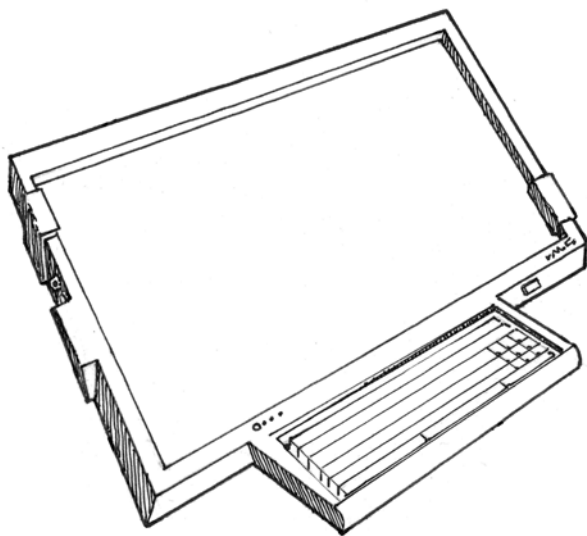
To fix lunch

Easy (1D) < Edu + Chef

To prepare a feast

Difficult (3D) < Edu + Chef

**Related Skills.** Chef is one of the six Arts (Actor, Artist, Author, Chef, Dancer, and Musician).



## COMMS

Comms (Communications) is skill in the use of technological communications equipment with a focus on primary data input.

Communications reflects a deep understanding of the operation of a wide variety of communications devices, including an understanding of the protocols of communication, an awareness of the various limitations of communicators, and an ability to quickly identify why a communication device is not working properly.

Characters with Communications know how to use basic communicators (or can puzzle them out with a minimum of effort) including telephones, radios, laser communicators and other user-friendly devices.

**Communications Is (Sometimes) A Default Skill.** The use of most communications equipment is obvious or even intuitive. Any character who has travelled off his homeworld, or whose homeworld is TL9 or greater has the default skill Comms-0; other characters do not have Comms as a default.

### Use and Operation

The individual has a basic familiarity with the use and operation of communicators (conveying voice, video, and other information). The medium may include radio (broadcast and beamcast), laser, and other media.

**Data Input.** The characteristic feature of communications equipment is the use of primary data input. Spoken words and current images are captured as they occur and are transmitted to a recipient. The process may be recorded, but it not typically further processed.

**Mode Selection.** The user understands the available modes of communications equipment operation, including the benefits and drawbacks of each. For example, broadcast reaches the greatest possible number of recipients, but is susceptible to interception, and reveals the location of the broadcaster; beamcast is relatively immune to interception, but must be aimed at a specific recipient.

**Repair and Maintenance.** The character has been trained in diagnosis and repair of faults in Communications equipment.

**Sophisticated Operations (Tap, Jam, Clone).** The individual knows techniques for intercepting communications by others, interfering with communications by others, and imitating other communicator stations.

To intercept all unencrypted broadcasts available.

Difficult (3D) < Int + Comms

This is scanning.

To establish communicator contact with a pinnacle crew.

Average (2D) < Edu + Comms + Environ + Mod2

To intercept a specific broadcast.

Difficult (3D) < Edu + Comms

To intercept a specific beamcast.

Staggering (5D) < Edu + Comms

Not possible unless in correct position.

To jam a specific broadcast  
Formidable (4D) < Int + Comms  
Broadcast must have been intercepted first.

**Communications Equipment.** Communicating requires a communicator. A task cannot be attempted unless the effect is within the capability of the equipment.

Mods (in the task statement) indicates the task should implement any appropriate modifiers for the specific equipment (generally Ease of Use).

Comms is about the exchange of information. At its most basic, Comms deals with voice information by telephone or radio; at more complex levels, it involves video, text messaging, specialized devices, and cryptography.

**Related Skills.** Comms, Computer, and Programmer are related skills. Computer is the ability to use technological office equipment and focuses on non-primary data input. Comms is the ability to use technological communications equipment and focuses on primary data input. Programmer is the ability to configure office equipment or communications equipment (as well as other equipment) to achieve desired functions.

## COMPUTER

Computer (Office Equipment) is skill in the use of technological office equipment and focuses on non-primary data input. Characters with Computer understand how to use the basic office equipment of a technological society. They view computers as essential and helpful interfaces for research, communications, and control of necessary services.

**Computer is a Default Skill.** At the most fundamental level, computers are transparent to the user; no skill is required: the use of computers is entirely unsupervised.

Essentially any character who has travelled off his homeworld, or whose homeworld is TL7 or greater has the default skill Computer-0. Other characters do not have Computer as a default.

### Use and Operation

The individual has a basic familiarity with the use and operation of office equipment, including computers, information processors, graphics processors, duplicators, scanners.

**Data Input.** The characteristic feature of office equipment is the use of non-primary data input. Words are entered by keyboarding or data entry procedures rather than as spoken. Images are scanned or acquired rather than viewed. Data which has been input is then inserted into data bases, accounts, or files, and may subsequently be manipulated to produce reports or records. It may also be data mined to find relationships or insights.

**File Access.** An essential part of Computer is file retrieval and access.

To retrieve a specific file  
Difficult (3D) < Int + Computer

Computer skill is about information processing: information capture, manipulation, storage, and retrieval.

**Related Skills.** Computer, Comms, and Programmer

are related skills. Computer is the ability to use technological office equipment and focuses on non-primary data input. Comms is the ability to use technological communications equipment and focuses on primary data input. Programmer is the ability to configure office equipment or communications equipment (as well as other equipment) to achieve desired functions.

## COUNSELLOR

Counsellor (Advisor) is skill in providing advice, guidance, or recommendations to individuals, with its emphasis on personal or interpersonal behavior.

Characters with Counsellor are able to listen to other characters and assist them in understanding their options as to behavior.

**Counteracting Losses Of Sanity.** Sessions with a Counsellor may increase or restore Sanity.

To Restore Sanity (one hour)  
Difficult (3D) < Int + Counsellor  
Uncertain (2D)

Success increases the subjects San +1 (not to exceed original San).

This is the equivalent of Grief Counselling or Post-Traumatic Event Counselling.

To Restore Sanity (1D hours over 1D weeks)  
Difficult (3D) < Int + Counsellor  
Uncertain (1D)

Success increases the subjects San +1D (not to exceed original San).

**Personal Advice.** Sessions with a Counsellor may provide understanding of proper courses of action.

To Understand A Situation (one hour)  
Difficult (3D) < Int + Counsellor  
Uncertain (1D)

Success provides Good Flux on an upcoming vital task. Failure provides a Bad Flux in an upcoming vital task.

**Ignoring Advice:** The character may decide to ignore the advice (and the unknown Mod).

**Session Frequency.** Counsellor sessions are typically weekly or monthly.

### The Costs Of Counselling

Counsellors are professionals equivalent to Advocates or Doctors. A typical one-hour session is Cr100.

Counsellors available as ship crew typically provide their services as part of their duties.

**Related Skills.** Counsellor provides assistance in personal or interpersonal matters. Advocate is the ability to formulate and present logical and emotional arguments on behalf of themselves and others, primarily in a legalistic setting.

**Bureaucrat  
Chef  
Comms  
Computer  
Counsellor**



## CRAFTSMAN

Craftsman (Craftsperson, Craftsophont, Craftsbeing) is concerned with the production of high quality work output.

**Appreciation.** The character can appreciate quality and workmanship in objects, and can evaluate the degree of quality such an object has.

To evaluate the general workmanship of an object  
Easy (1D) < Int + Craftsman

**Evaluation.** Craftsman can evaluate the specific components of QREBS.

To evaluate Quality  
Difficult (3D) < C5 + Craftsman  
Uncertain (1D)

To evaluate Reliability  
Formidable (4D) < Int + Craftsman  
Uncertain (1D)

To evaluate Ease Of Use  
Average (2D) < C2 + Craftsman  
Uncertain (1D)

To evaluate Burden  
Average (2D) < Str + Craftsman  
Uncertain (1D)

To evaluate Safety  
Average (2D) < Int + Craftsman  
Uncertain (1D)

**Workmanship.** Craftsman can improve the quality of a successful task (although it does not improve the possibility of success for a task; Cautious can achieve that result).

When creating (building, crafting, constructing) an object (but not when buying one, or evaluating one), the individual may distribute the total Craftsman skill level as Mods to the determination of QREBS rolls.

For example, Filis Ten crafts a crossbow with Craftsperson-6. She completes the weapon; when the game master rolls for the five QREBS values, Filis says she wants this item to be of good quality and reliable. She specifies DM +3 for Quality and +3 for Reliability on the rolls. The Referee rolls 0, 0, 0, 0, and 0 producing QREBS values for the Crossbow are +3 +3 0 0 0. To confirm them (or determine them), Filis needs to go through the evaluation process.

### Masterpieces

A character with Craftsman may attempt to produce a

#### EVALUATING QREBS

	Difficulty	Char	Skill
Q Quality	3D	C5	Trader or Craftsman
R Reliability	4D	Int	Trader or Craftsman
E Ease of Use	2D	C2	Trader or Craftsman
B Burden	2D	Str	Trader or Craftsman
S Safety	2D	Int	Trader or Craftsman

Masterpiece (using this Masterpiece process).

Designate a Controlling Characteristic C1 C2 C3 C4 C5 C6 which governs creating the current Masterpiece.

**Master Points.** Master Points available to a Craftsman include: the Controlling Characteristic, Craftsman Skill, and up to FIVE skills with level 6 or greater (or Knowledges-6).

A Masterpiece cannot be attempted unless Master Points equals 40 or above.

The Masterpiece Creation Process. Roll 9D for Masterpiece Points or less for success in creation.

For example, the Craftsman has 45 Master Points when creating a Masterpiece; he must roll 45 or less (on 9D) for success.

If The Creation Fails, the Piece (not Masterpiece) is flawed and worthless.

If The Creation Is Successful, a beautiful Masterpiece has been created. Name an object capable of being lifted or carried by the Character, and reasonably created using the Skills applied. Allocate the Masterpiece points to QREBS (for the ranges -5 to +5, -5 = 1 point; +5 = 11 points). If all QREBS values are set at the Maximum, excess Master Points can be allocated equally in excess of +5.

A Perfect Masterpiece has 55 or more Master Points.

A Masterpiece can be sold at Cr150,000 plus Cr10,000 per Master Point over 39. A Perfect Masterpiece (=55 points) sells for Double (= Cr600,000). A Masterpiece increases in value about 1% per year, but subject to Flux when sold.

A Masterpiece can be created in about three years of steady, dedicated work. This time can be reduced by about one month per Master Point diverted from the work.

**Craftsman is one of the ten Trades.** A trade is a skilled practice of a practical occupation. An individual with skill in one of the Trades is a skilled worker (as opposed to an unskilled worker). The ten Trades are Biologics, Craftsman, Electronics, Fluidics, Gravitics, Magnetism, Mechanic, Photonics, Polymers, and Programmer.

**Related Skills.** Craftsman modifies the ability to create objects to make the result of higher quality. Designer is the ability to create new objects using available principles and concepts. Each of the Trades is the ability to use tools to create objects based on plans created by a Designer.

## DANCER

Dancer (Dance) is ability in the arts associated with body movement. Dance is the ability to move one's body with rhythm and grace.

Characters with Dancer have a familiarity with dance styles and techniques, and an ability to dance as a performer.

### Dance History

The individual knows the general history of dance, including the major regional and ethnic types of dance. Individual knowledge will vary with the background of the character.

**Dance styles vary across the universe.** For obscure styles, the task reflects its distance from the current territory.

To identify a dance by ethnic or regional origin

Hopeless (6D) < Edu + Dancer + <Dance Fame>

Dancer skill is optional (but helpful) for this sort of trivia

question. Identifying a Waltz (Fame= 25) is probably automatic for an average person ( $= 6D < 7 + 25 = 32$ )

Identifying a Hurap (an obscure, but oddly compelling dance from the backwaters of a world on the Trailing Frontier [Fame = 7 ] is harder. For an average person, ( $=6D < 7 + 7 = 14$ ) it's maybe 6% = Hopeless if his life depended on it. For University of Regina Professor of Dance Ingles Yreva 7778C9 Dancer-9 the task is easier ( $6D < 12 + 9 + 7 = 29$ ): close to 98%.

**Dance Technique and Style.** The individual is experienced in the techniques and styles of dance.

To perform a dance in a specific style.

Average (2D) < Dex + Dancer

Complex dance styles and techniques may be harder.

**Dance Choreography.** The individual has talent in the field of dance and can lead or instruct others in specific techniques and routines.

**Ballroom or Formal Dance.** The individual has an acquaintance with traditional forms of ballroom dance (and may include modern dances, ethnic dances, and folk dances).

To have a nice dance with a partner.

Average (2D) < Dex + Dancer

Co-operative (2).

Success is having a good time and not looking foolish.

**Related Skills.** Dancer is one of the six Arts (Actor, Artist, Author, Chef, Dancer, and Musician).

## DESIGNER

Designer (Design) is skill in creating new objects using available principles, components, and concepts.

Designer is used in conjunction with other skills to create new objects: Designer plus Communications can be used to create a new design for a communicator (or to build one from components otherwise on hand).

Characters with Designer understand the concepts and details of the creative process. They can create new objects by combining existing components.

For example, the shuttle from the Imperial Exploratory Cruiser Gibiluur has crashed on a world surface and its three communicators are disabled. A character with Electronics could attempt to repair any one of them. A character with Comms and Designer could combine three broken communicators to produce one functioning comm.

To combine several broken Communicators

Difficult (3D) < Dexterity + Designer + Comms

**Related Skills.** Designer is the ability to create new objects using available principles and concepts. Each of the Trades is the ability to use tools to create objects based on plans created by a Designer. Craftsman modifies the ability to create objects to make the result of higher quality.

## DIPLOMAT

Diplomat (Diplomacy) is skill in formal negotiation between governments or large organizations. Diplomacy in-

volves communication of organizational views, the negotiation of agreements, and the resolution of disputes between governments and between large organizations.

Characters with Diplomat are able to present the views of his superiors, receive the views of other organizations, and communicate them back to his superior.

Diplomat reflects activities which formally represent a large organization; a character engaged in diplomacy is speaking for such a government or organization.

**First Contact.** The first contact between any two governments or large organizations is a crucial event. If poorly handled, relations between the organizations can be crippled for a long time. Diplomat attempts to gauge attitudes and opinions and react to them before misunderstandings occur.

To initiate a first contact with an organization

Formidable (4D) < Int + Diplomat

Uncertain (1D).

**Negotiations.** Diplomat is used in the art of negotiation enhance the negotiating position.

To negotiate a preliminary understanding

Formidable (4D) < Soc + Diplomat

Uncertain (1D).

To negotiate a win-lose agreement.

Formidable (4D) < Edu + Diplomat

Opposed (2).

To negotiate a win-win agreement.

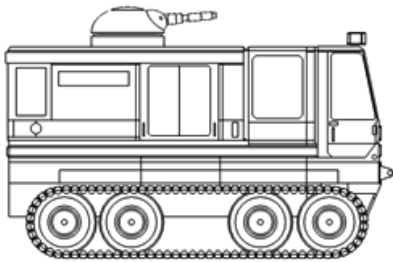
Formidable (4D) < Int + Diplomat

Cooperative (2).

**The Diplomacy Handbook (DH).** Governments and large organizations maintain a bureaucratic regulation book which details how any specific situation should be handled diplomatically. Members of the organization can defend their actions to their superiors if they can demonstrate that they have used the Handbook as support of their actions. If actions succeed, then there is no need to defend them.

When an organization or government becomes prominent, the game master must determine the relative value of the Diplomacy Handbook. Roll Flux to create a common organization-wide DM for use in Diplomat tasks. Because this value can range from +5 to - 5, the effectiveness of the DH (and Diplomacy tasks which use it) depends on its value. A government with DH +5 is very effective in diplomatic activity, regardless of the skill of its diplomats; DH -5 severely handicaps the activities of diplomats.

Record the DH value for various organization for future use. This DH Mod is not necessarily known to the members of the organization (although it may become apparent over time).



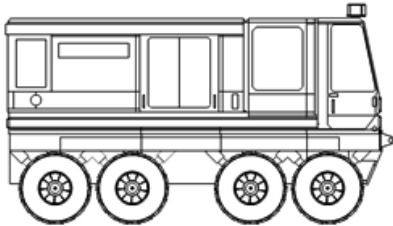
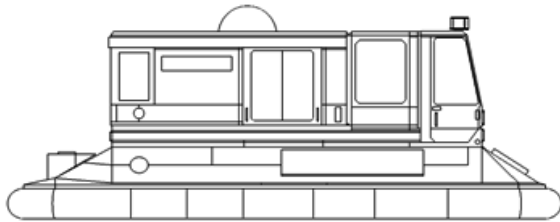
To negotiate a preliminary understanding  
Formidable (4D) < Soc + Diplomat + DH  
Uncertain (1D).

To deliver a note verbal  
Average (2D) < Soc + Diplomat + DH  
Uncertain (1D).

The Diplomacy Handbook represents established policy constraints imposed by functionaries in the upper levels of the Diplomatic Service (and ultimately by governmental rulers). If the Mod it produces is negative, the DH is hidebound and conservative; if the Mod is positive, the DH is enlightened and supportive. While the DH cannot be changed, Admin, Bureaucracy, or Liaison (as appropriate) can be used to counter some of its effect.

For example, Force Commander Dame Arlane Titanium 88789B is negotiating a preliminary understanding with the locals Nishast, a world bordering on the Imperium; She is handicapped by the Diplomatic Corps' DH -4 (and its unusually restrictive regulations). She works behind the scenes for an exchange of favors (Admin-2, Bureaucracy-3 as Mods), essentially countering the negatives of the DH.

**Related Skills.** Diplomat is skill in formal negotiation between governments or large organizations. Liaison is skill in informal relationships between different cultures or organizations.



## DRIVER

Driver is skill in the operation of ground vehicles. It includes the physical aspects of driving vehicles, an awareness of the standards of driving, including with or near other vehicles, and basic procedures of preventative and curative maintenance. Characters with Driver are qualified to operate most ground vehicles.

**Skill Acquisition.** Driver follows a standard pattern: Knowledge, Knowledge, Skill. The character initially learns a subset of the skill (a knowledge), then more knowledge, and finally the full skill.

**Driver is a Default Skill.** Most people are able to operate vehicles at a basic level. Essentially all characters have Driver-0.

To avoid an accident  
Average (2D) < Dex + Driver

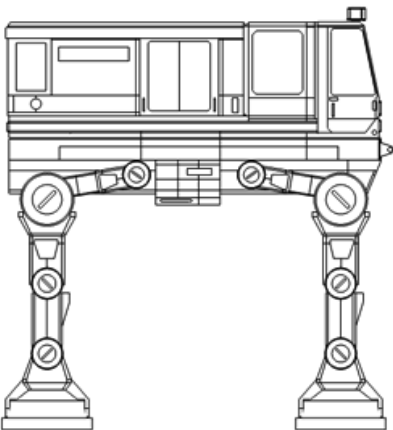
### Types of Vehicles

The use of Driver skill requires knowledge on a specific type of vehicle. Surface vehicles operate by reducing friction with the ground. Characters with Driver are qualified to operate most ground vehicles.

**ACV. Air Cushion Vehicle. Hovercraft.** The vehicle floats on a cushion of air.

**Legged. Walker. Multiple Jointed Legs.** The vehicle is supported by multiple legs.

**Mole.** The vehicle burrows or tunnels beneath the world surface.



**Diplomat  
Driver  
Electronics  
Engineer**

**DRIVER VEHICLE TYPES**

- ACV. Air Cushion Vehicle. Hovercraft.
- Legged. Walker.
- Mole. Underground. [not illustrated].
- Tracked. Treaded.
- Wheeled. Off Road Wheeled. Road Only Wheeled.
- Grav. Lifter.
- Automotive. Detailed Repair and Maintenance.

**Tracked.** The vehicle is supported by endless tracks to reduce ground pressure and produce movement.

**Wheeled.** The vehicle uses wheels to reduce friction and produce movement.

**Grav. Lifter.** The vehicle uses gravitic technology to provide motion and support. Grav Knowledge associated with Flyer or Seafarer is equally applicable to Grav Driver.

**Vehicle Identification.** The character can identify vehicles in general terms and often in specific terms based on education and experience.

To identify a vehicle by type and function.  
Average (2D) < Edu + Driver

**Vehicle Operation**

Although ground craft are built to be easily operated, they are complex machines.

Ground vehicle operations tasks are detailed under Vehicle Operations in the Vehicle Chapter.

**Vehicle Maintenance**

Automotive is the Knowledge of ground vehicle maintenance and repair. It contrasts with the other Knowledges under Driver in that it is deeply concerned with repair, modification, and maintenance rather than with specific vehicle operation. It addresses all ground vehicles rather than specific vehicles.

**ELECTRONICS**

Electronics (Electronic) is concerned with devices based on electron flow. Example electronics devices include signal processors, controllers, and sensors associated with the electromagnetic spectrum.

Characters with Electronics are skilled in the maintenance, repair, and construction of electronic devices. Electronics conveys an understanding of the principles of device construction and repair.

**Fundamental Knowledge.** The individual has a basic grasp of what the field of Electronics is and how it can be applied to the world in general. He understands basic concepts, units of measure, and safety procedures. He is familiar the basic tools of Electronics and as a matter of course carries with him rudimentary tools which allow basic fault diagnosis.

**Advanced Tools.** The individual has a familiarity with sophisticated tools of Electronics and how to use them for Electronics repair.

**Diagnosis and Repair.** The individual's skill and experience allows him to reach basic conclusions about electron-

ics equipment and whether it is functioning properly (or if not, the probable cause of the fault). The individual can attempt to repair electronics equipment which he has previously diagnosed as malfunctioning.

**Construction.** The individual can assemble electronics components into operating pieces of equipment (assuming adequate components are available and an appropriate design is on hand).

**Device Design.** The individual can design devices which make use of Electronics if he also has Designer.

**Electronics is one of the Trades.** A trade is a skilled practice of a practical occupation. An individual with skill in one of the Trades is a skilled worker (as opposed to an unskilled worker). Electronics is one of ten Trades: Biologics, Electronics, Fluidics, Gravitics, Polymers, Magnetism, Mechanic, Photonics, and Programmer.

**ENGINEER**

Engineer (Engineering) is skill in the operation, maintenance, and repair of the drives of starships and spacecraft.

Characters with Engineer are capable of proper operation, adjustment, and maintenance of starship maneuver drives, jump drives, and power systems. The person who does this work is called an Engineer (if an officer) or Drive Hand (if not an officer).

Some ships and craft are small enough that they do not require an Engineer. In such cases, the drives are automated. Although those ships' operation does not require an Engineer (or Drivehand) to be always present, the services of an Engineer are necessary for maintenance and overhaul.

**Skill Acquisition.** Engineer follows a standard pattern: Knowledge, Knowledge, Skill. The character initially learns a subset of the skill (a knowledge), then more knowledge, and finally the full skill.

**Tasks for Drive Operation.** The operation of starship and spacecraft drives requires the services of an Engineer. He or she understands the procedures and the principles behind the procedures, and can make the equipment operate reliably and efficiently. Typical Drive Operation Engineer tasks and difficulties include:

Pre Operation Checks	Average	2D
Power Up	Average	2D
Routine Operation	Easy	1D
Overload Operation	Formidable	4D
Emergency	Difficult	3D
Power Down	Easy	1D
Basic Maintenance	Difficult	3D
Basic Repair		

Difficult  
3D

**Diagnosis and Repair.** The individual's skill and experience allows him

**ENGINEER**

- Jump Drives
- Life Support
- Maneuver Drive
- Power Systems

to reach basic conclusions about drives, their function, and whether it is functioning properly (or if not, the probable cause of the fault). The individual can attempt to repair engineering equipment which he has previously diagnosed as malfunctioning.

**Starship Skills.** Engineer is one of the seven Starship skills (Astrogator, Engineer, Gunner, Medic, Pilot, Sensors, and Steward).

## EXPLOSIVES

Explosives (Demolitions) is skill in the use of high energy devices for destructive purposes.

The individual is experienced in the proper handling, placement, and efficient use of explosives.

**Recognition and Identification.** The character can recognize and identify explosives and can describe their capabilities and potential effects.

To disarm a complex device.  
Average (2D) < Dex + Explosives

To disarm a booby-trapped device.  
Difficult (3D) < Dex + Explosives  
To identify a booby-trapped package:  
Average (2D) < Int + Explosives

To recognize the characteristics of the explosive used:  
Difficult (3D) < Edu + Explosives

## FIGHTER

Fighter (Fighting, Personal Combat) is skill in conflict resolution through violence.

Characters with Fighter understand the basic elements of fights: how to attack and defend; how to select and employ weapons; and when to engage and when to withdraw.

**Fighter** includes seven knowledges: Battle Dress, Beams, Blades, Exotics, Slug Throwers, Sprays, and Unarmed.

**Skill Acquisition.** Fighter follows a standard pattern: Knowledge, Knowledge, Skill. The character initially learns a subset of the skill (a knowledge), then more knowledge, and finally the full skill.

**Fighter is a Default Skill.** Most people are able to engage of a fight and use basic personal weapons when called upon. Essentially all characters have Fighter-0.

To win a brawl  
Difficult (3D) < Str + Unarmed  
Opposed (up to 4). Resolves the brawl in one task.  
All losers receive 2D hits. The winner is unscathed.

Notice that the brawl focusses on Unarmed; the character could instead use Fighter-0.

A more extended resolution of a brawl determines the loser of a specific round. The highest result (provided that result is unsuccessful) is the loser, receives 3D in damage, and is eliminated from the brawl. If no one is unsuccessful, repeat the task.

To resolve one round of a brawl.  
Difficult (3D) < Str + Unarmed  
Opposed (up to 6). Resolves one round of the brawl  
Highest Roll (if unsuccessful) is the Loser (= 3D Hits).

Use of the Fighter skill is discussed in considerably greater detail in the Personal Combat chapter.

**Soldier Skills.** Fighter is one of the Soldier skills: Fighter, Forward Observer, Heavy Weapons, Navigator, Recon, and Sapper.

**Related Skills.** Fighter, Heavy Weapons, and Gunner are related skills. Fighter concerns personal combat, including attacking and defending using various personal weapons (defined as weapons which a person can carry). Heavy Weapons relates to the use of battlefield weapons (defined as weapons carried or deployed by vehicles or launchers). Gunner relates to the weapons installed on starships and spacecraft (and which may be installed on other large vehicles).

## FLEET TACTICS

Fleet Tactics is concerned with the command and control of groups of ships for naval combat operations.

Characters with Fleet Tactics understand the planning concepts required to assemble and deploy starships in order to defeat an enemy. It necessarily includes an understanding of siege operations (including planetary bombardment), search and detection operations, and small and large battles.

**Related Skills.** Fleet Tactics, Strategy, and Tactics are related skills. Strategy addresses the reasons for a military or naval encounter and planning the deployment of resources to achieve an intended result. Tactics is the specific activities within a battle which help achieve victory. Fleet Tactics is the direction of multiple ships in space combat.

## FLUIDICS

Fluidics (Fluidic, Hydraulic) is concerned with devices based on fluid flow and interaction. Example fluidics devices include force amplifiers (based on hydraulics), pumps, and signal processors.

Characters with Fluidics are skilled in the maintenance, repair, and construction of fluidic devices. Fluidics conveys an understanding of the principles of device construction and repair.

**Fundamental Knowledge.** The individual has a basic grasp of what the field of Fluidics is and how it can be applied to the world in general. He understands basic concepts, units of measure, and safety procedures. He is familiar the basic tools of Fluidics and as a matter of course carries with him rudimentary tools which allow basic fault diagnosis.

**Advanced Tools.** The individual has familiarity with sophisticated tools of Fluidics and their use for Fluidics repair.

**Diagnosis and Repair.** The individual's skill and experience allows him to reach basic conclusions about fluidic equipment and whether it is functioning properly (or if not, the probable cause of the fault). The individual can attempt to repair fluidic equipment which he has previously diagnosed as malfunctioning.

---

## FIGHTER TYPES

Battle Dress  
Beams  
Blades  
Exotics  
Slug Throwers  
Sprays  
Unarmed

---

**Construction.** The individual can assemble fluidic components into operating pieces of equipment (assuming adequate components are available and an appropriate design is on hand).

**Device Design.** The individual can design devices

which make use of Fluidics if he also has Designer.

**Fluidics is one of the ten Trades.** A trade is a skilled practice of a practical occupation. An individual with skill in one of the Trades is a skilled worker (as opposed to an unskilled worker). The ten Trades are Biologics, Craftsman, Electronics, Fluidics, Gravitics, Magnetism, Mechanic, Photonics, Polymers, and Programmer.

## FLYER

Flyer (Aircraft) is skill in the operation of flying craft. It includes the physical aspects of flyer operation, an awareness of the standards of flyer operation, including air traffic control, and basic procedures of preventative and curative maintenance.

**Skill Acquisition.** Flyer follows a standard pattern: Knowledge, Knowledge, Skill. The character initially learns a subset of the skill (a knowledge), then more knowledge, and finally the full skill.

### Types of Flyers

The use of Flyer skill requires knowledge of a specific type of flying craft.

**Flapper. Ornithopter.** Aircraft which fly making use of reciprocating, moving, or flapping wings (essentially in imitation of birds).

**LTA. Lighter-Than-Air.** Aircraft which use differences in atmospheric density to provide lift.

**Rotor. Rotary Wing. Helicopter.** Aircraft which use rotating or moving wings to generate lift.

**Wing. Fixed Wing.** Aircraft which use fixed or static lift-generating wings.

**Grav. Lifter.** Aircraft which generate lift through gravitic technology. Grav Knowledge associated with Driver or Seafarer is equally applicable to Grav Flyer.

**Aeronautics** is associated with repair and maintenance of all types of Flyers.

Characters with Flyer are qualified to operate most flying craft or aircraft.

**Aircraft Identification.** The character can identify aircraft in general terms and often in specific terms based on education and experience.

To identify an aircraft

Average (2D) < Edu + Flyer + Visibility

To identify an aircraft flying high overhead.

Difficult (3D) < Edu + Flyer + Visibility + Speed

### Aircraft Operation

Aircraft are complex machines. Although an individual can never know the details of all possible aircraft, it is possible to know the general details of aircraft operation as well as know how to operate a specific type of aircraft well.

**Licensing.** An individual is licensed by an appropriate authority if he or she has skill-2 or greater. Worlds with Population 6+ and Law 5+ require a license before allowing operation of an aircraft.

**Aircraft Operation Tasks.** The Aircraft Operations Tasks are detailed in the Vehicle Chapter.

**Related Skills.** Flyer and Pilot are related skills. Flyer is the operation of vehicles in atmosphere or in vacuum near world surfaces. Pilot is the operation of starships, spacecraft, and small craft which travel between worlds (and may involve some near world travel).

---

## FLYER AIRCRAFT TYPES

Flapper. Ornithopter.

LTA. Lighter-Than-Air. Dirigible. Blimp. Airship. Balloon.

Rotor. Rotary Wing. Helicopter.

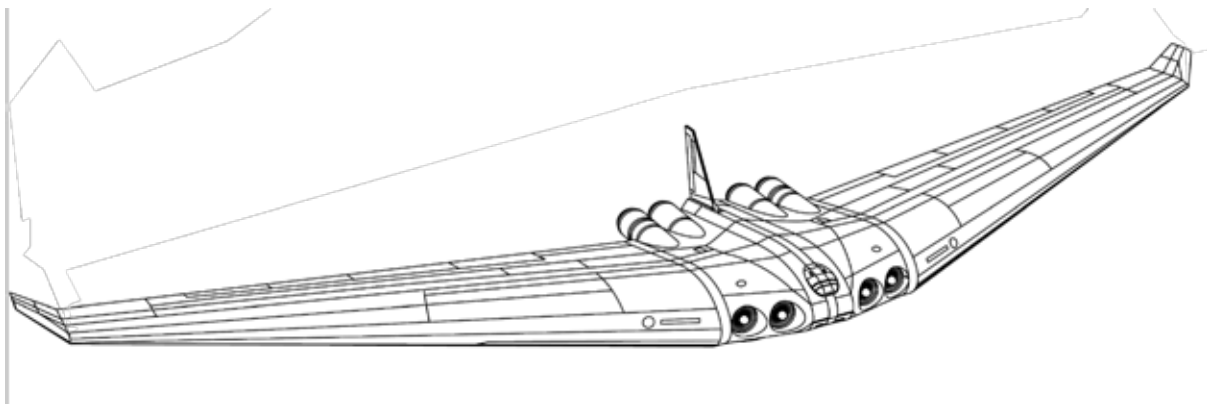
Wing. Fixed Wing. Plane. Airplane

Grav. Lifter. Air/Raft.

Aeronautics. Detailed Maintenance and Repair.

---

Engineer  
Explosives  
Fighter  
Fleet Tactics  
Fluidics  
Flyer



## FORENSICS

Forensics (Forensic Science, Investigation, Detective) is skill in investigation, especially when related to legal matters.

Characters with Forensics understand the process of investigating situations, crime scenes, and disaster sites to puzzle out their causes or explanations.

**Evidence Gathering.** The individual is trained to evaluate a crime scene and to gather evidence appropriate to the matter at hand.

To gather samples  
Average (2D) < Dex + Forensics

To find obscure samples  
Difficult (3D) < Dex + Forensics

Samples or evidence includes more than physical evidence; it can include a report of the nature or circumstances present at the scene.

**Is There Something Else?** The individual can decide that there is additional information present at the scene, and can search harder for it.

To try to find something else (additional samples)  
Average (2D) < Edu + Forensics  
Uncertain (1D)

To gather additional samples  
Average (2D) < Edu + Forensics

**Drawing Conclusions.** Forensics is the study of evidence; it can reasonably be expected that a character using forensics can come to conclusions about the causes of the evidence.

To draw conclusions  
Formidable (4D) < Edu + Forensics  
Uncertain (2D)

## FORWARD OBSERVER

Forward Observer (Fwd Obs, Fire Director, Fire Controller) is skill in directing military or naval attacks against targets. A Forward Observer is trained to locate potential military targets and to direct military fire support at them. He or she is the forward eyes and ears of a military organization.

Characters with Forward Observer direct the firepower of indirect fire weapons (artillery, ortillery, gunnery).

In traditional usage (pre-starflight Terra), a Forward Observer was a military officer deployed forward of an artillery unit who locates targets and radios instructions to the unit to conduct attacks.

In current usage, a Forward Observer is any individual who is assigned to locate targets and direct attacks against them. He may be a military officer directing attacks from an artillery unit 20 km away, a clandestine agent inputting target coordinates to an ortillery ship in orbit, or an individual scouting out targets to be attacked at a later date.

## The Interaction of the FO and the Gunner

An attack in which the Gunner can see (or sense through sensors) the target has no need for a Forward Observer. The attack is resolved using the skill of the Gunner.

A Forward Observer is useful if

**The weapon is firing in Indirect Mode.** The Gunner cannot directly see or sense the Target, and the Forward Observer substitutes his visual (or sensory) input for the Gunner's.

**The weapon fire is subject to Scatter.** The (in)accuracy of the weapon scatters the impacting projectiles. The Forward Observer substitutes his visual (or sensory) input for the Gunner's.

## Traditional Fire Control

The individual knows the procedures used to call in indirect fire weaponry. The first step is to call in a preliminary (or targeting) round. If that is not a direct hit, then a second round is called in (and a third or however many are required). When a preliminary round hits the target center, then the Forward Observer commands Fire For Effect.

To call in indirect fire weaponry on a target (preliminary)  
Average (2D) < Edu + Fwd Obs

Success places the first hit Flux times 100 meters from the target center. The character is observing the target and observes where the hits land. Failure indicates that the character does not see the hits impact; repeat task.

If the first round is not a direct hit, standard practice calls for the point of impact to be shifted 400 meters toward the target. The second shift is 200 meters; the third shift is 100 meters.

To call in indirect fire weaponry on a target (adjusted).  
Average (2D) < Dex + Fwd Obs + Mods

Character states the increment of shift (400 meters, 200 meters, 100 meters). Referee shifts the fire and indicates if it hit or missed.

To call artillery fire for effect (final)  
Easy (1D) < Dex + Fwd Obs

Local conditions can influence the accuracy of Forward Observers: climate, the confusion of combat, atmospheric effects, and others.

## Non-Traditional Fire Control

The Forward Observer knows the procedures and equipment necessary for directing attacks against targets.

He knows how to place homing devices or beacons to guide attacking weapons fire. A beacon may be placed on a target to attract incoming missiles. A beacon may be placed near a target (with coded instructions to impact at some point relative to the beacon).

He knows how to identify targets by planetographic coordinates and forward them to the attacking weapons.

In Non-Traditional Fire Control, Forward Observer Skill is a Mod on the Attack.

**Soldier Skills.** Forward Observer is one of the Soldier skills: Fighter, Forward Obs, Heavy Wpns, Navigator, Recon, and Sapper.

## GAMBLER

Gambler (Gambling) is skill in variety of games of chance and includes a familiarity with the degrees of risk involved.

Characters with Gambler understand the rules and underlying laws of probability for gambling games.

**Spending The Evening Gambling.** In cases where the referee wants to gloss over the events ("Okay, you spent the night gambling"), the character declares the total amount to be gambled.

To win a casual game

Average (2D) < Dex + Gambling

Gamble Cr1 to Cr10 per event. Winning pays double.

To win a low risk game

Difficult (3D) < Dex + Gambling

Gamble Cr10 to Cr100 per event. Winning pays triple.

To win a high risk game with opponents

Formidable (4D) < Dex + Gambling

Opposed (5). Each participant bets the same (between Cr1,000 and Cr10,000). Winner takes 100% (it is customary to tip the participating dealer or game manager approximately 10%).

To win a high risk game against the house

Staggering (5D) < End + Gambling

Opposed (5). Each participant bets the same (between Cr1,000 and Cr10,000). Winner takes 90% (the remainder goes to the house).

Gambling also provides a comfort level or familiarity with the process of gambling. The character can join existing games or groups without clumsy violations of rules or accepted standards.

Streetwise is a useful supplement in casual or extralegal gambling situations.

**Situational Analysis.** The individual is able to observe and analyze gambling games and evaluate them for their degree of risk and for their legitimacy.

Gambling includes with it an additional ability to evaluate risk in non-gambling situations.

To evaluate the risk and reward potential for a situation.

Average (2D) < Int + Gambling

Difficulty may vary with the situation; success provides some Referee-expressed insight into the situation.

**Compulsive Gambling.** Some people feel they are destined to win and routinely play at gambling games.

To play the lottery (once per week)

Hopeless (6D)

Pay Cr10 for a ticket. Roll 6 ones and win Cr250,000.

Roll 5 ones to win Cr25,000. Roll 4 ones to win Cr2,500.

Roll 3 ones to win Cr250. Roll 2 ones to win Cr25.

**For The Referee:** The Dice chapter provides insights into the odds of winning these particular jackpots.

Gambling skill does not affect the lottery.

## GRAVITICS

Gravitics (Gravitic) is concerned with devices based on gravity control. Example gravitics devices include lifters, grav plates, and inertial compensators.

Characters with Gravitics are skilled in the maintenance, repair, and construction of gravitic devices. Gravitics conveys an understanding of the principles of device construction and repair.

**Fundamental Knowledge.** The individual has a basic grasp of what the field of Gravitics is and how it can be applied to the world in general. He understands basic concepts, units of measure, and safety procedures. He is familiar the basic tools of Gravitics and as a matter of course carries with him rudimentary tools which allow basic fault diagnosis.

**Advanced Tools.** The individual has a familiarity with sophisticated tools of Gravitics and how to use them for Gravitics repair.

**Diagnosis and Repair.** The individual's skill and experience allows him to reach basic conclusions about Gravitics equipment and whether it is functioning properly (or if not, the probable cause of the fault). The individual can attempt to repair Gravitic equipment which he has previously diagnosed as malfunctioning.

**Construction.** The individual can assemble Gravitic components into operating pieces of equipment (assuming adequate components are available and an appropriate design is on hand).

**Device Design.** The individual can design devices which make use of Gravitics if he also has Designer.

**Gravitics is one of the ten Trades.** A trade is a skilled practice of a practical occupation. An individual with skill in one of the Trades is a skilled worker (as opposed to an unskilled worker). The ten Trades are Biologics, Craftsman, Electronics, Fluidics, Gravitics, Magnetism, Mechanic, Photonics, Polymers, and Programmer.

## GUNNER

Gunner (Gunnery, Ship's Guns) is skill in the targeting, operation, and maintenance of the weaponry typically used by starships and spacecraft.

Characters with Gunner are familiar with the basic operation of the weapons installed on starships.

**Skill Acquisition.** Gunner follows a standard pattern: Knowledge, Knowledge, Skill. The character initially learns a subset of the skill (a knowledge), then more knowledge, and finally the full skill.

**Turret is a Default Knowledge.** Most people can be assigned to operate a turret on a starship and function with at least a minimal level when called upon.

Flyer  
Forensics  
Forward Observer  
Gambler  
Gravitics



GUNNERY	HEAVY WEAPONS	FIGHTER TYPES
Bay Weapons	Artillery	Battle Dress
Ortillery	Launchers	Beams
Screens	Ordnance	Blades
Spines	WMD	Exotics
Turrets		Slug Throwers
		Sprays
		Unarmed

Essentially all characters have Turret-0 and can be depended on to operate a Turret on a ship..

### Types of Gunnery

Gunner skill requires knowledge related to a specialty of specific type of weapon.

**Turrets** are the simplest and most easily used weapon installations. A simple armored structure contains the weapon; the gunnery may work within the turret, or from a remote location. Turret includes the similar but larger **Barbette**. Turret weapons are the simplest or least powerful on a ship.

**Bay Weapons** are intermediate powered weapons contained in larger volume Bays.

**Spines** are the most powerful weapons a ship can carry. The Spine designation includes Main Weapons (which are larger than Bay Weapons, but fall short of the immense power of Spines).

**Screens** are a ship's protective or defensive devices.

**Ortillery** is a specialized weapon type dedicated to orbital bombardment or siegecraft.

**Starship Skills.** Gunner is one of the seven Starship skills (Astrogator, Engineer, Gunner, Medic, Pilot, Sensors, and Steward).

**Related Skills.** Gunner, Fighter, and Heavy Weapons are related skills. Fighter concerns personal combat, including attacking and defending using various personal weapons (defined as weapons which a person can carry). Heavy Weapons relates to the use of battlefield weapons (defined as weapons carried or deployed by vehicles or launchers). Gunner relates to the weapons installed on starships and spacecraft (and may be installed on other large vehicles).

## HEAVY WEAPONS

Heavy Weapons (Heavy Wpns) is skill in the targeting, operation, and maintenance of the large military weapons systems. Heavy Weapons are any military weapons larger than those carried by a single person, and include Launchers, Artillery, Ordnance, and WMD (Weapons of Mass Destruction).

Heavy Weapons are usually used against targets at Range R= 5 Vlong or greater.

Characters with Heavy Weapons understand their principles of operation, the techniques of their use, and the basics of their maintenance.

**Skill Acquisition.** Heavy Weapons follows a standard pattern: Knowledge, Knowledge, Skill. The character initially learns a subset of the skill (a knowledge), then more knowledge, and finally the full skill.

**Weapon Use.** The individual can operate Heavy Weapons. The skill is used in personal combat.

**Weapon Repair.** Heavy Weapon skill is sufficient to allow basic repairs to various weapons within the category (consisting primarily of replacing assemblies).

### Types of Heavy Weapons

The use of Heavy Weapons skill requires knowledge on a specific type.

**Artillery** shoots unguided projectiles on a non Line-Of-Sight path.

**Launchers** shoot guided projectiles or missiles.

**Ordnance** is military weapon maintenance and repair (basically gun-related maintenance and repair).

**WMD Weapons of Mass Destruction** is any weapon intended to produce indiscriminant area killing or destructive effects. WMDs include biological and infectious agents, chemical and poison weapons, radiation weapons, and nuclear weapons.

**Soldier Skills.** Heavy Weapons is one of the Soldier skills: Fighter, Forward Obs, Heavy Wpns, Navigator, Recon, and Sapper.

**Related Skills.** Heavy Weapons, Fighter, and Gunner are related skills. Fighter concerns personal combat, including attacking and defending using various personal weapons (defined as weapons which a person can carry). Heavy Weapons relates to the use of battlefield weapons (defined as weapons carried or deployed by vehicles or launchers). Gunner relates to the weapons installed on starships and spacecraft (and which may be installed on other large vehicles).

## HI-G

Hi-G (High-Gravity, Hi-Gravity) is skill in functioning in High-Gravity Environments. High Gravity is defined as any environment with a Gravity higher than 1G.

Characters with Hi-G are familiar with the activities and precautions associated with Hi-G environments.

**Familiarity.** The individual understand the effects of High Gravity, including the higher potential for loss of balance, trips, falls, and mishaps. He understands the potential for injury if a fall occurs, and he understands that unfamiliar circumstances may distort normal reflexes and reactions.

To avoid mishap in High Gravity

Average (2D) < Dex + Hi-G

**Reactions.** The individual is trained to react properly in High Gravity situations. He knows how to fall to best avoid or minimize injury; he knows the behavior of objects in High Gravity.

To react to a High Gravity mishap

Average (2D) < Dex + Hi-G

Success avoids injury.

**Related Skills.** High-G, Hostile Environment, and Zero-G are related skills.

## HOSTILE ENVIRONMENT

Hostile Environ (Hostile Environment) is skill in function-

## LANGUAGE

Language is skill in communications between sophonts using a commonly accepted symbol set.

**Native Language is (usually) Anglic.** Every character has a native language: the one learned in childhood and the one currently used. The level of skill in a native language is equal to the higher of the character's Intelligence or Edu (not C5).

By default, a character's native language in **Traveller** is Anglic. Anglic is a form of English evolved over the course of thousands of years and heavily influenced by other languages it has encountered. If a character does not specifically choose another language, his or her native language is the default language.

Human Eneri Dinsha 777777 has Anglic as his native language. He speaks at understands Anglic-7.

**Additional Languages (other than through Education).** When Language is received (other than in Education), the individual selects a specific foreign language other than his or her native language. The first receipt of Language is at one level less than the character's Native Language. Each additional receipt of Language allows selection of another language at one level less than the previous. Language skill level received = Native minus number of Language receipts. For example, a character 777777 has English as his native Language. He receives Language five times, and takes each in a separate language: He has English-7, Spanish-6, French-5, German-4, Italian-3, Swedish-2.

If the character elects, additional receipts of Language can instead increase a non-native language, but never to more than Native Language.

For example, Eneri Dinsha's native language is Anglic; his skill is Language (Anglic)-7. He can speak it well and has a reasonable vocabulary. He occasionally makes simple grammatical errors. During one of his careers, he receives Language. He selects Vilani (the other major language in the Imperium) and receives it at one level less than his Native Language. He has Language (Vilani)-6. He receives Language a second time: he uses it to increase Vilani (to Language (Vilani)-7). He receives Language a third time. It cannot be used to increase Vilani beyond his Native Language, so he selects Gvegh and receives (level= Native minus number of receipts = 7-3= 4) Language (Gvegh)-4.

**Reading and Writing.** Language includes the ability to read and write, and includes an ability to input through appropriate keypads, touchpads, and other input devices.

**Technological Devices** may have an ability to input, process, and output in various languages. Where necessary, a device will include a statement of its Language capability. By default, most devices are dual-labelled in Anglic-9 and Vilani-9 and can (with minimal difficulty) process these two languages.

**Non-Human Languages.** Some languages are impossible for Humans: they operate with senses Humans do not have, or beyond the range that that Humans can experience. It is possible for any character to learn a language even if it cannot be expressed or sensed; there are technological devices which can make up for physical inabilities.

**Recording Languages A Character Knows:** Record this skill as Language (Specific)-Skill. For example, Language (Spanish)-4 or Language (Gonk)-3. Space constraints may force Vilani-4, or Gonk-4 where the meaning is clear.

**Related Skills.** Language and Linguistics are related skills. Language is the ability to hear, speak, and use a specific language. Linguistics is the specialized study of all languages.

### TYPICAL LANGUAGES

Language	Users	Description
Ikee	K'kree	The trade language spoken by most space-faring K'kree.
Anglic	Imperial	One of two standard Imperial languages: derived originally from the English.
Battle	Imperial	The spoken and gesture battlefield language of the Imperial Star Marines.
Flash	Kursae	The Perception-based Poice language of the Kursae.
Gonk	Geonee	The spoken language of the Geonee, a Human minor race heavily involved in imperial trade.
Gvegh	Vargr	The most commonly encountered Vargr language, spoken by most Vargr.
Mariel	Plexxan	An Awareness-based language; typically written or printed in Mag-based inks.
Oynprith	Droyne	Ancient ritual language of the Droyne.
Sagamaal	Sword Worlds	The most common language of the Sword Worlds, derived from Icelandic.
Tezapet	Darrian	The Darrian spoken language.
Trokh	Aslan	The Aslan spoken language.
Vilani	Imperial	One of two standard Imperial languages: derived from the spoken language of Vland.
Zdetl	Zhodani	The Zhodani spoken language.

**Language as a Major or Minor in Education.** When a specific Language is specified in Education as a Major or Minor, it is acquired at double rate and is not restricted by the character's Native language level. Education may be used to increase native language level..

ing in environments which are hostile to life. A typical Hostile Environment includes poisonous or unbreathable atmospheres, corrosive or insidious local conditions, extremes of temperature, or extremes of weather.

**Familiarity.** Characters with Hostile Environment understand the proper steps to protect themselves from difficult environments. The individual understand the effects of unbreathable atmospheres, of local contaminants or poisons, and of weather and temperature. He understands the potential for injury and the protective measures that should be taken.

**Evaluation.** The individual can recognize and identify potentially hostile environmental effects. While some may be obvious, he can identify less likely effects and bring them to others attention.

To identify potential dangers in a Hostile Environment  
Difficult (3D) < Edu + Hostile Env  
Properly identifies protective equipment necessary.

**Reactions.** The individual is trained to react properly in Hostile Environment situations. He knows how to react to best avoid or minimize injury; he knows the behavior of the elements of a Hostile Environment.

To react  
Difficult (3D) < C5 + Hostile Env

**Related Skills.** Hostile Environment, High-G, and Zero-G are related skills.

## JACK OF ALL TRADES

Jack of all Trades (JOT, rarely JOAT, Jack-Of-All-Trades) is skill in acting competently in many different undertakings.

Jack of all Trades implies a general education and wide experience which allows to attempts at many different tasks with some expectation of success in each.

**Attempting Tasks.** A character may attempt any task for which he or she has no other skill. The character may not use Jack-of-all-Trades in place of a skill which is already held.

Jack of All Trades can be used as a shield against the effects of the This Is Hard! Rule. If Skill plus JOT is equal to or greater than the number of dice being rolled on a task, then the TIH! rule does not apply. But, JOT does not directly increase the skill level used for task resolution.

**Limits on Jack-of-All-Trades.** A character may not use a level of Jack-Of-All-Trades which is higher than the associated personal characteristic. For example, if a task calls for Mechanics and Strength, the level of Jack-of-All-Trades used cannot exceed the character's Strength.

Jack-of-all-Trades may not be learned by experience; it must be acquired through the prior career process.

## LEADER

Leader (Leadership) is skill in personal power to persuade or command others to perform specific tasks.

Characters with Leader know what actions are required in order to lead others.

**Appointed Leaders.** Within organizations, some leaders are appointed (for example, military or naval officers). These individuals have rank and position, but they may not necessarily have Leadership skill.

**Emergent Leaders.** Individuals who have Leader, regardless of their rank or position, are emergent leaders. They are natural leaders with an ability to know what steps to take and what orders to give.

**Related Skills.** Leader is the ability to express power without regard to position within an organization. Admin is the management of resources and involves setting and communicating policy to members of the organization. Bureaucrat is the understanding of standardized procedures within an organization, and the ability to interpret and follow those procedures.

## LIAISON

Liaison is skill in informal coordination of relationships between different cultures or organizations; it includes an ability to guide them toward achievement of a common purpose. Characters with Liaison are trained in the art of dealing with others; this skill is usable in relations with members of military units, citizens in a community, and with alien or foreign cultures.

This individual is trained to subordinate his own views and prejudices where they may conflict with those opinions held by the individuals he is dealing with. As a result, greater cooperation can be achieved and progress in mutual projects made.

**Related Skills.** Liaison is skill in informal relationships between different cultures or organizations. Diplomat is skill in formal negotiation between governments or large organizations.

## MAGNETICS

Magnetics (Magnetic) is concerned with devices based on magnetism and magnetic fields. Example magnetic devices include manipulators, sophisticated connectors, frictionless bearings, and sensors.

Characters with Magnetics are skilled in the maintenance, repair, and construction of magnetic devices. Magnetics conveys an understanding of the principles of device operation, construction and repair.

**Fundamental Knowledge.** The individual has a basic grasp of what the field of Magnetics and how it can be applied to the world in general. He understands basic concepts, units of measure, and safety procedures. He is familiar the basic tools of Magnetics and as a matter of course carries with him rudimentary tools which allow basic fault diagnosis, and simple repairs.

**Advanced Tools.** The individual has a familiarity with sophisticated tools of Magnetics and how to use them for Magnetics repair.

**Diagnosis and Repair.** The individual's skill and experience allows him to reach basic conclusions about Magnetics equipment and whether it is functioning properly (or if not, the probable cause of the fault). The individual can attempt to repair Magnetics equipment which he has previously diagnosed as malfunctioning.

**Construction.** The individual can assemble Magnetics components into operating pieces of equipment (assuming adequate components are available and an appropriate design is on hand).

**Device Design.** The individual can design devices which make use of Magnetics if he also has Designer.

**Magnetics is one of the ten Trades.** A trade is a skilled practice of a practical occupation. An individual with skill in one of the Trades is a skilled worker (as opposed to an unskilled worker). The ten Trades are Biologics, Craftsman, Electronics, Fluidics, Gravitics, Magnetics, Mechanic, Photonics, Polymers, and Programmer.

## MECHANIC

Mechanic (Mechanics, Mechanical) is concerned with devices based on mechanical interaction. Example mechanical devices include motors, drive trains, and structural components.

Characters with Mechanic are skilled in the maintenance, repair, and construction of mechanical devices. Mechanic conveys an understanding of the principles of device construction and repair.

**Mechanic is a Default Skill.** Most people are able to accomplish basic mechanical tasks when necessary. Essentially all characters have Mechanic-0.

**Fundamental Knowledge.** The individual has a basic grasp of what the field of Mechanics is and how it can be applied to the world in general. He understands basic concepts, units of measure, and safety procedures. He is familiar the basic tools of Mechanics and as a matter of course carries with him rudimentary tools which allow basic fault diagnosis.

**Advanced Tools.** The individual has a familiarity with sophisticated tools of Mechanics and how to use them for Mechanics repair.

**Diagnosis and Repair.** The individual's skill and experience allows him to reach basic conclusions about Mechanics equipment and whether it is functioning properly (or if not, the probable cause of the fault). The individual can attempt to repair Mechanics equipment which he has previously diagnosed as malfunctioning.

**Construction.** The individual can assemble Mechanics components into operating pieces of equipment (assuming adequate components are available and an appropriate design is on hand).

**Device Design.** The individual can design devices which make use of Mechanics if he also has Designer.

**Mechanic is one of the ten Trades.** A trade is a skilled practice of a practical occupation. An individual with skill in one of the Trades is a skilled worker (as opposed to an unskilled worker). The ten Trades are Biologics, Craftsman, Electronics, Fluidics, Gravitics, Magnetics, Mechanic, Photonics, Polymers, and Programmer.

## MEDIC

Medic (Medical, Doctor) is skill in the healing arts.

Characters with Medic understand injuries and illnesses and how they are treated. They can diagnose physical and mental illnesses and they can prescribe treatment to improve or cure them.

### Treating Injury and Illness

When a Medic examines a patient, he must determine three elements: Location, Severity, and Diagnosis.

The Referee determines the three elements (through a process of logic, or through consultation of the Malfunctions Table). **Location** details the anatomical or the biological location of the illness or injury. Injuries are anatomical; illnesses are biological. **Severity** details how serious the illness is, and how difficulty the treatment task is. **Diagnosis** details how difficult the task of defining the illness is.

**Palliative Treatment.** Until the Medic succeeds in Diagnosis, he can only provide palliative treatment (pain relief, basic physical support, stopping bleeding).

To provide palliative treatment (Variable Hours)  
Average (2D) < C5 + Medic

Success stabilizes the patient condition. Failure increases Severity 1D.

**Diagnosis.** The Medic resolves the Diagnosis task.

To diagnose an injury or illness (Variable Hours)  
Difficulty (nD) < C5 + Medic  
Uncertain (Difficulty minus 1). Anyone may try to diagnose an illness or injury.

To diagnose an injury or illness (Variable Hours)  
Difficulty (nD) < C5 + Medic + Diagnostic Tools  
Uncertain (Difficulty minus 3).

The result of the successful task reveals the Severity of the injury or illness. If the task fails, the diagnosis is Unknown, and a repeat attempt at diagnosis must be made the following day. Each successive diagnosis receives a Mod +1 (the third diagnosis receives Mod +2).

If the Diagnosis task fails, the Referee creates a false Diagnosis (roll 1D for the Severity).

**Treatment.** The Medic resolves the Treatment task.  
To replace an injured anatomic location  
Severity (nD) < Dex + Medic +1 + Equipment  
Item must be available as a spare.

To repair an injured anatomic location  
Severity (nD) < Dex + Medic  
Uncertain (1D)

To treat a diseased biological component  
Severity (nD) < C5 + Medic  
Uncertain (1D)

Treatment of anatomic locations is governed by Dexterity. Treatment of Biological location is governed by C5.

Hi-G  
Hostile Environ  
Jack Of All Trades  
Leader  
Liaison  
Magnetics  
Mechanic  
Medic

Improper treatment (created by a false or incorrect diagnosis) worsens a patient's Severity +1 D per day.

For example, a soldier appears at the military aid station complaining of muscle pain. The referee rolls for Location (= 6 = Respiration), Severity (=1 = Easy treatment), and Diagnosis (= 4 Formidable diagnosis).

Doctor Emerald 777777 Medic-2 prescribes palliative treatment and then attempts a diagnosis with Tools+2.

To diagnose an injury or illness.  
Formidable (4D) < C5 + Medic + Diagnostic Tools+2  
Uncertain (Difficulty minus 3).

Doctor Emerald needs to roll (=7 + 2 + 2 =) 11 or less on 4D. He rolls 3-3-3 and the Referee rolls the uncertain die = 1). Assuming the Uncertain Roll = 3, the Referee tells the Doctor the Diagnosis fails (although it actually succeeded).

Meanwhile, the Doctor resolves palliative therapy.

To provide palliative treatment (Variable Hours)  
Average (2D) < C5 + Medic

He needs to roll (7 + 2 = 9 or less on 2D. He rolls 11 and fails. The patient's condition worsens to Severity = 2D.

Doctor Emerald 777777 Medic-2 tries a new diagnosis the next day.

Doctor Emerald has a Mod + 1 for the second diagnosis and needs to roll (=7 + 2 + 2 +1=) 12 or less on 4D. He rolls 2-3-4 and the Referee rolls the uncertain die = 6.

Assuming the Uncertain Roll = 3, the Referee tells the that the Severity is (= roll 1D = 3 =) Difficult, and that the location is Biological Digestion (the Doctor thinks "Can that be right?"). The Doctor begins a course of treatment.

To treat a diseased biological component  
Difficult (3D) < C5 + Medic  
Uncertain (1D)

He needs to roll (= 7 + 2 =) 9 or less on 3D. He rolls 5 + 5 which indicates success despite the Uncertain die. The patient's condition worsens to Severity = 3D.

**Healing.** Any successful treatment begins a course of healing requiring Severity squared days (Severity 1D requires a day to recover; Severity 6D requires 6^2 =36 days.

**Xeno-Medicine.** Medics are routinely educated (or trained) in the treatment of sophonts beyond their own species. Nevertheless, they encounter situations beyond their

**Knowledge - Knowledge - Skill**

First Receipt of Musician=	Musician-0. Instrument-1
Second Receipt of Musician=	Musician-0. Instrument-2
Third Receipt of Musician=	Musician-1. Instrument-2
Fourth Receipt of Skill=	Musician-2. Instrument-2

Exception: Knowledge acquired through Education increases without affecting Skill.

**TYPICAL MUSICAL INSTRUMENT CHOICES**

Guitar	Keyboard	Trumpet	Violin
Banjo	Piano	Trombone	Viola
Mandolin	Piano	Tuba	Cello

experience. Xeno-Medicine (on the Mods table) provides a Mod for such encounters.

**Starship Skills.** Medic is one of the seven Starship skills (Astrogator, Engineer, Gunner, Medic, Pilot, Sensors, and Steward).

**MUSICIAN**

Musician (Music) is ability in the auditory arts.

Musician is a skill in the creation of entertaining sounds, including the ability to play a musical instrument, to sing (or hum, or whistle), and to convey a wide range of emotion while playing music.

**Music Appreciation.** The individual enjoys music and understands its power and its interest. He or she has a background in the field which allows reasonable discussion with others who also appreciate music.

**Performing.** The individual can play one or more musical instruments (or can sing).

**Musical Instruments.** The use of Musician skill requires knowledge in at least one on a specific instrument type.

**Skill Acquisition.** Musician follows a standard pattern: Knowledge, Knowledge, Skill. The character initially learns a subset of the skill (a knowledge), then more knowledge, and finally the full skill.

**Related Skills.** Musician is one of the six Arts (Actor, Artist, Author, Chef, Dancer, and Musician).

**NAVAL ARCHITECT**

Naval Architect is skill in design of starships and spacecraft. The individual is trained in the design of starships and small craft. Knowledge of the requirements for accurate, usable ship design plans and of the details of ship design are part of this skill.

The use of this skill is governed by the starship design and construction rules and does not allow the invention of new devices or equipment.

**Ship Identification.** Naval Architect enables an individual to identify starships by mission (and to estimate weapons, drives, or performance) based on an external examination.

**NAVIGATOR**

Navigator (Navigation, Land Navigation, Sea Navigation) is skill in the determination of present location and course planning to a destination in a world surface setting.

Characters with Navigator know how to use navigation instruments (compass, inertial navigator, maps, direction finders), and have developed spatial sense that helps determine position.

**Map Reading.** The individual can find his or her current position on a map.

To find current position on a map  
Average (2D) < Edu + Navigator  
Uncertain (1D)

**Course Plotting.** The individual can determine and express the best (or most efficient, or most useful) course to be taken (for vehicles in association with a world surface).

To plot a course  
Difficult (3D) < Int + Navigator Uncertain (1D)

**Soldier Skills.** Navigator is a Soldier skills: Fighter, Forward Obs, Heavy Wpns, Navigator, Recon, and Sapper.

**Related Skills.** Navigator is world-based direction-finding. Astrogator is space-based interplanetary and interstellar course charting; it is tedious and laborious, even when aided by computers and sensors. Survey is world-based terrain analysis and identification.

## PHOTONICS

Photonics (Photonic) is concerned with devices and materials based on light, electromagnetic radiation, and photon flow. Photonics devices include those which emit or radiate photons externally (including radio frequency devices, lasers, and illuminators), or which make use of photon flow internally (as in fiber optics, photon cascades, and vision devices).

Characters with Photonics are skilled in the maintenance, repair, and construction of photonic devices. Photonics conveys an understanding of the principles of device construction and repair.

**Fundamental Knowledge.** The individual has a basic grasp of what the field of Photonics is and how it can be applied to the world in general. He understands basic concepts, units of measure, and safety procedures. He is familiar the basic tools of Photonics and as a matter of course carries with him rudimentary tools which allow basic fault diagnosis.

**Advanced Tools.** The individual has a familiarity with sophisticated tools of Photonics and how to use them for Photonics repair.

**Diagnosis and Repair.** The individual's skill and experience allows him to reach basic conclusions about Photonics equipment and whether it is functioning properly (or if not, the probable cause of the fault). The individual can attempt to repair Photonics equipment which he has previously diagnosed as malfunctioning.

**Construction.** The individual can assemble Photonics components into operating pieces of equipment (assuming components are available and a design is on hand).

**Device Design.** The individual can design devices which make use of Photonics if he also has Designer.

**Photonics is one of the ten Trades.** A trade is a skilled practice of a practical occupation. An individual with skill in one of the Trades is a skilled worker (as opposed to an unskilled worker). The ten Trades are Biologics, Craftsman, Electronics, Fluidics, Gravitics, Magnetism, Mechanic, Photonics, Polymers, and Programmer.

## PILOT

Pilot is skill in the maneuver of ships and small craft.

**Skill Acquisition.** Pilot follows a standard pattern: Knowledge, Knowledge, Skill. The character initially learns a subset of the skill (a knowledge), then more knowledge, and finally the full skill.

Characters with Pilot can operate a ship, directing its

launch, its movement from place to place, and its landing at a starport or other suitable location.

To perform a preflight check on a deep space fighter.  
Easy (1D) < Edu + Pilot

To launch/take-off a deep space fighter.  
Average (2D) < Dex + Pilot  
To travel to a destination in a deep space fighter.  
Easy (1D) < Dex + Pilot

To maneuver against an opponent in a space fighter.  
Average (2D) < Dex + Pilot  
Opposed (2). Success gives Advantage-3 in Dogfight.

To attack a target with a deep space fighter  
Average (2D) < Dex + Pilot  
A successful attack drives off the defender.

To return to base with a deep space fighter.  
Average (2D) < Dex + Pilot

**Starship Skills.** Pilot is one of the seven Starship skills (Astrogator, Engineer, Gunner, Medic, Pilot, Sensors, and Steward).

## POLYMERS

Polymers (Polymer, Plastics) is concerned with devices and materials based on plastics. Many polymer uses are structural, including coatings, adhesives, and rigid, flexible, or transparent panels. Polymer devices include fittings (hinges, gaskets), textiles, and impact absorbing armor.

Characters with Polymers are skilled in the maintenance, repair, and construction of polymer devices. Polymers conveys an understanding of the principles of device construction and repair.

**Fundamental Knowledge.** The individual has a basic grasp of what the field of Polymers is and how it can be applied to the world in general. He understands basic concepts, units of measure, and safety procedures. He is familiar the basic tools of Polymers and as a matter of course carries with him rudimentary tools which allow basic fault diagnosis.

**Advanced Tools.** The individual has a familiarity with sophisticated tools of Polymers and how to use them for Polymers repair.

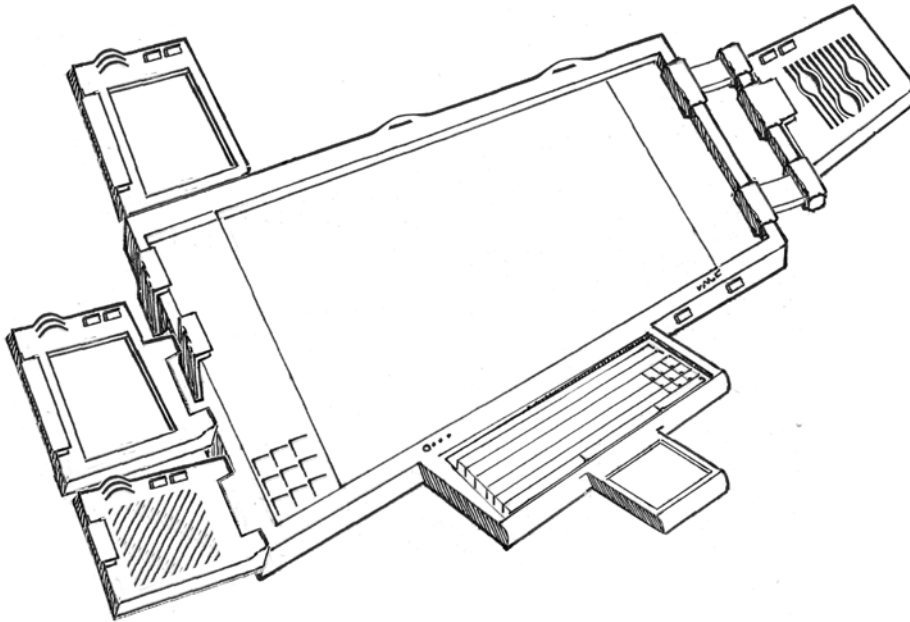
**Diagnosis and Repair.** The individual's skill allows him to reach basic conclusions about Polymers equipment and whether it is functioning properly (or if not, the probable cause of the fault). The individual can attempt to repair Polymers equipment which he has previously diagnosed as malfunctioning.

**Construction.** The individual can assemble Polymers components into operating pieces of equip-

### PILOT

Small Craft  
Spacecraft ACS  
Spacecraft BCS

Medic  
Musician  
Naval Architect  
Navigator  
Photonics  
Polymers



ment (assuming adequate components are available and an appropriate design is on hand).

**Device Design.** The individual can design devices which make use of Polymers if he also has Designer.

**Related Skills.** Polymers and Chemistry are related. Chemistry is the broad knowledge of the study of matter; Polymers is the practical skill in creating and using plastics.

**Polymers is one of the ten Trades.** A trade is a skilled practice of a practical occupation. An individual with skill in one of the Trades is a skilled worker (as opposed to an unskilled worker). The ten Trades are Biologics, Craftsman, Electronics, Fluidics, Gravitics, Magnetism, Mechanic, Photonics, Polymers, and Programmer.

## PROGRAMMER

Programmer (Programming, Coding, Coder) is concerned with the operating and control systems of both analog and digital devices. Programmer includes installation of devices, adjustment to operate with within prescribed parameters, and detailed configuration for specific tasks.

Characters with Programmer are skilled in the process and procedures of programming devices to correctly accomplish their functions. Programmer conveys an understanding of the principles of programming languages, analysis of systems, writing programs in higher level languages, and debugging of problems.

**Fundamental Knowledge.** The individual has a basic grasp of what the field of Programmer is and how it can be applied to the world in general. He understands basic concepts, units of measure, and safety procedures. He is familiar the basic software tools of Programming.

**Advanced Tools.** The individual has a familiarity with sophisticated tools of Programming and how to use them.

**Device (or Program) Design.** The individual can design complex programs from scratch (or using existing code

modules) if he also has Designer skill.

### Diagnosis and Repair.

The individual's skill and experience allows him to reach basic conclusions about Programming problems, determine whether specific programs are functioning properly (or if not, the probable cause of the fault). The individual can attempt to repair Programs which he has previously diagnosed as malfunctioning.

**Related Skills.** Programmer, Comms, and Computer, are related skills. Computer is the ability to use technological office equipment and focuses on non-primary data input. Comms is the ability to use technological communications equip-

ment and focuses on primary data input. Programmer is the ability to configure office equipment or communications equipment (as well as other equipment) to achieve desired functions.

**Programmer is one of the ten Trades.** A trade is a skilled practice of a practical occupation. An individual with skill in one of the Trades is a skilled worker (as opposed to an unskilled worker). The ten Trades are Biologics, Craftsman, Electronics, Fluidics, Gravitics, Magnetism, Mechanic, Photonics, Polymers, and Programmer.

## RECON

Recon (Reconnaissance) is skill in gathering information about military and naval operations and units.

Characters with Recon collect information on or near the battlefield and report it to higher headquarters. The individual is skilled in military scouting and is capable of moving about in the wilderness without being detected.

### Collecting Information

The individual can move through Terrain, and Local Hexes avoiding detection by locals or natives, or by military or civil authorities. The individual travels through individual hexes in search of military information.

**Recon In A Terrain Hex.** The individual may determine the presence of military forces in the Terrain Hex. A proper recon takes about a day.

To Locate Military Forces in a Terrain Hex (if any)  
 Difficult (3D) < End + Recon  
 Success indicates the presence of the military force and the Local Hex in which it is located.

**Recon In A Local Hex.** The individual may determine the presence of military forces in the hex. A proper recon takes about a day.

To Assess Military Forces In A local Hex (if any)  
Difficult (3D) < End + Recon

Success indicates the size of the military force, its weapons and vehicles, and its apparent mission or purpose.

**Recon In A Single Hex.** The individual may precisely identify military forces or civilian targets with sufficient precision to allow planning attacks, or for targeting by artillery or ortillery.

To Identify Potential Targets  
Average (2D) < Edu + Recon

Identifying a potential target by its location in a Single Hex is sufficient for it to be targetted and attacked by artillery or ortillery.

Some Recon tasks may be Uncertain.

**Soldier Skills.** Recon is one of the Soldier skills: Fighter, Forward Obs, Heavy Wpns, Navigator, Recon, and Sapper.

## SAPPER

Sapper (Combat Engineer, Miner, Pioneer) is skill in rapid construction or demolition under military conditions.

Characters with Sapper can perform a variety of military engineering duties such as bridge-building, laying or clearing minefields, demolitions, field defenses and general construction, as well as road and airfield construction and repair.

Sappers understand the use of construction equipment on an urgent or expedited basis, often without specific plans or blueprints. Sappers also understand tunnelling and underground excavation.

**Soldier Skills.** Sapper is one of the Soldier skills: Fighter, Forward Observer, Heavy Weapons, Navigator, Recon, and Sapper.

## SEAFARER

Seafarer (Sailor, Wet Sailor, Watercraft) is skill in the operation of watercraft. It includes the physical aspects of operating watercraft, an awareness of the protocols of watercraft traffic, and basic procedures of preventative and curative maintenance.

**Skill Acquisition.** Seafarer follows a standard pattern: Knowledge, Knowledge, Skill. The character initially learns a subset of the skill (a knowledge), then more knowledge, and finally the full skill.

### Types of Watercraft

The use of Seafarer skill requires knowledge on a specific type of watercraft.

**Boat.** A small watercraft suitable for use on rivers and lakes, or in the ocean or sea portion of shore terrain. A Boat is a vehicle of less than 100 displacement tons.

**Submarine. Submersible.** A vessel capable of operating underwater. A submarine is purpose-built to operate most efficiently underwater; a submersible is most efficient on the surface, but is capable of submerging.

**Ship.** A large watercraft suitable for operation in oceans and seas, including the ocean or sea portion of shore terrain.

A Ship is a vehicle of more than 100 displacement tons.

**Grav.** A watercraft equivalent in size to a Boat, which additionally is moved by Grav technology and capable of moving through atmosphere above water surfaces. Grav Knowledge associated with Driver or Flyer is equally applicable to Grav Seafarer.

Characters with Watercraft are qualified to operate all types.

**Watercraft Identification.** The character can identify watercraft in general terms and often in specific terms based on education and experience.

To identify an watercraft  
Average (2D) < Edu + Seafarer + Visibility

To identify an watercraft far out to sea.  
Difficult (3D) < Edu + Watercraft + Visibility

### Watercraft Operation

Watercraft operation tasks are detailed under Vehicle Operations in the Vehicle Chapter.

### Aquanautics

Repair and maintenance of watercraft is supported by Aquanautics.

## SENSORS

Sensors is skill in the use of technological sensory equipment: the artificial devices which extend and enhance the natural senses. Sensors detect a variety of stimuli and provide it in readable form to the sensor operator; this skill reflects the ability to understand and use that information.

Characters with Sensor understand the role of sensors in military, naval, scout, and commercial activity. They can discuss intelligently a variety of sensors and their functions.

**Starship Skills.** Sensors is one of the seven Starship skills (Astrogator, Engineer, Gunner, Medic, Pilot, Sensors, and Steward).

Polymers  
Programmer  
Recon  
Sapper  
Seafarer  
Sensors

---

### SEAFARER

Grav. Grav Boat.  
Boat. Hydrofoil. Speedboat. Sailboat.  
Ship. Warship. Tanker. Transport. Ferry.  
Sub. Submersible. Underwater Craft.  
Aquanautics. Detailed Repair and Maintenance.

---



## STEALTH

Stealth (Clandestine, Spycraft) is skill in moving or functioning without being detected. Characters with Stealth understand how to move silently and unobserved.

**Stealth Movement.** The individual is able to move undetected.

To move undetected  
Difficult (3D) < End + Stealth

**Stealth Equipment.** Unfortunately, Stealth itself is of no benefit against automated electronic surveillance devices or robots. There are pieces of equipment which frustrate automated surveillance, and Stealth is of value in their use.

**Evaluation.** The individual is able to evaluate the difficulty of penetrating the defenses of a location.

To evaluate the defenses of a location (from outside)  
Difficult (3D) < Int + Stealth  
Uncertain (2D). Result is a difficulty level.

To evaluate the defenses of a location (from a tour).  
Difficult (3D) < Int + Stealth  
Uncertain (1D). Result is a difficulty level.

**Penetrating Defenses.** The individual is able to overcome or bypass the defenses of a location.

To enter premises.  
Difficult (3D) < Dex + Stealth  
Difficulty level is set from previous evaluation.

To sneak past a guard into a nuclear power plant.  
Staggering (5D) < Int + Stealth  
Uncertain (1D)

## STEWARD

Steward (Servant, Purser) is skill in meeting the personal needs of others. Characters with Steward understand the basic elements of personal service. They can receive basic instructions and execute them. Higher levels of Steward involve personal initiative and anticipation of employer needs.

**Steward is a Default Skill.** Most people are able to attend to the personal needs of others when necessary. Essentially all characters have Steward-0.

**Servant.** The individual has training as a servant, and knows the details of personal service, including meal preparation, domestic duties (cleaning, laundry), and general help.

**Executive Assistant.** The individual has training and experience as an executive assistant or secretary, and knows the details of service within the business environment, including scheduling, note taking, and correspondence.

### Starship Skills

Steward is a vital role aboard merchant ships.

**Steward (typically 4th Officer).** The individual has training and experience as a steward (the passenger service oriented crew position on starships), including meal service, entertainment, and general assistance.

Although starship officer responsibilities vary from ship to ship, the 4th Officer is typically the Steward. He sells tickets and arranges accommodations for passengers when in port; during voyages, he tends to the needs of the passengers (especially the High Passengers). A good Steward can arrange advance accommodations for passengers (for a "fee" of 1% of the ticket price). A good Steward can make reasonable tips from satisfied passengers.

On ships with more than one Steward, the Chief Steward is called the Purser.

### Tips (in Credits) =

Good Flux \* Steward \* 10 \* High Passengers

**FreightMaster.** The individual has training or experience in the handling of freight (designates goods carried for a fee by a ship) and cargo (trade goods bought by the ship owner and carried as speculation), including knowledge of proper stowage, environmental conditions, and quarantine and health requirements.

Freightmaster is an additional duty for the Steward.

**Related Skills.** Steward is one of the seven Starship skills (Astrogator, Engineer, Gunner, Medic, Pilot, Sensors, and Steward).

## STRATEGY

Strategy is skill in formulating long-range or high level plans for business, military, or athletics. Strategy deals with the planned reasons for the encounters or confrontations and with the intended results; strategy is much more the realm of the players, rather than of the characters.

**Strategic Planning.** Players make general plans for their characters' actions. When they make such plans, the level of Strategy skill the characters have must be considered by the game master when those plans are implemented.

Strategy is not to be confused with Tactics (naval tactics concerns the operation of starships and spacecraft).

### Naval Strategy

The individual is trained and experienced in the deployment and operations of groups of naval spacecraft.

**Analysis.** The individual can analyze information about spacecraft deployment and arrive at an understanding, based on that information, of the strategies and tactics that those forces will use.

**Space Combat.** Fleet Tactics is used in space combat.

**Related Skills.** Strategy, Tactics, and Fleet Tactics are related skills. Strategy addresses the reasons for a military or naval encounter and planning the deployment of resources to achieve an intended result. Tactics is the specific activities within a battle which help achieve victory. Fleet Tactics is the direction of multiple ships in space combat.

## STREETWISE

Streetwise is skill in interacting with local subcultures. Characters with Streetwise are acquainted with the ways of local subcultures and are capable of dealing with strangers without alienating them. Close-knit subcultures generally reject contact with strangers or unknown elements. Streetwise

allows interaction for the purposes of obtaining information, hiring, purchasing or selling contraband or stolen goods, and other shady or borderline activities .

## SURVEY

Survey (Exploration) is skill in the art of wilderness exploration and mapping, which includes an ability to move through rough areas with ease and to evaluate the resources and features of the territory.

Characters with Survey understand exploring, mapping, and otherwise recording information about worlds.

### Exploratory Survey

The individual can move through territory which is not clearly mapped or explored, and note its key geographic features. If there are intelligent beings in the territory, the character can make contact and evaluate them as well.

Individuals conducting Planetary Surveys produce reports in the form of a hex map of the territory being explored.

**World Hex Survey.** A Character enters a World Hex and proceeds to record its constituent Terrain Hexes on a map.

An individual entering a Terrain Hex can discover and record the basic Terrain identification for the hex in about a day. An individual with Survey can discover (or deduce) and record the basic Terrain identification for the hex (and for adjacent hexes equal to his Survey skill) by traveling through it.

To Locate Resource Hexes in a World Hex (if any)  
Difficult (3D) < Edu + Survey

To Locate Population Centers in a World Hex (if any)  
Difficult (3D) < Edu + Survey

To Locate Military Forces in a World Hex (if any)  
Difficult (3D) < Edu + Survey

To Locate Natives in a World Hex (if any)  
Difficult (3D) < Edu + Survey

Upon exiting the World Hex, the individual produces a Map of the Terrain Hexes in the World Hex.

**Terrain Hex Survey.** The individual can conduct a rigorous Resource Survey of a Terrain Hex, populating it with Local Hexes in much the same manner as a World Hex Recon.

An individual with Survey can discover (or deduce) and record the basic Terrain identification for a Local hex (and for adjacent Local hexes equal to his Survey skill) by traveling through it. Upon exiting the Terrain Hex, the individual produces a Map of the Local Hexes in the Terrain Hex.

**Related Skills.** Survey is world-based terrain analysis and identification. Navigator is world-based direction-finding. Astrogator is space-based interplanetary and interstellar course charting; it is tedious and laborious, even when aided by computers and sensors.

## SURVIVAL

Survival is skill in remaining alive in the face of dangerous situations or locations. Characters with Survival expertise are adept at locating food and water, constructing natural weapons and shelter, setting simple wildlife traps,

and travelling across country, in a wilderness or hostile environment.

**In The Wild.** The individual knows the basic steps to be taken when cast into the wild without standard resources.

To determine the best direction to travel.

Average (2D) < Int + Survival

To locate suitable food and water.

Average (2D) < Int + Survival

To create suitable shelter

Average (2D) < Int + Survival

**In Emergencies.** The individual has an ability to respond in emergencies (vehicle crashes, surprise attacks, disasters).

To pick the right course of action.

Difficult (3D) < Int + Survival

**Hunting and Fishing.** Survival is concerned with wilderness activity. It necessarily includes the ability to hunt animals and gather foodstuffs. Hunting itself is a situation rather than a skill.

## TACTICS

Tactics is skill in engaging and defeating an opponent.

### Military Tactics

The character has training and experience in small (military) unit tactics and operations. Tactics is used in combat. Not all participants in Combat understand Tactics; those who do have an advantage.

**The Tactics Mod.** Characters (with Tactics) can create a Tactics Mod used every Combat Round for the duration of a battle; it is created anew for every battle. The Tactics Mod equals the C5 plus Tactics minus 2D. It is possible for the Tactics Mod to be negative, in which case it is useless for the battle.

**The Tactics Mod Grant.** A character can grant his Tactics Mod to any combatant under his direct control (and within communication). In one Combat Round, he can grant it to a gunner; in another to a Sniper; in another to someone in hand-to-manipulator combat.

A combatant can only be granted one Tactics Mod per combat round. The Tactics Mod is a direct positive Mod in combat and increases the chance of success.

### Close Order Drill (Rifle or Sword)

The individual knows how to participate in military parades, marches, and ceremonies. He or she knows how to manipulate small arms in Close Order Drill, and how to give orders to others when in a position of leadership.

To properly march a unit of soldiers through a plaza  
 Difficult (3D) < Edu + Tactics

### Naval Tactics

The individual knows how to operate starships and spacecraft in combat and maneuver situations.

**Combat.** Naval Tactics is used in space combat. Naval Tactics is the operation of starships and spacecraft; Fleet Tactics is the operation of groups of starships or spacecraft.

**Related Skills.** Tactics, Strategy, and Fleet Tactics are related skills. Strategy addresses the reasons for a military or naval encounter and planning the deployment of resources to achieve an intended result. Tactics is the specific activities within a battle which help achieve victory. Fleet Tactics is the direction of multiple ships in space combat.

### TEACHER

Teacher (Instruction, Instructor, Teaching) is skill in imparting knowledge in classroom or practical situations.

Characters with Teacher have the ability to impart knowledge to other characters who have C5 = Edu, and to a lesser extent, to characters who have C5= Tra.

To teach a skill to one student (1 year)  
 Difficult (3D) < Edu + Teacher

To teach a skill to one C5= Tra student (1 year)  
 Formidable (4D) < Edu + Teacher

Specify skill being taught (the teacher must have at least one level higher in the skill being taught). Student receives plus one level at year end. The student need not begin the course with any skill level in the skill being taught.

To teach a skill to a class of students (1 year)  
 Difficult (3D) < Edu + Teacher  
 Each student must roll Edu or less to receive the skill (thus, a student with C5= Tra uses Tra/2 for Edu).

**Enhancements to Teacher.** The chance of success of the instruction task may be improved by a variety of enhancements. For example, Linguistics can be used when teaching Language.

The skill received is in place of the experience skill increase for the year. The advantage is that the skill received may be a totally new one to the student.

**Related Skills.** Teacher and Trainer are related skills. Teacher is the ability to impart knowledge to characters who have C5= Edu. Trainer is the ability to impart knowledge to characters who have C5= Tra.

### TRADER

Trader is skill in identifying goods and estimating their value in the local market. Characters with Trader have learned to identify a wide variety of objects and to evaluate them in terms of their relative scarcity (both locally, and throughout the universe). They can determine with some degree of accuracy the current local market price of objects.

To evaluate a trade good or cargo  
 Difficult (3D) < Int + Trader  
 Uncertain (1D)

**Evaluation.** Objects are (or can be) described in the QREBS system to indicate their level of Quality, Reliability, Ease of Use, Burden, and Safety. Trader (and Craftsman) can evaluate the specific components of QREBS.

**Appraisal.** Trader (but not Craftsman) can also estimate the value of an object.

To evaluate Quality  
 Difficult (3D) < C5 + Trader  
 Uncertain (1D)

To evaluate Reliability  
 Formidable (4D) < Int + Trader  
 Uncertain (1D)

To evaluate Ease Of Use  
 Average(2D) < C2 + Trader  
 Uncertain (1D)

To evaluate Burden  
 Average (2D) < Str + Trader  
 Uncertain (1D)

To evaluate Safety  
 Average (2D) < Int + Trader  
 Uncertain (1D)

To estimate Value  
 Difficult (3D) < Int + Trader  
 Uncertain (1D)

### Trade and Commerce

Trader provides an understanding of market processes. Trader allows one die on the Actual Value Table to be rolled in advance; each level of Trader allows a throw one day in advance of the sale date.

For example, a character with Trader-3 can roll one die on the 2D Actual Value Table (on the Trade Charts) three days before the transaction. Using simple logic, he can predict the minimum and maximum values on that table (reflecting his experience in such transactions). If the transaction will not produce sufficient profit, he can cancel and move on.

Trader provides a sophisticated understanding of market processes. The Actual Value Table in Trade and Commerce is Flux-driven. A character with Trader may substitute Trader Skill for the +D in Flux on the Table (to a maximum of +5).

### EVALUATING QREBS

	Difficulty	Char	Skill
Q Quality	3D	C5	Trader or Craftsman
R Reliability	4D	Int	Trader or Craftsman
E Ease of Use	2D	C2	Trader or Craftsman
B Burden	2D	Str	Trader or Craftsman
S Safety	2D	Int	Trader or Craftsman

For example, Eneri Dinsha (Trader-4) consults the Actual Value Table. For flux, he uses his Trader-4. He then rolls the minus Flux die (=4) for a Flux result of 0 and reads 100% on the AVT.

A Trader may use one of the available provisions, but not both in the same transaction.

**Related Skills.** Trader and Broker are related skills. Broker is the ability to bring together a seller and a buyer based on interpersonal interactions and an understanding of relative values of goods. Trader is the ability to independently appraise and value goods.

## VACC SUIT

Vacc Suit (Space Suit, Vacuum Suit) is skill in functioning in Vacuum environments, and using vacuum suits and environmental protective equipment.

Characters with Vacc Suit know how to examine a vacc suit, ascertain that it is functional, put it on, check its seals, and maneuver while wearing it without a tear in the fabric.

**Vacc Suit is a Default Skill.** Most people are able to wear a Vacc Suit, with suitable caution and attention, when necessary. All characters have Vacc Suit-0.

To put on and wear a vacc suit.

Average (2D) < Dex + Vacc Suit

Cooperative (1 Vacc Suit)

**Mishaps.** There are opportunities for mishaps while wearing environmental protection equipment.

To patch a vacc suit (minor)

Average (2D) < Dex + Vacc Suit

To patch a vacc suit (major)

Difficult (3D) < Dex + Vacc Suit

**Other Equipment.** Vacc suit skill is also usable with respirators, filter masks, high temperature environment suits, and low temperature suits.

## ZERO-G

Zero-G (Zero-Gravity) is skill in functioning in Zero-Gravity environments.

Characters with Zero-G have developed the basic abilities to function in non-gravity environments, including using secondary limbs to stabilize themselves, understanding how to move from place to place, predicting the position of self and others based on the laws of motion, and internalizing basic safety procedures.

To leap a Vlong Gap between ships in deep space

Average (2D) < Dex + Zero-G

To leap a Distant Gap between ships in deep space

Difficult (3D) < Dex + Zero-G

**Tactics  
Teacher  
Trader  
Vacc Suit  
Zero-G  
The Trades**

---

## THE TRADES

A trade is a skilled practice of a practical occupation. An individual with skill in one of the Trades is a skilled worker (as opposed to an unskilled worker).

There are ten Trades: Biologics, Craftman, Electronics, Fluidics, Gravitics, Magnetism, Mechanics, Photonics, Polymers, and Programming.

Each trade has a standard response to emergency or important situations. The user gets an inspiration and says:

Biologics	Add more amino acid.
Craftman	Slap on another coat of varnish.
Electronics	Reverse the polarity.
Fluidics	Purge the primary (/secondary) feed.
Gravitics	Filter out the harmonics.
Magnetism	Adjust the pole tolerance.
Mechanics	Give it a whack!
Photonics	Increase (/decrease) the wavelength.
Polymers	Reverse the last ion pair.
Programming	Run the error suppression routine.

He then rolls Immediate Action.

---

# THE KNOWLEDGES

A knowledge is a body of information based on a field of science, training, or experience. For example, Chemistry reflects the body of knowledge of theoretical and practical chemistry. The maximum attainable level of a knowledge is 6.

**Academia (Academics)** is the general Knowledge associated with the profession of scholar.

**ACV (Air Cushion Vehicle)** is the Knowledge associated with the operation of vehicles using ACV technology.

**Aeronautics** is the Knowledge of Flyer maintenance and repair. It contrasts with the other Knowledges under Flyer in that it is deeply concerned with repair, modification, and maintenance rather than operation.

**Aquanautics** is the Knowledge of watercraft maintenance and repair. It contrasts with the other Knowledges under Watercraft in that it is deeply concerned with repair, modification, and maintenance rather than operation.

**Archeology** is the scientific study of civilizations, societies, and cultures

**Artillery** is the Knowledge associated with the targeting, operation, and maintenance of the artillery weapons systems.

**Automotive** is the Knowledge of ground vehicle maintenance and repair. It contrasts with the other Knowledges under Driver in that it is deeply concerned with repair, modification, and maintenance rather than operation.

**BattleDress** is skill in the use, care, and repair of personal combat armor, including Powered Armor. Battle Dress is also required to use weapons designated as Portable.

**Bay Weapons** is the Knowledge associated with large starship weapons installations (those mounted in Bays).

**Beams** is the Knowledge associated with the use, maintenance, and repair of personal energy weapons.

**Biology** is the scientific study of living organisms

**Blades** is the Knowledge associated with the use, maintenance, and repair of blade or edged weapons.

**Boat** is the Knowledge associated with the operation of small watercraft.

**Capital** is the general Knowledge associated with Capital, the center of the Imperium.

**Career** is the general Knowledge associated with a specific <Career>.

**Chemistry** is the scientific study of matter at the atomic, molecular, and macromolecular levels

**Exotics** is the Knowledge associated with the use, maintenance, and repair of strange, unorthodox, or unusual personal weapons.

**Flapper (Ornithopter, Flapping Wing Aircraft)** is the Knowledge associated with the operation of aircraft which use flapping wings.

**G-Drive (Gravity Drive)** is the Knowledge associated with the operation of gravitic drives. G-Drives are a subset of M-Drives, and this obscure Knowledge is typically learned by citizens and functionaries.

**Grav (Grav Vehicle)** is the Knowledge associated with the operation of vehicles using gravitics technology.

**Grav (Grav Watercraft)** is the Knowledge associated

with the operation of watercraft using gravitics technology.

**Grav (Grav Flyer)** is the Knowledge associated with the operation of flying craft using gravitics technology.

**History** is the scientific study of events over time

**J-Drive (Jump Drive)** is the Knowledge associated with the operation of jump drives.

**Launcher** is the Knowledge associated with the targeting, operation, and maintenance of the military launcher weapons systems.

**Legged** is the Knowledge associated with the operation of vehicles supported by and propelled by legs. Legged is the controlling Knowledge for Units (a form of personal armor).

**Life Support** is the Knowledge associated with the operation of life support systems.

**Linguistics** is the scientific study of languages

**LTA (Lighter Than Air Craft)** is the Knowledge associated with the operation of lighter-than-air craft.

**M-Drive (Maneuver Drive)** is the Knowledge about operation of maneuver drives. It includes G-Drives.

**Mole** is the Knowledge associated with the operation of vehicles which burrow underground.

**Ordnance (Gun Repair)** is the Knowledge associated with military weapon maintenance and repair.

**Ortillery (Orbital Bombardment)** is the Knowledge associated with the targeting, operation, and maintenance of the orbital bombardment systems.

**Philosophy** is the scientific study of the purpose or purposes of life

**Physics** is the scientific study of fundamental laws of the universe

**Planetology** is the scientific study of structure and characteristics of worlds

**P-Plant (Power System, Power Plant)** is the Knowledge associated with the operation of fusion (and other) power generating plants.

**Psonianology** is the scientific study of psionics and paranormal activity.

**Psychohistory** is the scientific study of extremely large populations. Psychohistory is a predictive and manipulative science which envisions specific stimuli applied to a large population to achieve a specific result.

**Psychology** studies mental processes and behavior.

**Regina** is the general Knowledge associated with the world of Regina.

**Rider (Equestrian)** is the Knowledge associated with the use of animals as personal transport.

**Robotics** is the scientific study of the design, construction or creation, and maintenance of artificial beings

**Rotor (Helicopter, Rotary Wing Aircraft)** is the Knowledge associated with the operation of aircraft which use rotary wings.

**Scout Service (Scout)** is the general Knowledge associated with the profession of scout.

**Screens** is the Knowledge associated with the operation of protective screens.

**Ship** is the Knowledge associated with the operation of large scale ocean-going surface watercraft.

**Slug Throwers (Guns)** is the Knowledge associated with the use, maintenance, and repair of personal bullet-firing weapons.

**Small Craft (Ship's Boat)** is the Knowledge associated with the operation of spacecraft typically smaller than 100 tons.

**Soldier (Army, Military)** is the general Knowledge associated with the profession of soldier.

**Sophontology (Xenology)** is the scientific study of intelligent beings

**Spacecraft ACS (Spaceship, Spacecraft)** is the Knowledge associated with the piloting or direction of spacecraft in the ACS series (larger than Small Craft but smaller than 2500 tons).

**Spacecraft BCS (Big Spaceship, Big Spacecraft, BCS Spacecraft)** is the Knowledge associated with the piloting or direction of spacecraft in the BCS series (larger than 2400 tons).

**Spacer (Navy, Naval)** is the general Knowledge associated with the profession of spacer.

**Spines** is the Knowledge associated with the operation of spinal weaponry for starships and spacecraft.

**Sprays** is the Knowledge associated with the use, maintenance, and repair of personal spray weapons.

**Sub (Submarine, Submersible, Undersea Craft)** is the Knowledge associated with the operation of subsurface watercraft.

**Teamster** is the Knowledge associated with the use of animals as beasts of burden and the loading and unloading

of transport vehicles (especially beast-drawn vehicles).

**Tracked** is the Knowledge associated with the operation of vehicles propelled by endless tracks.

**Trainer (Training)** is the Knowledge associated with changing behavior of animals (and of sophonts with C5 = Training).

**Turret** is the Knowledge associated with the operation of turret based weaponry.

**Unarmed (Unarmed Combat, Melee, Brawling)** is the Knowledge associated with unarmed combat techniques.

**Wheeled (Wheeled Vehicle)** is the Knowledge associated with the operation of vehicles which use wheels.

**Wing (Fixed Wing Aircraft, Winged Flyer)** is the Knowledge associated with the operation of fixed wing aircraft.

**WMD (Weapons of Mass Destruction, Nuclear Weapons, Chemical Weapons, Biological Weapons, Kinetic Kill Weapons)** is the Knowledge associated with the targeting, operation, and maintenance of the Weapons of Mass Destruction.

**World (MainWorld, Planet)** is the general Knowledge associated with <World>.

**More Knowledges**

Many other Knowledges are possible: one for every career; one for every world; one for every branch of science, and one for each specialized subset of the Knowledges shown.

Where the situation calls for it, the referee can create new Knowledges reflecting personal interests or specific game requirements (for example, sports or historical trivia, psychic phenomena, or various collecting activities: coins, stamps, autographs, or dinnerware, and books).

**Skill, Knowledge, and Talent Maximums**

Skill-15	as applicable,
Career Knowledge- 6	Skills, Knowledges, and Talents
World Knowledge- 6	may be stacked in Tasks but
Talent-15	not in Checks.

# THE TALENTS

A talent is a personal ability not generally possible for a human, but which may be possible for some specific non-humans. The maximum level for a specific talent is usually 15

## COMPUTE

Compute is the native ability to perform detailed or extensive information processing rapidly and without external aids or devices.

Compute essentially mimics the information processing capabilities of an electronic computer. The individual can scan text at high speed and make simple or complex notations. The ability includes both text processing and number processing.

For example, scan pages of text in search of specific words or groups of words, or scan pages of numbers and calculate sums, averages, or other relationships.

To scan a text searching for instances of <World Name>  
To scan accounting documents to calculate values  
To scan documents for clues

**Compute is evaluated in Pages of Text.** A half-page is about a kilobyte. A megabyte is about 500 pages. Compute assumes scanning one page in about one second.

**Each use of Compute is a task.** Task Difficulty in Dice equals pages divided by 6. Scanning up to 6 pages is Easy; scanning 18 pages in a single task is Difficult.

**Compute is about Accuracy.** Accuracy is the percent value on the C+S Table based on Task Difficulty and C+S. For example, The Hadron (a non-Human 789A75 Compute-3) can scan 6 pages in 6 seconds with 100% accuracy and 18 pages in 18 seconds with about 91% accuracy.

For some tasks, there is no point in using Compute without 100% accuracy. Even if the task is a success, the individual doesn't know where any errors or missed information is.

For other tasks, the individual may be content to determine some information (some clues, but perhaps not all of

---

### COMPUTE: THE PROCESS

Compute assumes scanning written documents at about one second per page.

**1. Identify The Task.** Express it in Groups of 6 Pages.

**2. Determine The Difficulty.** Number of Groups determines the Number of Dice and thus the Difficulty. 4 Groups is 4D = Formidable.

**3. Determine The Time.** Each Group takes about 6 seconds to scan and process.

**4. Determine User C+S.** Add Intelligence + Compute.

**5. Determine Accuracy.** Consult the C+S table cross-referencing C+S and Difficulty. The result is a percentage.

**6. Determine Fatigue.** After each Task, Check C3. Failure reduces the User in the sequence

Optimal-Ordinary-Tired-Sleepy.

**7. Continue Until Satisfied.**

---

them; some references, but perhaps not all of them).

**Fatigue.** Using Compute is physically taxing. Check C3 after each task: failure advances C3 to its next stage (Optimal becomes Ordinary; Ordinary becomes Tired; Tired becomes Sleepy). Decrease C3 minus 1 per task.

### Using Compute

After long negotiations, Free Trader **Beowulf** has acquired a contract for varied cargo in several containers. They are delivered only minutes before the ship is scheduled to depart, and (at local Tech level 4) the accompanying documents are typed on paper: about 50 pages of line after line of descriptions, stock numbers, quantities, and values.

**The Basic Situation.** Freightmaster Hadron (a non-Human 789A77 Compute-4 Computer-4) runs the pages through the document scanner and the ship's freight accounting software reconciles the numbers, outputs tags for each carton, and produces a summary of costs, values, anticipated profits. It flags three pages with duplicate entries, reduces the amount to be paid by Cr3,000, and prints out the proper receipts to be attached to the delivery documents.

To Computer Reconcile Cargo Documents (50 Pages)  
Difficult (3D) < Int or C5 + Computer  
Uncertain (1D)  
Duration: several minutes

It must roll 14 or less on 3D; he has a 91% chance of success, but the two visible dice it rolls must be at most 8 for certainty.

**Double Checking Using Compute.** Freightmaster Hadron is good at his job primarily because he can double-check the computer; he scans the pages just before they are scanned.

Hadron scans the pages at his Compute limit: about 12 pages (two Groups of 6) at a time. Its C+S=14 guarantees success on each task. After each task, It Checks C3. After five such Checks, his C3 has been reduced to 4 and he (with two failures) is Tired. But, the effort is complete; he has fully checked the documents with 100% accuracy. The ship can depart and he can rest up before his next responsibilities.

## EMPATH

Empath (Empathy) is the native ability to sense and understand the emotions of others.

Empathy is either a variant of, or related to, the sense of Perception. An Empath is able to sense the emotional state of other beings and sophonts.

To Scan for Emotional Content  
Average (2D) < C4 + Empath  
Identifies individuals and their emotional states

## EMPATH: READABLE EMOTIONAL STATES

Flux	Emotion	Degree
-5	Distress	Utmost
-4	Hate	Extreme
-3	Fear	Major
-2	Surprise	Significant
-1	Unease	Minor
0	Blank	Trivial (or masked)
1	Calm	Minor
2	Surprise	Significant
3	Courage	Major
4	Love	Extreme
5	Delight	Utmost

To Sense a General Emotional State  
Average (2D) < C4 + Empath

To Sense the Emotional State of a Specific Person  
Difficult (3D) < C4 + Empath

## HIBERNATE

Hibernate is the native ability to enter a short-term or long-term state of reduced consciousness and physical activity.

Hibernation is a survival mechanism based on an evolutionary need to avoid extremes of weather or environment, or to undergo prolonged healing.

### Going Into Hibernation

Hibernation may be voluntary or involuntary.

**Voluntary.** Hibernation may be a voluntary act. The individual makes a conscious decision to hibernate. He finds a safe place (his bunk; a remote corner somewhere) and falls asleep with some plan for total sleep time (in weeks).

**Involuntary.** Any wounding which would otherwise kill the character converts to involuntary hibernation. The individual enters hibernation automatically. Hibernation lasts weeks equal to C3. Upon emergence, characteristics are returned to normal.

### In Hibernation

A character in hibernation requires no food or water; reasonable breathing gases are required. He is unconscious and unaware of external circumstances.

### Awakening

A character awakens after some passage of time (measured in days). The character is extremely hungry and thirsty.

To Wake From Voluntary Hibernation

Average (2D) < C3 + Hibernation

Success= Awaken at the planned time.

Failure= Awaken at planned time + Good Flux Days.

Involuntary Hibernation ends after C3 weeks.

## HYPNO

Hypno is the native ability to create altered mental states in which the subject's critical thinking faculties are bypassed or overridden.

Hypno interacts with non-player characters find answers to questions and to force compliance or action. Hypno uses a variety of senses to work its effect, but appears to the observer to be extra-sensory.

To Create the Hypnotic State  
Difficult (3D) < C4 + Hypno

If the hypnotic state is not created, then no further hypno is possible. If the state is created,

To Ask Questions  
Check Query + 2x Hypno

To Persuade to Do <something>  
Check Persuade + 3x Hypno

To Command to Do <something>  
Check Command + 4x Hypno

Failure in each case results in feeble or ineffective attempts by the subject (rather than outright refusal).

**Post Hypnotic Suggestions.** Hypno may be used to implant reasonable post hypnotic suggestions which remain in effect on the subject for (subject's) C3 days.

**Mass Hypnosis.** A Hypno user may (attempt to) affect multiple subjects simultaneously.

## INTUITION

Intuition is the native ability to generate or obtain information without any apparent operation of the senses.

**Akin to Insight.** The character can see (or puzzle out) correct action, which usually expresses itself as a question: "Why don't we try (blank)?"

Treat Intuition as a Characteristic and Check Intuition.

**Helpful In Choices.** In tasks which present choices, Intuition is an acceptable substitute for the suggested skill.

### Intuition Failure

When a task using Intuition fails, the user's unconscious confidence in it is shaken; reach failure reduces Intuition by minus 1 (but to no less than 1); each success raises it +1 (but not to exceed its true value).

## MATH

Math is the native ability to perform detailed or extensive mathematical calculations rapidly and without external aids or devices. The individual is able to do math "in his head."

Provided the individual understands the specific mathematics (as evidenced by C5), the individual can (for example):

Add or subtract columns of numbers,

Multiply or divide multi-digit numbers,

Find roots

Identify prime numbers.

Solve equations for unknowns.



To Solve Basic Math (1 digit)  
Easy (1D) < (Int or C5) + Math

To Solve Basic Math (2 digit)  
Average (2D) < (Int or C5) + Math

To Solve Basic Math (3 digit)  
Difficult (3D) < (Int or C5) + Math

To Solve Basic Math (4 digit)  
Formidable (4D) < (Int or C5) + Math

To Solve Basic Math (5 digit)  
Staggering (5D) < (Int or C5) + Math

**Astrogration.** Math is a Mod for Astrogrator tasks.

**Math Speeds Up Calculations.** When Math is used as a Mod in calculation tasks, it radically cuts the time required (by an order of magnitude).

## MEMAWARE

MemAware (Eidetic Awareness Memory) is the native ability to recall in great detail previous experiences through the sense of Awareness.

**Recall.** The individual can recall (in Awareness descriptive terms) specific facts or elements of his experience when prompted by need or by query.

**Descriptive Terms.** The individual can describe the facts (details of description, intensity, field strengths, aspect, and benchmarks) as they were sensed, and as if they were being sensed at the present moment.

**Accuracy.** For the ability to use words to describe the facts, Check Int for each major fact.

## MEMORIZE

Memorize is the native ability to recall in great detail previously acquired information.

**Memorization.** The individual can consciously scan pages of information and repeat it (verbally) as needed. The acquisition of information is automatic and without effort.

**Memory Purge.** Memorized materials disappear from memory over time (as reflected by the increased difficulty of the tasks).

**Memory Retention.** An individual can consciously retain memorized information by consciously recalling specific information (and alerting the Referee).

**Memory Capacity.** The individual's capacity for Memorization is roughly  $10^M$  (M= Memorization) pages.

### To Repeat Memorized Information from the Previous Day

Past Day	Easy (1D)	< (Int or Ins) + Memorize
Past Week	Average (2D)	< (Int or Ins) + Memorize
Past Month	Difficult (3D)	< (Int or Ins) + Memorize
Half Year	Formidable (4D)	< (Int or Ins) + Memorize
Year	Staggering (5D)	< (Int or Ins) + Memorize
Term	Hopeless (6D)	< (Int or Ins) + Memorize
Life Stage	Impossible (7D)	< (Int or Ins) + Memorize
Lifetime	Beyond (8D)	< (Int or Ins) + Memorize

**Memory Failure.** A failed Memory Task can be re-attempted under Immediate Action. If Immediate Action fails, the information is lost.

Memorization may be used in conjunction with MemAware, MemPercept, MemSound, MemSight, and MemScent.

## MEMPERCEPT

MemPercep (Eidetic Perception Memory) is the native ability to recall in great detail previous experiences through the sense of Perception.

**Recall.** The individual can recall (in Perception descriptive terms) specific facts or elements of his experience when prompted by need or by query.

**Descriptive Terms.** The individual can describe the facts (details of description, intensity, field strengths, aspect, and degree of emotion) as they were sensed, and as if they were being sensed at the present moment.

**Accuracy.** For the ability to use words to describe the facts, Check Int for each major fact.

## MEMSCENT

MemScent (Eidetic Scent Memory) is the native ability to recall in great detail previous experiences through the sense of Smell.

**Recall.** The individual can recall (in Smell descriptive terms) specific facts or elements of his experience when prompted by need or by query.

**Descriptive Terms.** The individual can describe the facts (details of description, intensity, odor identity, and benchmarks) as they were sensed, and as if they were being sensed at the present moment.

**Accuracy.** For the ability to use words to describe the facts, Check Int for each major fact.

## MEMSIGHT

MemSight (Eidetic Visual Memory; Photographic Memory) is the native ability to recall in great detail previous experiences through the sense of Vision.

**Recall.** The individual can recall (in Visual descriptive terms) specific facts or elements of his experience when prompted by need or by query.

**Descriptive Terms.** The individual can describe the facts (details of description, intensity, color, and benchmarks) as they were sensed, and as if they were being sensed at the present moment.

**Accuracy.** For the ability to use words to describe the facts, Check Int for each major fact.

## MEMSOUND

MemSound (Eidetic Aural Memory; Phonographic Memory) is the native ability to recall in great detail previous experiences through the sense of Hearing.

**Recall.** The individual can recall (in Awareness descriptive terms) specific facts or elements of his experience when prompted by need or by query.

**Descriptive Terms.** The individual can describe the facts (details of description, intensity, pitch, melody, benchmarks) as they were sensed, and as if they were being

sensed at the present moment.

**Accuracy.** For the ability to use words to describe the facts, Check Int for each major fact.

## MORPH

Morph is the native ability to change the shape, contours, appearance, and coloration of one's body.

Within limits, the individual can change the shape and appearance of his body.

### Appearances

Morph can change skin color and texture to imitate almost any example encountered.

Morph can extrude additional limbs, or enhance existing limbs to mimic examples.

Morph can faithfully mimic existing faces.

### Limits

The total mass of the body cannot change.

Volume cannot change more than plus or minus 10%.

Structures can be formed, but they are non-functional (additional eyes don't actually see, for example).

Fanciful Morph activity is always possible. Morph activity which is faithful to a pattern or model requires access to images, pictures, or examples.

To Morph to an Existing Pattern Faithful at Range= 2  
Average (2D) < Dex + Morph + Art + Craftsman

To Morph to an Existing Pattern Faithful at Range = 1  
Difficult (3D) < Dex + Morph + Art + Craftsman

To Morph to an Existing Pattern Faithful at Range = 0  
Formidable (4D) < Dex + Morph + Art + Craftsman

**Morph in the Natural State.** The natural use of Morph is fanciful: it has cultural or biological imperatives which do not require faithfulness to patterns or originals. It is only as Morph has moved into a wider society that its other uses have become known.

## RAGE

Rage is the native ability to enter a heightened emotional state characterized by increased physical characteristics, and insensitivity to pain and wounds,

**Increased Physical Characteristics.** At the beginning of any Fighting situation, the point value of Rage may be distributed among any of the three physical characteristics C1 C2 C3.

**Combat Effects.** Injuries and wounds in combat reduce Rage points first.

**Stopping Rage.** Rage naturally exhausts itself after C3 Rounds (Minutes), at which point the individual is Tired.

Rage can be stopped with an Intelligence Check or a Sanity Check. If successful, the individual returns to a normal state (and if the duration of the rage has been less than half of C3, there is no other effect; otherwise he is Tired).

### Situations For Rage

Rage can be called into use in situations with an identifiable adversary. Typically, this adversary is an enemy in combat, but it may also be physical barriers, elements of the environment (perhaps the challenge of a violent storm), or elements of society (brutal enforcers, unfair treatment, or social injustice).

## SOUNDMIMIC

SoundMimic is the native ability to recreate or imitate sounds which the individual has previously heard.

**Expression.** The individual has the ability to mimic complex sounds and express them as required.

To Mimic A Sound  
Difficult (3D) < Dexterity + SoundMimic

---

### Skill, Knowledge, and Talent Maximums

Skill-15	as applicable,
Career Knowledge- 6	Skills, Knowledges, and Talents
World Knowledge- 6	may be stacked in Tasks but
Talent-15	not in Checks.

---

# QREBS

Objects vary widely in quality and usefulness. This variation gives seemingly identical objects a variety of positive and negative attributes. The QREBS system details these differences.

Despite the uniformity which mass production techniques impart to their output, individual pieces of equipment can vary widely due to the differences between manufacturers, and the different emphases that they give to design and quality.

## THE QREBS EQUIPMENT EVALUATION SYSTEM

The QREBS (pronounced "krebs") system evaluates pieces of equipment for five essential characteristics:

<b>Q</b>	<b>R</b>	<b>E</b>	<b>B</b>	<b>S</b>
Quality	Reliability	Ease-Of-Use	Burden	Safety
QUA	REL	EOU	BUR	SAF
=2D -2	=Flux	=Flux	=Flux	=Flux
0 to 10	-5 to +5	-5 to +5	-5 to +5	-5 to +5

**Objects.** Any item which is subject to QREBS is called an object (or a device, a piece of equipment, a machine, an item, or an apparatus). QREBS is primarily concerned with devices and machinery, but it can also be used (judiciously omitting some parts of the system) with plants and animals, artwork, even books, drama, or music.

**Multi-Component Objects.** Where several objects are combined into a larger item (for example, components combined to become a groundcar), the proper use of the QREBS system is to treat each major subsystem separately.

## THE QREBS FORMATS

Present values for QREBS in standard format so referees, players, and users can quickly understand them

### Full QREBS

QREBS = 4 -4 -4 +4 0

Write the individual values (preceded by + / -).  
Notice that the first digit Q Quality has no sign.

### Individual QREBS Values

qreBs = - 4 Capitalize the appropriate value.  
Burden = - 4 Write out the value as a word.  
BUR = - 4 Use the abbreviation.  
B = - 4 Write the value as a letter.

Use Equal to avoid confusing a minus with a hyphen.  
(B = - 4 rather than B - 4; B = +1 rather than B +4).

The essential rule for QREBS values is: state the value in an unambiguous way to ensure easy comprehension.

## THE STANDARD OR EXPECTED VALUE IS... 0

The most common roll for any of the QREBS values is zero (or 5 for Quality). If values have not been created or calculated, the standard values apply.

The presence of standard or expected values makes the entire system optional, or applicable piecemeal.

## THE FIVE QREBS VALUES

QREBS values (except for Quality) are Flux values from - 5 to +5. Quality is a number (2D-2) from 0 to 10. Low or negative values are poor or bad; high or positive values are good (Burden is an exception; low Burden is better).

**Quality** is an overall measure of workmanship.

**Reliability** is compared to Flux for mishaps.

**Ease of Use** is a Mod on tasks using an object.

**Burden** is a Mod on the felt weight of an object.

**Safety** is compared to Flux for Dangerous and Destructive Mishaps.

## Q QUALITY

Quality is a measure of the consistency of workmanship, merit, value, or worth of an object. It directly reflects the time period between reliability downgrades.

**Determining Quality.** Quality may be pre-specified for an object; if not, it is generated with 2D-2.

**Quality Mod.** The Quality Mod (= Q minus 5) is a Flux equivalent to Quality and a Mod when using the object.

Quality Gives Period directly on the Quality table. For example, Vacc Suit Q= 5 is an average Quality item of equipment. A Jump Drive Reciprocator Q= 9 is Better Than Most.

**"A" Quality.** The top value in ordinary situations for a QREBS object is 10. Expressing 10 in Ehex, top Quality objects are A Quality. (Even higher quality levels are possible).

## **P** Period (defined by Quality)

Period is the elapsed active non-storage time between Reliability downgrades.

**Period= Quality.**

As each Period ends, reduce Reliability by 1.

For example, a Vacc Suit Q= 5 is an average Quality object: Q = 5 translates to Six Month Periods and it degrades one level of Reliability every six months when in use. A Jump Drive Reciprocator Q= 9 is Better Than Most; Q= 9 translates to Four Year Periods. It degrades one level of Reliability every four years when in use; on the other hand, if the Jump Drive Reciprocator is in original packaging on the shelf, it probably does not degrade.

## **R** Reliability

Reliability measures the dependability of an object.

**Reliability = Flux. Or as specified otherwise.**

**Reliability Degradation.** Reliability degrades at a rate determined by the Quality of the equipment. Quality indicates Period (usually the number of years between reliability down-grades). Reduce reliability by -1 at the end of each Period.

Reliability is independent of Quality.

An object can be Low Reliability and High Quality. For example, a Jump Drive Reciprocator Q= 9 and R= - 2 is Somewhat Unreliable, BUT Q= 9 states that its Reliability will not get any worse for at least four years.

An object can be High Reliability and Low Quality. A Vacc Suit Q= 3 R=+3 is Lesser Quality and Reliable. In any specific use, the Vacc Suit can be depended on to function properly, but it needs to be checked

**Staving Off Reliability Downgrades.** When (or before) an object reaches Reliability Downgrade, a competent technician can perform an IROAN (Inspect and Repair Only As Necessary).

To IROAN (1D Hours)

Average (2D) < Char + Skill + Quality Mod + Mod

Uncertain 1D if Skill < 6

Success forestalls the Reliability Downgrade.

For example, Eneri Dinsha is comfortable with his Vacc Suit QREBS= 3 +3 +3 +3 +3. The suit is of Lesser Quality, but Reliable, Easy to Use, Easy to Wear, and Safe to Use. Since he likes it and is comfortable with it, and since he cannot afford better at the moment, he takes steps to keep it in good repair: Every week he has it IROAN checked by a Vacc Suit-6 technician.

**No Downgrades in Quality Storage.** Objects in proper storage (temperature controlled, good packaging, no energy cells installed) have Reliability Downgrades suspended.

### **Using Reliability**

Reliability is the probability that an object will fail. When circumstances (The Scene Roll) indicate a Potential Bad

Scene, an object has potential for failure if Reliability is less than or equal to Flux.

### **Why Is It Unreliable?**

Equipment may be less reliable due to wear, age deterioration, poor engineering, or poor craftsmanship.

## **E** Ease of Use

Ease of Use measures the facility with which a piece of equipment can be put into operation.

**Ease of Use = Flux. Or as specified otherwise.**

For example, a Communicator with EOU= +5 is easily activated with the touch of a single button. An Inertial Navigator with EOU= -5 requires careful calibration before [each] use and displays position as a series of hard-to-read 8-digit numbers.

**Large Equipment:** Ease of Use governs individual systems and their controls rather than a craft or vehicle or assembly as a whole.

### **Using Ease Of Use**

Ease of Use is a Mod on object use tasks.

### **Why Is It Hard To Use?**

Low Ease of Use may happen for several reasons.

**Bad Ergonomics.** The object may have been designed by engineers who have not clearly considered ultimate users and usage.

**Cheap.** Standard (but ill-suited) components may have been used to reduce cost.

**Proprietary Technology.** Special training (from the manufacturer or reseller) is required in order to achieve full potential (and the training provides the manufacturer with an additional income stream).

## **B** Burden (or Bulk)

Burden measures the difficulty of carrying or transporting using a piece of equipment. It expresses ergonomic fitness for transport or manipulation. Alternatively, it measures the bulk or unwieldiness of an object.

**Burden = Flux. Or as specified otherwise.**

Note that the sign on Burden runs opposite to the signs on the other elements of QREBS: minus is good and plus is bad. Negative Burden reduces felt weight or mass, and positive Burden increases felt weight or mass and becomes more burdensome.

For example, a Pistol Burden= - 5 feels light in the hand and is barely noticeable in its holster. A Revolver Burden= +5 feels bulky, awkward, and unbalanced. It fits poorly in the holster, drags the belt down, and just feels awkward.

### **Using Burden**

Burden is the reduction in the perceived Load for a character (not to exceed its actual weight or mass). An ACR Advanced Combat Rifle-10 weighs 2.8 kilograms. A model with

AN OBJECT IN USE	Q	R	E	B	S
Assumed	Quality 5	Reliability 0	Ease-Of-Use 0	Burden 0	Safety 0
Inspected	Q+Flux	R+Flux	E+Flux	B+Flux	S+Flux
In Use (after one day)	Q ± 1	Assumed	E ± 1	B ± 1	Assumed
In Use (after first mishap)		R ± 1			S ± 1

**Assumed:** With no other information, a user assumes the values shown.

**Inspected:** After its first experienced mishap, reveal the true value within one point.

**In Use:** Any user soon comes to understand at least some of the QREBS values for an object through the process of using it.

**Quality** is easily identified. A user knows this value within one point after a day of use.

**Reliability** is not easily determined. Assume a value of zero. If inspected, assume that value. After its first experienced mishap, reveal the true value within one point.

**Ease Of Use** is easily identified. User knows this value within one point after about a day.

**Burden** is easily identified. A user knows this value within one point after a day of use.

**Safety** is not easily determined. Assume a value of zero. If inspected, assume that value. After its first experienced mishap, reveal the true value within one point.

**± (Within One Point):** Roll Flux: if Zero, then the true value is known. If a positive value, reveal the true value plus 1; if a negative value, reveal the true value minus 1.

BUR= -4 reduces that felt weight by -4 kilograms (effectively cancelling its Burden on the character).

### Why Is It Bulky?

An object may have poor Bulk for several reasons.

**Lack Of Design.** The designers may not have clearly understood the interaction of the user and the object.

**Unwieldy.** The object has no natural features for grasping, or such features may be uncomfortable or even painful.

**Unbalanced.** The object is not well balanced.

### Why Is It Easier To Carry?

Objects with a low Burden are easier to carry.

**Handles.** An attached handle makes it easier to carry this object.

**Straps.** A strap or shoulder sling allows the object to be carried in a slung position without using the hands or manipulators.

**Packs.** A pouch or bag with straps allows several different objects to be carried without using the hands or manipulators.

**Ergonomic.** Some objects are naturally (or deliberately) configured so that they are easy to carry or manipulate.

## S Safety

Safety measures the inherent safety or danger presented by an object when in use.

Safety expresses the possibility, even probability, that the use of a piece of equipment will inflict pain, injury, or even death.

**Safety = Flux. Or as specified otherwise.**

For example, a Respirator Safety= - 5 lacks a battery reserve and has no low energy warning; its compressor can catastrophically fail and send metal shavings into the user's face. A Filter Mask with Safety= +5 is constructed so replacement filters can only be inserted correctly. With Ease-of-Use +5, they can be inserted while the Filter Mask is in use.

### Using Safety

Safety is the roll which determines if a mishap is dangerous or destructive. If Safety is equal or less than Flux, then the mishap injures the operator. On a separate roll, if Safety is equal or less than Flux, then the mishap damages or destroys the object.

### Why is It Unsafe?

There are many reasons why an item may be unsafe.

**Lack of Safety Features.** The item is poorly designed in terms of safety and lacks safety features, guards on moving parts, and fail-safe mechanisms.

**Inherently Hazardous.** The item is inherently unsafe because it is intended to produce hazardous consequences: knives, cutters, poisons, explosives.

## EVALUATING OBJECTS

The QREBS values for an object are initially unknown (and assumed to be QREBS = 5 0 0 0 0).

### Inspecting An Object

A skilled individual can check an object: it takes about an hour to carefully look it over, test its operation, disassemble and reassemble it looking for flaws or problems. The inspector must have a skill related to the object.

In the inspection process, the referee rolls Flux for each of the QREBS values. For each QREBS value,

Roll Flux plus the QREBS value.

An as-inspected QREBS for the object is then created, randomly substituting one correct value for each level of inspector skill (to a maximum of 4). The referee (through the inspector) reveals this final value.

### Company or Corporate Reputation

The Master Mods Table identifies a variety of companies and an expected or recommended Mod for each QREBS value when creating QREBS for one of their products.

## AN ADVENTURE ON ZEYCUDE

Eneri Dinsha 777777 needs a new respirator. He checks at the Starport market and finds a good looking one, buys it and throws it in his pack for the day when he will need it.

The Referee quietly rolls QREBS for the item.

Q= 5. R= - 2. E= +2. B= - 1. S= - 1

Several weeks later, he arrives at Zeycude C330698-9 and Atm-3 means he needs a Respirator. He digs in his pack and gets his new one out.

**Mishaps.** The Referee has privately determined today is a Potential Bad Day. He has also privately rolled for this Respirator: Flux= 0; Reliability -2 is less than Flux=0 and the Respirator will fail today. He further rolls 1D = 5 = a failure in 5 hours.

**Ease of Use.** The first thing he notices is that it so easy to put on and adjust. EOU= +2.

**Burden.** The second thing he notices is that it feels pleasantly light. BUR = -1.

Because Reliability is less than 1, there is no warning of the impending mishap. Five hours later, Eneri has left his vehicle and is walking toward a maintenance shop. He's two minutes away from a doorway and the respirator stops working. Eneri feels the mechanism lock up.

Atm-3 inflicts Suff-2 every minute. For the first minute, he Checks Int and Edu, even as he realizes that he has a problem and dashes to the doorway. For the second minute, he again Checks Int and Edu.

He just makes it, and collapses inside the airlock door.

He rolls Flux against Safety for Dangerous (= +4 = no effect). He rolls Flux against Safety again for Damage (= - 3

= Damaged) and finds that his Respirator has basically shut down with a bearing failure.

He needs a new Respirator. He notices some fine print on the tag that he can return this one (postpaid) for a refund or replacement.

## MODEL NUMBERS

Many manufactured devices have model numbers or serial numbers: seemingly endless strings of characters and digits which identify specific devices. When appropriate, the referee may choose to apply identifying numbers which indicate the QREBS values for devices (which can then be puzzled out by a character with appropriate skill).

**Encoding.** Positive QREBS values are shown as positive numerics. Negative values use alphabetics A B C D X.

For example, Device Model 1435A encodes Q= 1, R= +4, E= +3, B= +5, and S= - 1.

**Unencoded Devices.** Hand crafted devices (swords, cross bows, wagons), one-of-a-kind items (works of art, custom made replacement parts), experimental or prototype devices rarely carry model numbers.

**Unintelligible or Misleading Markings.** Some devices may be marked in foreign or non-standard symbol systems; some devices may carry several distinct digit strings (a model number, a serial number, a product code, a batch control code, and a reorder identifier), only one of which accurately reflects its QREBS.

**Decoding the Information.** Regardless of whether a **player** understands that markings on a device may reflect its QREBS, a **character** is able to decode the information through an appropriate process (probably using Trader or Intelligence or Education).

## WHY USE QREBS?

The most common roll for any QREBS value is 0 (or 5 for Quality). This neutral QREBS value adds nothing or takes away nothing. The purpose of QREBS is:

**To add variation to otherwise standard objects.** When the adventurers visit a store, they can buy communicators. QREBS allows the store to offer a range of products instead of a single model.

**To add variation to otherwise standard adventures.** Devices have the potential of breaking down; new found treasures can turn out to be junk. Some acquisitions can prove to be especially reliable or useful.

## Do I Have To Use This Every Day?

Although players will certainly pursue devices and objects that are high quality, the primary beneficiary of QREBS is the referee.

QREBS is the mechanism that justifies special situations and special circumstances in the course of ordinary adventures. Without a rules basis, it is difficult for a referee to impose (and for players to accept) the sudden breakdown of equipment, or the failure of a weapon at a crucial time. Under the QREBS regime, the catalog of equipment is vastly larger and filled with goods from the very good to the very bad.

**The Scene Roll (QREBS Chart-3).** The Scene Roll determines if QREBS becomes important. If the Scene Roll is 0 or greater, then the referee and the players can more-or-less ignore QREBS for the current scene.

On the other hand, if the Scene Roll goes bad, the referee is alerted that QREBS will be important during the current situation.



# QREBS

# Q1 Equipment Evaluation

## THE QREBS EQUIPMENT EVALUATION SYSTEM

Individual items can vary widely due to the differences between manufacturers, and the different emphases they give to design and quality. The QREBS (pronounced "krebs") system evaluates items for five essential characteristics: Quality, Reliability, Ease Of Use, Bulk (or Burden) and Safety.

**Objects.** An item subject to QREBS is called an object: it may be a device, a piece of equipment, a machine, an item, or an apparatus. While QREBS is primarily concerned with devices and machinery, it can also apply to (judiciously omitting some parts of the system) plants and animals, artwork, even books, drama, or music.

**Multi-Component Objects.** Where several objects are combined into a larger item (for example, the components of a groundcar), the proper use of the QREBS system is to treat each major subsystem separately (motor, steering, brakes, comfort systems, and others).

### Q QUALITY (AND PERIOD)

2D-2	Description	Mod	Period
	Garbage	-6 or less	Non-functioning
0	Very bad	- 5	Minutes
1	Bad	- 4	Hours
2	Poor	- 3	Days
3	Lesser	- 2	Weeks
4	Below average	- 1	Months
5	Average	0	Six Months
6	Better than some	+1	One Year
7	Better than many	+2	Two Years
8	Very good	+3	Three Years
9	Better than most	+4	Four Years
10	A Excellent	+5	Ten Years
11	B Superb	+6	Twenty Years
12	C Masterpiece	+7	Centuries

**Q Quality** is a measure of the workmanship of an object. It directly reflects the Period between reliability downgrades. Quality= 2D-2. Or as specified otherwise.

Quality Mod= Q minus 5. (= Quality converted to Flux for use as a Mod).

When an Object fails, reduce its Quality by -1.

**P Period** is the time between Reliability downgrades. As each Period ends, reduce object Reliability by -1. For example, an Average quality object with a Period of One Year is reduced in Reliability -1 every Year.

When an Object fails, reduce its Period -1 (= more likely to fail again).

Period may be suspended when the object is in storage or non-use under circumstances which do not promote wear or degrade.

### R RELIABILITY

Description
- 5 Very unreliable
- 4 More unreliable
- 3 Unreliable
- 2 Somewhat unreliable
- 1 Slightly unreliable
0 Reliability neutral
+1 Better than some
+2 Better than many
+3 Reliable
+4 More reliable
+5 Very reliable

**Reliability** is the dependability of an object.

Reliability = Flux.

Reliability degrades -1 per Period.

Reliable / Unreliable

### E EASE OF USE

Description
- 5 Very difficult to use
- 4 More difficult to use
- 3 Hard to use
- 2 Somewhat hard to use
- 1 Slightly difficult to use
0 Ease of use neutral
+1 Better than some
+2 Better than many
+3 Easy to use
+4 Easier to use
+5 Very easy to use

**Ease of Use** is the facility (Mod) for operation of an item.

Ease of Use = Flux

**Large Items.** EOU refers to individual items rather than to the craft, vehicle, or assembly as a whole.

Easy To Use /Hard To Use

### B BULK / BURDEN

Description
- 5 Very easy-to-carry
- 4 Easier to carry
- 3 Easy to carry
- 2 Better than many
- 1 Better than some
0 Burden neutral
+1 Slightly unergonomic
+2 Unwieldy
+3 Hard to carry
+4 More burdensome
+5 Very burdensome

**Burden** is the apparent or felt weight of an object.

Burden = Flux.

**Ergonomics.** Burden addresses the ergonomics of an object.

Bulky / Compact

### S SAFETY

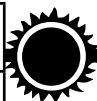
Description
-5 Very hazardous
-4 More hazardous
-3 Hazardous
-2 Somewhat hazardous
-1 Slightly hazardous
0 Safety neutral
+1 Better than some
+2 Better than many
+3 Safe to use
+4 Safer to use
+5 Very safe

**Safety** is the inherent danger presented by an object when in use.

Safety = Flux.

Compare Safety to Flux in Dangerous mishaps.

Safe / Hazardous



# Implementing QREBS Q2

## IMPLEMENTING QREBS

Any object can be evaluated for QREBS using the simple procedure provided here.

**MOARN.** There is no need to determine QREBS for every object. Evaluate objects only as really necessary.

## CALCULATING QREBS

<b>Q</b>	<b>R</b>	<b>E</b>	<b>B</b>	<b>S</b>	<b>Wa</b>	<b>P</b>
Quality QUA	Reliability REL	Ease-Of-Use EOU	Burden BUR	Safety SAF	Working Age	Period
=2D -2	=Flux	= Flux	= Flux	=Flux	= Good Flux	= Quality
adjust						
R= R- Wa/P						

- Quality = 2D-2.** Usually ranges from 10 Excellent to 0 Very Bad.
- Reliability = Flux.** Provides the value for a New object. Ranges from +5 Very Reliable to -5 Very Unreliable.
- Ease Of Use = Flux.** Ranges from +5 Very easy to use to -5 Very difficult to use.
- Bulk/Burden = Flux.** Ranges from +5 very burdensome to -5. Very easy to carry
- Safety = Flux.** Ranges from +5 Very safe to -5 very hazardous.
- Period = Quality.** Determine the units of time from the Quality Table.
- Working Age= Good Flux (in Periods).**
- True Age = from Table.**
- Adjust Reliability** (= minus subtract Working Age divided by Period; drop fractions).

## AGING WITH QREBS

QREBS allows an evaluation based on age.

### New Objects

New objects have QREBS values without adjustment.

For example, a new Communicator Q=5 Period= 5 (= Six Months) R= 0 is Reliability Neutral when New. After six months in use, it falls to Reliability= -1, after another six months, it falls to Reliability= -2.

### Older Objects

Used, older, or antique objects have both a True Age (or Chronological Age) and a Working Age.

**True Age** is years since the object was created or manufactured. It is determined from the True Age Table.

**Working Age** is the number of years the object has been in use. Since use wears an object out, Working Age is the important value in determining Quality and Reliability.

### Working Age

Working Age = Good Flux (in Periods)

TRUE AGE					Experi-
Flux	Current	Antique	Artifact	Surplus	mental
- 5	50	400	RR	100	20
- 4	35	300	1300	90	10
- 3	25	250	1200	80	9
- 2	21	210	1100	70	8
- 1	18	180	1000	60	7
0	15	150	900	50	6
+1	12	120	800	40	5
+2	9	100	700	30	4
+3	6	80	600	20	3
+4	3	60	500	10	2
+5	new	50	400	new	1

Values are Years before the present date. Determine the current date and subtract the value on this table.

RR= Reroll and add 1000.

**True Age.** This table provides the True Age of the object.

**Storage.** The Object has been in Storage (was not used, did not degrade in Quality) for the period between Working Age and True Age. A Communicator with True Age = 100 Years and Working Age = 1 year has been in Storage for 99 years: it is Like New.

## AGING THE OBJECT

**Create QREBS.** Determine its Working Age (= Good Flux in Periods). Reduce Reliability by Working Age in Periods. .

For example, Eneri Dinsha has acquired a Jump Drive Diagnosticator QREBS= 5 0 0 0 0. Period= 5 = 6 Months. Working Age = Good Flux times Period = +2 x 6 months = 1 Year. True Age (from Table) = Flux = -3 = 25 Years.

This device was manufactured 25 years ago, but has only been used for a year. Reduce Reliability Minus Working Age in Periods (=2), downgrading Reliability to -2.

This Jump Drive Diagnosticator QREBS = 5 -2 0 0 0 is unremarkable except it has a -2 Reliability Mod.





# Q3 Potential Disaster

## POTENTIAL DISASTER

There is always some potential for objects to fail, for mechanisms to malfunction, and generally for things to go wrong. More than that, there is the chance that people will be pushed into hasty or unreasonable actions, or tempers will flare.

### The Scene Roll

A Scene is a major situation or environment location.

When characters change to a different major location, a new Scene begins. Leaving the starport is a Scene Change. When environment changes (when entering new terrain), the Scene changes. When the group comes under attack, the Scene changes. At the beginning of a Scene, the referee (privately) makes the Scene Roll.

## Scene = Flux + Mods

Ignore results zero or greater.

### Potential Bad Scene

Every new scene is a Potential Bad Scene.

### Scene Mods

The Scene Roll is affected by a variety of Mods based on Ergonomics, Environment, and Situation.

**Ergonomics** reflects the usability of the controls of a ship. Ship-based Scene Rolls receive the Ship Ergonomics Mod. When a Scene involves a major item of equipment, its QREBS Ease Of Use is an Ergonomic Mod.

**Environmental Factors** reflect the differences between normal habitable conditions and unusual or extreme conditions. Extremes of temperature, pressure, weather, or atmosphere produce Environmental Mods. Changing local terrain type produces an Environmental Mod.

**Situational Factors** reflect the many unforeseen effects of new encounters: Surprise and Confusion produce negative Mods. On the other hand, Preparation and Planning produce positive Mods.

### Ignoring The Scene Roll

If the Modified Scene Roll is 0 or greater, the Scene proceeds normally. Noting unusual will happen (at least nothing unusually caused by the Scene Roll). But since the Scene Roll is private, the participating characters remain unaware of the result.

### The Scene Roll Goes Bad

If the Modified Scene Roll is less than Zero, the characters begin a Bad Scene. There is a potential of Mishaps through the Scene (and perhaps into later Scenes).

**Bad Scene Situations.** When a significant piece of equipment is brought into use for the first time in a Bad Scene, roll for its Potential Failure.

Potential Failure if Reliability <= Flux

If the equipment passes this test, it performs properly throughout the day. If it fails this test, roll 1D, which is the next use in which it fails. If the item is in continuous use, the result is the hour in which it fails.

**Warning Signs of Failure.** When a device starts to fail while in operation, it will emit warning signals (telltale warning lights, squeaks, smoke, dust, shavings, vibrations) for Reliability (in half-hours) before failure.

**Over Until Tomorrow.** Once it has been determined that a device will fail, the event is foreordained. If the failure doesn't happen during the current day, it will happen in immediate future use.

### Dangerous and Destructive Mishaps

When the mishap occurs, determine if it is dangerous or destructive or both. Roll Flux twice.

Dangerous Mishap if Safety <= Flux  
A dangerous mishap may injure the user/operator.

Destructive Mishap if Safety <= Flux  
A destructive mishap may destroy parts of the device.

### The Rolls for Daily Ship Life

Tension = Flux + Mods > Less Than 0 = Check San  
Event = Flux + Mods > Less Than Zero = Mishap

# Personals

Characters routinely meet non-player characters and engage them for enjoyment, to gather information, to persuade them to do something (or to not do something), and even to command them to do something (or not do something).

Many Personals are automatic (following the general rule: if the situation is trivial or unremarkable, there is no need to resolve or role-play it). When a non-trivial Personal arises, the player must decide the process and state it for resolution.

**Why Not Just Role-Play?** Personal situations are the essence of social interaction and they are perfectly suited for role-playing. The Personal system gives structure to the role-playing situation. Without a structure which gives options to the character, role-playing becomes an interaction between the personality of the player and the personality of the referee.

**The Personal Situation.** Personals are governed by laws of behavior. Rarely can a character simply walk up to another and ask detailed questions and expect detailed answers, or give orders and expect them to be obeyed. When a character encounters and interacts with a non-player character, results are based on the encounter purpose, its goal, and strategies that help accomplish that goal.

**How This Works.** A Personal allows a character to interact realistically with a non-player character. It proceeds through several escalating steps based on the intentions of the character (the Actor) and the responses of the non-player character (the Target).

---

## RESOLVING THE PERSONAL

Purpose \_\_\_\_\_ D  
Strategy \_\_\_\_\_  
Tactic \_\_\_\_\_ x  
Laws \_\_\_\_\_  
Mod1 \_\_\_\_\_  
Mod2 \_\_\_\_\_  
Target No=

**Select A Purpose.** Purpose determines the number of Dice to be rolled.

**Select A Strategy.** Strategy proves a Base Point Value.

**Select A Tactic to implement the Strategy.** Some Tactics are inappropriate.

**Apply the best applicable Law** to create a Mod.

**Apply up to TWO Mods**, as available. Some Mods are required.

**Roll the Dice** specified by **Purpose** against the **Target Number**.

---

The values create the Target Number; the dice are rolled, compared and success of the Personal is determined. Failure terminates the Personal (subject to Please Reconsider). Success allows the Personal to continue with a new interaction.

## THE ELEMENTS OF THE PERSONAL

A Personal Interaction (for short, a Personal) consists of a Goal, Participants, a Purpose, and supporting Strategies, Tactics, and Mods. The entire sequence of a Personal from start to finish is called an Interaction.

### The Goal

Every Personal has a **Goal**: a statement of the desired (or just hoped for) results.

Goals are usually stated as a phrase or a sentence, and are subject to approval by the Referee.

### The Participants

Participants are Actor and Target. The **Actor** is one (or more) characters; typically a Player Character.

The **Target** is one or more characters: the object of the Actor's activity. Targets are role-played by the referee.

### The Purpose

A Purpose is an Objective within a Personal.

There are four general categories of Purposes:

Carouse, Query, Persuade, and Command.

## Strategies and Tactics

Players implement their Purpose with a Strategy. The Player selects a strategy and determines its value. The Actor determines the Strategy value based as points from the Strategy table.

Actors support their Strategies with Tactics. The Player selects a Tactic and determines its value. Tactics are typically multipliers applied to Strategies.

## THE FOUR TYPES OF PERSONAL

There are four general types of Personal: Carouse, Query, Persuade, and Command.

Personals have escalating difficulties: Carouse 1D, Query 2D, Persuade 3D, and Command 4D.

### Check <Personal>

Check Personal is resolved by noting the purpose of the Personal, the Strategy selected, the Tactic used, and the appropriate Laws and Mods to calculate the Target Number. Roll the appropriate number of dice: if the result is equal to or less than the Target Number, the check succeeds. Otherwise, it fails.

### Carouse (Difficulty= 1D)

Carouse is a general enjoyable social activity, paraphrased as "Let's Have A Good Time!" The Actor and Target interact socially, getting to know each other better. Neither asks anything of the other or makes any demands of the other.

Carouse has a social purpose. When successful, the participants establish a foundation of acquaintance and familiarity which allows later attempts at Query or Persuade. For example, businessmen have dinner together to get acquainted before they start negotiating a deal. A salesman may take a client to an athletic event before a later meeting presenting their line of products.

The casual friendship created by Carousing is expressed as Mod +1 per successful Carouse (to a reasonable maximum of 6).

### Query (Difficulty= 2D)

Query is devoted to obtaining information or performance of a discretionary duty, paraphrased as "Tell Me About X." The Actor asks the Target some question. Often, the Target already has a responsibility to provide simple answers, and Query is devoted to obtaining additional information, elaborating, or assistance.

Query is an information gathering activity. That information may be a goal in itself, or it may be helpful in determining what specific actions will later be requested.

Functionaries often decide whether to help a customer based on their reactions to their requests. Query is the method of asking for their help.

### Persuade (Difficulty= 3D)

Persuade is devoted to obtaining decisions which the Target is free to make, paraphrased as "You Should Do X." Its goal is to make the object decide to do something (or to decide to not do something). It implies that the Target will use some rationale (usually provided by the Actor) to make that decision.

Persuade is an attempt to convince. Some action by the Target is necessary, and Persuade is the Actor's attempt to make that happen. An example of Persuasion is coercion.

### Command (Difficulty= 4D)

Commands are not easily given. Individuals may be persuaded to do things, but rarely do they obey commands

without a social structure to back them up, paraphrased as "I Require You To Do X." Its goal is a specific action (or inaction) by the Target. It depends on external social structures or social dominance to bring about obedience.

Command is an order-giving activity. Authority figures (for example, police officers) can give commands; organizational superiors (for example, those with a higher rank in a company or military unit) can give commands.

## THE FIVE LAWS OF PERSONAL INTERACTION

Personals are governed by the Five Laws: a series of statements detailing how social interaction operates.

**Law 1. Similarity.** Similar people cooperate.

**Law 2. Superiority.** Superiors give commands.

**Law 3. Inferiority.** Inferiors use politeness and flattery.

**Law 4. Comfort.** Comfort promotes cooperation.

**Law 5. Violence.** Violence compels obedience.

The Five Laws are universal: they apply across many different cultures. For example, there is no culture in which inferiors bark commands at superiors. When a traveller encounters a society in which this occurs, then there are cultural forces at work which explain it. Perhaps, barking orders is perceived culturally as behavior for inferiors. In practice, those "orders" are obeyed only when a superior actually wants to.

The triggers for the Laws are binary: a character is Similar, or not; Superior, or not; Inferior, or not.

If the character can point out (to the Referee) facts supporting the Law, it allows a Mod based on the Five Laws.

### The Laws of Similarity

Social interaction is enhanced when the speaker has common links with the listener. When the Actor can establish common interests, a Strategy can provide provide Mods.

Similarity (and common interests) is established by obvious observable facts (a uniform; an obvious career, an interesting insignia on a shirt).

For example, a non-player character may wear a shirt with an Imperial Army logo: an Army veteran can use that fact to establish similarity. Or, in the course of Carousing, a character may learn facts which support similarity.

Similarities, include: common skills, knowledges, careers, life pursuits, or homeworlds.

### The Law of Superiority

Superiors have the charisma to support Query, Persuade, or Command. When the Actor can establish superiority, it provides positive Mods. For example, superiority in Rank, in an appropriate Characteristic, or even being armed.

### The Law of Inferiority

Inferiors support Query or Persuade by appealing to Superiors. When an Actor can establish Inferiority, it provides Positive Mods. If Inferiority is used in an Interaction, the Actor cannot subsequently use Similarity or Superiority. For example, inferiority in Rank, or in an appropriate Characteristic.

**The Law of Comfort**

Personals become easier as the level of comfort rises. Providing Comfort typically involves hospitality: buying meals, picking up the check at dinner, providing a ride to a destination, providing a small helpful part, or bit of advice.

When the Actor can establish Comfort, it provides positive Mods. For example, after casually meeting the Target, he offers a ride to the hotel, or he buys a shared meal.

**The Law of Violence**

Personals backed by violence have a greater risk of violence in response. The use of Insult or Pain as a tactic makes the Personal Violent (or Threat of Violence). The Actor may use Fighter skill (or any subordinate Knowledge) as a Mod. If the Violent Personal fails, the interaction ends and become a Fight.

**DISTANCE**

Personals take place at a distance which allows for conversation, typically Vshort or Talking. A meaningful Personal cannot be accomplished at a distance greater than Vshort.

**By Communicator.** Personals can be attempted by Communicator, subject to a Mod -4.

**STATING A PERSONAL**

The components are simple words or phrases which convey the process. Because this is an on-going role-playing situation, there is no need to repeat the data sought, or the identity of the clerk. The Personal tells the referee enough information to resolve the situation.

**Talking To The Clerk**

The ship needs a replacement part for the J-Drive. Engineer Gustav Windhoek knows exactly what the part is, but for some reason the drive logs don't reflect the proper part number. He goes across the tarmac to the parts window. There's a sign posted: "Closed For Inventory. Come Back Tomorrow."

Gustav needs a successful Query which means he will roll 2D.

He selects Appeal To (=4), Politeness (=x2), and Simi-

**MODS FOR PERSONALS**

By Communicator. Voice.	- 4
By Communicator. Voice + Visual	- 2
Brazen (Query or Persuade)	+3
Bluff (once)	Flux
Urgent (only once)	+2
Subsequent Use of Strategies, per	- 1
Subsequent Use of Tactics, per	- 1
Deliberate	(allows a third mod)
Threat of Violence	= +Fighter Skill
(failure converts the personal into a fight).	

larity (=+1). He taps on the glass to get the clerk's attention, and then says, "Excuse me? I know you're busy. This will just take a minute. I'm stuck on a part number; the Main Office told me you could help." There are no obvious Mods.

He must roll (4 x2 +1=) 9 on 2D.

The Referee secretly rolls and then

Provides a part number, or

Indicates that the clerk says, "Go away!" or

Indicates that the clerk says, "Console's down; nothing I can do today."

Or,

He selects Force Of Will (=5), Authority (x2), and Superiority (=+1). He bangs on the parts window and says in a firm voice, "Your logs are telling my ship the wrong part number; I need the right one."

He must roll (5 x2 +1=) 10 on 2D.

The Referee secretly rolls and then provides a part number. Did the clerk give him the right one?

The Clerk asks, "OK. What do you need?"

"My Drive Reciprocator comes in three alternate variations, and I can't find the identifier for the one I have. Check Query (=9) Gustav rolls 11. "Whoa! That's way beyond me. You need to talk to the Lieutenant. Over there."

Notice that the clerk's non-co-operation does not need to be violent, or impolite; he just can't help.

**QUICK PERSONALS**

For fast resolution of personal situations, assign (or roll) 2D base personal values for a non-player character and keep them behind the screen:

				Mods				
				Create	Check	1 Similarity	2 Superiority	3 Inferiority
Carouse	2D	1D		+1			+2	
Query	2D	2D		+1	+1	+1	+1	+1
Persuade	2D	3D		+1	+2	+2*	+1	+2
Command	2D	4D			+3			+3

The player, when interacting with the NPC Checks the appropriate <Personal> for the required result.

It begins as a minor situation  
 Gustav needs a part number because his computer logs are corrupted. He need to talk to a parts clerk at the local Navy Base. The referee creates the personals for the clerk (Carouse, Query, Persuade, Command) with 2D each: 7777 and keeps the values behind the screen.  
 Gustav makes a call to the parts resupply department and asks for some help. Gustav asks (with suitably more words), "Can you help me?" Check Query (=7 on 2D), mod +4 for communicator link.  
 Gustav rolls 2+4=6. The clerk finds and gives him the number he needs.  
 or,  
 Gustav rolls 7+4=11. The clerk says "We don't have the data base here. Sorry."



**PERSONAL INTERACTIONS**

Purpose	Strategy		Tactic														
			Interests	Enemies	Logic	Authority	Morality	Culture	Emotion	Indebted	Payment	Begging	Politeness	Flattery	Referral	Familiarity	Insult
<b>1D</b> Carouse	Casual	1	+3	+2		no					no	no	x2	x2	x2	no	- 8
	Enjoyment	2									no		x2	x2	x2	no	- 6
	Discussion	3			x2	x2	x2	x2	x2					x2	x2	no	- 6
	Active Listen	4															- 6
	Appeal To	5			x2		x2	x2	x2		x2	x2	x2				+4*
<b>2D</b> Query	Enjoyment	1	+2	+1							no		x2	x2	x2	no	- 6
	Discussion	2			x2	x2	x2	x2	x2					x2	x2	no	- 6
	Active Listen	3															- 6
	Appeal To	4			x2		x2	x2	x2		x2	x2	x2				+4*
	Force of Will	5			x2	x2	x2	x2	x2		no					x2	+6*
<b>3D</b> Persuade	Discussion	1	+1		x2	x2	x2	x2	x2					x2	x2	no	- 6
	Active Listen	2															- 6
	Appeal To	3			x2		x2	x2	x2		x2	x2	x2				+4*
	Force of Will	4			x2	x2	x2	x2	x2		no					x2	+6*
	Charming	5		x3		x2	x2	x2	x2	x2		x2	x2	x2			- 4*
<b>4D</b> Command	Active Listen	1															- 6
	Appeal To	2			x2		x2	x2	x2		x2	x2	x2				+4*
	Force of Will	3			x2	x2	x2	x2	x2		no					x2	+6*
	Charming	4		x3		x2	x2	x2	x2	x2		x2	x2				- 4*
	Angry	5		x3	x2	x2	x2	x2	x2	x2						x2	+6*

THE FIVE LAWS	Carouse	Query	Persuade	Command	
1 Similarity	+1	+1	+1		The <b>Five Laws</b> are a series of statements governing Personals.
2 Superiority	+1	+1	+2	+3	<b>Similarity.</b> Similar people cooperate.
3 Inferiority	+1	+1	+2*		<b>Superiority.</b> Superiors command.
4 Comfort	+2	+1	+1		<b>Inferiority.</b> Inferiors use politeness, flattery, and begging.
5 Violence		+1	+2	+3	<b>Comfort.</b> Comfort helps cooperation.
					<b>Violence.</b> Force and threats of force compel obedience.

\*if Begging, Flattery, or Politeness.

**RESOLVING THE PERSONAL (EXAMPLE)**

Purpose	Persuade	<b>3</b>	<b>D</b>	Select a Purpose
Strategy	Charming	<b>5</b>		Select a Strategy
Tactic	Flattery	<b>x 2</b>		Select a Tactic
Laws	Similarity	<b>1</b>		Best Applicable Law
Mod1	Cameraderie-2	<b>+ 2</b>		Up To Two Mods, As Available
Mod2				
Target No = 5x2+1+3=		<b>13</b>		Roll Against This Target Number

Any Failure stops the Interaction (but Please Reconsider may be possible).

**RESOLVING THE PERSONAL**

Purpose		<b>D</b>	Select a Purpose
Strategy			Select a Strategy
Tactic	<b>x</b>		Select a Tactic
Laws			Best Applicable Law
Mod1	<b>+</b>		Up To Two Mods, As Available
Mod2			
Target No =			Roll Against This Target Number

Any Failure stops the Interaction (but Please Reconsider may be possible).

## THE PURPOSE

A Purpose is a subordinate Goal within a Personal. There are four general Purposes:

### **Carouse** “Let’s Have A Good Time!”

The participants interact socially, getting to know each other better. Neither asks anything of the other. Each success in Carousing increases Cameraderie +1.

### **Query** “Tell Me About X.”

Query is information gathering. Query is devoted to obtaining information or the performance of discretionary duties. Information may be a goal in itself, or it may be helpful in understanding the Target.

### **Persuade** “I Request You Do X”

Persuade is a convincing activity. Its goal is to make the object decide to do something (or to decide to not do something). Persuade is devoted to obtaining decisions which the Target is free to make.

### **Command** “I Require You Do X”

Command is order-giving. Its goal is a specific action (or inaction) by the Target. It depends on external social structures or social dominance to bring about obedience. Individuals may be persuaded to do things, but they rarely obey commands without a social structure to back them up. Authority figures (for example, police officers) and organizational superiors (for example, higher rank in a company or military unit) can give commands.

## STRATEGIES

Players implement their Purpose with a Strategy. The Player selects a strategy and determines its value.

**Casual** [Our Interaction Has No Long-Term Effects]. The encounter is unstructured and unconcerned with ultimate goals.

**Enjoyment** [Let’s Enjoy Ourselves]. The encounter is based on recreation and the pleasure of personal interaction.

**Discussion** [Let’s Exchange Information]. The encounter is focused on conversation about some topic of mutual interest.

**Active Listening** [I Enjoy Listening To You]. The Actor listens and encourages participation by the Target.

**Appeals To** [Do X Because of Y]. The Actor focuses on a tactic to focus the interaction.

**Force-of-Will** [Do X Because Of My Strength]. The Actor strongly presents information based on Tactic.

**Charming** [My Positive Emotions Influence You]. The Actor presents positive social cues in the conversation.

**Angry** [My Negative Emotions Influence You]. The Actor dominates the conversation with negative social cues.

## TACTICS

Actors add strength their Strategies with Tactics. The Player selects a Tactic and determines its value.

**Common Interests** [We Share The Same Interests]. The participants have knowledge of the same subjects.

**Common Enemies** [We Share The Same Adversaries]. The participants are opposed by the same adversaries.

**Logic** [Logic Requires You Do X]. Actor indicates that Logic supports compliance.

**Authority** [My Authority Requires That You Do X]. The Actor is empowered by outside sources to expect assistance.

**Morality** [Morality Requires You Do X]. Actor indicates that the Target’s Morality supports compliance.

**Culture** [Culture Requires You Do X]. Actor indicates that the Target’s culture support compliance.

**Emotion** [Emotion And Sympathy Require You Do X]. Actor supports the Strategy in emotional terms.

**Debt** [You Owe Me]. Actor indicates compliance will cancel a debt between Target and Actor.

**Payment** [I Will Give You Money]. Actor offers money in return for compliance.

**Begging** [Charity Requires That You Do X]. Actor assumes an inferior position by requesting assistance.

**Politeness** [I Include Appropriate Courtesy]. Actor uses of courtesy to supplement Strategy.

**Flattery** [I Tell You Positive Compliments]. Actor uses of flattery to supplement Strategy.

**Referral** [I Am Vouched For By Another]. A third party has provided details about Actor’s character.

**Familiarity** [I Am Known To You]. Actor is a friend or acquaintance of Target.

**Insult** [I Reinforce My Appeal With Dominating Negative Words]. The use of insults punctuates the appeal.

**Pain** [I Will Hurt You If You Do Not Do X]. Actor indicates he will provide negative consequences.

## MODS

Personals are influenced by several circumstances.

**Strategies.** After the first use of a Strategy, Mod -1 per use of a Strategy (Required).

**Tactics.** After the first use of a Tactic, Mod -1 per use of a Tactic (Required).

**Urgent.** If there is a time constraint, try a Purpose only once with Mod +2.

**Deliberate.** Carefully planned Query or Persuasion allows using a Third Tactic.

**(Threat of) Violence.** Use of Fighter as a Mod makes a Personal Violent. If a Violent Personal fails, the Personal becomes a Fight.

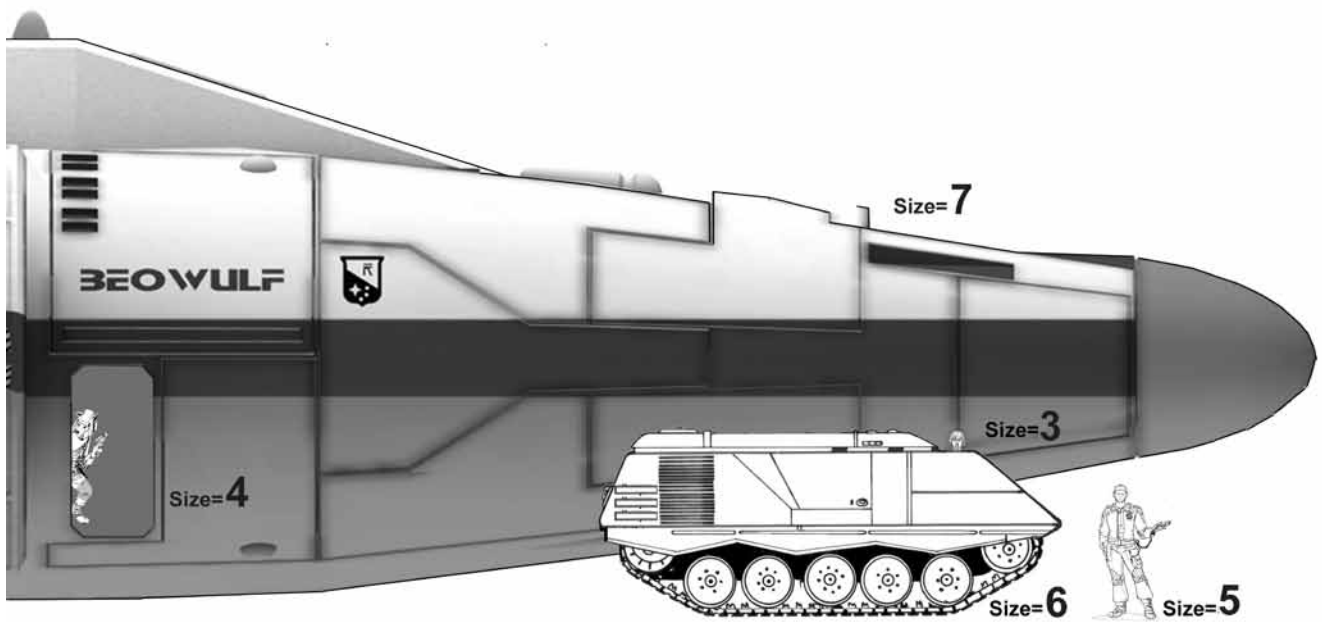
**Bluff.** Use Flux as Mod at the last minute (can be used once in the conversation).

**Brazen.** Mod +3 in Query or Persuade.










**Please Reconsider.** A Failure can be rerolled as Please Reconsider IF Begging/Politeness/Flattery are possible for the Strategy. For the remainder of the Interaction, only Inferior Mods can be used.

## THE SENSES

Vision  
 Hearing  
 Smell (includes Taste)  
 Touch  
 Awareness (non-Human)  
 Perception (non-Human)



### SIZE, RANGE, AND DISTANCE

Size= Range=	0	1	2	3	4	5	6	7	8	9
										
Range	Contact	Vshort	Short	Medium	Long	Vlong	Distant	VDistant	Orbit	Far Orbit
Distance		5 m	50 m	150 m	500 m	1000 m	5000 m	50 km	500 km	5000 km

**Understanding Sizes.** Most people (sophonts) are Size=5. A half-hidden person is Size=4, as is a small sophont. Just a head or a limb is Size=3. A very small control sensor, or an eye, is Size=2. Most vehicles are Size=6. ACS Adventure Class Starships (2000 tons or less) are Size=7. BCS Battle Class Starships are Size=8.

Size minus Range gives apparent size. A Size-5 Person at Range=5 looks about the same size as a Size-6 Vehicle at Range=6. If Size minus Range is less than zero, the object is too far away to see (or to be attacked).

The interplay of Size and Range is essential to an understanding of Vision and the other senses.

# The Senses

The senses feed information to a character. In most cases, this process is both assumed and invisible to the players. In some cases, the senses is resolved:

To resolve some sensory activities (as actions) where the result is uncertain.  
To show the distinct sensory abilities of different sophonts.

The sense rules provide to players an understanding of what information they can readily find through their senses, as well as showing how likely they are to be successful. Can this character smell something strange on the wind? Can that character see some movement on the horizon? Can another character hear a faint conversation across a room? Each of these situations may happen in the course of an adventure and the outcome inevitably shapes the actions of the characters.

## THE SENSES

Every person perceives the environment through the senses. Each single sense concentrates on one specific phenomenon: there are six broad types of phenomena that the senses can perceive.

The six broad categories for senses are:

**Energy.** The detection of energy is **vision**. The energy detected is wavelengths of **light** (which may extend into the infrared or ultraviolet).

**Vibration.** The detection of vibration is **hearing**. The vibration detected is **sound** (which may be ordinary sound, infrasonic, or ultrasonic).

**Matter.** The detection of matter is **touch**. Touch involves contact with objects and sensing of **patterns, textures, shapes, temperature, and other information**.

**Volatiles.** The detection of chemical (or biochemical) volatiles is **smell** (in atmosphere); or **taste** (in solution; typically water). The sense involves uniquely identifying information. The two are treated as one sense.

**Fields.** The detection of fields is **awareness**. The fields detected are **electrical or magnetic**.

**Auras.** The detection of auras is **perception**. The auras detected are **biological** (and reflect the presence of life), or **sentient** (and reflect the presence of thought).

Other senses are certainly conceivable, but they are either too minor in scope or too exotic in resolution for this system to handle. When they are present, they are administered as exceptions or through special rules.

## THE SENSE ACTIONS

The Senses are resolved as Actions (an Action is expressed like a Task, but no specific Skill is involved). The purpose is to determine IF the information is sensed by the character. Two types of Action are possible: At Range, and In Contact.

## At Range

When senses operate at a distance (Vision, Hearing, Awareness, Perception), the Action takes account of Range by using D6 equal to Range (when Benchmark Size equals Range). For example, resolving a Vision Action with a Range=2 and Size=2 uses 2D; resolving a Vision Action at Range=5 and Size=5 uses 5D.

Smell uses multiple dice based on Intensity instead of Range.

## In Contact

When senses operate in contact (Touch), range is ignored and the Action is based on 2D.

## THE REFEREE VERSUS THE CHARACTER

Two important concepts govern sense use:

### Sense Only As Really Necessary SOARN

Events become bogged down when every glance is resolved with Vision, or every noise is resolved with Hearing. Use the senses only when the ability to sense something is unclear or unusual.

### Conceal The Input Until It Is Sensed

The sense system allows the Referee to conceal what he knows. The story becomes more exciting when information unfolds slowly and as the result of character effort.

**The Referee.** The Referee has perfect knowledge about the situation. He knows if there are soldiers lying in ambush, or faint markings on stone walls. Or, he knows that the present location is harmless.

**The Players.** The players initially have no input from their senses to understand the situation. Some information is obvious: the referee should describe what they normally see or hear or sense.

Other information may be uncertain, and the use of the senses is called for.

**The Process.** The Sense Process is the way characters investigate their surroundings.





# THE SENSE ACTIONS

**V = VISION** Human Vision Constant **16**

Sense ID Constant Band1 Band2 Band3

**V - 00 - B B B**

Human=  
16 R G B

**T = TOUCH** Human Touch Constant **06**

Sense ID Constant Sensitivity

**T - 00 - S**

Human=  
06 2

**nD** To Notice an Object  
 < Constant + Benchmark + Mod + Mod

**2D** To Notice an Texture  
 < Constant + Benchmark + Mod + Mod

**H = HEARING** Human Hearing Constant **16**

Sense ID Constant Freq Span Voice Range

**H - 00 - F S V R**

Human=  
16 9 3 8 2

**A = AWARENESS** Human Awareness Constant **X**

Sense ID Constant Acuity

**A - 00 - A**

Human=  
(not applicable to Humans) (not applicable to Humans)

**nD** To Notice an Sound  
 < Constant + Benchmark + Mod + Mod

**nD** To Notice an Field  
 < Constant + Benchmark + Mod + Mod

**S = SMELL** Human Smell Constant **10**

Sense ID Constant Sharpness

**S - 00 - S**

Human=  
10 2

**P = PERCEPTION** Human Perception Constant **X**

Sense ID Constant Tone Poice

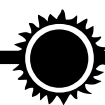
**P - 00 - T P**

Human=  
(not applicable to Humans) (not applicable to Humans)

**2D** To Notice an Scent  
 < Constant + Benchmark + Mod + Mod

**nD** To Notice an Aura  
 < Constant + Benchmark + Mod + Mod

BENCHMARK RANGES											
Range	0	1	2	3	4	5	6	Horizon	7	8	9
Distance	Contact	Vshort	Short	Medium	Long	Vlong	Distant	VDistant	Orbit	Far Orbit	
		5 m	50 m	150 m	500 m	1000 m	5000 m	50 km	500 km	5000 km	



# THE SENSE BENCHMARKS

**VISION BENCHMARKS**

	Contact	Reading	Talking	Vshort	Short	Medium	Long	Vlong	Distant	Vdistant
Range	<b>0</b>	<b>R</b>	<b>T</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
Distance				5 m	50 m	150 m	500 m	1000 m	5 km	50 km

**HEARING BENCHMARKS**

	Contact	Reading	Talking	Vshort	Short	Medium	Long	Vlong	Distant	Vdistant
Range	<b>0</b>	<b>R</b>	<b>T</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
Distance				5 m	50 m	150 m	500 m	1000 m	5 km	50 km

**AWARENESS BENCHMARKS**

Mass										
Electric										
Magnetic										
Range	<b>0</b>	<b>R</b>	<b>T</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
Distance				5 m	50 m	150 m	500 m	1000 m	5 km	50 km

**PERCEPTION BENCHMARKS**

Thought										
Life										
Range	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>
Distance		5 m	50 m	150 m	500 m	1000 m	5 km	50 km	500 km	5000 km

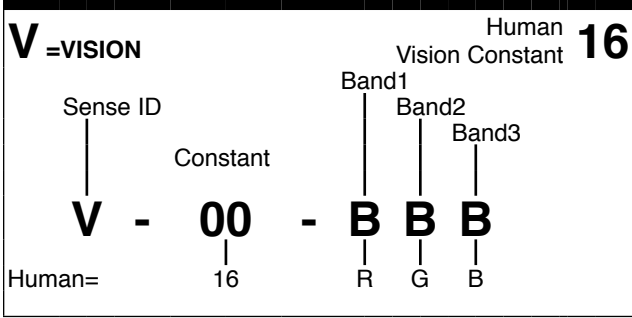


# Vision

## The Senses

Vision senses radiant energy: light. Emitted or reflected photons provide information about objects.

Vision differentiates between colors; specific colors vary by sophont (or for sensors, by mechanism design).



**nD** To Notice an Object  
 $< \text{Constant} + \text{Benchmark} + \text{Mod} + \text{Mod}$

**Range.** Roll Dice equal to R= Range. Treat Range=R and Range=T as Range=1.

**Vision.** The Vision Constant for the Race (Human = 16). Higher numbers are better: a sophont with Vision 20 has better vision; one with Vision 12 has worse vision.

**Benchmark.** Object Size minus Range. If zero or less, the Action cannot be attempted.

**Mods.** Mods based on circumstances from the Master Mods table (as applicable). Higher Mods are better.

### UNDERSTANDING VISION

The sense organ for **vision** is the **eye**. It detects radiant energy and feeds it to a nerve system that processes the information. A sophont's eye is sensitive to a range of light wavelengths (bands) which correspond to colors.

A sophont with a sense of vision has eyes and can **see**. A sophont without the sense of vision is **blind**.

### THE VISION CONCEPT

The Vision Action is the referee's opportunity to present sense information to a character. When the character indicates he is trying to see what he can ("I am scanning the horizon" or "I am looking around"), the referee resolves the Vision Action based on the Vision Constant, Range, Object Size, and other details.

Once an object is noticed, the character continues to see it until it moves out of range or becomes hidden.

### For Example

Human Eneri Dinsha V-16-RGB has landed his scoutship on a broad plain. He steps out and looks around. It is ordinary daytime. There is a cargo mover Size=6 moving near the horizon Range=6.

Vision Constant = 16. Benchmark = Size minus Range = 6-6 = 0. Mod = +2 Vfast.

The referee hands the player 6D and says "Roll." He must roll 16 +0 + 2 = 18 or less on 6D to notice the cargo mover. He has about a 28% chance of seeing it.

**Option1.** Eneri rolls 21. The referee tells him: "The landscape looks fairly common. Some flats, a few rocks, some hills off in the distance." He's probably not looking very hard.

Eneri can go back inside because there's nothing to see. Or he can keep looking and try again.

**Option2.** Eneri rolls 12. The referee tells him: "There is a Cargo Mover out near the horizon, moving from left to right, appears to be moving quite fast."

### VISION BENCHMARKS

Range	<b>0</b>	<b>R</b>	<b>T</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
Distance				5 m	50 m	150 m	500 m	1000 m	5 km	50 km



### THE COLORS OF LIGHT

The Vision String identifies three adjacent Bands: named adjacent peak wavelengths corresponding to colors. Vision detectable wavelengths (defined in nm nanometers) range from the ultraviolet to the infrared across a spectrum of sixteen colors.

Humans see in RGB (Red-Green-Blue); others may see a spectrum which overlaps human vision (for example, PBG, or RCA), or a spectrum above or below the human range.

**Subjective Color.** A being “sees” a range of colors analogous to RGB. Vision in the PSU (Purple-Sparkle-Uv) band “sees” P as Red, S as Green, and U as Blue.

### Seeing Colors

Objects reflect (or radiate) many different colors; beings can only see the colors their eyes can sense. Colors convey information; beings seeing different wavelengths harvest different information from what they see.

**Seeing White.** A white object reflects all colors. A human seeing RGB sees a white object. A sophont seeing PSU also sees a white object.

**Seeing Black.** A black object reflects no colors. A human seeing RGB sees a black object. A sophont seeing PSU also sees a black object.

**Seeing Heat.** A sophont who sees in the InfraRed (any of the colors ANIFXZ) can see objects hotter than its body temperature as bright glowing ANIFXZ colors and those colder as dull grey or black regardless of light levels. In addition, the sophont can see ordinary objects in reflected ANIFXZ colors.

### AN OVERVIEW OF COLORS

	nm	Code	Name	Star	Extended Color Name
VHDUS	30	V	Vharduv	B0 I	Very Hard Ultra Violet.
	100	H	Harduv	B0 V	Hard Ultra Violet.
	170	D	Darkuv	B5 V	Dark Ultra Violet.
	240	U	Uv	B9 V	Ultra Violet.
	310	S	Sparkle	A2 V	Near Ultra Violet.
	380	P	Purple	A9 V	Human visible Violet.
ANIFXZ	450	B	Blue	F7 V	Human visible Blue.
	540	G	Green	G2 V	Human visible Green.
	610	R	Red	K1 V	Human visible Red.
	680	C	Cerise	K4 V	Human visible Cerise.
	750	A	Aglow	K7 V	Edge of infrared.
	820	N	Nearir	M0 V	Near Infra Red.
	890	I	Ir	M2 V	Infra Red.
	1000	F	Farir	M5 V	Far Infra Red.
	2000	X	Xir	L9 VI	Extreme Infra Red.
	4000	Z	Zir	T7 VI	Beyond Extreme IR.

**nm:** the wavelength in nanometers (nm). The peak wavelength perceived; the eye actually sees wavelengths within 100 nm on either side of the peak (more in the Infra-red). **Code.** The single letter abbreviation for this color.

**Name.** The name of this color. **Star.** Stellar spectral class with peak output at this wavelength. **Extended Color Name.** A description of this color.

### IT'S MORE COMPLEX

The equivalence of colors across wavelengths is far more complex than these few statements. For role-playing purposes, a player can assume some equivalences for everyday usage and can concentrate on the differences.

### THE ADVANTAGES OF OTHER COLORS

A sophont with vision in the infrared can see heat: hotspots in machinery; body heat from animals or sophonts, even in the darkest night; heat traces left by vehicles.

A sophont with vision in the ultraviolet can see fluorescing minerals, chemicals left by organic activity.

Vision in other colors can often detect flaws, document alterations, or overpainting not visible to the original users.

### THE DISADVANTAGES OF COLOR

Devices may show blank output: in colors invisible to the user.

Insignia, markings, color identifiers, warning signs, or alarms may be in invisible colors to some vision senses.

Paints, pigments, and markings may have low contrast in a particular vision range: vision in a specific range may be unable to distinguish differences or to read text; display screens may be unintelligible.

### TECHNOLOGICAL VISION

Many devices depend on light input, produce light output, and operate to enhance vision.

A Vision device is identified with a Vision String and may include an enhanced Vision Constant, a Range Mod, and alternate color input and output.

An unaided human V-16-RGB has a 40% chance of noticing a person Size = 5 at R=5. Roll 16 or less on 5D (=40% chance of success).

Binox-10 V-20-VHD > RGB is a TL-10 vision enhancer seeing in the VHD range and outputting in human-visible RGB. Constant 20 increases the chance of success. To notice a Size=5 person at R=5, roll 20 or less on 5D (=78% chance).

Binox-12 V-16-RGB R-1 is a TL-12 vision enhancer seeing in the RGB range. R-1 reduces the applicable range band by 1. To notice a Size=5 person at R=5, roll 16 or less on 4D (=76% chance). To notice a Size=5 person at R=6, roll 16 or less on 5D (=40% chance).

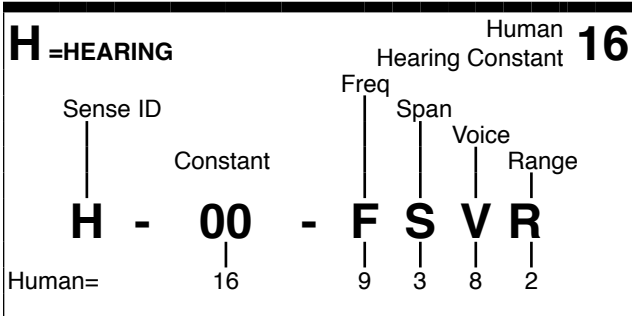


# Hearing

## The Senses

Hearing senses vibration of matter in atmosphere. Objects in motion create vibration in atmospheric gases (or in water) and this vibration provides information about motion and location.

Sounds can convey information and reveal location. Some sounds can produce other effects.



**nD** To Notice an Sound  
 $< \text{Constant} + \text{Benchmark} + \text{Mod} + \text{Mod}$

**Range.** Roll Dice equal to R= Range. Treat Range=R and Range=T as Range=1.

**Hearing.** The Hearing Constant for the Race (Human = 16). Higher numbers are better.

**Benchmark.** Sound Intensity minus Range. A benchmark less than zero can still be attempted.

**Mods.** Mods based on circumstances from the Master Mods table (as applicable). Higher Mods are better.

### UNDERSTANDING HEARING

The sense organ for hearing is the ear. It takes in vibration and feeds it to a nerve system that then processes the information. Typically, the ear is sensitive to a range of frequencies which correspond to sound pitch.

A sophont with the sense of hearing has ears and can hear. A sophont without the sense of hearing is deaf.

### THE CONCEPT

The Hearing Action is the referee's opportunity to present sense information to a character. When the character indicates he is trying to hear what he can ("I am listening" or "I am trying to hear any unusual noises"), the referee resolves the Hearing Action based on the Hearing Constant, Range, Object Size, and other details.

The referee may also introduce information (when an unusual sound happens, he gives the player an opportunity to hear it through the Hearing Action).

Once a sound is noticed, the character continues to hear it until it ends or it becomes insignificant.

### For Example

Human Eneri Dinsha H-16-9382 is relaxing in the Lone Star with his friends. They notice two uniformed human naval officers talking to each other. Eneri's friend whispers "Sh! Listen to those officers. Can you hear what they are saying?"

The officers are Talking. They are close by: Range=1.

Hearing Constant= 16. Benchmark = Sound minus Range = 0 - 1 = -1. The room isn't crowded, and relatively quiet. Mod= 0. Eneri must roll 16 - 1 = 15 or less on 1D to listen to the conversation. He rolls 6. After a while, the officers notice and stop talking.

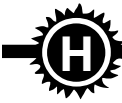
Or, the room is noisy. Noise Mod= -12. He must roll 16 - 12 = 4 or less on 1D. He rolls 5, and can't make out anything.

Outside, it starts to rain. There is a flash of lightning about a kilometer away. Hearing Constant= 16. Benchmark = Sound Minus Range = 6 - 5 = +1. The Lone Star has background noise = -3. He must roll 16 + 1 - 3 or less on 5 D. He rolls 22 and doesn't notice the noise outside. Later they step outside and notice its raining. There's another flash of thunder. It's obvious; there's no need to roll. They hear the thunder.

### HEARING BENCHMARKS

Intensity	-2	-1	0	+1	+2	+3	+4	+5	+6	+7
Range	0	R	T	1	2	3	4	5	6	7
Distance				5 m	50 m	150 m	500 m	1000 m	5 km	50 km

# Hearing The Senses



## THE FREQUENCIES OF SOUND

The Hearing String identifies the sound frequencies (pitch) which a sophont can hear, and the sound frequencies of the sophont voice.

**F Freq.** The central frequency the ear can hear in Hertz (= cycles per second). F is a power of 2 (so, if F=8, Freq =  $2^8 = 256$ ). The difference between any two Freq values is an Octave.

**S Span.** The number of Octaves above and below Freq. If S=1, then the span of sound the sophont can hear is one octave above and below Freq.

**V Voice.** The central frequency of voice in Hertz.

**R Range.** Octaves above and below Voice.

## THE FREQUENCIES OF SOUND

	Flux	Code	Freq (Hz)	ID	F	Description
Infrasonic	-9	1	2	2 <sup>^</sup> 1	1	C d delta
	-8	2	4	2 <sup>^</sup> 2	2	C th theta
	-7	3	8	2 <sup>^</sup> 3	3	C a alpha
	-6	4	16	2 <sup>^</sup> 4	4	C 0 beta
	-5	5	32	2 <sup>^</sup> 5	5	C 1 gamma
Human Audible	-4	6	64	2 <sup>^</sup> 6	6	C 2
	-3	7	128	2 <sup>^</sup> 7	7	C 3
	-2	8	256	2 <sup>^</sup> 8	8	C 4 Middle C
	-1	9	512	2 <sup>^</sup> 9	9	C 5
	0	A	1,000	2 <sup>^</sup> 10	10	C 6
	+1	B	2,000	2 <sup>^</sup> 11	11	C 7
	+2	C	4,000	2 <sup>^</sup> 12	12	C 8
Ultrasonic	+3	D	8,000	2 <sup>^</sup> 13	13	C 9
	+4	E	16,000	2 <sup>^</sup> 14	14	C10 Dog whistle
	+5	F	32,000	2 <sup>^</sup> 15	15	C11
	+6	G	64,000	2 <sup>^</sup> 16	16	C12
	+7	H	128,000	2 <sup>^</sup> 17	17	C13 Bats
	+8	J	256,000	2 <sup>^</sup> 18	18	C14
	+9	K	524,288	2 <sup>^</sup> 19	19	C15

Pitch is sound frequency (in Hertz; in cycles per second). Each increase in pitch is twice the frequency of the previous level and equals one octave.

## Calculating What Sounds Can Be Heard

Human Hearing is H-16-9392.

**Frequency= 9.** Human hearing is centered on Frequency =9 =  $2^9$  cycles per second = 512 hertz. This corresponds to C5 on the Musical Pitch Chart.

**Span= 3.** Human hearing extends 3 octaves above and below the central Frequency. A human can hear sounds from  $2^6$  (= 64) Hz to  $2^{12}$  (= 4000) Hz.

**Voice= 9.** The human voice is centered on Voice= 9 =  $2^9$  cycles per second = 512 hertz. This corresponds to C5 on the Musical Pitch Chart (the Human male voice is one octave lower).

**Range= 2.** The human voice extends 2 octaves above and below the central Voice frequency. A human can make sounds from  $2^7$  (= 128) Hz to  $2^{11}$  (= 2000) Hz. The Human Male is about one octave lower.

## SPECIAL SOUNDS

Some frequencies of sound have additional effects outside of the sense of hearing (they have no effect on sophonts who hear the Frequency naturally).

**F=5 C=1. Gamma Waves.** Induces heightened productivity. After 5 minutes, subject is Optimal for 1 hour, followed by a return to previous attention level.

**F=4 C=0. Beta Waves.** Induces alertness. After 1 minute of exposure, subject is Ordinary for 1 hour, followed by a return to previous attention level.

Many alarms include output at F=4 (overuse checks San).

**F=3 C=a. Alpha Waves.** Induces relaxation states. After 5 minutes, the subject is Sleepy.

**F=2 C=th. Theta Waves.** Induces hypnotic or trance suggestive states. After 5 minutes, a Personal against the subject may include Mod = Good Flux.

**F=1 C=d. Delta Waves.** Induces or promotes sleep. After 5 minutes of exposure, Check C3: Failure = Character falls asleep for 1D minutes the first time; 1D hours the second time.

## TECHNOLOGY

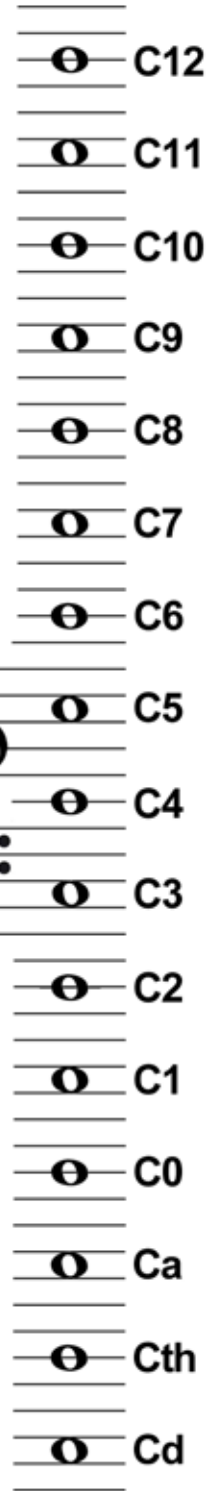
Many devices input, process, and output sound. A Hearing Device is identified with a Hearing String and may include an enhanced Hearing Constant, a Rang Mod, and alternate sound input and output.

## MUSICAL PITCH

Pitch is best understood in a musical format. Pitch corresponds to musical C (Middle C= 256 Hertz). The typical human male voice centers on C4 or Middle C; the typical human female voice centers on C5.

Player-8 H-16-0093 is a TL-8 sound entertainer reproduces sound in the human hearing range.

Comm-9 H-16-9090 R=5 inputs and outputs sound (with a tinny quality) and communicates with similar communicators to Range=5.



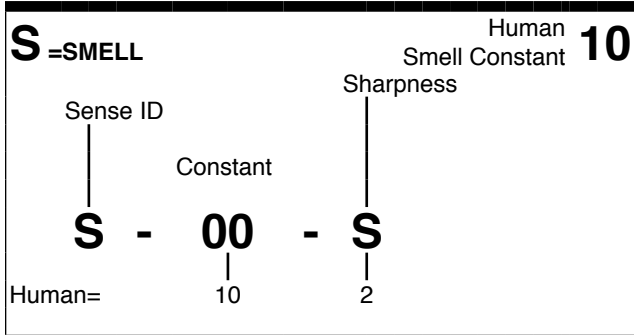




# Smell

## The Senses

Smell senses volatile molecules. Objects emit molecules through evaporation, fragmentation, or combustion, and the types of molecules provide information about objects.



**2D** To Notice an Scent  
 < Constant + Benchmark + Mod + Mod

**Intensity.** Intensity is a negative Mod increasing the chance of noticing the smell. Intensity decreases by 1 per Range Band.

**Smell.** Smell Constant for the Species (Human = 10). Higher numbers are better.

**Benchmark.** Smell Intensity. If zero, there is no smell to be sensed.

**Adjust and Comment.** Mods may be based on the Master Mods table (as applicable). Higher Mods are better.

UOP UNIVERSAL ODOR PROFILE					
Dice:	DD	DD	DD	DD	DD
	<b>P</b>	<b>O</b>	<b>N</b>	<b>-</b>	<b>G C E</b>
Primary Smell	Overtone	Nuance	Differentiator1 Also Gender	Differentiator2 Also Caste	Effect or Pheromone
<b>9</b>	<b>A</b>	<b>B</b>	<b>-</b>	<b>5</b>	<b>6 7</b>

The Universal Odor Profile UOP identifies Scents. The first three digits (PON) identify the **smell** of the Scent. The next three digits (GCE) identify the **effects** of the Scent.

Sharpness is the ability to identify increasingly subtle elements of smell, and the number of digits in the Universal Odor Profile which a sophont may try to identify.

Noticing a Scent provides the first digit in the UOP.

The character may try again to sense the additional digits in the UOP subject to Sharpness and Sharpness Mods, stopping when a failure occurs.

### UNDERSTANDING SMELL

The sense organ for smell is the nose. It gathers molecules in the environment and feeds it to a nerve system that processes the information. In addition, some smells (pheromones) create automatic direct responses that bypass the consciousness.

Someone with a sense of smell has a nose and can **smell**. One without a sense of smell is **smellblind** or **anosmic**.

Smells may originate near or far away, but they are sensed based on their intensity at the nose (the sensing location).

### THE SMELL CONCEPT

The Smell Action is an opportunity to present sense information. When the character indicates (“I am sniffing” or “I am trying to smell anything”), the referee resolves the Smell Action based on the Smell Constant, Intensity, and other details. Once a smell is noticed, the character continues to be aware of it as necessary.

**Intensity.** Smells are evaluated based on intensity at the location of the smell sense organ. Intensity generally diminishes -1 per Range Band.

### For Example

Human Eneri Dinsha S-10-2 steps out of his scout ship.

There is a campfire downwind at R=5, and out of sight. The smell intensity at Eneri’s location is Slight = 1.

Smell Constant = 10. Benchmark = Intensity = +1. Downwind Mod -4. There are no other Mods.

The referee hands the player 2D and says “Roll.” He must roll 10+1-4 = 7 or less on 2D to scent of fire (burning wood) in the air. He rolls 10 and notices nothing. As he then ventures out, Range changes to R=4 and Intensity becomes +2. The roll becomes 10+2-4=8. He rolls 9 and again smells nothing. Abruptly, the wind shifts (cancelling the Downwind Mod); the roll becomes 10+2= 12 and he suddenly smells the burning campfire.

Create a scent randomly by rolling two dice for each UOP entry.

For example, rolling 4+5 produces Q; the Primary Smell is Q.

Rolling 1+1 produces 1; the Overtone is 1.

### SMELL BENCHMARKS

Intensity	Smell
<b>0</b>	Odorless
<b>1</b>	Slight
<b>2</b>	Aromatic
<b>3</b>	Strong
<b>4</b>	Intense
<b>5</b>	Overwhelming

### DCREATING SCENTS

1D	1	2	3	4	5	6
1	1	2	3	4	5	6
2	A	B	C	D	E	F
3	G	H	I	J	K	L
4	M	N	O	P	Q	R
5	S	T	U	V	W	X
6	Y	Z	7	8	9	0



### THE DETAILS OF SMELL

The characteristic smell of a Scent consists of its **Primary** Smell, an **Overtone**, and a **Nuance** (together PON). These three digits define the smell of a Scent and how it is perceived by the individual.

A Scent is a characteristic of the substance that emits it. A Scent indicates the chemical or being is (or was recently) present.

**Sophont Characteristic Scent.** Each Sophont species has its own characteristic Scent (indicated on the Sophont Creation Card and the Character Card) expressed as PON. Sophonts of a Species emit (in greater or lesser amounts) a characteristic Scent with the same initial PON. The Scent is further refined by the individual. All of a specific Gender emit the same G; all of the same caste (if any) emit the same C (otherwise the C emitted is random). Individuals emitting pheromones emit them as E (otherwise, the E is random).

**Intensity.** A scent has a base Intensity at its origin, and reduces in strength with distance from its origin (one level per Range Band). An Intense smell Intensity=4 diminishes to 0 at R=4.

### Identifiers

Most Scents function only as a marker or identifier. have no effect other than as marker. Some have specific effects.

**Gender Identifier.** Each Species includes in its definition Gender Identifiers for each Gender. When the Smell of a Scent has been identified, the individual also knows the Gender Identifier (if present and applicable).

**Caste Identifier.** Each Species includes in its definition Caste Identifiers for each Caste (if the Species has Caste). When the Smell of a Scent has been identified, the individual also knows the Caste Identifier (if present and applicable). If the Species does not have Caste, this digit has no meaning.

### Effects

Smells may have effects on characters.

**Substance Effects.** The substance which a Scent identifies may have its own effects (which are independent of the Scent). For example, the Scent of smoke indicates a fire nearby.

**Respiratory Effects.** A Scent with a numeric GC (any numbers from 01 through 99) has a negative respiratory effect when breathed, and equal to 1 hit per digit times Intensity. Intensity-1 scent ABC-95A inflicts Poison-2. Intensity-4 scent ABC-10K inflicts Poison-4.

### PSEUDOMONES

Some Scents may mimic Pheromones based on similarities in the PON.

**Strong Pseudomone.** A Scent PON with the same three Digits (in any order) as the Racial PON. For Race PON= ABC, BCA and BAC are **Strong** Pseudomones).

**Equivalent Pseudomone.** A Scent PON with two of its Digits the same (in any order) as the Racial PON. For Race ABC, AYC and C4B are **Equivalent** Pseudomones.

**Faint Pseudomones.** A Scent PON with two identical digits which are contained in the Racial PON. For Race PON= ABC, AAT and CCN are **Faint** Pseudomones.

### Pseudomone Effects

A Pseudomone takes its effect from the sixth digit E regardless of other digits in GCE (see the Pheromone table).

Equivalent is full strength; Strong is Double Strength; Faint is Half Strength.

### PERHOMONES

Not all pheromones are not necessarily produced by every individuals.

**The Pheromone Marker.** A Scent with a Racial PON and GC=00 is a **pheromone** with an effect determined by E below. It exerts its effects only on the race identified by PON.

### THE PHEROMONE CATALOG

Value	eHex	Comment	
0	0	= null value	
1	1		traditional digits arabic numerals 0-9
2	2		
3	3		
4	4		
5	5		
6	6		
7	7		
8	8		
9	9		
10	A		
11	B	Trail Marker	hex digits anglic A-F
12	C	Alarm	
13	D	Gender Attractorr	
14	E	Fear	
15	F	Repellant	
16	G	Mood Soother	
17	H	Gender Balancer	
	I	= null value	
18	J	Caste Balancer	eHex digits anglic G-Z
19	K	Caste Determiner	
20	L	Gender Change Trigger	
21	M	Caste Change Trigger	
22	N	Sense Damper	
	O	= null value	
23	P	Sense Enhancer	
24	Q	Royalty Marker	
25	R	Universal Compeller	
26	S	Dread	
27	T	Courage	
28	U	Shun	
29	V	Berserk	
30	W	Scatter	
31	X	=unknown	
32	Y	=special	
33	Z	=ultimate	
	?	=unknown	
	*	=any value	

eHex expects that alphabetic digits will be CAPS. Some uses may differentiate between CAPS and lower case.

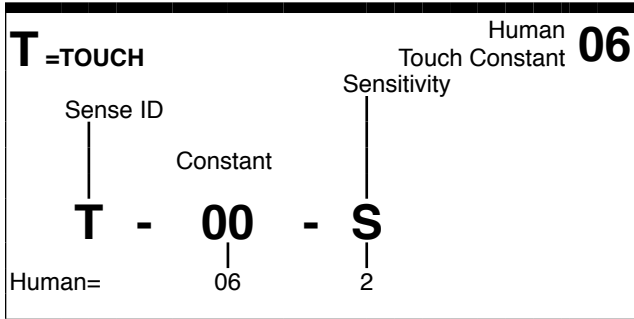




# Touch

## The Senses

Touch senses direct contact with objects. The pressure of contact (and other details: temperature, texture) provides information about objects.



**2D** To Notice an Texture  
 < Constant + Benchmark + Mod + Mod

**Range.** Touch operates only at Contact.

**Touch.** The Species Touch Constant (Human = 06). Higher is better; Touch-20 has better sensitivity; Touch-04 is less sensitive.

**Benchmark.** Textures are identified by Benchmarks which are also Mods on the Touch Task. The Referee identifies the appropriate Texture when creating the Touch task.

**Adjust and Comment.** Mods based on circumstances may be imposed; Higher Mods are better.

For example: Gloves. Hot or Cold. Sharp or Dangerous Surfaces.

**Sensitivity.** Sensitivity is the number of times the Character may retry before deciding there is nothing of interest and abandoning the effort.

### UNDERSTANDING TOUCH

The sense organ for touch is the skin in general, but specifically manipulators (hands for humans; other manipulators for other sophonts). They feel contact with objects and feed the information to the nervous system.

All sophonts have a sense of touch.

### THE TOUCH CONCEPT

The Touch Action is the referee's opportunity to present sense information to a character. When the character indicates he is trying to feel a texture or a surface ("What does this surface feel like?" or "Are there any seams, or cracks?"), the referee resolves the Touch Action based on the Touch Constant, Sensitivity, and other details.

### For Example

Human explorer Darren Buck T-06-2 and his comrades are exploring a ruined alien temple. He runs his hand along a stone wall. The Referee decides there are Faint carvings in the surface. Touch Constant = 6. Benchmark = Faint = -2. Mods = 0. The referee hands the player 2D and says "Roll." He must roll 6 - 2 = 4 or less on 2D.

**First Try.** Darren rolls 12. The Referee tells him: "There doesn't seem to be much there."

**Second Try.** Darren's Touch Sensitivity allows him two attempts; he continues. He rolls 3. Darren says: "No! Wait! I think there's something here."

The Referee then reveals, "The surface feels like etched figures, obscured by years of dirt." Darren can now attempt to trace the writing.

TEXTURE	
Flux	Descriptor
- 5	Smooth
- 4	XFaint
- 3	VFaint
- 2	Faint
- 1	VSmall
0	Small
+1	Grooved
+2	Coarse
+3	Rough
+4	VRough
+5	XRough

### MANIPULATOR MODS

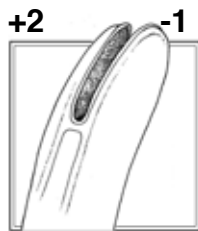
Manipulator	Grip	Touch
Hand	0	0
Paw	- 2	-1
Tentacle	+1	0
Grasper	0	-2
Gripper	+2	-1
Socket	- 1	-3



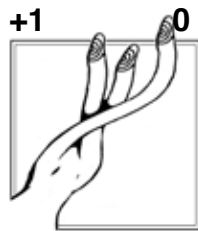
**Hand**  
 Two opposed groups of one or more moderately flexible digits, capable of holding an object.



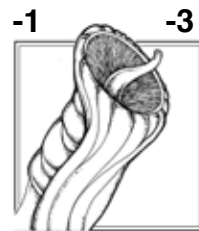
**Paw**  
 Several unopposed moderately flexible digits which can grasp and hold an object.



**Gripper**  
 Two opposed groups of relatively inflexible flaps or digits capable of clamping an object.



**Tentacle**  
 One or more flexible digits capable of entwining or coiling either together or in opposition.

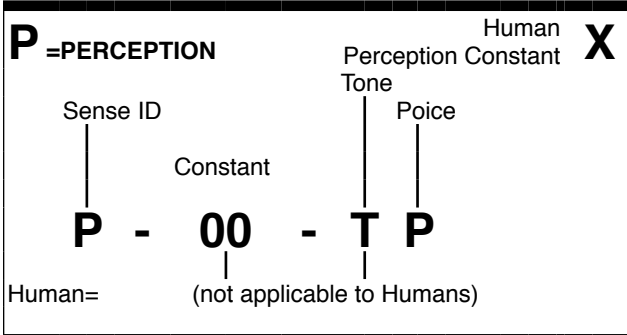
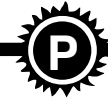


**Socket**  
 A fleshy hollow rimmed with muscle capable of holding an object (with or without an internal digit).



**Grasper**  
 Three or more mutually opposed flaps or digits capable of clamping an object between them.

# Perception The Senses



Perception senses the auras which surround living things, and which have special characteristics when surrounding intelligence.

## THE PERCEPTION CONCEPT

The Perception Action provides specific information to a character. When the character asks (“I am concentrating on life signs or thoughts” or “I am trying to sense anything unusual”), the referee resolves the Perception Action.

**Tone** is a descriptor of the source of a Poice. A successful Perception action provides this information.

**Poice** is the Perception-based analog of Voice: a voluntary use of the Perception medium to express information, and a sophont Peaks (speaks) using Poice.

A source not using Poice may be sensed based on Size and complexity of thought or emotion. Its Tone is apparent.

A source using Poice applies its Poice Mod and the perception medium may be modified by language.

Intelligent and Sapient Poices may use language.

## For Example

Sophont Sir Glibern Dashash P-24-24 is shredding files, preparing for the evacuation of Efate. The Zhodani invasion is imminent. A missile strike hits Windrose City, 50 km away R=7. Thousands of people die in a matter of minutes = Multiple Death Throes = Size 8. Perception Constant =24. Benchmark =Size minus Range = 8 - 7 = +1.

The player must roll 24 +1 = 25 or less on 7D to notice (sense, Perceive) the death throes. He rolls 24. He feels the pain of thousands of people dying. A couple minutes later, he hears a loud rumble in the distance.

Sir Gilbarn’s friend Tocca, also P-24-24, was in Windrose City, knocked over by the blast and dazed. It Peaks a simple thought with Poice, “I think I am unhurt.”

Perception Constant= 24. Benchmark= Size minus Range = 3 - 7 = -4. Poice is Firm=+4. Gilbarn must roll 24 -4 +4 = 24 or less on 7D to perceive Tocca’s comment.

**nD** To Notice an Aura  
< Constant + Benchmark + Mod + Mod

**Range.** Roll Dice equal to R= Range.

**Perception.** The Perception Constant for the species (Humans do not have Perception). Higher values are better.

**Benchmark.** Object Size minus Range.

**Mods.** Mods based on circumstances from the Master

1D	TONE Descriptor	POICE Descriptor	Mods table (as applicable). Higher Mods are better.
0	Dominating	Whine	Tone is a Mod and (if the Perception Action is successful) also imparts its description.. Poice is a Mod if the source is using Poice. A source without the Perception sense has
1	Very Intelligent	Faint	
2	Intelligent	Vague	
3	Sapient	Common	
4	Conscious	Firm	
5	Rudimentary	Strong	
6	Artificial	Powerful	
7	Strange	Blast	
8	Bizarre	Overwhelming	

Poice =0 and an estimated Tone based on intelligence.

Perception propagates at the speed of light.

## UNDERSTANDING PERCEPTION

The sense organ for perception is the brain. Native brain structures detect auras associated with life and with intelligence directly and process the information.

Perception is an analog of hearing: a sophont “hears” the information that the perception sense provides overlaid by brain processes on whatever hearing input is available.

## PERCEPTION BENCHMARKS

	Thought	Life	Contact	Vshort	Short	Medium	Long	Vlong	Distant	Vdistant	Orbit	Far Orbit
Range			<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>
Distance				5 m	50 m	150 m	500 m	1000 m	5 km	50 km	500 km	5000 km



# Awareness

## The Senses

Awareness senses electrical and magnetic fields. By extension, it senses disturbances in those fields by various masses, creating an ability to sense position and direction.

### UNDERSTANDING AWARENESS

The sense organ for awareness is the nervous system. As a being moves within a field, the nervous system responds to the microcurrents which the field creates, and this information is processed by the brain (in much the way that the skin senses wind or radiant heat).

A sophont with the sense of awareness is aware. A sophont without the sense is unaware.

Awareness is an analog of Vision. When Awareness functions in association with Vision, the result is a form of Synthetic Vision. The brain maps its sensing of Mag and Lek to a three-dimensional mental visual image.

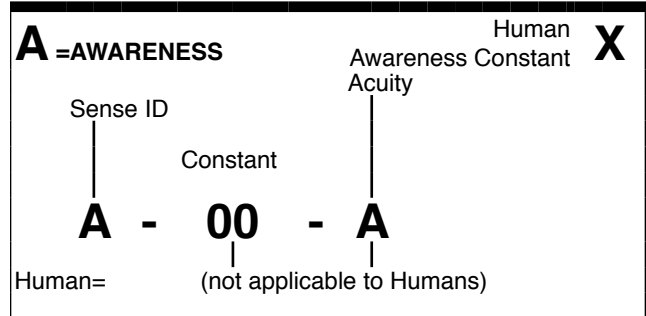
**Full Circle Coverage.** Awareness functions in all directions. As a result, awareness input is mapped to the beings mental image rather than to the sights seen by the eyes.

**False Colors.** Awareness is mapped to the mental image using mind generated false colors Mag and Lek. They are perceived as transparent colors which do not illuminate or reflect. They are perceived despite intervening objects (more or less). To the extent they are not absorbed or attenuated, they create a kind of xray vision.

### THE AWARENESS CONCEPT

The Awareness Action is the referee's opportunity to present sense information to a character. When the character is trying to sense what he can ("I am trying to sense anything unusual" or "I am concentrating on fields").

The Awareness Action is resolved. Once an object is noticed, the character continues to be aware of it until it moves out of range or somehow becomes hidden.



**nD** To Notice an Field  
 < Constant + Benchmark + Mod + Mod

**Range.** Roll Dice equal to R= Range.

**Awareness.** The Aware Constant for the Race (Human do not have Awareness). Higher numbers are better: a sophont with Aware 20 has better awareness; one with Aware 12 has worse awareness.

**Benchmark.** Object Size minus Range.

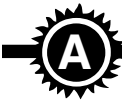
**Mods.** Mods based on circumstances from the Master Mods table (as applicable). Higher Mods are better.

### AWARENESS BENCHMARKS

	Contact	Reading	Talking	Vshort	Short	Medium	Long	Vlong	Distant	Vdistant
Mass										
Electric										
Magnetic										
Range	<b>0</b>	<b>R</b>	<b>T</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
Distance				5 m	50 m	150 m	500 m	1000 m	5 km	50 km

# Awareness

## The Senses



### SENSING THE ETHER

Awareness senses the complex jumble of electrical and magnetic fields that pervade almost every environment.

Over evolutionary time, beings who have developed this sense of Awareness come to believe that what they sense is perturbations in the ether, the universal fluid which pervades all space.

In a sense, this understanding provides a working model for the understanding of how Awareness works. All of space is permeated by electrical and magnetic fields and individuals sense these fields and perturbations in them.

Awareness provides three types of sensory input.

**Relative Direction.** Awareness detects the background magnetic field of a world and allows the individual to instinctively know magnetic north (assuming the world has a magnetic field). A character takes about one sleep cycle for his body and sense to adjust to the new environment; thereafter, he unfailingly knows local directions.

**Local Features.** Massive objects (mountains, buildings, starships) distort local fields and thus register their presence. This is mapped to visual information as hazy, indistinct silhouettes observable even when visually obscured. Awareness senses mountains even when invisible because of forest, fog, clouds, or distance. It senses buildings even in darkness. Larger masses are sensed farther away; metals are more likely sensed than non-metals.

**Electric and Magnetic Fields.** Current flowing through wires is sensed as a glow of a specific color ("Lek") even behind walls or barriers (alternating current flickers or pulses). Magnetic objects are sensed as a glow of a different specific color ("Mag").

One of the great challenges to Aware artists is the reproduction in paint or pigment of the appearance of Lek and Mag as they sense it in their minds.

### For Example

Sophont Norhin Sakdili A-16-1 (but vision blind) has landed his ship on a new world. He is slightly disoriented: he has not yet developed a sense of direction on this world.

He has a general sense of massive objects, feeling the presence of a range of mountains beyond the horizon, and a vast sea in the distance.

Standing at the hatch of his ship, he is Aware (behind him) of constant flickering Lek from the ship's alternating current circuits, and of scattered Mag glows from magnetic devices.

There is a storm near the horizon Range=6 and a flash of lightning Size=7.

Awareness Constant = 16. Benchmark = Size minus Range =  $7 - 6 = +1$ .

The referee hands the player 6D and says "Roll." He must roll  $20 + 1 = 21$  or less on 6D to notice lightning. He has a 55% chance of success.

**Option1.** Norhin rolls 12. The referee tells him: "You sense a flash of Lek on the horizon." Sakdili starts counting and at 18 the referee says, "You hear a distant clap of thunder." at  $18 / 3 = 6$  km distant.

**Option2.** Norhin rolls 31. The referee tells him: "There doesn't seem to be much going on."

### THE UNSEEABLE COLORS: MAG AND LEK

Code	Name	Associated With
L	Lek	Electric Fields
H	Mag	Magnetic Fields

**Code.** Single letter abbreviation for this color.

**Name.** Name of this color.

**Associated With.** Brief description of color source.

## THE PARTICIPANTS

A battle consists of two Sides.

One side consists of the Player-Characters; the other is Non-Player-Characters managed by the Referee.

### Who Acts When?

Within the Combat Round, everyone Targets at once. Each Player Character decides who he or she is going to attack, and each can change his mind as the action in the Round progresses.

The participants each Attack separately. Players volunteer their characters to Attack if they want. The Referee interrupts with Non-Player Character Attacks where appropriate. As the Attack phase progresses, every participant has the opportunity to make an Attack.

Once all Attacks are complete, everyone Moves at once.

It helps for the Referee (or someone in charge) to call out "End Of <Phase Name> to keep the action moving.

### Attack Is Also Any Action

The Attack phase is the time for any Action in addition to weapon use. The individual may use a communicator, use sensors, manipulate devices or perform other activity as required.

## ONE COMBAT ROUND

**= about a minute**

Some Combat Rounds seem to pass in seconds; some seem to take hours. Some pass without anything happening; others are intense flurries of activity.

On average, however, a Combat Round is about a minute. At the end of combat, count the number of Rounds and equate them generally to minutes (concluding that a ten Round fight probably took about ten minutes).

## THE COMBAT PROCESS

1. Roll to Hit
2. Roll for Hit Location
3. Roll for Damage and Penetration
4. Inflict Damage

### TARGET SIZE

Target Size is the apparent difference between Size and Range. = Size minus Range.

If Target Size is less than Zero, the attack is not possible. Cover and Concealment affect Target Size.

**Crouching:** Reduce Size minus 1.

**Prone:** Reduce Size minus 2.

**Evading:** Reduce Size minus 1.

ATTACKS	Speed=	0	1	2		
Aimed		- 1D	R	No	Cautious	1 Attack Only
Standard		R	+1D	+2D	Standard	2 Shots
SnapFire		+1D	+2D	+3D	Hasty	3 Shots
DAMAGE		Single	Burst	Auto	Continuous	
Point		1x	2x	3x	3x	
Area		1x	2x	no	no	
Spray		1x	no	no	1x	

### AIMED SHOTS

Designate the Aimed Hit Location. The entire Combat Round to consumed by Aiming. At start of the next Combat Round, Roll To Hit. If Successful, skip the Roll for Hit Location. If Failure, add Flux (and if now Successful, consult the Hit Location table).The Attacker may designate a new Target and devotes the rest of the Combat Round to Aiming.

Moving Targets: Increase Difficulty by Dice = Speed.

### KNOCKDOWN

### B D F X

An Attack by B Bullet, D Blast/ Blow (doubled), F Frag, or X Pen which falls short of penetrating Armor nevertheless Knockdown. If Hits inflicted are at least half the Armor Value AND greater than Target's C2, the character suffers Knockdown. Knockdown inflicts Stun for 1D-2 Rounds.

### S DAMAGE SEVERITY

1D	Difficulty
1	Easy 1D
2	Average 2D
3	Difficult 3D
4	Formidable 4D
5	Staggering 5D
6	Hopeless 6D
7	Impossible 7D
8	Beyond 8 D
9	Destroyed

### D DIAGNOSIS SEVERITY

1D	Difficulty
1	Easy 1D
2	Average 2D
3	Difficult 3D
4	Formidable 4D
5	Staggering 5D
6	Hopeless 6D
7	Impossible 7D
8	Beyond 8 D
9	Destroyed

### IA IMMEDIATE ACTION DAMAGE CONTROL

#### Check Double Skill (2D)

Use any appropriate skill. Success converts the damage to Severity= Easy 1D and the component remains operable.

Not Possible if Damage above 6D

### FA FIRST AID DAMAGE CONTROL

#### Check Double Medical (2D)

For an injury, the victim (if still conscious) or a comrade may devote one Round to Check Double Medical (2D).

Success reduces an injury or wound by 1D.

Not Possible if Injury above 6D

## INJURY

Injury reduces personal Characteristics (usually the Characteristic used in the Task first). If injury reduces one Characteristic to zero, apply remaining Injury to other Characteristics.

Injury may be non-physical: it may be affect the Mental or even the Social Characteristics.

If total Injury reduces only one Characteristic to more than zero, the Injury heals naturally in about a week.

# Personal Combat

Conflict between individuals, groups, or military units is resolved using the Traveller Personal Combat System.

Personal Combat is the resolution of violent conflict based on weapons, tactics, decisions, and choices of the participants, and on some measure of chance. Combat is based on coarse variable scales that give a feeling of authenticity without slavish adherence to exact formula: distance is a set of approximate ranges; time is a coarse measure of passing time; size is an approximation based on the relative size of objects and targets.

Finally, the **Traveller Personal Combat System (TPCS)** assumes that many shots and many attacks are taking place, but many bullets go wild and many attacks come to nothing. The system also assumes that there are lulls in the action which characters wait or think or catch their breath. TPCS accomplishes all of these realistic constraints without burdening the players with arbitrary or constraining rules.

**Non-Combat Events.** The damage rules of TPCS can also be implemented in non-combat situations; they detail the effects of environment, weather, falls, collisions, and other mishaps.

## THE ELEMENTS OF A FIGHT

A fight includes the following elements:

### The Encounter Situation

A situation is an encounter: a firefight; an attack; a short battle. One or both sides have goals and the situation dictates that violence will be used to resolve the conflict.

The encounter is defined by:

**The Participants.** Participants are characters. One side is player-characters operated by the players. The other is non-player characters (or possibly beasts) controlled by the referee. Characters are defined by their UPPs, weapons, armor, and protection. There may be vehicles and equipment.

**The Terrain.** The location is the terrain; it may be an exterior location, the interior of buildings or ships, or in space. Terrain features can provide concealment to hide fighters, and cover to protect them from attacks. Terrain may constrain or channel movement by either side.

**Initial Range.** The distance between the two sides determines which weapons can be used and when.

### The Battle

The characters attack, defend, move, and otherwise act to resolve the encounter in a series of Rounds. In each Combat Round, every participant has the opportunity to move and to use a weapon (or to do some other activity like use a communicator or operate an important device). When every participant has had an opportunity to act, the current Round ends and the next Round begins.

### The Aftermath

Once the fight is over, participants resolve the consequences of the battle: evaluating the severity of wounds and damage; determining the diagnosis level of damage and wounds; victors occupying the territory they have won; the defeated fleeing to safer positions.

## SCALE

Fighting is based on approximate distance in Range Bands, approximate Size for Objects, and approximate time in Rounds.

### Distance Scale and Size Scale

Physical location for Fighting is tracked using Scaled Range Bands. Each Band is numbered and corresponds to a specific physical distance.

Physical Size is identified with benchmark objects. Each Size corresponds to an identified benchmark.

For example, Range Band 3 (Range=3) represents a distance of approximately 150 meters. Its benchmark is a book (a typical human can see a Size -3 [book-sized] object at 150 meters, but probably not at the next Range Band).

Weapon maximum ranges are stated in Range Bands.

### Time Scale

Combat takes place in Combat Rounds.

Just as Ranges are abstracted into Bands of varying lengths, time is abstracted into Rounds of approximate duration. Some Rounds seem like seconds; some seem like minutes. Some pass without anything happening; others are flurries of activity.

At the end of the battle, count the number of Rounds that have passed and equate them generally to real time: 15 seconds per round (thus, a fight taking twelve Rounds probably took about three minutes).

---

## COMBAT SCALE

---

Object Size= Standard Sizes  
Distance= Range Bands  
Combat Round= 15 Seconds

---

---

## THE COMBAT PROCESS

---

1. Roll to Hit
  2. Roll for Hit Location
  3. Roll for Damage and Penetration
  4. Inflict Damage
- 

## THE COMBAT PROCESS

Combat is resolved in a logical four-step process which resolves each attack. The process is managed by the referee as needed.

### 1 Roll To Hit

The Attacker determines if his attack hits the target. More than one Attack by a single participant is possible in a Combat Round depending on the Attack Type and Mode.

There are three basic types of Attack:

A **Melee Attack** in contact with the Target. Typical weapons for Melee Attacks are unarmed contact, or knives. A Melee Attack continues until both (or all) participants miss. **Melee Attack** is an Average 2D Task.

An **Impact** involving a collision with some other object. Typical circumstances for a Ram Attack include a vehicle colliding with an Attacker, or a fall. **Impact** is an Average 2D Task.

A **Ranged Attack** at some distance from the Attacker. Typical weapons for Ranged Attacks are guns. **Ranged Attack** is a Task with base Difficulty equal to the Range to the Target.

### 2 Roll For Hit Location

If an Attack Hits, roll for Hit Location. Weapons (and other attacks) are identified as Point or Area Attack weapons.

**Area Attack Weapons.** The weapon is directed at a specific target and it affects that target and all other targets within a specific range of that target. Area effects ignore hit location.

**Sense Effects Weapons.** Some weapon effects affect the senses. The effect bypasses Hit Location; it produces an effect without regard to Hit Location.

**Point Attack Weapons.** The weapon is directed at a specific target and uses an appropriate hit location chart.

The Attacker rolls on the Hit Location table to determine the specific part of the Target that is hit.

Some Hit Locations are Armored or Protected. If the location is not Armored or Protected, the process moves immediately to Damage.

**Aimed Shots.** An Attack with a weapon capable of be-

---

## AIMED SHOTS

---

Designate the Aimed Hit Location. The entire Combat Round to consumed by Aiming.

At start of the next Combat Round, Roll To Hit.

If Successful, skip the Roll for Hit Location.

If Failure, add Flux (and if now Successful, consult the Hit Location table).

The Attacker may designate a new Target and devote the remainder of the Combat Round to Aiming.

Moving Targets: Increase Difficulty by Dice = Speed.

---

ing aimed may designated an Aimed Shot.

The Attacker devotes the entire Combat Round to aiming at a Target. At the beginning of the next Combat Round (before any other non-Aimed Attacks), the Attacker Roll-To-Hit is resolved. If it hits, Hit Location is automatic.

For example, Eneri Dinsha 777777 Slug Thrower-2, standing still, sights a Human target at Size=5, Range=5 (thus Target Size=0), Speed=0. He needs to disarm the opponent, so he aims for its (weapon-carrying) Right Arm. He spends the entire Combat Round aiming. He must roll (7+2=) 9 or less on 5D. Because he is Aiming while Speed=0, he only need roll on 4D. He rolls 8 and hits. The Hit Location is automatically Right Arm.

If an Aimed Shot misses, the Attacker may add Flux to the Roll To Hit. If that roll now succeeds, consult the Hit Location table.

For example, Eneri Dinsha rolls 12, and the Aimed Shot misses. He adds Flux (= -3) and hits. He consults the Hit Location table (= 0) and hits the Target in the Torso.

### 3 Roll For Damage and Penetration

Each weapon effect creates Damage or Injury. Before it can take effect, it must penetrate any Armor or Protection.

**Potential Damage.** Weapons (and environmental effects) are evaluated by the damage, injury, or wound they may inflict.

For example, Revolver can potentially inflict Bullet-1 (1D of hits by bullet); Flame Projector can potentially inflict up to 3D hits by Burn and up to 3D hits by Pen).

Roll for Potential Damage, Injury, or Wound.

Armor absorbs hits equal to its rating. Armor-10 absorbs 10 Hits.

**Hits Versus Armor.** If the Hits applied against Armor exceed Ar=, then the Armor's protective ability (for that Hit Location) is destroyed for the remainder of the combat situation. Remaining hits are applied to the wearer.

Hit Effect X Pen is doubled against Armor Value for the purpose of Penetration (but not for Damage or Injury).

**Hits Versus Protection.** If the Hits applied against any Protection exceed that Protection, then the remaining hits are applied to the wearer. The Protection retains its effectiveness against other attacks.

Hits are imposed in whole die amounts: armor and protection absorbs whole die amounts; objects and characters receive hits in whole die amounts. Any excess from the process is lost.

For example, (Lt) BA-11 Light Battle Armor-11 has Ar=32, In=12. It will absorb 32 hits before any effect is passed to the wearer. RAML-8 RAM Grenade Launcher-8 Blast-2 Frag-3 inflicts a Blast hit of 2D6 and a Frag hit of 3D6.

A successful attack inflicts a Blast (roll dice for 3 and 6) totalling 9, which does not penetrate the Armor, and a Frag of (roll dice for 4, 5, and 6) totalling 15, which does not penetrate the Armor.

If an attack inflicted Blast-7 (rolls= 6 6 6 6 6 6) totalling 42, the Armor would absorb six of the 6's for a total of 36; the remaining 6 would continue to injure the target within the Armor.

## 4 Inflict Damage

Any Hit Points which Penetrate Armor or which Overwhelm Protections are applied to the Target.

Hit Points reduce the Characteristics of Characters.

Hit Points disable Functions: component systems of vehicles, devices, and weapons.

**Hits Against Characters.** Regardless of Hit Location, apply Hit Points by their Die amounts to Characteristics randomly.

For example, Eleri Dinsha 777777 is Hit by Bullet-2. Roll 2D for Damage inflicted (= 4 and 3). Bullet inflicts Hits to C1 C2 C3. Determine the location of each of the two Hit Dice randomly. The first Die (4 Hit Points) is applied to C2 and reduces it to 3. The second Die (3 Hit Points) is applied to C1 and reduces it to 4.

Hits apply to a specific Hit Location,

A Weapon may be able to inflict more than one type of Damage. Each damage is inflicted separately including to a potentially different Hit Location.

### ATTACK! IS A TASK

The activities of combat are task-based.

Because the tasks are used repeatedly within a combat encounter, the tasks are pre-defined: the Ranged Attack (for use with guns and weapons which have a range), the Melee Attack (for close quarters grappling and fighting), and the Ram Attack (for a physical collision between two opponents, or with a vehicle).

Each participant has a pre-calculated Number for each of these Tasks: **Shooting Number**, **Melee Number**, and **Ram Number**. This number is the base Throw to Hit subject to any applicable Mods.

### Difficulty

Difficulty for the Ranged Attack is based on Range dictates the number of Dice rolled. For example, an Attack at Long Range R=4 requires the attacker roll 4D. Ranges less than 1 (Talking Range R=T, Reading Range R=R, and Contact Range R=0) are all treated as 1D (since there is always some slight chance, even at such very close range, that an unskilled attacker may miss).

Difficulty for the Melee Attack is Average 2D.

Difficulty for the Ram Attack is Average 2D.

### The Target Number (Assets)

The Task system defines the Target Number as the sum of all Assets used in the Task. The player must roll the Target Number (or less) on the Dice in order to succeed.

The Target Number equals the Attacker's Assets: Characteristic, Skill (and Knowledges), the Apparent Size of the Target, and any applicable Mods.

Don't confuse Target Number with the target being attacked: the specific target is the enemy; Target Number is the number the attacker is trying to roll (or less).

### Unskilled or Low Skill

If Range (and thus Difficulty) is greater than the Attacker's Skill, the Attack Task is subject to the **This Is Hard!** rule. Add +1D to the Difficulty of the Attack.

er's Skill, the Attack Task is subject to the **This Is Hard!** rule. Add +1D to the Difficulty of the Attack.

### Ranged Attack Modes

Three different modes or styles of Ranged Attack are possible: Aimed, Standard, and Snapshot. Attack Modes may not be mixed within a Combat Round.

**Aimed.** An **Aimed Attack** is a Cautious Attack. The Attacker may make only this attack in the Combat Round.

**Standard.** The **Standard Attack** task is the most commonly used Ranged Attack. The Attacker may make two Standard Attacks in a Combat Round.

**Snapshot.** The **Snapshot Attack** is a Hasty Attack. The attack is resolved first, before the Target may attack or respond. The Attacker may make three Standard Attacks in a Combat Round.

### Speed Mods

Speed addresses the difficulty of accuracy while moving, and the difficulty of hitting a moving target.

**Target Movement.** The Target applies a negative Speed Mod equal to his speed. A moving target is harder to hit.

**Toward Or Away.** If the Target is moving directly Toward or Away From the User, ignore Speed.

**Attacker Speed.** Attacker Movement is factored into task difficulty based on Attack Type; there is no Speed Mod applied to the Attacker.

### Target Size (Size Minus Range)

The Target of the Attack changes apparent size at different Ranges.

The Attack system is calibrated to Targets with Size equal to Range. For example, a Size=5 Man is the expected Target Size at Range R=5.

Apparent Size reflects differences from this expectation.

If the Target is larger than expected, Size Minus Range produces a positive Mod that increases the chance of the Attack succeeding.

On the other hand, if the Apparent Size is less than zero, the Target cannot be seen and cannot be attacked. But, telescopic sight or specialized technology may have an effect.

**Crouching Or Prone.** Targets may change their visible size in an effort to protect themselves. A standing man may crouch (reducing his Size -1) or even lie prone (reducing his Size -2).

**Evasion.** Running at a crouch is a Size Modification (reduce Size -1).

### Cover and Concealment

Cover is anything solid which will stop (or partially stop) an attack. It includes vehicles, buildings, structures, and geologic elements. Concealment is anything (solid or not) that will prevent an attacker from clearly seeing a Target. It includes vehicles, buildings, and terrain elements (which are also cover); it also includes vegetation, haze, fog, or smoke.

**Selecting Cover and Concealment.** The referee specifies Cover and Concealment for non-player targets. A Player Character specifies (subject to referee approval) Cover and



---

**TARGET SIZE**

---

Target Size is the apparent difference between Size and Range. = Size minus Range.

If Target Size is less than Zero, the attack is not possible. Cover and Concealment affect Target Size.

**Crouching:** Reduce Size minus 1.

**Prone:** Reduce Size minus 2.

**Evading:** Reduce Size minus 1.

---

Concealment from 0 to - 6.

Concealment is not necessarily Cover (a swath of vegetation may conceal, but it does not protect). Further, Concealment disappears if a Target acts in a way that can be detected.

Cover remains after Concealment is removed (the attacker may know that the Target is behind a stone wall, but the wall still provides some protection).

**Concealment** is a negative Mod to Target Size that reduces the chance that it will be seen. If it cannot be seen, it cannot be attacked.

A soldier Size=5 at Long Range R=4 selects Concealment -2. His S-R= 5 - 4 - 2 = -1. He cannot be seen and thus cannot be attacked.

**Cover** as a negative Mod defending against an Attack; it reduces the chance that the Target will be hit.

If a Target uses the protection of a Cover Mod during an Attack, he must apply half the Cover Mod (round down) as a Mod on any attacks he makes to reflect the restrictions that Cover places on his movement and vision.

A soldier Size=5 at Long Range R=4 selects Cover -2. An Attack against him includes Mod -2. When he attacks, he must use only half his Cover Mod (= -1) because he becomes more visible.

For example, in an ambush during the Jewell Cluster Campaign, Lieutenant Kris "Starflash" Comet stands without Cover and fires at an enemy soldier across the battlefield. The enemy's comrades (all eight of them) all return fire; the Lieutenant cannot claim a Cover Mod for protection.

In the next round, Lt. Comet ducks for cover. He picks Cover Mod -4. Hunched behind a brick wall, he peeks around the corner (Cover Mod -2), spots a target, and prepares to return fire; his attack will be subject to Cover Mod -2.

**Cover (Cover Me!).** The attacker is charged with suppressive fire in support of other members of the team. The attacker operates reactively to attacks by the other side. An attacker in Cover Mode may make up to five reaction attacks in a combat round.

When a participant is assigned to Cover, he may not move; he may not make any attacks on his own. But (up to five times) he may make Standard attacks against anyone who attacks members of his unit.

The assignment to Cover may also apply to a location: a doorway, a corner, a rooftop, a vehicle. An order to "Cover that doorway!" allows the shooter up to five attacks against target in that location during the Combat Round.

**Technological Means**

Concealment can sometimes be defeated by technology. Concealment may defeat vision or vision sensors, but

---

**KNOCKDOWN**

---

**B D F X**

An Attack by B Bullet, D Blast/ Blow, F Frag, or X Pen which falls short of penetrating Armor nevertheless may create a Knockdown. If Hits inflicted are at least half the Armor Value AND greater than the Target's C2, the character suffers Knockdown.

Blast/Blow is doubled for this calculation.

Knockdown inflicts Stun for 1D-2 Rounds.

---

not affect other sensors (heat, alternative light bands, awareness, perception).

It is possible for Apparent Size to vary depending on the technological sensors in use for specific weapons.

**Organic Senses.** Concealment is not uniform across the senses. A target may be concealed to vision but not to hearing, or smell, or perception, or awareness.

Apparent Size may vary by the sense being applied.

**Brute Force.** An attack may be made without regard to precise identification of a Target (for example, firing into a thicket without first identifying a specific target ).

**Stealthy.** Concealment garments or equipment may defeat technological or organic sensors. Camouflage may defeat vision; a chameleon suit may defeat heat sensors.

**Tactics**

Not all participants in combat understand the use of Tactics: those who do have a personal advantage and can provide a team advantage to their comrades.

**The Tactics Mod.** Characters with Tactics can create a Tactics Mod which can be used every Combat Round for the duration of the battle. It is created anew for every battle.

The Tactics Mod Value equals the Character's C5 plus Tactics plus Flux. It is calculated when a battle begins and remains the same throughout the course of the battle.

**The Tactics Mod Grant.** A character can grant his Tactics Mod to any combatant under his direct control (and within communication). In one Combat Round, he can grant it to a gunner; in another to a sniper; in another to someone in hand-to-manipulator combat.

A combatant can only be granted one Tactics Mod per combat round. The Tactics Mod is a direct positive Mod in combat and increases the chance of success.

It is possible for the Tactics Mod to be negative, in which case it is useless for the battle (granted by an incompetent commander).

For example, Army Sergeant Hal O'Rear 789987 Tactics-4 finds himself and his team in a firefight. He creates his Tactics Mod for the battle: 8 +4 +Flux. He rolls +2 (= 12 +2 = +14). He has a Tactics Mod= 14 for the duration of the battle.

**Designator Fire**

An attacker's weapon coupled with a Designator automatically fires when the Designator Attacker / Operator triggers an attack.

**Explosions**

Explosions are presented as tables showing Range from the detonation point center and associated damage at each Range Band.

Each object or person within range of the explosion is a

Target and is subject independently to the explosion effects.

### HITS AGAINST CHARACTERS

Hits against characters may be:

**Hit** (Hits to C1 C2 C3)

**Cut** (Hits to C1 C2 C3 per Round)

**Suff** (Hits to C3 C4 C5)

**Heat** (Hits to C1 C2 C3 C4 C5)

**Freeze** (Hits to C1 C2 C3 C4 C5)

Hits to C1 C2 C3 reflect the infliction of Hits on Characteristics. Assume, after Armor or Protection absorbs some Hits, there remain three dice of Hits (=3 4 6) on the target Character. The Player determines which characteristics receive which hits in whole die amounts. Against a Character 777777, the Player may elect to assign each die to a different Characteristic (and no Characteristics are reduced to zero), or apply the 4 and 6 to one Characteristic (reducing it to Zero) and the 3 to different Characteristic.

Excess points on a die evaporate and have no effect.

Hit dice cannot be applied to a Characteristic of 0.

Additional Hit Types include:

Stun (Unconscious for 1D Rounds)

Blind (Blind for 1D Rounds)

Deaf (Deaf for 1D Rounds)

Fry (Ablind for 1D Rounds)

Effects against the Senses restrict the use of the Sense; if the Character does not have the Sense, there is no effect).

Stun (Unconsciousness) renders the Character unable to move or act in any way.

### HITS AGAINST OBJECTS

Every Hit against an object damages a Function; mark the first hit in the appropriate Function box. A second hit against a Function destroys it beyond repair; mark the second hit by lining out the entire Function. The Severity of Damage is determined by the number of Damaged or Destroyed Functions.

Rather than rigidly define the effects of each Function, the Referee is charged with detailing what abilities remain on an object after a Function is damaged or destroyed.

The Function which receives the hit is determined by Flux or 1D depending on the appropriate table. Some few Damages have no effect: Fry cannot affect non-electronics; Cut affects only some devices; Magnetic only affects device components based on Magnetics; Gravitics only affects device components based on Gravitics.

After the battle, damaged Functions may be repaired; destroyed Functions must be replaced.

### WEAPONS SKILLS AND CHARACTERISTICS

Based on Weapon Used:	Skill	Characteristic
Portable	BattleDress	+ Dexterity
Fixed, Tank Mount	Artillery	+ Intelligence
Gun, Gatling	Artillery	+ Intelligence
Cannon, Autocannon	Artillery	+ Intelligence
Launcher	Launcher	+ Dexterity
Laser, Fusion, Plasma	Beams	+ Dexterity
Acid, Fire, Gas, or Stench	Sprays	+ C2
Shock, EMP, Rad, Flash	Exotics	+ C2
Freeze, Mag, Sonic, Grav	Exotics	+ C2
Psi Amp	Exotics	+ Psi
Edged Weapons	Blades	+ Strength
Hand-to-Hand	Unarmed	+ Strength
Designator	Fwd Observer	+ Dexterity
Fires Bullets *	Slug Thrower	+ Dexterity
*and not otherwise assigned.		
Hand-Thrown Explosives	Athlete	+ Strength
Or	Explosives	+ Strength
Bay Weapon	Bay Weapons	+ Intelligence
Turret	Turrets	+ C2
Ortillery	Ortillery	+ C5
Spines	Spines	+ C5

## FALLING

A fall produces damage without regard for armor.

The Falling Table shows object's speed when falling from a specified height on a world. Upon impact, it receives Hits= Speed<sup>2</sup> D.

**Knowing How To Fall.** A fall can be reduced to Stun (1D-2 Rounds) with Check C2 using Dice equal to Range.

Eneri Dinsha 777777 falls off a rather tall building R=2 on an Earth-like world Size=8. Speed at impact is 6. He will receive 36D Hits. But he still has a chance! Check Dexterity on 6D. If he succeeds he is instead only stunned for 1D-2 rounds.

**Terminal Velocity** is the maximum speed for a falling body based on air resistance regardless of the height of the fall. Atmosphere Type and Gravity determines Terminal Velocity.

On Terra, John falls from a height of 5 meters R=1. Speed at impact is about 30 kph = Speed-4. He receives Hits=4<sup>2</sup> = 16D.

Richard (also on Terra) falls from a height of 50 meters R=2. Speed at impact is about 100 kph = Speed-6. Hits= 6<sup>2</sup> = 36D.

Charles (on Mars Size=4 Atmosphere=3) falls from a height of 150 meters R=3. Speed at impact is about 100 kph = Speed-6. Hits= 6<sup>2</sup> = 36D.

Alice falls from a height of 50 kilometers R=7 above a large airless world. Speed at impact is 700 kph = Speed-9. Hits = 9<sup>2</sup> = 81D.

## WHO GOES FIRST?

The central concept of Initiative is: "Who Goes First?" and determining the order in which characters make their attacks in any particular round of combat.

**Initiative** is the advantage a character or group receives because it has acted before others. There is always someone who moves first, who attacks first, who has surprise, or who holds some position of superiority, or of advantage. That person or group has the initiative.

### Seizing The Initiative

When a character or group acts (moves or attacks) first, it **seizes the initiative**. Before doing so, they state "We're moving first; or We're attacking." If no one objects, they act first, and they receive the advantages (and disadvantages) of the initiative.

### Disputed Initiative

The other side may object to the Initiative. If they do, the Initiative is disputed, and the matter must be resolved.

**Concede The Initiative.** Either side may concede the initiative and allow the other to move or act first.

**Better Leadership or Tactics.** The side with the better leader receives the Initiative.

To determine the better Leader.

Average (2D) < (C4 or C5) + Leader

Opposed (2). Resolves the dispute in one task.

The lowest result is successful (provided that result is a Success) and his side receives the Initiative. If both fail, the lowest roll takes the Initiative.

## FALLING (Speed At Impact Falling From Height)

Height	World Size=	G=												Speed	kph	Hits	
		0.12	0.25	0.37	0.50	0.62	0.75	0.87	1.00	1.12	1.24	1.37	1.50				
R	0.5 meters	1	1	1	2	2	2	2	2	2	2	2	2	2	1	5	1
T	1.5 meters	1	2	2	2	3	3	3	3	3	3	3	3	3	2	10	4
1	5 meters	2	3	3	3	4	4	4	4	5	5	5	5	5	3	20	9
2	50 meters	5	5	5	6	6	6	6	6	6	6	6	6	6	4	30	16
3	150 meters	5	6	6	6	6	6	6	6	6	6	6	6	7	5	50	25
4	500 meters	6	6	6	7	7	7	7	7	7	7	7	7	7	6	100	36
5	1000 meters	7	7	7	7	7	7	7	7	7	7	7	7	7	7	300	49
6	5000 meters	8	8	8	8	8	8	8	8	9	9	9	9	9	8	500	64
7	50 kilometers	9	9	9	9	9	9	9	9	9	9	9	9	9	9	700	81
	Atm=	0	1	2	3	4	5	6	7	8	9	A+					
	Terminal Velocity=		9	8	8	8	8	8	7	7	7	6	6				



# Armor and Protection

The term Armor includes both Armor and the seven other types of Protection; the specific terms are used where necessary. Effect is the output of a weapon (or the natural output of the universe). Bullet-1 can be the output of a Rifle, or it can be a meteor. Hot-4 can be the output of a weapon, or it can be a fire.

**Each Effect Is Matched To Specific Armor Or Protection.** Flashproof protects against Flash. Insulation protects against Hot, Cold, and Elec.

**Each Effect Is In D At The Moment It Occurs.** Bullet-1 rolls 1D at the moment of impact: it can be as little as 1 and as much as 6. Statistically, Armor-4 will **usually** resist Bullet-1, and Armor-6 will **always** resist Bullet-1.

**An Effect Must PENETRATE Armor Before it Can Damage.** An Effect point value equal to or less than the Armor value does not Penetrate and produces no Damage. If the Effect point value exceeds the Armor value, the excess points each inflict Damage, and the Armor value is reduced to zero for the remainder of the situation.

**An Effect Must OVERWHELM Protection Before it Can Damage.** An Effect point value equal to or less than the Protection value does not Overwhelm and produces no Damage. If the Effect point value exceeds the Protection value, the excess points each inflict damage. The Protection remains in force for lesser effects.

## INFLICTS:

Penetration or Overwhelm Inflicts Damage.

**Against People.** Damage against people applies hits to personal characteristics or the senses.

**Against Equipment and Vehicles.** Damage against equipment makes equipment unusable until repaired.

## Armor

Armor is a barrier to Penetration, Bullet, Wound, Blast/ Blow, Frag, Burn, Pain, Slash, and Corrode.

For example, an assassin fires Bullet-3 at the Duke of Rhylanor. The shot hits his discretely armored Cloth-14 Coat producing (3D = ) 13 hits and has no effect.

## Cage

Cage is protection against EMP Electromagnetic Pulse.

For example, Gustav Windhoek, Engineer on the Beowulf in orbit, has ventured outside in his Alternate Light Vacc Suit -10 Cage-10. The local star unexpectedly flares. Cage-10 is strong enough to protect against EMP. However, the Flash temporarily blinds him, and the Rad-2 makes him sick for about a day.

## Insulation

Insulation is Protection against Heat, Cold, and Electric.

For example, Ranscinesru E544953-2 is a cold world orbiting a M9 II primary. Its environment imposes Cold-2 = 2D. The degree of Cold varies from 2 to 12 over any period of time. Explorer Eneri Dinsha wears a Cold Weather Suit with Insulation-9. Any Cold Effect of 9 or less is ignored. When the Cold Effect is 10, Eneri feels the effects of the cold (Cold-10 minus Insulation-9 = 1 = ) as 1 Freeze.

## RadProof

RadProof is protection against Rad.

For example, a Star Marine squad in the Battle of Jewell has ensured the safe lift-off of more than a thousand civilians. As they race to their retrieval cutter, the enemy nukes the terminal. Imperial Battle Dress is RadProof-30. At this distance, the nuke's Rad Effect is 5D.

Each of the Marines rolls to see if the radiation affects them. The Leader rolls 5D (=24) which does not overwhelm

RadProof-30. His runner rolls 5D (=22) which does not overwhelm. Two of the Marines have ventured too close (Rad-10). The first must roll 10D (= 28) which does not overwhelm and the second rolls 10D (=40) = 10 Hits to C1 C2 C3. He quickly leaves the area but is noticeably weakened.

## SoundProof

SoundProof is protection against Bang and Sound.

Eneri Dinsha is walking in an open field when a storm sweeps in. He steps under a tree to keep out of the rain. He feels a tingle, and hears a crack as lighting strikes the tree. He is unhurt, but the thunder is literally deafening.

Eneri, unprotected, is hit with Bang-5 ( 5D = 21 Rounds of Deaf). He can't hear a thing for about twenty minutes.

## PsiShield

PsiShield is protection against Psi.

The Duke of Rhylanor plans a meeting with the Zhodani ambassador. He orders a Psionic Helmet (PsiShield-15) to protect against any probing thoughts by the Ambassador. Actually, no one seems to know how effective the helmet is, or needs to be, but the Duke feels better about the meeting.

## Sealed

Sealed is protection against Gas, Infection, Stench, Poison, Vacc, and Tranq.

For example, Scout Eneri Dinsha 777777 is exploring a Hellworld beyond the Imperial border. He is using a StH-HES-8 Standard Heavy Hostile Environ Suit -8 Sealed-22. As he explores he encounters

- Rough Vegetation = Cut-1
- Noxious volcanic gases = Stench-3 / Poison-1
- Poison Thorn Bushes = Tranq-2.
- None of which can overwhelm Sealed-22.

## FlashProof

FlashProof is protection against Flash.

For example, Spacer Eneri Dinsha is working on the vast hull of Korrikak battleship and wearing a Vacc Suit with FlashProof -8. As the ship turns, he is thrown into the stark brightness of the local A7 V primary = Flash 2D = 7. Eneri notices that his visor darkens.

## ATTACK TYPES

There are 3 basic types of personal combat attacks.

**Melee.** The combatants are in physical contact, trading blows, grappling, wrestling, or using contact weapons.

**Ranged Attack.** The Attacker is using a weapon which reaches out some distance to the Target.

**Impact.** The Attacker impacts the Target in a collision. In some cases, the Attacker is a vehicle or the World (as in a fall).

RANGED ATTACKS	Speed=			Attacks	
	0	1	2		
Aimed	- 1D	R	No	Cautious	1 Only
Standard	R	+1D	+2D	Standard	2
SnapFire	+1D	+2D	+3D	Hasty	3

DAMAGE	Single	Burst	Auto	Continuous
Point	1x	2x	3x	3x
Area	1x	2x	no	no
Spray	1x	no	no	1x

## RANGED ATTACK MODES

There are three basic Modes of Ranged Attack:

**Aimed Fire.** The Attacker deliberately and cautiously aims his weapon at a target. He may designate one Aimed Target in a Combat Round and resolve the attack in the next.

**Standard.** The Attacker directs his weapon at a target and fires; he may make two Standard Attacks in a Combat Round.

**Snapshots.** The Attacker fires his weapon generally toward targets. He may make three Snapshots in a Combat Round.

## DAMAGE SETTINGS

If possible, the Attacker may select a Damage Setting.

**Single.** The weapon fires one shot at standard Damage value.

**Burst.** The weapon fires several discharges with one trigger pull. If the attack Hits, apply double damage (roll Hit Dice twice).

**Auto.** The weapon fires until the trigger is released. If the attack Hits, apply triple damage (roll Hit Dice three times).

**Continuous.** Some weapons (beam lasers) use the term Continuous: the effect mimics Burst: apply double damage (roll Hit Dice twice).

**Continuous (Spray).** Spray weapons under the Continuous setting apply only standard Damage.

## TYPICAL WEAPON MODE SETTINGS

	Off	Single	Burst	Auto	P1-P2-P3	Override
Gun	Off	Single	*			Override
Gatling	Off	Single	Burst	Full		Override
Cannon	Off	Single	*			Override
AutoCannon	Off		Burst	Full		Override
Rifle	Off	Single	*	*	*	
Carbine	Off	Single	*	*	*	
Pistol	Off	Single	*		*	
Revolver	Off	Single	*		*	
Shotgun	Off	Single	*			
Machinegun	Off		Burst	Full		
Launcher	Off	Single				Override
Multi-Launcher	Off	Single	Burst	*		
Designator	Off			Full	P1-P2-P3	Override
Projector	Off	Single				Override

**Override.** When activated, the weapon will function at least once, even if it has sustained damage and otherwise seems inoperable.

**P1-P2-P3.** The weapon has three power level settings. The standard is P2 and corresponds to standard or ordinary damage in each of the possible damage types for the weapon. Power Level P1 corresponds to **Half** damage. Power Level P3 corresponds to **Double** Damage (the user must Check Quality to avoid weapon malfunction).

**Spray Projectors.** The weapon has an area effect regardless of its Hit Type.

**Frag.** The effect also applies to all other being Targets less than Range=1 of the Target.

**Pen.** The effect is automatically doubled when applied to Armor.

**Area Effect.** The weapon effect applies to a being Target without regard to Hit Location. The effect also applies to all other being Targets less than Range=1 of the Target.

**Sense Effects.** The weapon effect applies automatically to Hit Location= Head (if Senses are located in the Head) or Hit Location= Torso (if Senses are located in the Torso) or Hit Location= Sense. Except: Pain.



---

**COMBAT CARDS AND CHARTS**

Combat information is presented in a series of **Combat Cards and Charts**. Cards hold information about the combatants; **Charts** contain reference information useful in the Combat process.

The Combat Cards and Charts are formatted to fit three to a single sheet.

---

**Combat Cards**

T5-011.1 Combat Card (Human)  
T5-011.2 Combat Card (non-Human)  
T5-012 Beast Combat Card  
T5-013 Vehicle Combat Card  
T5-014 Object Combat Card

**Combat Charts**

T5-015 Combat Tasks Chart  
T5-016 Wound Location Chart  
T5-017 Object Hit Location Chart  
T5-018 Range Reference Chart  
T5-019.1 Penetration A-M  
T5-019.2 Penetration N-Z  
T5-020 BTSD Damage Chart

---

**T5-011.1 Personal Combat Card (Human)**

Complete the identification items for the character.  
Insert the UPP for the character.  
Insert any armor or protection for the character.  
Insert any weapons carried, their skills and damage.  
Compute the Shooting Number (= Characteristic + Skill)  
Compute the Melee Number (=Strength + Skill).  
Insert Size for the individual (typically 5 for Human).

**T5-011.2 Personal Combat Card (non-Human)**

Complete the identification items for the character.  
Insert the UPP for the character.  
Insert any armor or protection for the character.  
Insert any weapons carried, their skills and damage.  
Compute the Shooting Number (= Characteristic + Skill)  
Compute the Melee Number (=Strength + Skill).  
Insert Size for the individual.

**T5-012 Beast Combat Card**

Complete the identification items for the beast. Up to three similar beasts may be recorded on the same card.  
Record the animal weapon, the damage it inflicts, and its maximum range.  
Record the animal armor and protection values.  
Compute the Melee Number (=Strength + Skill).  
Compute the Ram Number (=Speed).  
Insert Size for the individual.

**T5-013 Vehicle Combat Card**

Complete the identification items for the vehicle: Bulk-Motive, Mission- Type, and User- TL. If several similar vehicles are in use, distinguish them with unique IDs.  
Enter additional details: Tons, Speed, Load, Stage, Environ, and Endurance.  
If known, enter QREBS.  
If the vehicle is armed, enter the weapon details.  
Enter the armor and protection values for the vehicle.

**T5-014 Object Combat Card**

Complete the identification items for the object.

**T5-015 Combat Tasks Chart**

The Combat Tasks Chart shows the standard formats for the ranged Attack, the Melee Attack, and Ramming.

**T5-016 Wound Hit Location Chart**

The Wound Hit Location Chart provides a reference to Hit Location on a variety of beings.

**T5-017 Damage Hit Location Chart**

The Object Hit Location Chart provides a reference to Hit Location on a variety of targets.

**T5-018 Range Reference Chart**

The Range Reference Chart provides the basic information about standard Ranges and Speeds.

**T5-019.1 Penetration A-M Chart**

The Penetration A-M Chart shows the various weapons effects on characters and objects.

**T5-019.2 Penetration N-Z Chart**

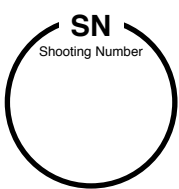
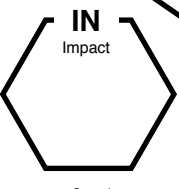
The Penetration N-Z Chart shows the various weapons effects on characters and objects.

**T5-020 BTSD Damage Chart**

The Behind the Screen Damage Chart provides a fast determination of damage.

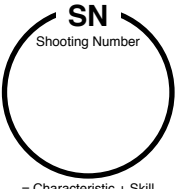
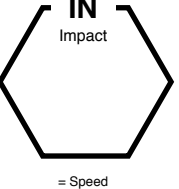




<b>VEHICLE COMBAT CARD</b>						ID	Armor Ar=	Cage Ca=	Flash Fl=	Radiation Ra=	Sound So=	Psi Ps=	Insulated In=	Sealed Se=	 <p>SN Shooting Number</p> <p>= Characteristic + Skill</p>  <p>IN Impact</p> <p>= Speed</p>
Bulk - Motive						<b>Hit Location</b>									
Mission - Type						Comms	- 5								
User - TL						Cargo	- 4								
Tons						Sensors	- 3								
Speed						Protections	- 2								
Load						Life Support	- 1								
Stage						Locomotion	0								
Endurance						Power Source	+1								
Weapon						Body Panels	+2								
Mount						Weaponry	+3								
Damage						Navigation	+4								
Max R=						Computer	+5								
QREBS						Q	R	E	B	S					
ABCD						FKPWX	E	U	R	NS	J	HLQ	GIOP	TVZ	

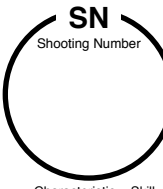
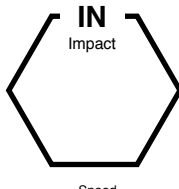

Vehicle Combat Card

T5-013

<b>OBJECT COMBAT CARD</b>						ID	Armor Ar=	Cage Ca=	Flash Fl=	Radiation Ra=	Sound So=	Psi Ps=	Insulated In=	Sealed Se=	 <p>SN Shooting Number</p> <p>= Characteristic + Skill</p>  <p>IN Impact</p> <p>= Speed</p>
<b>Object Hit Location</b>															
<b>Vehicle</b>						<b>Hvy Wpns</b>									
- 5 Controls						Controls									
- 4 Cargo						Mount									
- 3 Sensors						Sights									
- 2 Protections						Shields									
- 1 Life Support						Stocks									
0 Locomotion						Barrel									
+1 Power						Power									
+2 Body Panels						Frame									
+3 Weaponry						Ammunition									
+4 Navigation						Mechanism									
+5 Computer						Computer									
<b>Armor</b>						<b>Armor</b>									
Controls						Controls									
Interior						Interior									
Visor						Visor									
Protections						Protections									
Life Support						Life Support									
Locomotion						Locomotion									
Power						Power									
Torso						Torso									
Manipulators						Manipulators									
Navigation						Navigation									
Computer						Computer									
<b>Small Object Hit Location</b>															
<b>Device</b>						<b>Tool</b>									
1 Case						Case									
2 Power						Power									
3 Input						Adjuster									
4 Output						Toolhead									
5 Controls						Grip									
6 Processor						Safety									
<b>Weapon</b>						<b>Comm</b>									
Frame						Case									
Ammo						Power									
Sights						Input									
Barrel						Output									
Grip						Display									
Mechanism						Processor									

Object Combat Card

T5-014

<p><b>RANGED ATTACK</b></p> <p>Die Roll</p> $nD < \boxed{\text{SN}} + \boxed{\text{S-R}} + \boxed{\text{Mods}}$ <p>=Range If &lt;1 use 1D</p> <p style="text-align: center;">Shooting Number      Size -Range      Mods</p> <div style="text-align: center;">  <p>SN Shooting Number</p> <p>= Characteristic + Skill</p> </div>	<p><b>RAMMING</b></p> <p>Die Roll</p> $2D < \boxed{\text{Defender C2}} - \boxed{\text{Ram Number}}$ <p>Range= 0 R T 1</p> <div style="text-align: center;">  <p>IN Impact</p> <p>= Speed</p> </div>																																						
<p><b>ATTACKS</b>      Speed= 0      1      2</p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td>Aimed</td> <td>- 1D</td> <td>R</td> <td>No</td> <td>Cautious</td> <td>1 Attack Only</td> </tr> <tr> <td>Standard</td> <td>R</td> <td>+1D</td> <td>+2D</td> <td>Standard</td> <td>2 Shots</td> </tr> <tr> <td>SnapFire</td> <td>+1D</td> <td>+2D</td> <td>+3D</td> <td>Hasty</td> <td>3 Shots</td> </tr> </table> <p><b>DAMAGE</b></p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td></td> <td>Single</td> <td>Burst</td> <td>Auto</td> <td>Continuous</td> </tr> <tr> <td>Point</td> <td>1x</td> <td>2x</td> <td>3x</td> <td>3x</td> </tr> <tr> <td>Area</td> <td>1x</td> <td>2x</td> <td>no</td> <td>no</td> </tr> <tr> <td>Spray</td> <td>1x</td> <td>no</td> <td>no</td> <td>1x</td> </tr> </table>	Aimed	- 1D	R	No	Cautious	1 Attack Only	Standard	R	+1D	+2D	Standard	2 Shots	SnapFire	+1D	+2D	+3D	Hasty	3 Shots		Single	Burst	Auto	Continuous	Point	1x	2x	3x	3x	Area	1x	2x	no	no	Spray	1x	no	no	1x	<p><b>MELEE ATTACK</b></p> <p>Die Roll</p> $2D < \boxed{\text{Atk MN}} - \boxed{\text{Def MN}} + \boxed{\text{Mods}}$ <p>Range= 0 R T 1</p> <div style="text-align: center;">  <p>MN Melee Number</p> <p>= Strength + Skill</p> </div>
Aimed	- 1D	R	No	Cautious	1 Attack Only																																		
Standard	R	+1D	+2D	Standard	2 Shots																																		
SnapFire	+1D	+2D	+3D	Hasty	3 Shots																																		
	Single	Burst	Auto	Continuous																																			
Point	1x	2x	3x	3x																																			
Area	1x	2x	no	no																																			
Spray	1x	no	no	1x																																			

Combat Tasks Chart

T5-015



Penetration A-M		Effect	Ar=	Ca=	Fl=	Ra=	So=	Ps=	Ir=	Sa=	Type	Damage to Objects	Damage to Beings
spray		A Corrode	▲								Hit	=Yes	= Hits to C1 C2 C3
	KD	B Bullet ▷	▲								Hit	=Yes	= Hits to C1 C2 C3
		C Slash	▲								Cut	=Yes	= Hits to C1 C2 C3 per Rd
	KD	D Blast/Blow	▲								Hit	=Yes	= Hits to C1 C2 C3
	area	E EMP		□							Fry	=Electronics. Inop for Rds = Fry.	= Ablind for 1D turns
	KD	F Frag	▲								Hit	=Yes	= Hits to C1 C2 C3
spray	area	G Gas							□		Suff	---No Effect	= Hits to C3 C4 C5
	area	H Hot						□			Heat	=Inoperable for Rounds = Heat.	= Hits to C1 C2 C3 C4
		I Infection							▲		Hit	---No Effect	= Hits to C1 C2 C3
	area	J Psi						□			Stun	---No Effect	= Unconscious for 1D Rds
spray		K Burn	▲								Hit	=Yes	= Hits to C1 C2 C3
		L Elec							▲		Hit	=Yes	= Hits to C1 C2 C3
	area	M Magnetic									Stun	=Magnetics. Inop for Rds = Stun.	= Unconscious for 1D Rds

▲△□ = Attack may be stopped by this Armor or Protection. Otherwise, the Armor or Protection is ignored.  
▲ = Hit Effect. △ = Other than Hit Effect. □ = Area Effect. Rad= Area Effect inflicting Hits.  
▷ = Blast Hit Effect doubled versus Armor for KD (but not for Damage). ▷ = Pen Hit Effect doubled versus Armor for Penetration (but not for Damage).

### Penetration and Damage Chart

T5-019.1

Penetration N-Z		Effect	Ar=	Ca=	Fl=	Ra=	So=	Ps=	Ir=	Sa=	Type	Damage to Objects	Damage to Beings
	senses	N Bang					△				Deaf	---No Effect	= Deaf for 1D Turns
spray	senses	O Stench							△		Stun	---No Effect	= Unconscious for 1D Rds
		P Pain	△						△		Stun	---No Effect	= Unconscious for 1D Rds
	area	Q Cold							□		Freeze	=Inop for Rds = Cold.	= Hits to C1 C2 C3 C4 C5
	area	R Rad				□					Hit	=Yes	= Hits to C1 C2 C3
	area	S Sound				□					Stun	---No Effect	= Unconscious for 1D Rds
		T Poison							▲		Hit	---No Effect	= Hits to C1 C2 C3
	senses	U Flash			△						Blind	---No Effect	= Blind for 1D Turns
	area	V Vacc							□		Suff	---No Effect	= Unconscious for 1D Rds
		W Wound	▲								Hit	---No Effect	= Hits to C1 C2 C3
	KD	X Pen ▷	▲								Hit	=Yes	= Hits to C1 C2 C3
	area	Y Grav									Hit	=Gravitics. Inop for Rds= Hits.	= Hits to C1 C2 C3
		Z Tranq	△							△	Stun	---No Effect	= Unconscious for 1D Rds

▲△□ = Attack may be stopped by this Armor or Protection. Otherwise, the Armor or Protection is ignored.  
▲ = Hit Effect. △ = Other than Hit Effect. □ = Area Effect. Rad= Area Effect inflicting Hits.  
▷ = Blast Hit Effect doubled versus Armor for KD (but not for Damage). ▷ = Pen Hit Effect doubled versus Armor for Penetration (but not for Damage).

### Penetrate and Damage Chart

T5-019.2

<p><b>BTSD</b></p> <table border="1"> <tr><td>Wound</td><td>Damage</td></tr> <tr><td>- 7 Dead</td><td>Destroyed</td></tr> <tr><td>- 6 Disastrous</td><td>Near Total</td></tr> <tr><td>- 5 Very Heavy</td><td>Very Heavy</td></tr> <tr><td>- 4 Heavy</td><td>Heavy</td></tr> <tr><td>- 3 Common</td><td>Common</td></tr> <tr><td>- 2 Light</td><td>Light</td></tr> <tr><td>- 1 Slight</td><td>Surface</td></tr> <tr><td>0 Scratch</td><td>Scratch</td></tr> </table> <p>Bad Flux plus Mods</p> <p><b>BTSD MODS</b></p> <table border="1"> <tr><td>Protection</td><td>Actions</td></tr> <tr><td>0 Typical</td><td>Typical</td></tr> <tr><td>+1 Heavy Clothes</td><td>Dodging</td></tr> <tr><td>+2 Armored</td><td></td></tr> <tr><td>+3 Heavy Armor</td><td></td></tr> </table>	Wound	Damage	- 7 Dead	Destroyed	- 6 Disastrous	Near Total	- 5 Very Heavy	Very Heavy	- 4 Heavy	Heavy	- 3 Common	Common	- 2 Light	Light	- 1 Slight	Surface	0 Scratch	Scratch	Protection	Actions	0 Typical	Typical	+1 Heavy Clothes	Dodging	+2 Armored		+3 Heavy Armor		<p><b>THE FORWARD OBSERVER</b></p> <table border="1"> <tr><td></td><td>-5</td><td>-4</td><td>-3</td><td>-2</td><td>-1</td><td>0</td><td>+1</td><td>+2</td><td>+3</td><td>+4</td><td>+5</td><td></td></tr> <tr><td>-5</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>-5</td></tr> <tr><td>-4</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>-4</td></tr> <tr><td>-3</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>-3</td></tr> <tr><td>-2</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>-2</td></tr> <tr><td>-1</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>-1</td></tr> <tr><td>0</td><td></td><td></td><td></td><td></td><td></td><td>▲</td><td></td><td></td><td></td><td></td><td></td><td>0</td></tr> <tr><td>+1</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>+1</td></tr> <tr><td>+2</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>+2</td></tr> <tr><td>+3</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>+3</td></tr> <tr><td>+4</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>+4</td></tr> <tr><td>+5</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>+5</td></tr> <tr><td></td><td>-5</td><td>-4</td><td>-3</td><td>-2</td><td>-1</td><td>0</td><td>+1</td><td>+2</td><td>+3</td><td>+4</td><td>+5</td><td></td></tr> </table> <p>Numbers shown are Range Band Numbers.</p>		-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5		-5												-5	-4												-4	-3												-3	-2												-2	-1												-1	0						▲						0	+1												+1	+2												+2	+3												+3	+4												+4	+5												+5		-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5		<p><b>The Observer Process</b></p> <p>A Forward Observer identifies a Target, communicates with an Indirect Fire weapon operator, and tells it the Target's location identifiers (he may give coordinates by voice, or transmit data).</p> <p>On the Forward Observer's command (Fire One!) by communicator, the weapon shoots one ranging shot. It arrives in the next Round.</p> <p>The shot may deviate from a direct hit: roll Flux twice: once for vertical deviation and once for horizontal deviation.</p> <p>The Forward Observer observes the impact of the shot.</p> <p><b>Hit!</b> If it hits, he tells the weapon operator (Hit! Fire For Effect) and the weapon now fires one normal shot. It hits in the next Round.</p> <p><b>Miss!</b> If it misses, he tells the weapon operator (Miss! Up X Left Y) and the weapon fires a ranging shot. It hits in the next Round.</p>
Wound	Damage																																																																																																																																																																																																						
- 7 Dead	Destroyed																																																																																																																																																																																																						
- 6 Disastrous	Near Total																																																																																																																																																																																																						
- 5 Very Heavy	Very Heavy																																																																																																																																																																																																						
- 4 Heavy	Heavy																																																																																																																																																																																																						
- 3 Common	Common																																																																																																																																																																																																						
- 2 Light	Light																																																																																																																																																																																																						
- 1 Slight	Surface																																																																																																																																																																																																						
0 Scratch	Scratch																																																																																																																																																																																																						
Protection	Actions																																																																																																																																																																																																						
0 Typical	Typical																																																																																																																																																																																																						
+1 Heavy Clothes	Dodging																																																																																																																																																																																																						
+2 Armored																																																																																																																																																																																																							
+3 Heavy Armor																																																																																																																																																																																																							
	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5																																																																																																																																																																																												
-5												-5																																																																																																																																																																																											
-4												-4																																																																																																																																																																																											
-3												-3																																																																																																																																																																																											
-2												-2																																																																																																																																																																																											
-1												-1																																																																																																																																																																																											
0						▲						0																																																																																																																																																																																											
+1												+1																																																																																																																																																																																											
+2												+2																																																																																																																																																																																											
+3												+3																																																																																																																																																																																											
+4												+4																																																																																																																																																																																											
+5												+5																																																																																																																																																																																											
	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5																																																																																																																																																																																												

### BTSD Damage Chart

T5-020



## MOVEMENT OVERVIEW

Characters and Vehicles can change Range Bands in the course of combat. They can change from one Band to an adjacent Range Band during the Movement Phase of a Combat Round, subject to limitations.

RANGE BANDS			
Characters	Vehicles	Beasts	Range
	Vehicle cannot move closer than Range Band 3 unless moving directly toward Target.		<b>0</b> Contact
Character can move one Band per Round between Bands 0 - 1 - 2.	Vehicle may move one Band per Round between Bands 0 - 1 - 2.	Beast can move one Band per Round between Bands 0 - 1 - 2.	<b>1</b> Vshort 5 m
	Vehicle at Speed=2 can spend Rounds equal to the destination Band and then move one Band between Bands 3 - 4 - 5 in that final counted Round.		<b>2</b> Short 50 m
Character at Speed=2 can spend Rounds equal to the destination Band and then move one Band between Bands 3 - 4 - 5 in that final counted Round.		Beast at Speed=2 can spend Rounds equal to the destination Band and then move one Band between Bands 3 - 4 - 5 in that final counted Round.	<b>3</b> Medium 150 m
	Vehicle at Speed=3+ can move one Range Band per Round.		<b>4</b> Long 500 m
			<b>5</b> Vlong 1000 m
Character at Range Band 6 cannot change Range during a battle.		Beast at Range Band 6 cannot change Range during a battle.	<b>6</b> Distant 5 km
			<b>The Horizon</b>

### ATTACKER SPEED

Mod	Personal	Vehicle	kph
	Speed	Speed	
0	Still	Stopped	0
-1	Walk	Creep	10
-2	Run	Crawl	20
-3	Sprint	Xslow	30
-4	Charge	Vslow	50
-5	Fast	Slow	100
-6	Vfast	Standard	300

### ANIMAL SPEED

Mod	Personal	Vehicle	kph
	SpeedC	SpeedAF	
0	Still	Stopped	0
-1	Walk	Creep	10
-2	Run	Crawl	20
-3	Sprint	Xslow	30
-4	Charge	Vslow	50
-5	Fast	Slow	100
-6	Vfast	Standard	300



# ARTILLERY AND ORTILLERY

## INDIRECT FIRE

Some weapons can attack targets which are not directly in their line of sight. This Indirect Fire involves Artillery (high arcing shots which descend on the target), Ortillery (shots dropped from orbit on a target), or Bombing (shots dropped from flyers on a target). In most cases, Indirect Fire is controlled by a Forward Observer.

### The Observer Process

A Forward Observer identifies a Target, communicates with an Indirect Fire weapon operator, and tells it the Target's location identifiers (he may give coordinates by voice, or transmit data).

On the Forward Observer's command (Fire One!) by communicator, the weapon shoots one ranging shot. It arrives in the next Round.

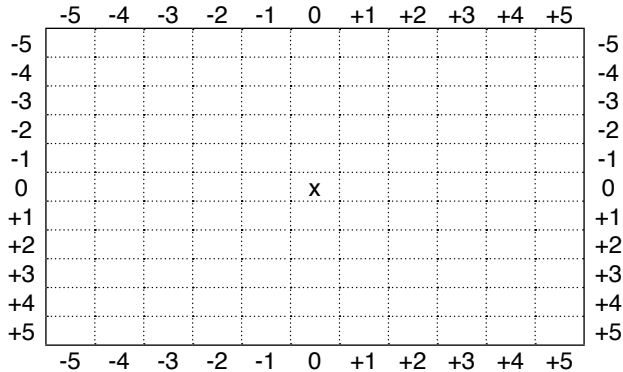
The shot may deviate from a direct hit: roll Flux twice: once for vertical deviation and once for horizontal deviation.

The Forward Observer observes the impact of the shot.

**Hit!** If it hits, he tells the weapon operator (Hit! Fire For Effect) and the weapon now fires one normal shot. It hits in the next Round.

**Miss!** If it misses, he tells the weapon operator (Miss! Up X Left Y) and the weapon fires a ranging shot. It hits in the next Round and the process repeats.

### THE OBSERVER METHOD



**Roll Flux twice:** apply it vertically and horizontally to determine where the shot actually hits. On each roll, apply Mod Forward Observer skill (with a sign as appropriate) but never beyond zero on the chart.

**Deviation Scale.** Indirect Fire weapons deviate in units of 50 meters. This may keep the hits in the same Range Band, or may move it to another Range Band.

### The Designator Process

A Forward Observer identifies a Target and is working with either a Remote weapon slaved to the Designator, or with an Indirect Fire weapon at another location.

### Indirect Fire Weapons

The FO is using a Designator. He activates the Designator and fires at the Target.

**Hit!** If he hits, he Triggers the Indirect Fire Weapon, which then fires and will hit in the next Round. The operator must fire again in the next Round to Redesignate the Target.

A Designator must Hit, but need not Penetrate.

**Pre-Shot.** An operator may Trigger the Indirect Fire Weapon before he attempts to Designate a Target. In the next Round, he Designates the Target: if he hits, the Indirect Fire Weapon also hits; if he misses, the Indirect Fire Weapon also misses (roll Flux twice for Deviation- it has to hit somewhere).

**Designate and Forget.** Designators which use Spray leave a residue on the Target. Once it has been hit, the operator may pursue other activities.

### Remote Indirect Weapons

A Remote weapon is emplaced at a location and slaved to an operator's Designator. When the Designator is fired, the Remote is automatically ready to fire in support.

**Triggered Operation.** The Designator fires at the Target. If it hits, the user Triggers the Remote weapon, which fires at the designated target and hits in the next Round.

A Designator must Hit, but need not Penetrate.

**Automatic Operation.** The Designator fires at the Target, and the Remote automatically fires at the same time.

A Designator must Hit, but need not Penetrate. If the Designator misses, then the Remote misses.

**Fighting Task.** The C+S for a Remote depends on its installation.

Char = Weapon Quality (if not already known, roll 2D-2).  
Skill = Installation.

To Install A Remote Weapon  
2D < Dexterity + Fighting  
Installation = Assets minus the Die Roll.

Deviation away from a target can generally be considered a miss but occasionally based on the situation the Referee can rule that a fire mission found an alternate target

# MILITARY EXPLOSIONS



Gr	Grenade	Military Explosions				
		Versus		----- Inflicts -----		
R=	Proximity	1D-1	Blast	Bang	Frag	Flash
1	Hit	0	1	2	1	
2	Near Miss	1		1		
3	Miss	2				

**Grenade** is hand (or manipulator) thrown.

AF	Anti-Flyer	Military Explosions				
		Versus		----- Inflicts -----		
R=	Proximity	1D-1	Blast	Bang	Frag	Pen
1	Hit	0	5	3	10	4
2	Near Miss	1	3	2	5	
3	Miss	2	1	1	3	

**Anti-Flyer Warhead** attacks flyers

FB	Flash-Bang	Military Explosions				
		Versus		----- Inflicts -----		
R=	Proximity	1D-1	Blast	Bang	Frag	Flash
1	Hit	0	1	4	1	6
2	Near Miss	1		2		3
3	Miss	2				

**Flash-Bang** is a distracting device.

AA	Anti-Armor	Military Explosions				
		Versus		----- Inflicts -----		
R=	Proximity	1D-1	Blast	Bang	Frag	Pen
1	Hit	0	2	2	1	5
2	Near Miss	1	1	1		
3	Miss	2				

**Anti-Armor Warhead** attacks tanks and vehicle armor.

IED	Improvised	Military Explosions				
		Versus		----- Inflicts -----		
R=	Proximity	1D-1	Blast	Bang	Frag	Flash
1	Hit	0	2	3	2	1
2	Near Miss	1	1	2	1	
3	Miss	2		1		

**Improvised Explosive Device.** Remotely triggered..

AA+	Heavy Anti-Armor	Military Explosions				
		Versus		----- Inflicts -----		
R=	Proximity	1D-1	Blast	Bang	Frag	Pen
1	Hit	0	2	2	1	10
2	Near Miss	1	1	1		
3	Miss	2				

**Hvy AA** (upgraded) attacks tanks and vehicle armor.

Ar	Artillery Shell	Military Explosions				
		Versus		----- Inflicts -----		
R=	Proximity	1D-1	Blast	Bang	Frag	Pen
1	Hit	0	3	4	5	3
2	Near Miss	1	2	3	3	
3	Miss	2	1	2	1	

**Artillery Shell** is incoming attack by distant artillery;

AAm	Anti-Armor Mine	Military Explosions				
		Versus		----- Inflicts -----		
R=	Proximity	1D-1	Blast	Bang	Frag	Pen
1	Hit	0	2	3	2	10
2	Near Miss	1	1	2	1	
3	Miss	2		1		

**AA Land Mine ignores individuals;** attacks ground vehicle which moves into the same Range Band..

Or	Ortillery Shot	Military Explosions				
		Versus		----- Inflicts -----		
R=	Proximity	1D-1	Blast	Bang	Frag	Flash
1	Hit	0	1	2	1	
2	Near Miss	1		1		
3	Miss	2				

**Ortillery Shot** is an incoming attack from orbit (an alternative to Ortillery missiles).

APm	Land Mine	Military Explosions				
		Versus		----- Inflicts -----		
R=	Proximity	1D-1	Blast	Bang	Frag	Flash
1	Hit	0	1	2	1	
2	Near Miss	1		1		
3	Miss	2				

**Land Mine** attacks individual who moves into the same Range Band.

A successful attack by these weapons is not necessarily a Direct Hit. Roll 1D-1 and implement the noted Effects instead. A result which is off the table has no effect.



# WEAPONS OF MASS DESTRUCTION

<b>N</b> PLAGUE "NI"		Biological Weapon			
		Versus		----- Inflicts -----	
<b>R=</b>	Proximity	1D-1	Gas	Infect	Poison
0	Direct Hit	0	3	6	1
1	Hit	1	3	4	
2	Near Miss	2	3	2	
3	Miss	3+	0		

**Ni** is a contact bio-weapon.  
It degrades 1 per month.

<b>D</b> PLAGUE "DA"		Biological Weapon			
		Versus		----- Inflicts -----	
<b>R=</b>	Proximity	1D-1	Gas	Infect	Poison
0	Direct Hit	0	3	3	3
1	Hit	1	3	2	2
2	Near Miss	2	3	1	1
3	Miss	3+	0		

**Da** is an air-borne infectious bio-weapon.  
It degrades after one day.

<b>R</b> RADIATION POINT SOURCE "RUUN"		Radiation Weapon		
		Versus		----- Inflicts -----
<b>R=</b>	Proximity	1D-1	Rad	Rad
0	Direct Hit	0	9	5
1	Hit	1	6	4
2	Near Miss	2	3	2
3	Miss	3+	0	

**Ruun** is a radioactive object.  
It does not degrade.

<b>Kh</b> DUST "KH"		Radiation Weapon			
		Versus		----- Inflicts -----	
<b>R=</b>	Proximity	1D-1	Gas	Infect	Poison
0	Direct Hit	0	6	6	
1	Hit	1	4	4	
2	Near Miss	2	2	2	
3	Miss	3+	0		

**Khulanii** is a radioactive area dust contamination.  
It does not degrade.

<b>G</b> POISON GAS "GALI"		Chemical Weapon				
		Versus		----- Inflicts -----		
<b>R=</b>	Proximity	1D-1	Gas	Suff	Poison	Stench
0	Direct Hit	0	3	10	5	0
1	Hit	1	3	8	4	0
2	Near Miss	2	3	2	2	0
3	Miss	3+	0	0	0	0

**Gali** is an odorless suffocating gas.  
It degrades 1 per minute.

<b>Z</b> POISON GAS "ZALA"		Chemical Weapon				
		Versus		----- Inflicts -----		
<b>R=</b>	Proximity	1D-1	Gas	Suff	Poison	Stench
0	Direct Hit	0	3	2	10	5
1	Hit	1	3		8	4
2	Near Miss	2	3		2	2
3	Miss	3+	0		0	0

**Zala** is a poison gas with an identifiable odor.  
It degrades 1 per ten minutes. Scent=

<b>T</b> CROWD CONTROL GAS "TAT"		Chemical Weapon				
		Versus		----- Inflicts -----		
<b>R=</b>	Proximity	1D-1	Gas	Suff	Poison	Stench
0	Direct Hit	0	3	3	1	7
1	Hit	1	3	2		4
2	Near Miss	2	3	1		2
3	Miss	3+	0			1

**Tat** is a non-lethal gas.  
It degrades 1 per minute. Scent=

<b>V</b> CONTACT POISON "VON"		Chemical Weapon			
		Versus		----- Inflicts -----	
<b>R=</b>	Proximity	1D-1	Poison	Poison	Tranq
0	Direct Hit	0	3	5	6
1	Hit	1	3	4	3
2	Near Miss	2	3	1	1
3	Miss	3+	0		

**Von** is a surface contaminant.  
It does not degrade.

A successful attack by these weapons is not necessarily a Direct Hit. Roll 1D-1 and implement the noted Effects instead. A result which is off the table has no effect.

<b>R=</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>
Range	Contact	Vshort	Short	Medium	Long	Vlong	Distant	VDistant	Orbit	Far Orbit
Distance	0m	5 m	50 m	150 m	500 m	1000 m	5000 m	50 km	500 km	5000 km

# NUCLEAR WEAPONS



<b>ME4</b>		<b>Massive Explosion</b>			<b>Missile Warhead</b>		<b>Also suitable for</b>
R=	Proximity	1D-1	Blast	BFE*	Burn	Rad	
0	Direct Hit	0	30	30	30	30	Emplaced Demolitions Suitcase Bomb
1	Hit	1	25	25	25	25	
2	Hit	2	10	12	12	20	
3	Vnear Miss	3	5	6	3	20	
4	Near Miss	4	1	4	1	5	
5	Far Miss	5		2		3	

Missile Warhead or Bomb. Size=4

<b>ME5</b>		<b>Massive Explosion</b>			<b>Missile Warhead</b>		<b>Also suitable for</b>
R=	Proximity	1D-1	Blast	BFE*	Burn	Rad	
0	Direct Hit	0	50	50	50	50	Tactical Nuke Tactical Aircraft Bomb Regional Range Weapon Ortillery
1	Hit	1	40	40	40	40	
2	Hit	2	30	30	30	30	
3	Vnear Miss	3	10	12	12	20	
4	Near Miss	4	5	6	3	20	
5	Far Miss	5	1	4	1	5	

Missile Warhead or Bomb. Size=5

<b>ME6</b>		<b>Massive Explosion</b>			<b>Missile Warhead</b>		<b>Also suitable for</b>
R=	Proximity	1D-1	Blast	BFE*	Burn	Rad	
0	Direct Hit	0	100	100	100	100	Strategic Nuke Strategic Bomber Intercontinental Weapon Ortillery
1	Hit	1	90	90	90	90	
2	Hit	2	80	80	80	80	
3	Vnear Miss	3	50	50	50	50	
4	Near Miss	4	10	12	12	20	
5	Far Miss	5	5	6	3	20	

Missile Warhead or Bomb. Size=6

<b>ME7</b>		<b>Massive Explosion</b>			<b>Missile Warhead</b>		<b>Also suitable for</b>
R=	Proximity	1D-1	Blast	BFE*	Burn	Rad	
0	Direct Hit	0	200	200	200	200	Strategic Nuke Strategic Bomber Intercontinental Weapon Ortillery
1	Hit	1	100	100	100	100	
2	Hit	2	50	50	50	50	
3	Vnear Miss	3	20	20	20	20	
4	Near Miss	4	10	5	1		
5	Far Miss	5	2	1			

Missile Warhead or Bomb. Size=7

## MASSIVE EXPLOSIONS

Warheads shown here are assumed to be Nuclear. Results are adaptable to AM Anti-Matter and Conventional Explosives.

Size-4-5-6-7 Warheads inflict Massive Explosion.

\*BFE = Bang, Flash, and EMP each in this amount. For example, a Direct Hit by an ME4 Suitcase-Nuke inflicts 180D in various Damage (30D each for Blast, Bang, Flash, EMP, Burn, and Rad).

**Explosive Non-Nuke= /10**  
inflicts one-tenth damage. Ignore EMP and Rad Effects.

**AM Anti-Matter x 3**  
inflicts triple damage. Ignore EMP and Rad Effects.

**KK Kinetic Kill x 2**  
inflicts double damage shown. Ignore EMP and Rad. Substitute Pen for Burn.

**Dirty Bomb Option x 4**  
inflicts 4x Rad effect shown.

**Vacuum Environ /10**  
inflicts one-tenth blast. Bang=0.

**Many Dice.** Many of the results on these Tables can be implemented more quickly using the Many Dice Rules.

A successful attack by these weapons is not necessarily a Direct Hit. Roll 1D-1 and implement the noted Effects instead. A result which is off the table has no effect.

R=	0	1	2	3	4	5	6	7	8	9
Range	Contact	Vshort	Short	Medium	Long	Vlong	Distant	VDistant	Orbit	Far Orbit
Distance	0m	5 m	50 m	150 m	500 m	1000 m	5000 m	50 km	500 km	5000 km





# ENVIRONMENTAL EFFECTS

	Code	Event	Effect1	Effect2	Effect3	Comment	TC
Temperature		Extreme Cold	Cold-25			HZ+2 and outer= - 100 C	Fr
		Intense Cold	Cold-16			= - 75 C	
		Very Cold	Cold-2			HZ+1	Tu
		Cold	Cold-1			= 0 C	
		Temperate	-none-			Temperate World	
		Hot	Heat-1			= 50 C	
		Very Hot	Heat-2			HZ -1	Tr
		Intense Heat	Heat-16			= +125 C	
		Extreme Heat	Heat-25			HZ -2 and inner = +150 C	
		Slow Reentry	Heat-50			= +200 C	
		Reentry	Heat-2000			Typical orbital reentry =	
	Reentry Plus	Heat-3000			Orbital reentry to Dense Atm =8+		
Atmosphere	0	Vacuum	Suff-3				Va
	1	Trace	Suff-3				
	2	Very Thin Tainted	Suff-2	Poison-1		Combination-5	
	3	Very Thin	Suff-2			Respirator-5	
	4	Thin Tainted	Suff-1	Poison-1		Combination-5	
	5	Thin	Suff-1			Respirator-5	
	6	Standard	-none-				
	7	Standard Tainted		Poison-1		Filter-3	
	8	Dense	-none-				
	9	Dense Tainted		Poison-1		Filter-3	
	A	Exotic	Suff-1 or	Infection-1 or		Breather-9 or Rebreather-10	
	B	Corrosive	Corrode-1	Poison-1			
	C	Insidious	Corrode-2	Poison-2			
	D	Dense High	-none-				
	E	Ellipsoid					
	F	Thin-Low	Suff-1			Respirator-5	
	Underwater	Suff-2			for Air Breathers		
	Smoke, Dust	Suff-1					
	Heavy Smoke	Suff-2					
	Chemical Smoke	Suff-2	Poison-1				
Impacts, Falls and Collisions		Trip and Fall	Wound-1			(substitute Hit for equipment)	
		Hi-G Trip and Fall	Wound-2				
		Very High Fall	Wound-N			N= Range/ Altitude.	
		One-Story Fall	Wound-2			Height = 3 meters	
		Traffic Collision	Wound-N			N= Speed.	
	Crash	Wound-N			N= Speed-3 or greater.		
Weather		Storm	Blast-1-2				
		Blizzard	Blast-1-2	Cold-1-2-3		Or use Cold Benchmark Hits	
		Hurricane	Blast-1-2-3				
		Tornado	Blast-2-3-4				
		Hail	Frag-1-2				
		Typhoon	Blast-1-2				
		Turbulence	Blast-1-2				
		Scirroco	Blast-1	Hot-1-2-3		Hot Winds.	
		Lighting	Elec-5				
		Thunder	Bang-5				
		Bright Sun	Flash-1-2	Hot-1-2-3		Unrelenting Desert Sun	

# MORE ENVIRONMENTAL EFFECTS



	Event	Effect1	Effect2	Effect3	Comment
Events and Encounters	Volcanic Eruption	Blast-1	Frag-1	Burn-1	
	Allergic Reactions	Tranq-1-2-3			Actual Effects vary wildly
	Poison Reactions	Poison-1-2-3			
	Fire	Burn-1-2-3			
	Loud	Bang-1			
	Decompression	Suff-2			
	Flood	Cold-1	Suff-2		
	Rough Vegetation	Cut-1			Thorns.
	Plague	Infection-1-2-3			
Short Circuit	Elec-2				
	Event	Effect1	Effect2	Effect3	Comment
Stars and Space	Star	Flash-3	Heat-3		In Space. Quite Close
	Star	Flash-2	Heat-2		In Space. Closer Than HZ
	Star	Flash-1	Heat-1		In Space. In Habitable Zone
	Star				In Space. Farther Than HZ.
	Vacuum	Suff-3			
	Stellar Flare	Flash-4	Rad-1-2-3	EMP-1	In Space.
	Nova	Flash-9	Heat-9	EMP-4	In Space. Quite Close
	Nova	Flash-7	Heat-7	EMP-3	In Space. Closer Than HZ
	Nova	Flash-5	Heat-5	EMP-2	In Space. In Habitable Zone
	Nova	Flash-3	Heat-3	EMP-1	In Space. Farther Than HZ.
		Inflicts	Intensity		
Animal Weapons	Horns, Antlers	Cut	= Str Dice	(=Dice required to generate Str).	
	Tusks, Fangs	Cut	= Str Dice		
	Teeth	Cut	= Str Dice		
	Claws	Cut	= Str Dice		
	Hooves	Blow	= Str Dice		
	Spikes	Cut	= Str Dice		
	Quills	Cut	= Str Dice		
	Sting	Poison	= Str Dice	or Tranq	
	Manipulator	Blow	= Str Dice	Gripper, Grasper, Hand/ Fist, Tentacle, Paw.	
Ped	Blow	= Str Dice	Any foot-like appendage.		
Thag	Blow	= Str Dice	Any tail capable of delivering a blow		
To and From Orbit	Slow Boost	Heat-10			Typical slow climb to orbit
	Slow Reentry	Heat-20			Typical slow descent from orbit
	Fast Boost	Heat-20			Typical fast climb to orbit
	Fast Reentry	Heat-1000			Typical reentry
	Meteoritic	Heat-2000			
Radiation	Non-Radioactive	-none-			
	Mildly Radioactive	Rad-1			
	Radioactive	Rad-2			
	Highly Radioactive	Rad-3			
	Stellar Flare	Rad-1-2-3	EMP-2		
	Nuclear Explosion Fallout	Rad-1-2-3 Rad-1-2-3			Otherwise quite distant.



# BATTLE DAMAGE

## THE PROBLEM

The Referee determines the details of the damage or malfunction. The three details are Location, Severity, and Diagnosis.

**L1 or L2 Location.** Determine the location of the problem.

**S Severity of Damage.** Determine the difficulty of repairing the problem. Typically, Damage Severity equals Hits divided by 2.

**D Diagnosis Severity.** Determine the difficulty of diagnosing the problem. The Referee now knows where the problem is, its diagnosis difficulty, and its repair difficulty.

For example,

Sensors, Easy Diagnosis, Difficult Repair.

Navigation, Staggering Diagnosis, Staggering Repair.

Until the Diagnosis is successful, the Repair task cannot be attempted.

## WHAT WENT WRONG?

Characters first diagnose the problem.

To diagnose why this object doesn't work. Uncertain (Difficulty minus 3).

Difficulty (nD) < Int + Skill + Diagnostic Tools  
Uncertain (Difficulty minus 1).

Mod +1 for each successive diagnosis attempt.

## LET'S FIX IT!

Based on diagnosis, characters repair the problem.

To **replace** a malfunctioning component  
Severity (nD) < Int + Skill + 1  
Item must be available as a spare.

To **repair** a malfunctioning component  
Severity (nD) < Int + Skill  
Uncertain (1D)

A failed repair increases next Repair Severity +1.

## PICKING A SKILL

A character can volunteer that their particular skill applies to the diagnosis and repair. Obviously wrong skills can be dismissed (the referee says: "You don't understand this thing."). Appropriate skills apply negative Mods as appropriate.

## USEFUL SKILLS

- Biologics
- Craftsman
- Electronics
- Fluidics
- Gravitics
- Magnetics
- Mechanic
- Photonics
- Polymers
- Programmer
- Medical

L1 DAMAGE LOCATION						
2D	Ship	Vehicle	Heavy Weapon	Armor	Anatomical	Biological
2	Bridge	Comms	Controls	Controls	Head	Brain
3	Hold	Cargo	Mount	Interior	Head	Senses
4	Sensors	Sensors	Sights	Visor	Limb-Group-1	Circulation
5	Protections	Protections	Shields	Protections	Limb-Group-2	Skeleton
6	Life Support	Life Support	Stocks	Life Support	Torso	Respiration
7	Drives	Locomotion	Barrel	Locomotion	Torso	Skin
8	Power Plant	Power Source	Power	Power	Torso	Digestion
9	Hull	Body Panels	Frame	Torso	Limb-Grip-3	Elimination
10	Weaponry	Weaponry	Ammunition	Manipulators	Limb-Grip-4	Muscle
11	Astrogation	Navigation	Mechanism	Navigation	Graze	Skin
12	Computer	Computer	Computer	Computer	Graze	Skin

L2 THING DAMAGE LOCATION			
1D	Device	Tool	Weapon
1	Case	Case	Frame
2	Power	Power	Ammunition
3	Input	Adjuster	Sights
4	Output	Toolhead	Barrel
5	Controls	Grip	Grip
6	Processor	Safety	Mechanism

For any device, tool, or weapon, inflict damage on an appropriate identified or similar component.

S DAMAGE SEVERITY	
H/2	Difficulty
1	Easy 1D
2	Average 2D
3	Difficult 3D
4	Formidable 4D
5	Staggering 5D
6	Hopeless 6D
7	Impossible 7D
8	Beyond 8 D
9	Destroyed

D DIAGNOSIS SEVERITY	
1D	Difficulty
1	Easy 1D
2	Average 2D
3	Difficult 3D
4	Formidable 4D
5	Staggering 5D
6	Hopeless 6D
7	Impossible 7D
8	Beyond 8 D
9	Destroyed

IMMEDIATE ACTION DAMAGE CONTROL	
<b>Check Double Skill (2D)</b>	
Use any appropriate skill. Success converts the damage to Severity= Easy 1D and the component remains operable. Not Possible if Damage above 6D	

# BEHIND-THE-SCREEN DAMAGE BTSD



Referees occasionally encounter dangerous situations not otherwise covered by the general body of rules. They must, in such circumstances, create the results quickly and reasonably. BTSD Behind The Screen Damage allows a referee to roll dice using a single procedure to produce rational results with a minimum of preparation.

BTSD is rolled secretly (Behind The [Referee's] Screen) when rules do not otherwise cover the situation, or when time is short. It produces results that can be quickly and easily interpreted and imposed.

**Assumptions.** BTSD assumes that a situation has come out negatively, and that the character faces potential consequences in the form of injury or wounding, or that an object or piece of equipment faces some level of damage.

**Using Bad Flux:** Bad Flux is a variant of Flux which produces only negative results (average - 2, ranges from - 1 to - 5). Roll 2D and subtract the larger result from the smaller result.

**With Negative Focus.** BTSD concentrates on negative consequences; once consideration moves to BTSD, the best that can occur is a "no-result."

## MODS TO BTSD

BTSD is eligible for various Mods, but the spirit of BTSD allows only minimal Mods.

For Example, Eneri and Aia are racing across a solidified lava plain just after the adjacent volcano begins an unexpected eruption. Hot ash is falling all around, and it is impossible for them to complete their dash to the safety of their ATV without some consequences. There isn't time for the Referee to make up falling ash rules, and he doesn't want to be arbitrary in imposing damage. He decides that each of the two is subject to one possible injury. He turns to BTSD and selects two dice.

**Eneri** is wearing ordinary clothing and receives no Mods. The Referee rolls 2 and 1. Subtract the larger from the smaller for a result of -1. Eneri suffers a slight wound.

**Aia** is wearing Mesh (= heavily clothed) and receives Mod +1. The Referee rolls 4 and 1. Subtract the larger from the smaller for a result of -3; Mod +1 gives a final result of -2. Aia receives a Light wound.

**The ATV.** The Referee decides the ATV is also subject to possible damage. The Referee rolls 6 and 6. Subtract the larger from the smaller for a result of 0. The ATV suffers a Scratch of no particular consequence (the characters can probably buff that out later).

BTSD BEHIND-THE-SCREEN-DAMAGE				
Roll	Wound	Damage	N	N%.
-7	Complete	Total	0	0%
-6	Disastrous	Near Total	0	0%
-5	Very Heavy	Very Heavy	2	6%
-4	Heavy	Heavy	4	11%
-3	Common	Common	6	17%
-2	Light	Light	8	22%
-1	Slight	Surface	10	27%
0	Scratch	Scratch	6	17%
+1			0	0%
+2			0	0%
+3			0	0%
+4			0	0%
+5			0	0%
+6			0	0%

**Wounding** applies to characters.  
**Damage** applies to equipment.

BTSD MODS		
Mod	Protections	Actions
-7		
-6		
-5		
-4		
-3		
-2		
-1		
0	Typical	Typical
+1	Heavily Clothed	Dodging
+2	Armored	
+3	Heavily Armored	
+4		
+5		
+6		

Protections apply to clothing or equipment;  
Actions apply to movement or position.



# GunMaker and ArmorMaker Output Samples

Abbrev	LongName
P-5	Pistol -5 R=2 Cr150 1.1 kg Bullet -1
Re-4	Revolver -4 R=2 Cr100 1.2 kg Bullet -1
C-5	Carbine -5 R=4 Cr400 3 kg Bullet -1
XC-3	Experimental Carbine -3 R=3 Cr1600 6 kg Bullet -1
PC-6	PC-6 Poison Dart Carbine -6 R=4 Cr360 3.0 kg Poison -1 Bullet -1
R-5	Rifle -5 R=5 Cr500 4 kg Bullet -2
PR-4	Prototype Rifle -4 R=4 Cr1500 7.6 kg Bullet -2
XR-3	Experimental Rifle -3 R=4 Cr2000 8 kg Bullet -2
SR-5	SR-5 Survival Rifle -5 R=2 Cr600 2 kg Bullet -3
Mg-6	Machinegun -6 R=5 Cr3000 8 kg Bullet -4
aCT-9	AutoCannon Turret -9 R=6 Cr30000 300 kg Pen-5
ESMg-4	Early Sub Machinegun -4 R=1 Cr3240 4 kg Bullet -3
XRSMg-4	Experimental Recoilless Sub Machinegun -4 R=0 Cr32,400 5.7 kg Bullet -5
ABR-9	ABR-9 Advanced Battle Rifle -9 R=5 Cr800 3.2 kg Bullet -7
ABC-9	ABC-9 Advanced Battle Carbine -9 R=5 Cr640 2.4 kg Bullet -6
ACR-10	ACR-10 Advanced Combat Rifle -10 R=3 Cr1500 2.8 kg Bullet-4 Frag -2
ACC-10	ACC-10 Advanced Combat Carbine -10 R=3 Cr1200 2.1 kg Frag -2 Bullet -3
AC-7	AC-7 Assault Carbine -7 R=4 Cr600 2.4 kg Bang -2 Blast -1 Bullet -1
GC-12	GC-12 Gauss Carbine -12 R=4 Cr800 2.7 kg Bullet -4
MsL-7	MsL-7 Missile Launcher -7 R=6 Cr5000 22 kg Pen-2 Frag -3
RAML-8	RAML-8 RAM Grenade Launcher -8 R=6 Cr3000 10 kg Frag -2 Blast-2
GmL-9	GmL-9 Grenade Multi-Launcher -9 R=4 Cr3000 6.48 kg Frag -2 Blast-2
ShPj-9	ShPj-9 Shock Projector -9 R=2 Cr600 0.5 kg Pain -2 Elec -2
FPj-8	Fire Projector -8 R=1 Cr600 0.9 kg Burn-1 Pen-1
APj-9	Acid Projector -9 R=3 Cr900 1 kg CORRODE-3 Pen-0
SPj-12	Stench Projector -12 R=2 Cr360 0.4 kg Stench -1
LD-12	Laser Designator -12 R=5 Cr12,000 12 kg Burn -2, Pen-2

Abbrev	LongName	Cost	Mass	Ar=	Ca=	Fl=	Ra=	So=	Ps=	In=	Se=
VS-9	Vacc Suit -9	Cr10000	10	10	05	00	01	01	01	05	05
CS-7	Cold Suit -7	Cr200	2	02	01	01	01	01	01	06	01
PrS-12	ProtectedSuit -12	Cr1000	3	04	01	01	02	01	01	03	04
HS-6	Hot Suit -6	Cr600	3	04	07	05	05	05	01	05	05
EnvS-7	Environ Suit -7	Cr1500	5	08	04	04	01	04	01	20	10
CS-7	Cold Suit -7	Cr200	2	02	01	01	01	01	01	06	01
VS-9	Vacc Suit -9	Cr10000	10	10	05	00	01	01	01	05	05
HES-6	Hostile Environ Suit -6	Cr8000	12	16	01	01	08	01	01	08	12
( St ) BD-14	Standard Battle Dress -14	Cr200000	100	45	30	30	30	30	05	30	30
( A ) BD-16	Advanced Battle Dress -16	Cr400000	80	55	40	40	40	40	05	40	40
( A ) CbtD-16	Advanced Combat Dress -16	Cr320000	64	46	34	34	34	34	04	34	34
( Alt ) ProU-12	Alternate Prospector Unit -12	Cr396000	440	13	09	07	07	07	04	11	15
( BT ) SS-10	Basic Titan Sapper Suit -10	Cr147000	421	21	09	09	04	09	01	11	11
( AltVI ) EnvA-12	Alternate Vlight Environ Armor -12	Cr66000	9	28	12	12	03	12	04	60	30
BU-12	Battle Unit -12	Cr300000	500	20	10	10	10	10	05	10	10
HU-10	Hot Unit -10	Cr36000	60	08	14	10	10	10	01	10	10
HEU-10	Hostile Environ Unit -10	Cr480000	240	32	02	02	16	02	01	16	24
EnvU-11	Environ Unit -11	Cr90000	100	16	08	08	02	08	01	40	20

# The Armory

A continuing challenge for adventurers is their search for new weapons to help them in their quests.

Weapons are found in a wide variety of locations: gun shops, military surplus auctions, factories, even abandoned bases.

## ACQUIRING WEAPONS

Weapons are acquired in the course of adventures. While the simplest course of action would seem to be simply buying specific items,

**Weapons Shops.** The simplest and easiest source of weapons is a Weapons Shop. Regrettably, its selection is usually restricted to Pistols and Rifles.

**The Armory.** Each military unit maintains an armory in which its weapons are securely stored. An Armory has weapons suitable to the military unit's mission.

**Caches.** Weapons are occasionally stored in clandestine caches, in reserve for future use, or to avoid capture by enemy forces. Caches are fortuitously discovered or encountered by explorers.

**Property Disposal Yards.** Excess weapons are sent to property disposal yards for recycling. Useful weapons can sometimes be purchased as surplus.

**The Factory.** Weapons are often produced in quantity at local manufacturing facilities.

**Mustering Out Benefits.** Some characters acquire one or more weapons when they Muster Out.

## FOR EXAMPLE

Trader Captain Carl Hess and his friends are looking for some firepower for their 5-person crew. Astrogator Iridia Croi'Lasair is ex-Marine and talks her way into the Star Marine Property Disposal Yard. Browsing in the ordnance area, they find several weapons in crates.

The Referee creates some weapons:

Category = 3. Pistols. Type = 6 Revolvers. Re TL 5  
 Descriptor 1D = 5 (blank) TL 0  
 Burden 2D = 8 Magnum M TL 1  
 Stage 2D = 8 Modified. Mod TL 2  
 ModMRe 8

"Here's a crate of ModMRe-8's. Wow. This is the Imperial model with the dark satin finish!"

Category = 2. Guns. Type = 1 Gun. G TL 6  
 Descriptor 1D = 5 Gauss. G TL 7  
 Burden 2D = 4 Disposable. D TL 3  
 Stage 2D = 3 Prototype P TL -1  
 PDGG 15

"Look at this! PDGG-15, Prototype Disposable Gauss Guns-15. I've never even heard of these before.

Category = Projectors. Type = Projector Pj TL 7  
 Descriptor 2D = 10 Psionic Amp Psi TL 4  
 Burden 2D = 5 Heavy H TL 0  
 Stage 2D = 6 (blank) TL 0  
 HPsiPj 11

"Aren't these illegal? HPsiPj-11, Heavy Psionic Amplifier Projector-11. This makes my skin crawl. Ugh!"

"No, look, the manual is in Zhodani. How far is a gdasht? About a kilometer? These could reach us in orbit! No, that can't be right. That's a gdist. OK. Now I see. They can only reach to the horizon."

Category = 1 Guns. Type = 2 Gun. G TL 6  
 Descriptor 2D = 6 Plasma P TL 6  
 Burden 2D = 7 (blank) TL 0  
 Stage 2D = 6 (blank) TL 0  
 PG 12

(referee looks further, and adds a portability code = MP).

"What's in here? Plasma Gun Man Portable-12. These are still new in the crate. See if there are any BattleDress crates. How are we going to get this stuff back to the ship?"

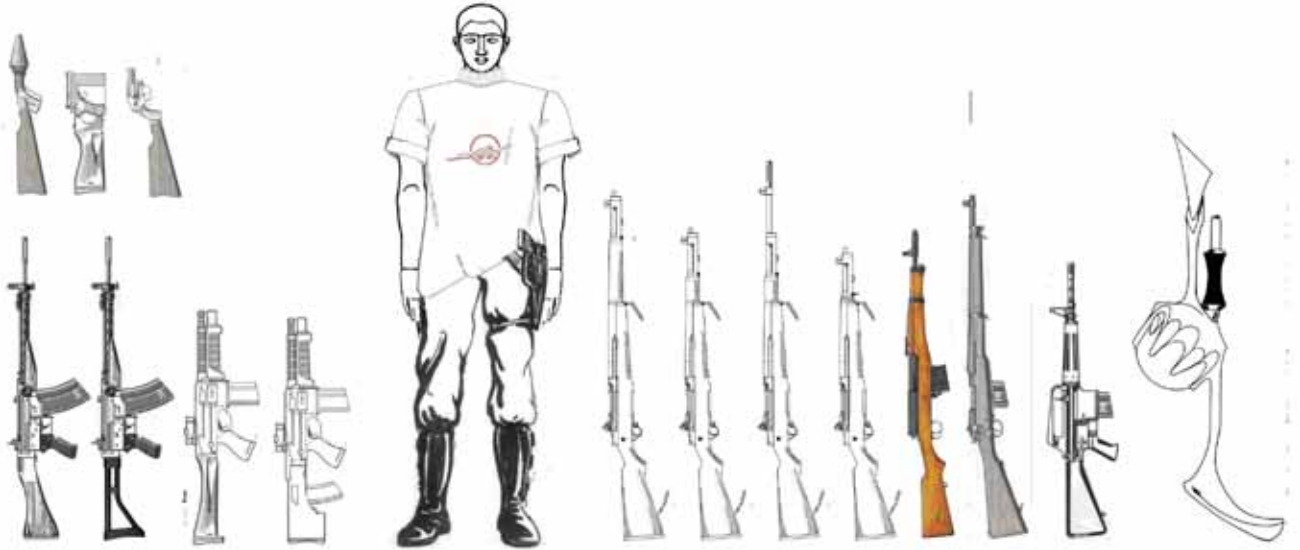
## TYPICAL WEAPONS AVAILABILITY

Location	Contents
Weapons Shop	10 different Rifle 10 different Pistol 3 different Shotgun
Armory	10 identical Rifle 5 identical Pistol 2 different Gun 2 different Projectors or Launcher
Cache	10 identical Rifle 5 identical Pistol 2 different Remote Weapon 1 Designator and 1 Launcher
Property Disposal	10 different Obsolete Weapon 5 different Prototype or Experimental 5 random weapons
Factory	4 different examples of a Weapon (all are As Issued)
Network Search	3 different examples of a Weapon (all are Used)
Muster Out	1 Player-Crafted Weapon

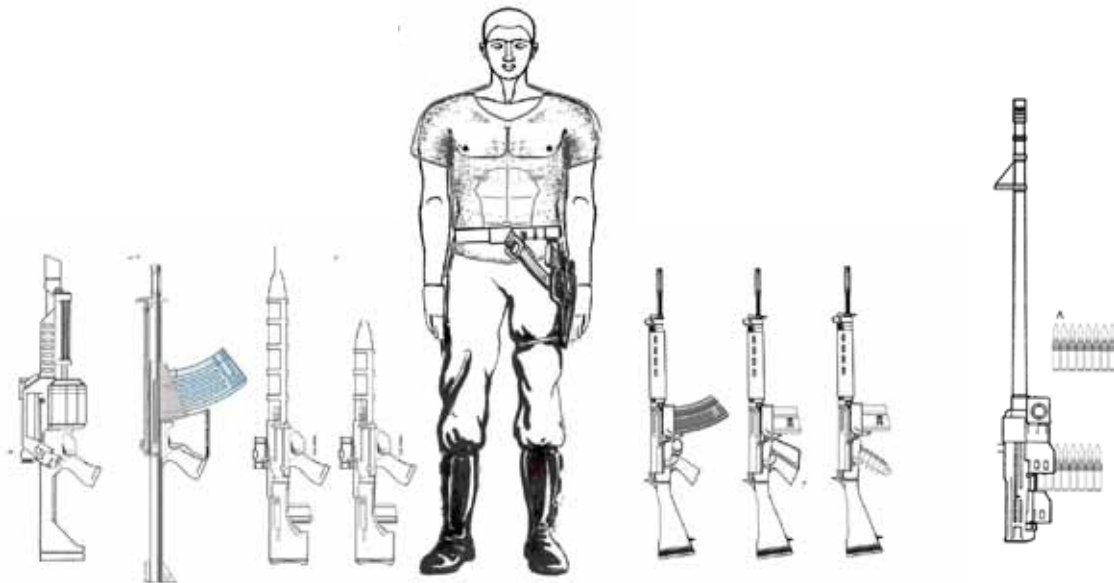


# 01 Weapons

**Left to Right (Upper Row):** Sonic Projector-12 with shoulder stock option. VRF Snub Pistol-8 with shoulder stock option. Snub Revolver-5 with shoulder stock option.

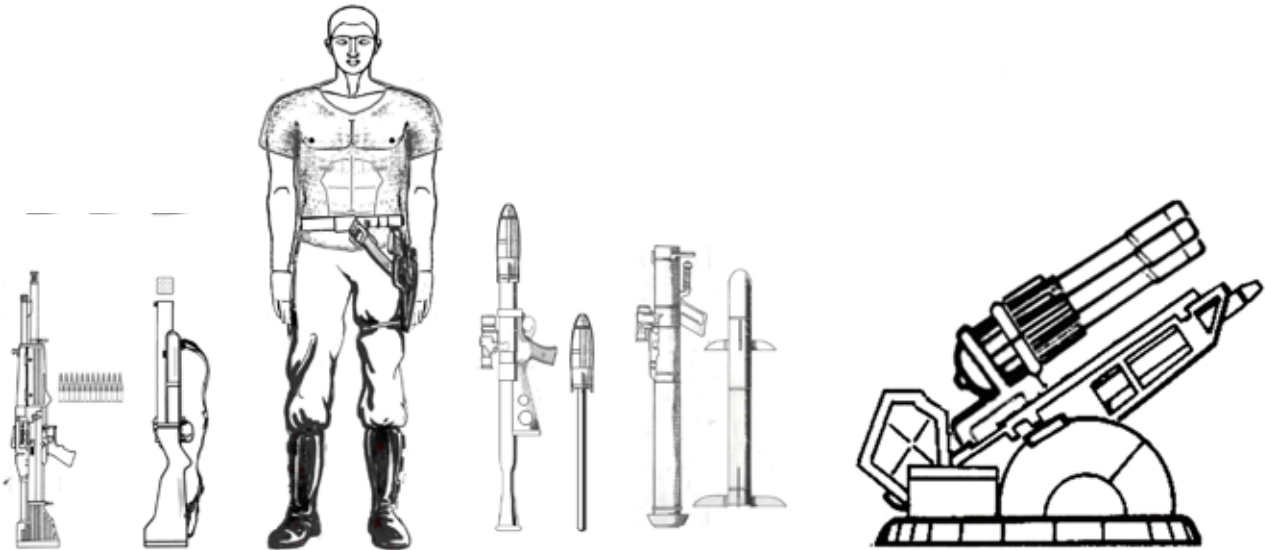


**Left to Right (Lower Row):** Battle Rifle-6. Battle Rifle-6 folding stock option. Grenade Multi-Launcher-9. Advanced Combat Rifle-10. [typical human]. Basic Rifle-5. Snub Rifle-6. Sniper Rifle-6. Basic Carbine-5. Alternate Rifle-5. Early Rifle-4. Early Battle Rifle-5. Alternate Light Combat Rifle-10 (Hiver).

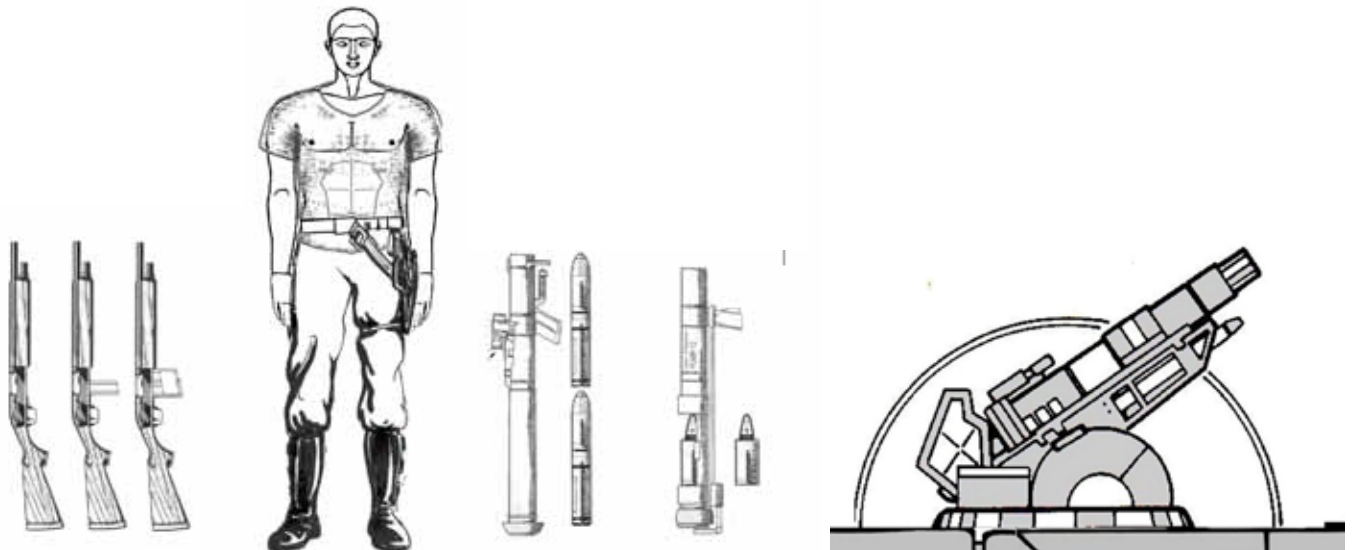


**Left to Right:** Heavy Grenade Multi-Launcher-9. Recoilless Combat Rifle-8. Gauss Rifle-12. Gauss Carbine-12. [typical human]. Combat Rifle-7. Combat Rifle-7 Grasper controls. Combat Rifle-7 Tentacle controls. Basic Heavy Machinegun-6.

# Weapons 02



**Left to Right:** Machine Gun-6. Splat Carbine-7. [typical human]. Light Rocket Launcher-5. Anti-Flyer Missile Launcher-10. Improved VRF Gatling Tank Mount -10.



**Left to Right:** Hunting Shotgun-4. Assault Shotgun-6. Improved Assault Shotgun-7. [typical human]. Anti-Tank Multi-Launcher-11. Experimental Recoilless Plasma Launcher Crewed -12. Advanced Assault AutoCannon-12 (Vehicle Mount)



**TYPES OF WEAPONS**

**Traveller** (gun-type) Weapons are differentiated by Type: there are seven different Types of Weapons based more or less on function.

A Gun is a relatively large projectile- or energy-firing artillery weapon created for distinctly military purposes.

A Rifle is a personal long-arm used by soldiers and by sportsmen.

A Pistol is a personal handgun intended to be operated with one hand.

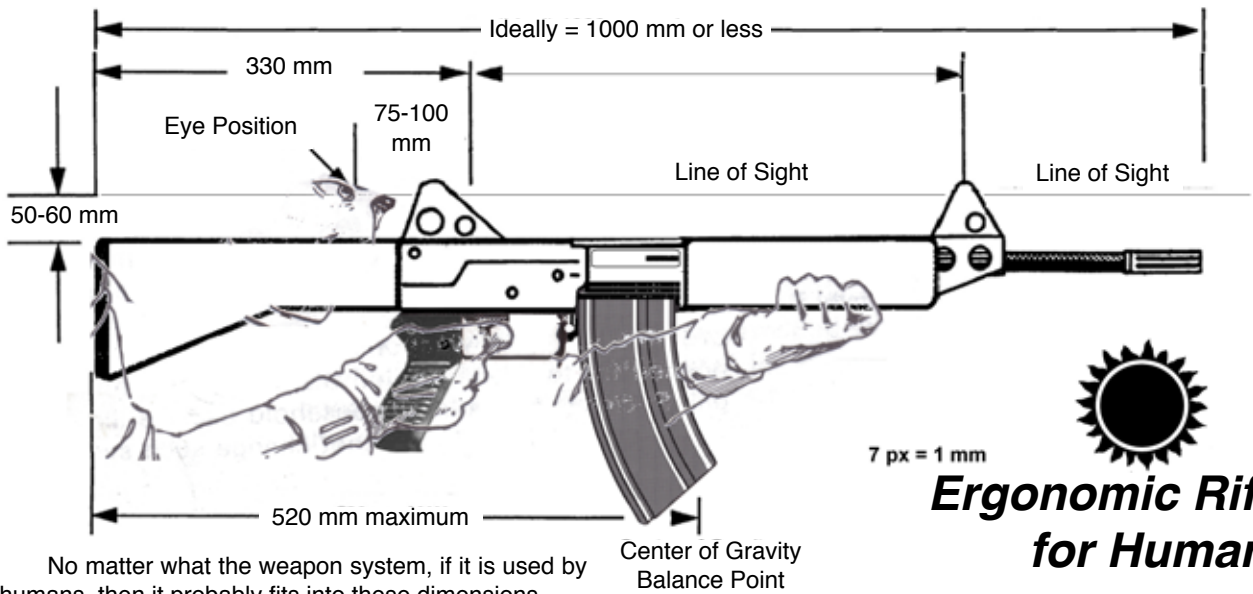
A Shotgun is a personal long-arm firing a group of shot pellets rather than single bullets.

A Machinegun is a military weapon firing multiple bullets in bursts with each pull of the trigger.

A Projector utilizes non-traditional technology not ordinarily or otherwise encountered.

A Designator marks or illuminates potential targets so that other weapons may attack them.

A Launcher ejects or launches self-propelled projectiles at a target.



No matter what the weapon system, if it is used by humans, then it probably fits into these dimensions.

Weapons are the tools that characters use for personal protection, for hunting, and for violence in pursuit of personal, corporate, and governmental goals.

Weapons are a natural consequence of, and element of, any tool-using sophont society: they are used (ideally) in situations that have escalated beyond non-violent personal interactions.

## UNDERSTANDING WEAPONS

Weapons are devices designed to inflict Effects (damage, injuries, wounds, destruction) on targets.

Each weapon has LongName which generally describes its principles and construction, and a Model which is an abbreviation of the LongName.

With an understanding of the principles of Weapons, Armor, Vehicles, and Combat, players can generally understand the relative worth of weapons from their LongNames and Models.

## USING WEAPONS

Weapons have Effects which inflict hits, wounds, injuries, or damage under the V1 or V2 hit systems.

**The Hit System V1.** The Basic Hit System (version 1) provides a simple hit mechanic for resolution of combat. V1 is intended for use with non-player characters (and especially hordes of NPCs) when speed of resolution is important.

**The Hit System V2.** V2 Damage inflicts different types of damage based on the specific weapon.

## CREATING WEAPONS

Weapons can be created randomly, or by design.

**Random Creation.** The GunMaker system produces weapons based on die rolls. Randomly created weapons can be used in a variety of encounters with adversaries, or to define trade goods.

**Design.** Weapons can be designed by substituting selections for die rolls in the Gunmaker system.

## DESCRIBING WEAPONS

Weapons can be described in many ways depending on the printed format required: any format is possible as long as it provides the information necessary for the situation.

### The Weapon Description

Weapons are described in a series of elements to form the LongName or abbreviated to form the Model. The LongName or Model contains enough information to allow a character to describe a weapon.

The LongName consists of the following elements:

Stage -Burden -Descriptor -Type -User -Portability - TL

**Stage** is the weapon's position in the spectrum of sophistication in the developmental life cycle. It is possible for Stage to be blank. For example, Prototype, Basic, or Advanced.

**Burden** identifies the relative weight, mass, or bulk of the weapon. It is possible for Burden to be blank. For example, Vlight, Light, Heavy, or Vheavy.

**Descriptor** elaborates on combat purpose, size, or the form of energy or injury it inflicts. It is possible for the Descriptor to be blank. For example, Laser or Survival.

**Type** identifies the basic function of the weapon. For example, Carbine. Type is required.

**User** identifies the intended or designed user, either by sophont, or by manipulator. Blank assumes the user is Human or Man or Hand. For example, a weapon may be identified by Sophont: Man, Vargr, Hive, or by the using manipulator: Tentacle, Grasper, or Gripper.

**Portability** identifies the relative size of the weapon.

**Tech Level** identifies the Technological Level at which the Weapon is commonly manufactured. TL is required.

The Identifying Weapons Chart shows the various component names and abbreviations.

Elements of a LongName not necessary for a proper understanding may be omitted; User and Portability are often omitted for basic weapons.

**Model.** LongName elements have abbreviations which are used to create the weapon Model.

Model is a jargon abbreviated Longname. Once a character is familiar with a specific weapon, references to it devolve to its abbreviation. P-5 is a Tech Level 5 Pistol. When used, Stage and Burden may be enclosed in parens to increase comprehension (some familiarity is required before players can quickly understand aFmLC-12).

Given the restrictions of the alphabet, element abbreviations are not necessarily unique.

### The Weapon Extension

The capabilities of a weapon are contained in the Weapon Extension. This string of values details enough information to allow a character to use a weapon. The Weapon Extension is a variable length string: only such information as is needed is included.

**The Wx: Prefix.** The Weapons extension begins with the prefix Wx:

## WEAPON DESCRIPTION

Model LongName (Stage-Burden-Descriptor-Type-User-Portability-TL)

--	--

The basic information required to describe a weapon.

## WX: WEAPON EXTENSION

Range Cost Mass QREBS Effects

Wx:	R=	Cr	kg	B=			
-----	----	----	----	----	--	--	--

The basic information required to use a weapon.

**The Elements.** Following the prefix, the Weapons Extension includes

Wx: Range - Cost - Mass - qreBs - Effects

Range (R=N usually a number from 0 to 5 or 6 or 7) is the maximum effective range of a weapon. Beyond this range, it is impossible to hit a reasonable target. Some weapons have options which increase this Range.

**Cost.** The cost of the weapon in Credits.

**Mass.** The mass (more-or-less the weight) of the weapon expressed in kilograms (unless otherwise identified).

**QREBS.** The QREBS values for the weapon (if known). Various formats are used to identify specific QREBS values, and care must be taken to avoid confusion with Range if Reliability is shown.

**Effects.** The Hit System effects inflicted by the weapon.'

## DESIGNING WEAPONS

Weapons are designed using the Weapons Fillform. The Fillform guides the designer through the process with spaces for information and references to the applicable charts.

### DELIBERATE DESIGN

The deliberate design process begins with a blank Weapons Fillform. In each step, the Chart Number indicates the Weapons Chart from which the information is selected.

Chart 1 Identifying Weapons may be consulted, but is not actually used in Deliberate Design.

These steps include:

#### Chart 2. Weapon Design FillForm.

Prepare a blank Fillform for the weapon design.

#### Chart 3. Weapon Type

Select weapons Type and SubType.

Record Model, TL, Range, Mass, qreBs (Burden), H1 (Weapon Effect) and D1 (Effect Dice), and Cost.

#### Chart 4. Descriptor

Based on Weapon Type, select Weapons Descriptor.

Record TL, Range, Mass, qreBs (Burden), H2 (Second Weapon Effect) and D2 (Second Effect Dice), and H3 (Third Weapon Effect) and D3 (Third Effect Dice), and Cost.

**Range.** Note that a non-zero Range under Descriptor

supersedes Range under Category and Type (cross out Category and Type Range).

**Mass.** Mass is a multiplier. Entries from this chart should be preceded by x (a times sign).

#### Chart 5. Burden

Select an appropriate Burden.

Select an appropriate Stage

Select an appropriate User.

Record its TL, Range, Mass, qreBs (Burden), Miscellaneous (usually Mods to QREBS), D2 (Mod to D2), and Cost. Observe the requirements under Comment.

**Mass.** Mass is a multiplier. Entries from this chart should be preceded by x (a times sign).

#### Chart 6. Weapon Special Effects

Review the Weapon Type, Descriptor, and Burden for applicable notes and record this information.

#### Chart 7. Options

Review the available options and note those selected.

Record QREBS drawbacks from the Weapons Options.

#### Chart 8. Weapon Controls

Review the Weapon Type and note the assigned controls. Review the Weapon Descriptor and add any additional controls.

#### Chart 5. Portability

Calculate the weight for the weapon. Using this value, determine the Portability for the weapon.

#### Totals

For each column, compute the totals. Tech Levels sum. Ranges sum. Some entries under Mass multiply. Burdens sum. Combine identical Effects and sum their hit dice. Some costs multiply.

Complete the QREBS entries with calculated Burden (and add any other QREBS entries dictated by comments).

#### Finally

Create the Weapon Description and Weapon Extension.

#### RANDOM CREATION

The random creation process begins with a blank Weap-

ons Fillform and the Random Weapon Creation Chart 9.

Using 1D and 2D as directed, roll for each element of the weapon on Chart 9 from right to left in the order:

Type (or SubType), Descriptor, Burden, and Stage.

**Simple Weapons.** A simple weapon can be created directly from the chart (Tech Levels are included).

**Complete Weapons Descriptions.** Using the information created from Chart 9, return to Deliberate Weapon Design and determine its details from the Charts.

**Some Designs Are Impractical.**

Some combinations of elements may not make sense (Recoilless Laser) or may seem impractical (Vheavy Carbine). It is the Referee's responsibility to discard a design as nonsensical or to justify the design based on local sophont cultural preferences.

For example, the Carbine element of a Vheavy Carbine produces an EOU Mod probably not available in a Vheavy Rifle.

**UNDERSTANDING THE WEAPON ELEMENTS**

Each Element of a Weapon description has meaning. Once a weapon has been created, consult the supporting paragraphs for a better understanding of the weapon function and operation.

**WEAPON TYPES**

Weapons fall into eight distinct categories or types (with occasional overlap) based on size, function, and use.

**Guns**

A Gun is a relatively large projectile- or energy-firing artillery weapon created for distinctly military (as opposed to hunting, recreation, or sport) purposes.

**Includes Gatling, Cannon, and AutoCannon.** Gatling is a multiple barrel and higher rate of fire version of a Gun. Cannon is a larger version of a Gun. AutoCannon is a higher rate of fire version of Cannon.

Weapons in Category = Gun are capable of Indirect Fire.

Category = Gun is often called Artillery.

**Rifles**

A Rifle is long-arm used by soldiers in combat and by sportsmen in pursuit of game. A rifle is a stable and relatively accurate weapon, and although the term "rifle" implies spiral grooved barrels which spin stabilize



**PLP-9**  
Prototype Laser Pistol-9

projectiles, that feature is not necessarily present.

**Includes Carbine.** A Carbine is a shorter version of the Rifle usually created to save weight or reduce size.

Alternative terms for Rifle include Fusil and Musket.

**Pistols**

A Pistol is a personal handgun intended to be operated with one hand. In this context, a pistol is semi-automatic (or self-loading). Less accurate and shorter-ranged than a Rifle, a Pistol offers considerable savings in mass and size.

**Includes Revolver.** A Revolver is a special type of Pistol using a multiple chambered cylinder instead of a magazine.

**Shotguns**

A Shotgun is a long-arm firing a group of shot pellets rather than single bullets (but see Splat under Descriptors).

**Machineguns**

A Machinegun is a military weapon which fires multiple bullets in bursts with each pull of the trigger. Firing more bullets theoretically means the weapon can do more damage.

**Projectors**

A Projector is a weapon which utilizes non-traditional technology not ordinarily or otherwise encountered.

An alternative term is Projac.

**Designators**

A Designator is a device which marks or illuminates targets (or potential targets) so that other weapons may engage or attack them. Although a Designator is not itself intended to be a weapon, it may inflict harm when in use.

Forward Observers use Designators to illuminate or mark a Target so that it can be attacked by Artillery.

**Launchers**

A Launcher is a device which ejects or launches self-propelled projectiles which then proceed to the target.

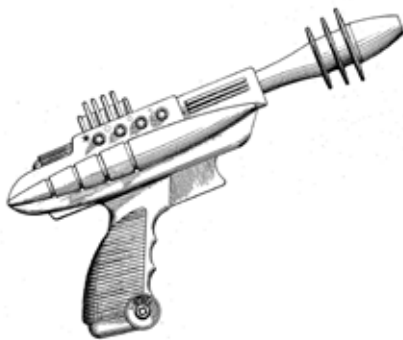
A Launcher can fire missiles (guided) or rockets or grenades (unguided).

**Includes Multi-Launchers.** A Multi-Launcher is a refinement allowing multiple uses before reloading.

**WEAPON DESCRIPTORS**

Descriptor is a statement of the specific mechanism, purpose, or effect the weapon may have. When paired with a Weapon Type, it provides a basic statement of a weapon and its function.

A Descriptor may apply to several



**ExAcRe-6**  
Experimental Accelerator Revolver-6

different types of weapons, but Descriptors are not necessarily used with every Weapon Category.

**(blank).** The weapon has no modifications or effects based on Descriptor.

**Accelerator.** The weapon fires a projectile at a low initial velocity; after it leaves the barrel, an internal charge accelerates the bullet to greater velocities. Accelerator weapons have low recoil and are well adapted to zero-G environments. For example, Accelerator Carbine.

**Acid.** The weapon discharges acid at the target. For example, Acid Projector.

**Anti-Flyer Missile.** The weapon launches a missile which attacks Flyers. Anti-Flyer Missiles are guided. For example, Anti-Flyer Missile Multi-Launcher.

Anti-Flyer Missile is optimized for use against Flyers; use against a Flyer allows Mod+1 to Hit.

**Anti-Flyer.** The weapon is intended for use against Flyers, typically through a higher rate of fire than similar weapons. Anti-Flyer refers to some aspect of the weapon's operation (as distinct from Anti-Flyer Missile). For example, Anti-Flyer Gatling.

Anti-Flyer is optimized for use against Flyers; use against a Flyer allows Mod+1 to Hit.

**Anti-Tank.** The weapon is intended for use against Tanks and other armored vehicles; it may reasonably be used against any vehicle. Anti-Tank refers to some aspect of the weapon's operation (as distinct from Anti-Tank Missile). For example, Anti-Tank AutoCannon.

Anti-Tank is optimized for use against Armored vehicles; use against an Armored Vehicle allows Mod+1 to Hit.

**Anti-Tank Missile.** The weapon launches a missile which attacks Tanks or other Armor. For example, Anti-Tank Missile Multi-Launcher.

Anti-Flyer Missile is optimized for use against Flyers; use against a Tank or Armored Vehicle allows Mod+1 to Hit.

**Assault.** The weapon is designed for use on the battlefield by soldiers. It is characterized by an ability to hit person - size targets at moderate ranges (Range 4 = 500 meters) and by bullets and explosive projectiles. For example, As-

sault Rifle.

**Auto.** An abbreviation for Automatic and another term for Battle (used about half the time). When a weapon is designated Battle by the tables or by design, Auto may be used instead. For example, a Battle Rifle may also be called an Auto Rifle.

**Battle.** The weapon is designed for use on the battlefield by soldiers. It is characterized by an ability to hit -person size targets at the limit of unaided vision (Range 5 = 1000 meters). For example, Battle Rifle.

**Combat.** The weapon is designed for use in combat by soldiers. It is characterized by an ability to hit person - size targets at relatively short ranges (Range 3 = 150 meters) using explosive projectiles. For example, Combat Rifle.

**Dart.** The weapon fires a small injector projectile which, on contact, injects a Tranq dose into the target. For example, Dart Rifle.

**EMP.** The weapon fires a directed electromagnetic pulse which fries electronic circuits and blinds sophonts who have Awareness. For example, EMP Projector.

**Fire.** The weapon fires or projects flame or fire at the target. For example, Fire Projector (the equivalent of a Flame Thrower).

**Flash.** The weapon fires a bright, blinding flash of light. For example, Flash Projector.

**Freeze.** The weapon induces an entropic effect, removing heat from the target. For example, Freeze Projector.

**Fusion.** The weapon superheats hydrogen fuel to a plasma state and retains it briefly (to allow progression to the fusion state). It fires its beam through a magnetically focused field along the weapon's barrel. The initial beam is approximately 2 cm, but it begins to expand immediately. Fusion weapons have a greater range than Plasma weapons. Fusion weapons have significant recoil. For example, Fusion Gatling.

**Gauss.** The weapon electromagnetically accelerates a projectile and spin stabilizes it through magnetic effects. For example, Gauss Rifle.

**Grav.** The weapon projects a high frequency gravitic effect onto the target; this rapid gravitic pushing and pulling reduces internal structural strength in objects and induces organic damage in beings. In addition, this weapon effect shuts down grav equipment. For example, Grav Projector.

**Grenade.** The weapon fires an explosive projectile. For example, Grenade Launcher.

**Hunting.** The weapon is adapted to game hunting situations. For example, Hunting Rifle.

**Laser.** The weapon fires a coherent beam of photons at the target. For example, Laser Designator.

**Mag.** The weapon projects a high frequency magnetic effect onto the target; this rapid magnetic pulsing scrambles electronic circuits and induces temporary disorientation in organic beings. In addition, this weapon effect shuts down magnetic equipment. For example, Mag Projector.

**Missile.** The weapon fires a missile which is guided to the target. For example, Missile Launcher.

**Plasma.** The weapon heats hydrogen fuel to a plasma state and fires it as a beam through a magnetically focused field along the weapon's barrel. The initial beam is approxi-



ImP-6 Improved Pistol-6



PrHC-11 Precision Hunting Carbine-11

mately 2 cm, but it begins to expand immediately. Plasma weapons have significant recoil. For example, Plasma Gun.

**Poison Dart.** The weapon fires a small pointed projectile which, on contact, injects a Poison dose into the target. For example, Poison Dart Carbine.

**Poison Gas.** The weapon projects a poison gas at the target. For example, Poison Gas Projector.

**Psi Amp.** The weapon amplifies the natural psionic ability of the user. For example, Psi Amplification Projector.

**Rad.** The weapon projects radiation effects at the target. For example, Rad Projector.

**RAM Grenade.** The weapon fires an explosive projectile which has extended range (RAM= Rocket Assisted Munition). For example, RAM Grenade Launcher.

**Rocket.** The weapon fires an unguided rocket at the target. For example, Rocket Multi-Launcher.

**Shock.** The weapon applies an electric shock to the target. For example, Shock Projector.

**Sonic.** The weapon projects a sound-based effect at the target (as distinct from the sound some weapons make when firing). For example, Sonic Projector.

**Splat.** The weapon is a multi-barrel slightly diverging configuration, with each barrel loaded with several projectiles (and associated propellant). Each use fires one projectile in each of the barrels. For example, Splat Gun.

Splat is distinct from Shotgun: Splat is a multi-barrel multi-projectile Rifle or Carbine.

**Stench.** The weapon projects a foul-smelling or obnoxious effect at the target. For example, Stench Projector.

**Sub.** The weapon configuration uses smaller (or less powerful) ammunition than normal, resulting in lighter weight and somewhat less power. For example, Sub Machinegun.

**Survival.** The weapon is adapted to use in survival situations. For example, Survival Rifle.

#### WEAPON BURDEN

Burden is the spectrum of effects based primarily on weight, mass, and bulk.

**(blank).** The weapon has no modifications or effects based on Burden.

**Anti-Designator.** The weapon senses the marking or illumination effects emitted by a Designator. The weapon can sense the Designator's trigger signal and fire automatically,

or can fire at the user's command.

**Body** (applies only to Pistols and Revolvers). The Pistol or Revolver is light-weight and ergonomically designed.

**Disposable.** The weapon is manufactured from inexpensive materials to reduce cost; it has a usable lifetime measured in days.

**Heavy.** The weapon is significantly heavier than the standard weapon, but has greater range.

**Light.** The weapon is significantly lighter than standard and thus easier to carry, but at a reduction in range.

**Magnum** (applies only to Pistols and Revolvers). The weapon is heavier than standard with greater range.

**Medium** (the term is often omitted). The weapon has no specific enhancements with the Burden classification.

**Recoilless.** The weapon is designed to have no recoil and is adapted to zero-G environments.

**Snub.** The weapon is specifically designed to be easy to carry and operate, but at a cost in range and effect.

**Very Heavy.** The weapon is extremely heavy, but has longer range and inflicts greater damage.

**Very Light (or Vlite)** The weapon is extremely light, but at a reduction in range and effect.

**VRF (Very Rapid Fire).** The weapon has a very high rate of fire.

#### WEAPON STAGE

Stage is the spectrum of effects based on the technological product development cycle.

**(blank).** The weapon has no modifications or effects based on Stage.

**Advanced.** The weapon is significantly better than the standard version, and features lower weight and excellent ergonomic design. It inflicts increased damage.

**Alternate.** The weapon uses an alternate technology to achieve its effects.

**Basic.** The weapon is a stripped down design with greater weight and lower cost.

**Early.** The weapon is a preliminary design available through mass production with the bugs not yet worked out.

**Experimental.** The weapon is a hand-made very early test model.

**Improved.** The weapon features small improvements.

**Modified.** The weapon features improvements.



**Ultimate.** The weapon represents the technological pinnacle of the design cycle.

**Precision.** The weapon is able to target a specific component of the target. A Precision weapon may specify (rather than roll) the result on a Hit Location Table.

**Prototype.** The weapon is a hand-made model.

**Remote.** The weapon is designed to be emplaced or installed in a location at some distance from the operator, or emplaced to operate independently. Remote weapons are controlled by a Designator and traverse to track a target which is being designated. The operator can trigger a fire signal from the Designator.

**Sniper** (used only with Rifles). The weapon is optimized for accuracy at extended ranges. Includes Q= +2 and E= +2.

**Standard** (often omitted). The weapon has no specific enhancements with the Stage classification.

**Target** (used only with Rifles and Pistols). The weapon is optimized for accuracy. Includes Q= +2 and E= +2

## WEAPON USERS

User indicates the typical or intended user, either by species or by manipulator type.

**(blank).** The weapon has no modifications or effects based on User. The default user is Man or Human.

If no User is specified, the weapon is intended to be operated by a Human or similar being.

**Universal.** The weapon has compromise controls which are usable by most sophonts.

## By Sophont

User may be described as a specific sophont.

**Man.** The intended user is Human (the military user term Man was adopted during the Second Empire to refer to Humans in general; although archaic in other uses, it is the accepted term here). The preferred manipulator is Hand.

**Aslan.** The preferred manipulator is Paw.

**Hiver.** The preferred manipulator is Grasper.

**Vegan.** The preferred manipulator is Tentacle.

**K'kree.** The preferred manipulator is the Hand.

**Vargr.** Rarely used. Vargr easily use human weapons. The preferred manipulator is the Hand.

**Droyne.** The preferred manipulator is the Hand.

**Bwaps.** The preferred manipulator is the Hand.

**<Sophont>.** The intended user is a specific Sophont, and various details are custom determined. For example, Plexxan (where Plexxan is a Sophont familiar to the characters, or otherwise described in available data bases).

## By Manipulator

User may be specified by the manipulator it is crafted to fit: Hand, Graspers, Grippers, Paws, Sockets, Tentacles.

## PORTABILITY

Portability is a measure of the ability of a weapon to be moved or carried.

**(blank).** The weapon has no modifications or effects based on Portability. If no Portability is specified, the weapon is intended to be a Personal weapon carried and used by one person.

**Crewed.** The weapon is commonly deployed and operated by a crew of two or more persons. A crew is necessary to carry the weapon and often its ammunition.

**Semi-Portable.** An alternative term for Crewed. Generally a large bulky weapon which can be carried by two or more persons, but once set up is rarely moved.

**Fixed.** The weapon is securely attached to an immovable base.

**Portable** (often Man-Portable). The weapon is designed to be operated by a user in BattleDress (or powered armor). This feature is dictated by the high recoil of the weapon, or by its mass.

**Vehicle Mount (or Tank Mount).** The weapon is mounted in a tank, armored fighting vehicle, or other vehicle (armored or not).

**Turret.** The weapon mounted in a standard turret on a starship or spacecraft.

## WEAPON TECHNOLOGY LEVEL

The weapon Tech Level indicates the relative level of technological sophistication required for manufacture. Any world with the indicated Tech Level and appropriate machinery can produce this item.

## QREBS

Any acquired weapon is ordinarily assumed to be QREBS=50000 (with no effects under QREBS system).

If the Weapon Design System imposes any QREBS elements (for example, B= -2), the imposed element applies.

**As Issued.** A weapon with only the imposed QREBS elements is As Issued. It is typical of the weapon as used in service. Most weapons are in this state, and any reasonable character can research and determine this information.

**Used.** Any character may ask for a Used weapon instead. The Referee then evaluates the weapon under QREBS and records this information.

For example, Captain Sir Mark Poles has acquired an AdvVhGC-15 Advanced Vheavy Gauss Carbine-15 8.6 kg with QREBS 50000. In an attempt have a better weapon, he specifies it is Used. The Referee rolls for all five QREBS elements: -1 +2 -3 -4 -1.

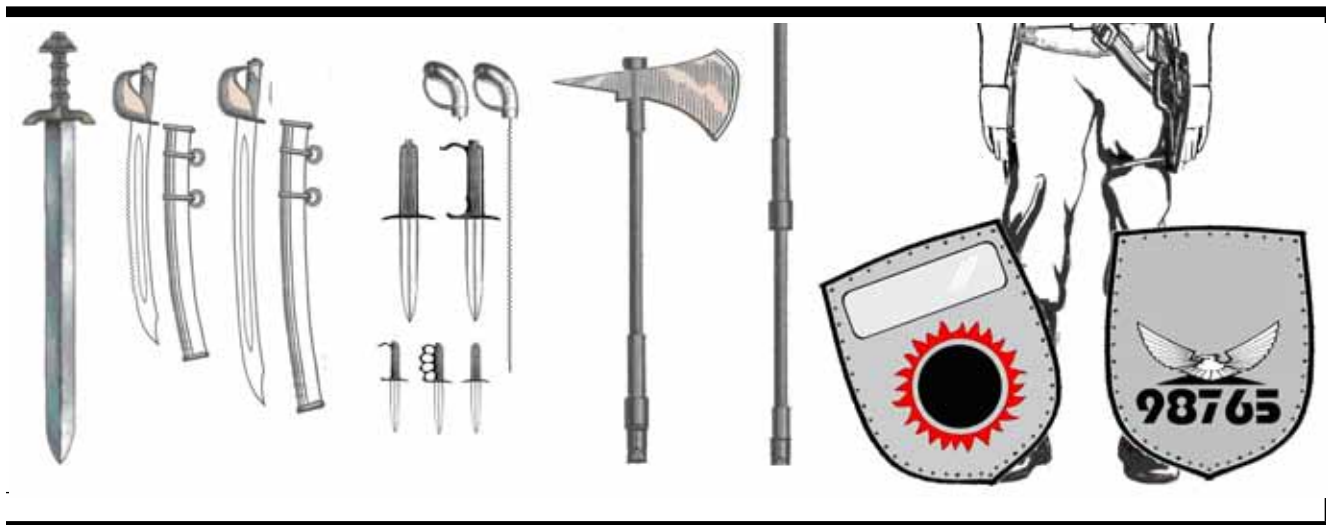
The weapon becomes QREBS -1 +2 -3 -4 -1. Below Average Quality, Better-Than-Many Reliability, Hard-To-Use, Easier-To-Carry, and Slightly-Hazardous. Sir Mark now needs to decide if this particular weapon will meet his needs.

**BLADE CATEGORIES AND TYPES**

Category	Code	Descriptor	TL	Range	Mass	qreBs	H1	D1	H2	D2	Hits (v1)	Cr
Short Blades	K	Knife	1	R	0.5		Cuts	2			2D	50
	D	Dagger	2	R	0.5		Cuts	2			2D	50
	TK	Trench Knife	4	R	1		Cuts	2	Blow	1	2D	100
	BK	Big Knife	5	T	3		Cuts	2	Pen	2	2D	200
	GBK	Great Big Knife	6	1	6		Cuts	2	Pen	2	2D	900
Medium Blades	S	Sword	3	1	2		Cuts	2			2D	300
	sS	Short Sword	3	1	1	B= - 1	Cuts	2			2D	300
	bS	Broadsword	4	1	3		Cuts	3			3D	700
	C	Cutlass	3	1	2		Cuts	2			2D	200
	OC	Officers Cutlass	5	1	1		Cuts	2			2D	400
Long Blades	P	Spear. Pike	1	1	2	B= +3	Cuts	2			2D	50
Special Blades	Ax	Axe	2	T	2		Cuts	3			3D	60
	A	Space Axe	9	1	2		Cuts	2	Pen	2	2D	500
	V	Vibro-Blade	10	1	0.5		Cuts	2			2D	900
		Mace	2	1	4		Cuts	1	Blow	2	2D	100
		Club	1	1	2		Blow	=C1			1D	10

Category	Code	Descriptor	TL	Range	Mass	qreBs	H1	D1	H2	D2	Hits (v1)	Cr
Body Weapons	Fi	Fists		R			Blow	=C1			1D	
	Te	Tentacle		0			Hit	=C1	Suff	1	1D	
	Ho	Horns		R			Pen	=C1			2D	
	Tu	Tusks		R			Pen	=C1			2D	
	Fa	Fangs		R			Pen	=C1			2D	
	T	Teeth		R			Cuts	=C1			1D	
	Cl	Claws		R			Cuts	=C1			1D	
	Dc	Dew Claw		R			Cuts	=C1			2D	
	H	Hooves		R			Blow	=C1			2D	
	Sp	Spikes		0			Pen	=C1			2D	
	St	Sting		R			Pen	=C1	Poison	2D	3D	

**Left to Right (Below).** Broadsword-4 . Star Marine Officer's Cutlass-5 (EOU+1). Star Marine Cutlass-3. Big Knife-5. Big Knife Alternate-5. Knife Alternate-1. Trench Knife-4. Knife-1. Vibro-Blade-10 (off). Vibro-Blade-10 (on; blade extended). Space Ax-9. Shield with Transparent Panel. Typical Human. Shield.

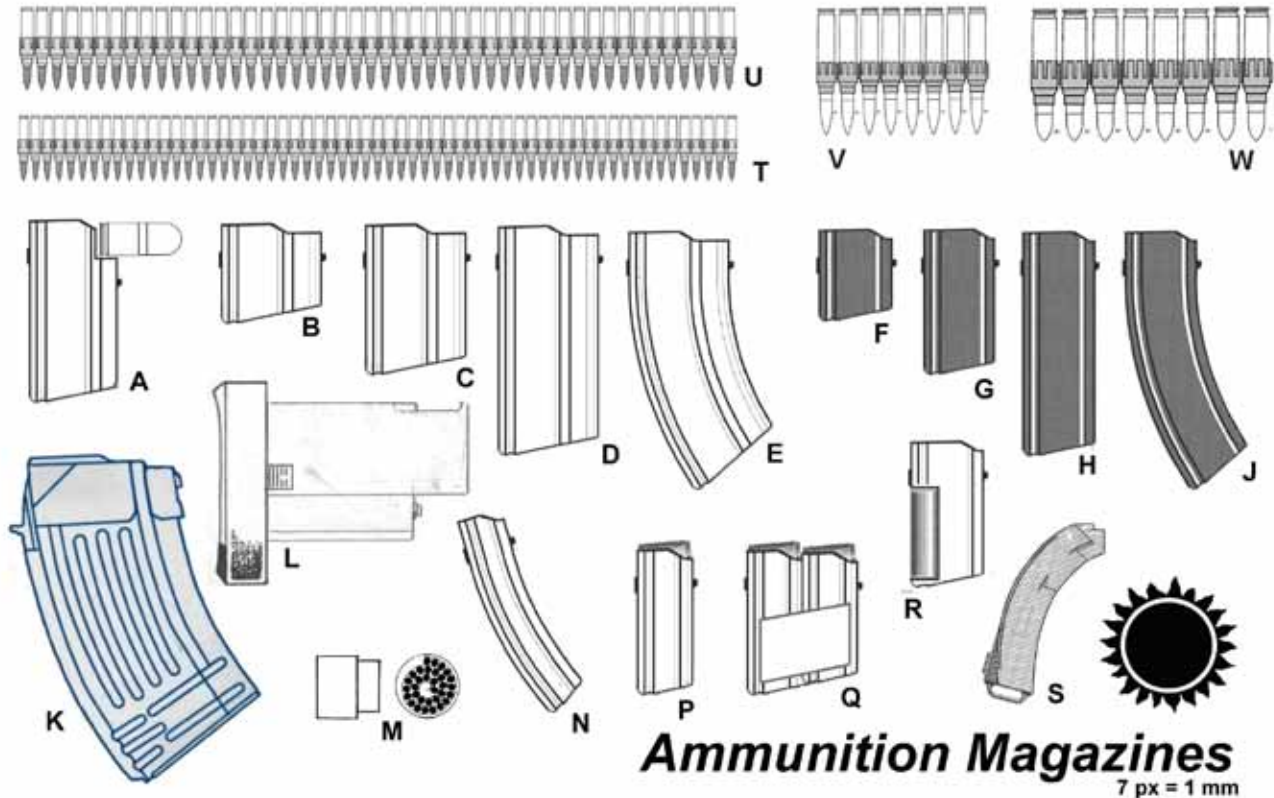




## AMMUNITION AND MAGAZINES

The creation or design of weapons assumes the creation of suitable ammunition and of magazines or cassettes that will feed munitions to the weapon. The weapon design does not delve into the process in that great a depth.

This Ammunition Magazines Image provides some detail for various weapons.



### Typical Magazines for Typical Weapons

- A. 30mm Grenade Launcher Magazine (= 4 rounds).
- B. 8mm Battle Rifle Magazine (= 10 rounds).
- C. 8mm Battle Rifle Magazine (= 20 rounds).
- D. 8mm Battle Rifle Magazine (=30 rounds).
- E. 8mm Battle Rifle Magazine Variant (= 30 rounds).
- F. 6mm Assault Rifle Magazine (= 10 rounds).
- G. 6mm Assault Rifle Magazine (= 20 rounds).
- H. 6mm Assault Rifle Magazine (=30 rounds).
- J. 6mm Assault Rifle Magazine Variant (= 30 rounds).
- K. 25mm Recoilless Zero-G Vhvy Carbine Magazine (= 12 rounds).
- L. 5 mm Bullpup Cassette (= 200 rounds includes binary propellant reservoir).
- M. 4mm Revolver Magazine (removable) (= 32 round internal spiral).
- N. 9mm Sub Machinegun Magazine (= 30 rounds).
- P. 15mm Shotgun Magazine (= 6 rounds).
- Q. 15mm Shotgun Double Column Magazine (= 12 rounds).
- R. 6mm Gauss Gun Magazine (includes high output power cell and 100-round bullet reservoir).
- S. 3mm StapleGun Magazine (= 200 rounds).
- T. 6mm Machinegun Ammunition Belt.
- U. 8mm Machinegun Ammunition Belt.
- V. 13mm (archaic .50 caliber) Machinegun Belt.
- W. 20mm Heavy Machinegun Ammunition Belt.

### Minimum Damage

A successful weapon effect can always be enhanced by Flux. After all effects have been inflicted, the attacker can specify and roll Flux. If that result is positive; it adds to the damage; if it is negative, it subtracts from the damage.

**Effect-0.** It is possible for a weapon to calculate as Effect-0 (for example, Body Pistol-7 BP-7 Bullet-0). Flux can be added to that effect if the weapon hits.

# Weapons

Use this chart to decode weapon elements.

# GunMaker 01



Stage		
Experimental	X	-2
Prototype	P	-1
Early	E	-1
Basic	B	
(blank)		
Standard	Std	+1
Improved	Im	+1
Modified	Mod	+2
Advanced	A	+3
Obsolete	Ob	
Precision	Pr	+6
Remote	R	+1
Sniper	S	+1
Target	T	
Ultimate	U	+4

Burden		
Body	B	+2
Vlight	VI	+1
Light	L	
Snub	Sn	+1
(blank)		
Medium	M	
Magnum	M	+1
Heavy	H	
Vheavy	Vh	
VRF	Vrf	+2
Recoilless	R	+1
Disposable	D	+3

Type		
Gun	G	6
Gatling	Ga	7
Cannon	C	6
AutoCannon	aC	8
Rifle	R	5
Carbine	C	5
Pistol	P	5
Revolver	Re	4
Shotgun	S	4
Machinegun	Mg	6
Projector	Pj	9
Designator	D	7
Launcher	L	6
Multi-Launcher	mL	8

Users		Manipulators	
(blank)			
Man	M	Hand	
Vargr	V		
Aslan	A	Paw	
K'kree	K		
Hiver	H	Grasper	
Droyne	D		
	G	Gripper	
Vegan	T	Tentacle	
	S	Socket	
	U	Universal	

Portability	
(blank)	
Personal	
Crewed	C
Fixed	F
Portable	P
Vehicle Mount	V
Turret	T

Stage
Burden
Descriptor
Weapon
User
Portability
Tech Level

P
G
M
P
-
11

Plasma Gun  
Man Portable -11

Designator / Projector		
Acid	A	
EMP	Emp	+1
Freeze	C	+1
Flash	F	-1
Fire	H	
Stench	S	+3
Gas	P	
Grav	G	+5
Mag	M	+4
Rad	R	+1
Shock	Sh	
Sonic	S	+3
Laser	L	+5
Psi Amp	Psi	+4

Artillery		
Anti-Flyer	aF	+4
Anti-Tank	aT	
Assault	A	+2
Fusion	F	+7
Plasma	P	+5
Gauss	G	+7

Machinegun		
(blank)		
AntiFlyer	aF	+4
Assault	A	+2
Sub	S	-1

Long Guns		
AcceleratorAc		+4
Assault	A	+2
Battle	B	+1
Combat	C	+2
Dart	D	+1
Gauss	G	+7
Laser	L	+5
Splat	Sp	+2
Survival	S	
Hunting	H	
(blank)		

Handguns		
(blank)		
Machine	M	
AcceleratorAc		+4
Laser	L	+5

Launcher		
AF Missile	aF	+4
AT Missile	aT	+3
Missile	M	+1
Rocket	R	-1
Grenade	G	+1
RAM Gren	RAM	+2
Plasma	P	+5
Fusion	F	+7

Shotgun		
(blank)		
Hunting	H	
Assault	A	+2



# 02 GunMaker

## Weapon FillForm

As the weapon is designed insert the design values and details into this Fillform. Values may be inserted in any order as the design is considered: the ultimate requirement is that the values balance and properly reflect the charts and tables.

### BUILDING WEAPONS

This Fillform allows an interactive design process which ultimately produces a final weapon design.

**Tech Level.** Tech Level for a weapon is the minimum level required for manufacture.

Manufacturer		
Surface or Orbital?	TL	Law Level

WEAPONS		Q	R	E	B	S	Model	TL	Range	Mass	Burden	H1	D1	H2	D2	H3	D3	KCr	Cr		
Chart	Item	Description																			
																		,000	,000		
03	Type																				
	SubType																				
04	Descriptor																				
	Burden																				
05	Stage																				
	User																				
06	Notes	Recoil=		Loud=																	
		Flash=		Heat=																	
		Vacc=		UW=																	
		CQ=																			
07	Options																				
08	Controls																				
05	Portability																				
	QREBS=																				
	Totals																				

### WEAPON DESCRIPTION

Model LongName (Stage-Burden-Descriptor-Type-User-Portability-TL)

--	--

The basic information required to describe a weapon.

### WX: WEAPON EXTENSION

Range Cost Mass QREBS Effects

Wx:	R=	Cr	kg	B=			
-----	----	----	----	----	--	--	--

The basic information required to use a weapon.

# Categories and Types

Select Category and Type of Weapon.

# GunMaker 03



## GUNMAKER CATEGORIES AND TYPES

Category	Code	Type	TL	Range	Mass	qreBs	H1	D1	Misc	Hits (v1)	Cr
Artillery	G	Gun	6	4	9	+1	*	2		2	5,000
	Ga	Gatling	7	4	40	+2	*	3		2	8,000
	C	Cannon	6	6	200	+4	*	4		2	10,000
	aC	Autocannon	8	6	300	+4	*	5		3	30,000
Long Guns	R	Rifle	5	5	4	0	Bullet	2	Not Bullet if Laser	2	500
	C	Carbine	5	4	3	-1	Bullet	1	Not Bullet if Laser	1	400
Handguns	P	Pistol	5	2	1.1	0	Bullet	1	Not Bullet if Laser	1	150
	R	Revolver	4	2	1.25	0	Bullet	1	Not Bullet if Laser	1	100
Shotguns	S	Shotgun	4	2	4	0	Frag	2		2	300
Machineguns	Mg	Machinegun	6	5	8	+1	Bullet	4		4	3,000
Projectors	Pj	Projector	9	0	1	0	*	1		1	300
Designators	D	Designator	7	5	10	+1	*	1		1	2,000
Launchers	L	Launcher	6	3	10	+1	*	1		0	1,000
	mL	Multi-Launcher	8	5	8	+1	*	1		0	3,000

\* Hit Type determined by other details of the weapon. qreBs=Burden /Bulk. H1=First Hit Type. D1=First Hit Dice.

## EFFECTS, ARMOR, DAMAGE

Effect	Effect	△	▲	□	Type	Damage to Objects	Damage to Beings
spray	A Corrode	▲			Hit	=Yes	= Hits to C1 C2 C3
KD	B Bullet ▷	▲			Hit	=Yes	= Hits to C1 C2 C3
	C Slash	▲			Cut	=Yes	= Hits to C1 C2 C3 per Rd
KD	D Blast/Blow	▲			Hit	=Yes	= Hits to C1 C2 C3
area	E EMP		□		Fry	=Yes	= Ablind for 1D turns
KD	F Frag	▲			Hit	=Yes	= Hits to C1 C2 C3
spray area	G Gas			□	Suff	=No	= Hits to C3 C4 C5
area	H Hot			□	Heat	=Yes	= Hits to C1 C2 C3 C4
	I Infection				▲ Hit	=No	= Hits to C1 C2 C3
area	J Psi			□	Stun	=No	= Unconscious for 1D Rds
spray	K Burn	▲			Hit	=Yes	= Hits to C1 C2 C3
	L Elec			▲	Hit	=Yes	= Hits to C1 C2 C3
area	M Magnetic				Stun	=Yes.	= Unconscious for 1D Rds
spray senses	O Stench			△	Stun	=No	= Unconscious for 1D Rds
	P Pain	△			△ Stun	=No	= Unconscious for 1D Rds
area	Q Cold			□	Freeze	=Yes	= Hits to C1 C2 C3 C4 C5
area	R Rad			□	Hit	=Yes	= Hits to C1 C2 C3
area	S Sound			□	Stun	=No	= Unconscious for 1D Rds
	T Poison				▲ Hit	=No	= Hits to C1 C2 C3
senses	U Flash		△		Blind	=No	= Blind for 1D Turns
area	V Vacc			□	Suff	=No	= Unconscious for 1D Rds
	W Wound	▲			Hit	=No	= Hits to C1 C2 C3
KD	X Pen ▷	▲			Hit	=Yes	= Hits to C1 C2 C3
area	Y Grav				Hit	=Yes	= Hits to C1 C2 C3
	Z Tranq	△		△	Stun	=No	= Unconscious for 1D Rds

▲△□ = Attack may be stopped by this Armor or Protection. Otherwise, the Armor or Protection is ignored.

▲ = Hit Effect. △ = Other than Hit Effect. □ = Area Effect. Rad= Area Effect inflicting Hits.

▷ = Blast Hit Effect doubled versus Armor for KD (but not for Damage).

▷ = Pen Hit Effect doubled versus Armor for Penetration (but not for Damage).



# 04 GunMaker

## Weapon Descriptors

Weapons descriptors detail the specific mechanism, purpose, or effect that a weapon may have. Not all weapons types use all descriptors. A weapon may have one Descriptor.

WEAPON DESCRIPTION												
Category	Code	Descriptor	TL	R=	Mass	greBs	H2	D2	H3	D3	Hits (v1)	Cr
Artillery (includes Guns, Cannon, AutoCannon, Gatling)	aF	Anti-Flyer	+4	=6	x6.0		Frag	1	Blast	3	4	x 3.0
	aT	Anti-Tank		=5	x8.0		Pen	3	Blast	3	6	x 2.0
	A	Assault	+2	=4	x0.8		Bang	1	Blast	2	3	x 1.5
	F	Fusion	+7	=4	x2.3		Pen	4	Burn	4	8	x 6.0
	G	Gauss	+7	=4	x0.9		Bullet	3			3	x 2.0
	P	Plasma	+5	=4	x2.5		Pen	3	Burn	3	6	x 2.0
Long Gun (includes Rifles, Carbines)	(blank)				x1.0							
	Ac	Accelerator	+4		x0.6		Bullet	2			2	x 3.0
	A	Assault	+2	=4	x0.8		Blast	2	Bang	1	3	x 1.5
	B	Battle	+1	=5	x1.0	+1	Bullet	1			1	x 0.8
	C	Combat	+2	=3	x0.9		Frag	2			2	x 1.5
	D	Dart	+1	=4	x0.6		Tranq	1-2-3			1-2-3	x 0.9
	P	Poison Dart	+1	=4	x1.0		Poison	1-2-3			1-2-3	x 0.9
	G	Gauss	+7		x0.9		Bullet	3			3	x 2.0
	H	Hunting		=3	x0.9	-1	Bullet	1			1	x 1.2
	L	Laser	+5		x1.2		Burn	2	Pen	2	4	x 6.0
	Sp	Splat	+2	=4	x1.3	+1	Bullet	1			1	x 2.4
S	Survival		=2	x0.5		Bullet	1			1	x 1.2	
Handgun (includes Pistols, Revolvers)	(blank)				x1.0							
	Ac	Accelerator	+4		x0.6		Bullet	2			2	x 3.0
	L	Laser	+5		x1.2		Burn	2	Pen	2	4	x 2.0
Shotguns	M	Machine		=3	x1.2		Bullet	2				x 1.5
	(blank)				x1.0							
Shot	A	Assault	+2	=4	x0.8		Bang	1	Blast	2	3	x 2.0
	H	Hunting		=3	x0.9		Bullet	1			1	x 1.2
MG Machineguns	(blank)				x1.0							
	aF	Anti-Flyer	+4	=6	x6.0		Frag	1	Blast	3	4	x 3.0
	A	Assault	+2	=4	x0.8		Bang	1	Blast	2	3	x 1.5
Spray Spray Designators And Projectors	S	Sub	-1	=2	x0.3		Bullet	-1			-1	x 0.9
	A	Acid		=3	x1.0	+1	Corrode	2	Pen	1-2-3	4	x 3.0
	H	Fire		=1	x0.9		Burn	1-2-3	Pen	1-2-3	2-4-6	x 2.0
	P	Poison Gas		=2	x1.0		Gas	1-2-3	Poison	1-2-3	2-4-6	x 3.0
Exotic Exotic Designators And Projectors	S	Stench	+3	=2	x0.4		Stench	1-2-3			1-2-3	x 1.2
	Emp	EMP	+1	=3	x1.0		EMP	1-2-3			1	x 4.0
	F	Flash	-1	=2	x0.5		Flash	1-2-3			2	x 1.5
	C	Freeze	+1	=3	x1.0	+1	Cold	1-2-3			2	x 3.0
	G	Grav	+5	=2	x3.0		Grav	1-2-3			3	x 20.0
	L	Laser	+5		x1.2		Burn	1-2-3	Pen	1-2-3	2-4-6	x 6.0
	M	Mag	+4	=1	x2.0		EMP	1-2-3	Mag	1-2-3	2-4-6	x 15.0
	Psi	Psi Amp	+4	=2	x1.0		Psi	1-2-3			1-2-3	x 9.0
	R	Rad	+1	=4	x1.0	+2	Rad	1-2-3			1-2-3	x 8.0
	Sh	Shock		=2	x0.5		Elec	1-2-3	Pain	1-2-3	2-4-6	x 2.0
Launcher Launchers	S	Sonic	+3	=2	x0.6		Sound	1-2-3	Bang	1-2-3	2-4-6	x 1.1
	aF	AF Missile	+4	=7	x4.0		Frag	2	Blast	3	5	x 3.0
	aT	AT Missile	+3	=4	x1.0	+1	Frag	2	Pen	3	5	x 2.0
	Gr	Grenade	+1	=4	x0.8		Frag	2	Blast	2	4	x 1.0
	M	Missile	+1	=6	x2.2		Frag	2	Pen	2	4	x 5.0
	RAM	RAM Grenade	+2	=6	x1.0		Frag	2	Blast	2	4	x 3.0
R	Rocket	-1	=5	x3.0		Frag	2	Pen	2	4	x 1.0	

# Burden and Stage

Weapons are further described by burden (size or bulk), stage (technological sophistication), user (human or other), and portability.

# GunMaker 05



WEAPON DESCRIPTION												
Category	Code	Descriptor	TL	R=	Mass	greBs	Misc	D1	D2	Comment	D3	Cr
Burden		(blank)	0	0	x1.0	0			0		x 1.0	
	aD	Anti-Designator	+3	1	x3.0	+3			1	Not Pistols. Shotguns.		x 3.0
	B	Body	+2	*1	x0.5	-4			-1	Only Pistols.		x 3.0
	D	Disposable	+3	0	x0.9	-1	Q= -2		0			x 0.5
	H	Heavy	0	1	x1.3	+3			1	Not Laser		x 2.0
	Lt	Light	0	-1	x0.7	-1			-1	Not Laser		x 1.1
	M	Magnum	+1	1	x1.1	+1			1	Only Pistols.		x 1.1
	M	Medium	0	0	x1.0	0			0	Not Pistols.		x 1.0
	R	Recoilless	+1	-1	x1.2	0			1			x 3.0
	Sn	Snub	+1	*2	x0.7	-3			1			x 1.5
	Vh	Vheavy	0	*5	x4.0	+4			5			x 5.0
	VI	Vlight	+1	-2	x0.6	-2			-1			x 2.0
	Vrf	VRF	+2	0	x14.0	+5			1	Only Guns and MGs		x 9.0
Stage		(blank)	0	0	x1.0	0			0			x 1.0
	A	Advanced	+3	0	x0.8	-3			2			x 2.0
	Alt	Alternate	0	1	x1.1	F			2			x 1.1
	B	Basic	0	0	x1.3	+1			0			x 0.7
	E	Early	-1	-1	x1.7	+1			0	EOU - 1		x 1.2
	Exp	Experimental	-3	-1	x2.0	+3	R= - 2		0			x 4.0
	Gen	Generic	+1	0	x1.0	0			0			x 0.5
	Im	Improved	+1	0	x1.0	-1	R= +1		1	EOU + 1		x 1.1
	Mod	Modified	+2	0	x0.9	0			1			x 1.2
	Pr	Precision	+6	3	x4.0	+2			0	Only Designators.		x 5.0
	P	Prototype	-2	-1	x1.9	+2			0			x 3.0
	R	Remote	+1	0	x1.0	0			0	Not Pistols.		x 7.0
	Sn	Sniper	+1	1	x1.1	+1	Q= +2		0	Only Rifles.		X 2.0
	St	Standard	0	0	x1.0	0			1			x 1.0
	T	Target	0	0	x1.1	+1	Q= +2		0	Only Rifles and Pistols.		x 1.5
	Ul	Ultimate	+4	0	x0.7	-4	R= +4		2			x 1.4
Users		(blank)	0	0	x1.0	0	EOU= 0			Subject to Manipulator Mods.		
	<S>	Sophont	(insert appropriate information)									
	U	Universal	0		x1.1	+1	EOU= -1			Usable by ANY manipulator.		
	M	Man	0	0	x1.0	0	EOU= 0					
	V	Vargr	0	0	x1.0	0	EOU=- 1					
	K	K'kree	0	0	x1.3	+2	EOU= 0					
	H	Grasper (Hiver)	0		x1.0	0	EOU= -1					
	P	Paw (Aslan)	0		x1.0	0	EOU= -1					
	G	Gripper	0		x1.0	0	EOU= -2					
	T	Tentacle (Vegan)	0		x1.0	0	EOU= -2			<b>Calculate Portability</b>		
	S	Socket	0		x1.0	0	EOU=- 2			<b>Min Mass</b>	<b>Max Mass</b>	<b>Portability</b>
Portability		(blank)	0	0	x1.0	0				< 20		(blank)
	C	Crewed	0	0	x1.0	+1		Hi Recoil +		< 40	P	Portable
	F	Fixed	0	+1	x1.0	+4			20	200	C	Crewed (Semi-Portable)
	P	Portable	0	1	x1.0	-2			200	500	T	Turret
	V	Vehicle Mount	0	+1	x1.0	0			500	1000	V	Vehicle Mount
	T	Turret	0	0	x1.0	0			1,000	100,000	F	Fixed



# 06 GunMaker

## Special Effects

Specific weapons have distinct capabilities or effects depending on the weapon type, descriptor, and other elements.

### SPECIAL EFFECTS

Type	Recoil	Loud	UW (R=)	CQ (Mod=)	Descriptor	Recoil	Loud	Flash	Heat	Vacuum	UW (R=)	CQ (Mod=)
Burden	Recoilless	○	●	●	Accelerator	○	○	○	○	●	○	●
	Snub	●	1	●	Acid	○	○	○	○	●	1	●
	Vheavy	★		○	AF AT Missile	○	●	●	●	●	○	○
	VRF	★		○	AT Rocket	○	●	●	●	●	○	○
	AutoCannon	★	★	●	Dart	○	○	○	○	●	1	●
Type	Cannon	★	★	●	EMP	○	○	★	○	●	●	●
	Carbine	●	●	●	Fire	○	○	●	●	●	○	●
	Designator	○		●	Flash	○	○	●	○	●	1	●
	Gatling	★	★	●	Freeze	○	○	○	○	●	1	●
	Gun	★	★	●	Fusion	★	●	●	●	●	●	●
	Launcher	○		●	Gas	○	○	○	○	○	○	○
	MachineGun	○	●	●	Gauss	●	○	★	○	●	○	●
	Multi-Launcher	●		●	Grav	○	○	○	○	●	●	●
	Pistol. Revolver	●	●	●	Grenade	●	●	○	○	●	1	●
	Projector	○		●	Laser	○	○	●	○	●	2	●
	Rifle	●	●	●	Mag	○	○	★	○	●	●	●
	Shotgun	●	●	●	Missile	○	●	●	●	●	○	●
					Plasma	★	●	●	●	●	2	●
					Poison Dart	○	○	○	○	●	1	●
					Poison Gas	○	○	○	○	○	○	○
					Psi Amp	○	○	○	○	○	1	●
					Rad	○	○	○	○	●	1	●
				RAM Gren	○	●	●	●	●	1	●	
				Rocket	○	●	●	●	●	○	●	
				Shock	○	○	●	●	●	1	●	
				Sonic	○	●	○	○	○	1	●	
				Splat	●	●	○	○	●	○	●	
				Spray	○	○	○	○	○	○	●	
				Stench	○	○	○	○	○	○	●	
				Tranq	○	○	○	○	●	1	●	

Recoil= No	○
Recoil= Yes	●
Recoil= High	★
Loud	●
Vloud	★
CQ= No	●
CQ= Yes	○
UW= No	●
UW= Yes	○

Blank indicates that effect depends on other elements of the weapon.

Recoil= No	○
Recoil= Yes	●
Recoil= High	★
Loud	●
Vloud	★
CQ= No	●
CQ= Yes	○
UW= No	●
UW= Yes	○
Flash=Bright	●
Flash=Mag	★
Hot	●
Vacc= No	○

**Recoil** disorients a user in Zero-G situations.

No = no recoil; preferred in Zero-G.

Yes = weapon has recoil.

Hi = weapon has high recoil.

**Loud** when operated

Loud =Bang-1.

Vloud=Bang-2. Weapon cannot be silenced.

All weapons are Silent in Vacuum.

**Flash** when operated.

No entry = Weapon has no flash.

Bright = Flash-1 (across all vision bands).

Mag = Mag-1. Weapon flash is Mag.

**Heat** (Hot) in operation.

No entry = weapon emits no heat.

Hot = weapon emits heat.

**Vacuum** prevents operation.

No = weapon unusable in Vacuum.

No entry = Vacuum has no effect.

**UW UnderWater** prevents operation.

No = cannot be used Underwater.

Range=N maximum underwater range

**CQ Close Quarters** weapons are more usable in confined spaces (inside buildings and starships).

No = unusable in Close Quarters.

Yes = preferred in Close Quarters.

N= EOU Mod in Close Quarters.

# Options

Weapons can be enhanced or varied by the addition of options by the user, or at the factory.

# GunMaker 07



## INSTALLABLE WEAPONS OPTIONS

Code	Option Item	Effect	Q	R	E	B	S
<b>a</b>	Low Signature- Visual. Camouflaged	Mod -2 for Visual Detection.					-1
<b>b</b>	Low Signature Metal. Plastic Construction.	Mod -4 for Metal Detection.					-1
<b>c</b>	Quiet. Silenced.	Converts Loud to Quiet.				-1	
<b>d</b>	Folding Stock. Collapsing Stock. Close Quarters.	Mod +2 for EOU in Close Quarters.				-2	
<b>e</b>	Stable Platform. Gyroscopic. Shoulder Stock for Pistols.	Reduces Difficulty 1D.				-1	
<b>f</b>	Flash Suppressor Visual.	Mod -4 Visual Detection in Darkness.					-1
<b>g</b>	Hot Environment Adapted. Insulated.	Mod +3 Reliability in Hot Environment.					-3
<b>h</b>	Corrosive Environment Adapted. Anti-Corrosion Coating.	Mod +3 Reliability in Corrosive Environ.					-3
<b>i</b>	Cold Environment Adapted. Insulated.	Mod +3 Reliability in Cold Environ.					-3
<b>j</b>	Amplification or Magnification Sights.	Increase Maximum Range +1. Actual Range is 1 Range Band closer.					-2
<b>k</b>							
<b>l</b>							
<b>m</b>							
<b>n</b>							
<b>o</b>	Locked to Key.	Usable only if in possession of Key.					-2
<b>p</b>	Locked To User.	Usable only by Current Identified User.					-2
<b>q</b>							
<b>r()</b>	Sight Input is [ ]	<u>V- Vision</u> <u>H-Sound</u>					
<b>s()</b>	Sight Display Output is [ ]	<u>S-Smell</u> <u>T-Touch</u>					
<b>t()</b>		<u>A-Awareness</u> <u>P-Perception</u>					
<b>w</b>							
<b>x()</b>	Sensor Acquisition and Tracking of Target.	Specify Sensor. Used with Type: Guns only.					
<b>y</b>							
<b>z</b>							

For example, t(NFX) x(RGB) n is a sight mechanism that sees in IR and outputs on a screen or display in visual light.



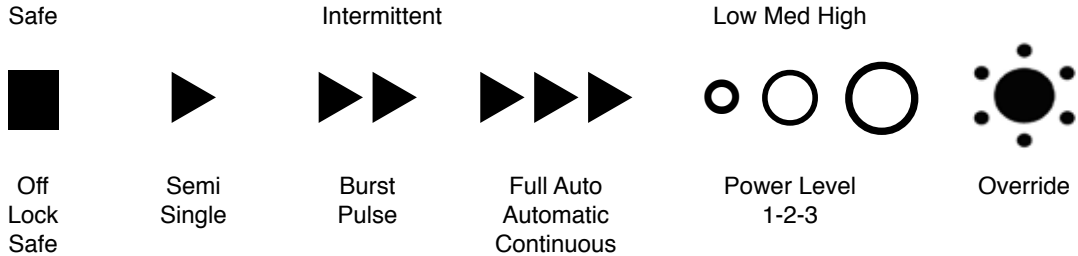


# 08 GunMaker

## Controls

The capabilities of weapons are reflected in their controls. These charts determine the controls to be expected on weapons.

### STANDARD WEAPONS CONTROLS



The following weapon controls are available.

**Off.** This control is a safety. Manipulating it turns the weapon on or off. A mishap is impossible if this control is Off.

**Single.** The weapon makes one attack when operated.

**Burst.** The weapon makes two attacks (against the same target) when operated.

**Full.** The weapon makes a series of attacks against targets using the automatic fire rule). For weapons marked \*\*, this is "Continuous" instead.

**P1-P2-P3.** The weapon has three settings for power level. The standard is P2 and corresponds to standard or ordinary damage in each of the possible damage types for the weapon. Power Level P1 corresponds to **Half** damage. Power Level P3 corresponds to **Double** Damage (the user must Check Quality to avoid weapon malfunction).

**Override.** If the weapon malfunctions, this control will force it to function, after the use, Check Quality to avoid malfunction.

**Determining Controls.** The Controls for a Weapon are the sum of the controls for Type and Descriptor. For example, a Rifle has Off-Single. Adding Assault to Rifle adds Burst to become Off-Single-Burst. Adding Accelerator to Rifle adds P1-P2-P3 to become Off-Single-Burst-P1-P2-P3.

The actual controls may be switches, levers, buttons, or manipulatable items. For some weapons, the markings themselves may be touch sensitive.

### WEAPON CONTROL MARKINGS

Type	Off	Single	Burst	Full	P1-P2-P3	Override	Descriptor	Off	Single	Burst	Full	P1-P2-P3	Override	Descriptor	Off	Single	Burst	Full	P1-P2-P3	Override
Gun	●	●				○	Accelerator	●	●	○	●		○	Hunting	●	●				
Gatling	●		○	●		○	Acid	●				○	○	Laser	●	●		●	○	○
Cannon	●	●				○	AF or AT Missile	●	●				○	Mag	●	●			○	○
Autocannon	●		○	●		○	Anti-Flyer	●	●				○	Missile	●	●				○
Rifle or Carbine	●	●					Anti-Tank	●	●				○	Plasma	●	●	○	●		○
Pistol or Revolver	●	●					Assault	●	●	○	●		○	Poison Gas	●	●			○	○
Shotgun	●	●					Battle	●	●	○	●		○	Psi Amp	●	●			○	○
Machinegun	●		○				Combat	●	●	○	●		○	Rad	●	●			○	○
Launcher	●	●				○	Dart	●	●	○			○	RAM Grenade	●	●	○			○
MultiLauncher	●	●	○			○	EMP	●	●			○	○	Rocket	●	●	○			○
Designator	●			●	○	○	Fire	●	●			○	○	Shock	●	●			○	○
Projector	●	●				○	Flash	●	●			○	○	Sonic	●	●			○	○
							Freeze	●	●			○	○	Splat	●	●				○
							Fusion	●	●	○	●		○	Stench	●	●	○			○
Standard= ●							Gauss	●	●	○	●		○	Sub	●	●	○			○
Optional= ○							Grav	●	●			○	○	Survival	●	●				○
							Grenade	●	●	○			○							

# Creating Guns

Most personal and military weapons can be created using this chart (the chart reads right to left)

# GunMaker 09



Roll (or Pick)  
Type, then  
SubType-Descriptor-Burden-Stage  
Add User  
Calculate details,  
Add Portability.

Weapon TL=  
Sum of TL Mods shown.

	STAGE	BURDEN		
2D	0 Precision*	6		
	1 Remote*	1	Recoilless*	1
	2 Experimental	-2	VRF*	0
	3 Prototype	-1	Anti-Designator*	3
	4 Early	-1	Disposable	3
	5 Basic	0	Heavy	0
	6 <blank>	0	Light	0
	7 Standard	1	<blank>	0
	8 Modified	2	Medium*	0
	9 Improved	1	Snub	1
	10 Advanced	3	Vheavy	0
	11 Alternate	1	Vlight	1
	12 Obsolete	4	Body*	2
	13 Sniper*	1	Magnum*	1
14 Target*	0			

	USER	
2D	2 Sophont	
	3 Droyne	Socket
	4 Vegan	Tentacle
	5 Vargr	Universal
	6 <blank>	
	7 Man	Hand
	8 <blank>	
	9 Aslan	Paw
	10 Hiver	Grasper
	11 K'kree	Gripper
	12 Sophont	

	DESCRIPTOR	SUBTYPE	TYPE
1D	1 Anti-Flyer	4 Gun	6
	2 Anti-Tank	0 Gun	6
	3 Assault	2 Gatling	7
	4 Fusion	7 Cannon	6
	5 Gauss	7 Cannon	6
	6 Plasma	5 AutoCannon	8
2D	2 <blank>	0 Carbine	5
	3 Accelerator	4 Carbine	5
	4 Assault	2 Carbine	5
	5 Battle	1 Rifle	5
	6 Combat	2 Rifle	5
	7 (Poison) Dart	1 Rifle	5
	8 Gauss	7 Rifle	5
	9 Hunting	0 Rifle	5
	10 Laser	5 Carbine	5
	11 Splat	2 Carbine	5
	12 Survival	0 Carbine	5
	1D	1 <blank>	0 Revolver
2 Accelerator		4 Pistol	5
3 Laser		5 Pistol	5
4 Machine		0 Pistol	5
5 <blank>		0 Pistol	5
6 <blank>		0 Revolver	4
1D	1 <blank>	0	
	2 Assault	2	
	3 Hunting	0 Shotgun	4
	4 Hunting	0	
	5 Assault	2	
	6 <blank>	0	
1D	1 <blank>	0	
	2 Anti-Flyer	4	
	3 Assault	2 Machinegun	4
	4 Sub	-1	
	5 Sub	-1	
	6 <blank>	0	
1D	1 AT Missile	4 Launcher	6
	2 AF Missile	3 Launcher	6
	3 Grenade	1 Launcher	6
	4 RAM Grenade	1 Multi-Launcher	8
	5 Missile	2 Multi-Launcher	8
	6 Rocket	-1 Multi-Launcher	8
2D	2 Poison Gas	0	
	3 EMP or Rad	1	
	4 Fire	3 Projector	7
	5 Flash	1	
	6 Freeze	1	
	7 Grav or Laser	5	
	8 Mag	4	
	9 Psi Amp	4 Designator	9
	10 Acid or Shock	0	
	11 Sonic	3	
	12 Stench	3	



# 10 GunMaker

## FillForm Example

As the weapon is designed insert the design values and details into this Fillform. Values may be inserted in any order as the design is considered: the ultimate requirement is that the values balance and properly reflect the charts and tables.

### BUILDING WEAPONS

This Fillform allows an interactive design process which ultimately produces a final weapon design.

Tech Level. Tech Level for a weapon is the minimum level required for manufacture.

Manufacturer		
Naasirka-Regina Industries		
Surface or Orbital?	TL	Law Level
Surface	11	9

WEAPONS					Q	R	E	B	S	Model	TL	Range	Mass	Burden	H1	D1	H3	D3	KCr	Cr	
Chart	Item	Description													H2	D2			,000	,000	
03	Type	Gun				G	6	4	9	-1	*	2								5	
	SubType																				
04	Descriptor	Plasma				P	+5	4	x2.5		Pen	3	Burn	3						x2	
	Burden																				
05	Stage																				
	User																				
06	Notes	Recoil=	Hi	Loud=	Vloud																
		Flash=	Bright	Heat=	Hot																
		Vacc=		UW=	No																
		CQ=	-3																		
07	Options																				
08	Controls	Off-Single-Override																			
05	Portability	(Man)-Portable						+1		-2											
	QREBS=																				
	Totals						11	5	22	-3	Pen	3	Burn	3						10,000	

### WEAPON DESCRIPTION

Model LongName (Stage-Burden-Descriptor-Type-User-Portability-TL)

PGMP-11 Plasma Gun Man Portable-11

The basic information required to describe a weapon.

### WX: WEAPON EXTENSION

Range Cost Mass QREBS Effects

Wx: R=5 Cr 10,000 22.5 kg B= -3 Pen-3 Burn-3

The basic information required to use a weapon.

# Big Weapons

Oversize and Titan armor require Oversize and Titan weapons.

# GunMaker 11



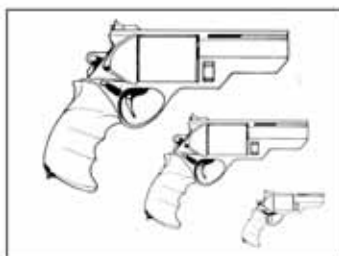
## BIG WEAPONS

The majority of weapons are manufactured as Standard, and the weapon creation system produces Standard size weapons. Appropriate automated and CNC manufacturing systems allow the production of upsized weapons for Oversize and Titan Sophonts, Robots, and Armor. Upsized weapons can be produced for all Categories except Guns.

### OVERSIZED WEAPONS

**Oversize Weapons** are pantographed to double Standard Size (dimensions x2; weight x 8).

TL=	+1
R=	+1 (max= 6)
Cr=	x2
Dimensions	x2
Kg=	x8
Effects=	x2
Q=	- 2
R=	- 2
E=	unchanged
B=	unchanged
S=	unchanged



### TITAN WEAPONS

**Titan Weapons** are likewise pantographed to triple Standard Size (dimensions x3, weight x27).

TL=	+2
R=	+1 (max= 6)
Cr=	x3
Dimensions	x3
Kg=	x27
Effects=	x3
Q=	- 3
R=	- 3
E=	unchanged
B=	unchanged
S=	unchanged

#### Left to Right:

Std RAMmL-10  
OS RAMmL-11  
Titan RAMmL-12

#### Inset Top to Bottom:

Std MRe-5  
OS MRe-6  
Titan MRe-7

## USERS

Small users (Size =50 or so) are unable to handle most Standard weapons. They can use Category Pistols and Projectors and Designators under 2 kg. Small assumes less than 1 meter tall and less than 50 kg mass. Characteristics C1 C2 C3 are probably created with 1D each.

**Standard** users (Size= 100 or so) can use most weapons depending on their personal characteristics. Standard assumes approximately 1.5 to 2 meters tall and less than 100 kg mass. Characteristics C1 C2 C3 are probably created with 2D each.

**Oversize** users (Size = 200 or so) cannot use Standard Category Pistols. They can use most other weapons depending on their personal characteristics. Oversize assumes approximately 3 to 4 meters tall (possibly altered by a multi-legged horizontal stance) and masses 400 to 800 kg. Characteristics C1 C2 C3 are probably created with 3D each.

**Titan** users (Size = 300 or so) cannot use Standard weapons; they must use Titan weapons. Titan assumes the individual is approximately 4 to 5 meters tall (possibly altered by a multi-legged horizontal stance) and masses 1 to 2 tons. Characteristics C1 C2 C3 are probably created with 4D or 5D each.

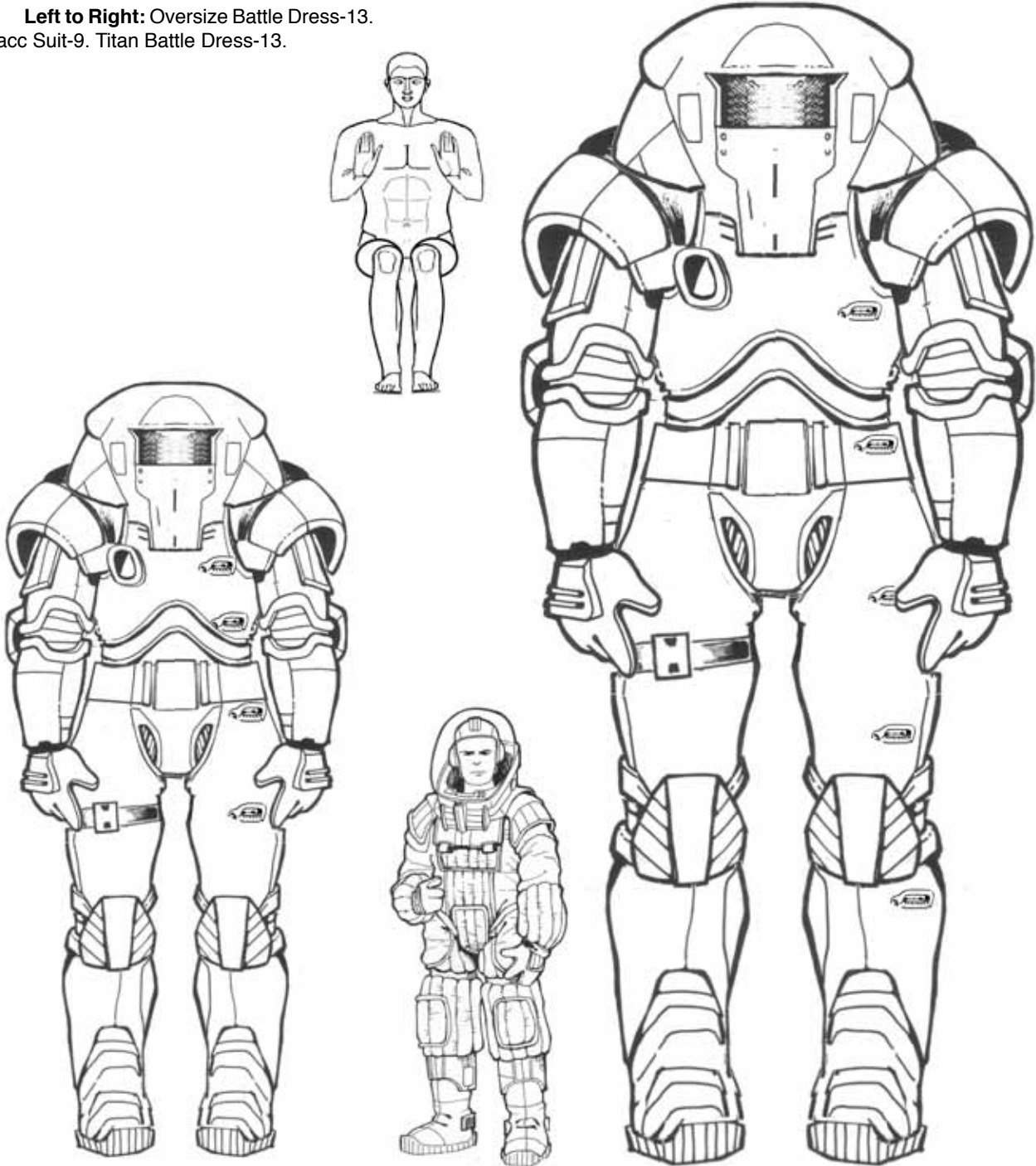
**Armor and Robots.** Armor for sophonts and Humaniform or Sophontiform robots are produced in Standard (same size as the Sophont), Oversize (double size), and Titan (triple size).

For example, an Oversize Humaniform Robot is twice the size (height) of a human. A Titan Battledress for a human is triple the size (height) of a human.



Typical armor examples provide insights into the armor generation system.

**Left to Right:** Oversize Battle Dress-13.  
Vacc Suit-9. Titan Battle Dress-13.



# ArmorMaker

Armor is the tool that characters use for personal protection against the elements, against animal violence when hunting, and against violence in pursuit of personal, corporate, and governmental goals.

Armor is a natural consequence of, and element of, any tool-using sophont society: it is used for personal protection, as defense against the elements, animals, and violence from other sophonts in situations that have escalated beyond non-violent personal interactions.

## UNDERSTANDING ARMOR

Armor is protection against the effects of weapons (and against the effects of the environment).

Armor is described with a LongName which generally describes its principles or construction, and with a Model which abbreviates the LongName.

With a knowledge of Weapons, Armor, Vehicles, and Combat, players can generally understand the relative value of Armor from their LongNames and Models.

### Types of Protection

Various types of Armor are differentiated by the protections they provide.

**Armor** is a barrier to physical blows and penetration.

**Cage** is a barrier to EMP.

**FlashProof** is a barrier to bright light (usually as automatic polarization or darkening of transparents).

**RadProof** is a barrier to radioactivity.

**SoundProof** is a barrier to sound.

**PsiShield** is a barrier to psionic activity.

**Insulated** is a protection against heat, cold, and shock.

**Sealed** is a barrier to liquids and gases.

## DESCRIBING ARMOR

Armor, like Weapons, can be described in many ways depending on the format required: any format is possible as long as it provides the information necessary.

### The Armor Description

Armor are described in a series of elements to form the LongName or abbreviated to form the Model. The LongName or Model contains enough information to allow a character to describe a type of Armor or Protection.

The LongName consists of the following elements:

Stage-Burden-Descriptor-Type-User -TL - [Options]

**Type.** Armor is produced in five distinct types based on function: Dress, Armor, Suit, Unit, and Item.

**Descriptor** describes the armor with a simple word based on purpose, or other function. For example, Battle or HazMat.

**Burden** identifies the relative weight, mass, or bulk. It is possible for Burden to be blank. For example, Light, Medium and Heavy.

**Stage** is the armor's position in the spectrum of sophistication in the developmental life cycle. It is possible for Stage to be blank. For example, Prototype, Basic, or Advanced.

**User** identifies the intended or designed user, usually by sophont, or by manipulator. Blank assumes the user is Human or Man or Hand. For example, Man, Hiver.

**Tech Level** identifies the Technological Level at which the Armor is commonly manufactured. TL is required.

**Options** indicate the installed options for the Armor.

The **Identifying Armor Chart** shows the various component names and abbreviations.

Elements of a LongName not necessary for a proper understanding may be omitted.

**Model.** LongName elements have abbreviations which are used to create the Armor Model.

Model is a jargon abbreviated Longname. Once a character is familiar with a specific Armor, references to it devolve to its abbreviation. VS-9 is a Tech Level 9 Vacc Suit. When used, Stage and Burden may be enclosed in parens to increase comprehension, and some familiarity is required before players can quickly understand ( AltH ) AU-15.

Given the restrictions of the alphabet, element abbreviations are not necessarily unique.

### The Armor Extension

The capabilities of Armor are contained in the Armor Extension. This string of values details enough information to allow a character to use Armor. The Armor Extension is a variable length string: only such information as is needed is included.

**Prefix.** The Armor extension begins with the prefix Ax:

**Elements.** Following the prefix, the Armor Extension includes

AX: Cost - Mass - QREBS - Ar Ca Fl Ra So Ps In Se

**Cost.** The cost of the Armor in Credits.

**Mass.** The mass (more-or-less the weight) of the Armor

## ARMOR DESCRIPTION

Model LongName (Stage-Burden-Descriptor-Type-User-Portability-TL)

--	--

The basic information required to describe armor.

## AX: ARMOR EXTENSION

	Cost	Mass	QREBS	Ar=	Ca=	Fl=	Ra=	So=	Ps=	In=	Se=
AX:	Cr=		kg								

The basic information required to use a weapon.

expressed in kilograms (unless otherwise identified).

**QREBS.** The QREBS values for the Armor (if known). Various formats are used to identify specific QREBS values.

**Armor and Protection Values (Ar= Ca= Fl= Ra= So= Ps= In= Se=).** The specific armor and protection values for the armor, including Armor=, Cage=, FlashProof=, Rad-Proof=, SoundProof=, PsiShield=, Insulated=, and Sealed=. Elements with zero values can be omitted.

For example, Cold Suit-7 In=16 is enough to describe the protection that it provides without insignificant or trivial detail.

### USING ARMOR

Armor absorbs hits, wounds, injuries, or effects under the V1 or V2 hit systems.

**The Hit System V1.** The Basic Hit System (version 1) provides a simple hit mechanic for resolution of combat. V1 is intended for use with non-player characters (and especially hordes of NPCs) when speed of resolution is important.

**The Hit System V2.** V2 Damage inflicts different types of damage based on the specific weapon. Armor is rated against V2 Damage to absorb different types of damage.

### DESIGNING ARMOR

Armor can be created randomly, or by design.

**Random Creation.** The **ArmorMaker** system produces armor based on die rolls. Randomly created armor can be used in a variety of encounters with adversaries, or to define trade goods.

**Design.** Armor can be designed by substituting selections for die rolls in the **ArmorMaker** system.

Armor is designed using the Armor Fillform. The Fillform guides the designer through the process with spaces for information and references to the applicable charts.

### Deliberate Design

The deliberate design process begins with a blank Armor Fillform. In each step, the Chart Number indicates the Armor Chart from which the information is selected.

**Chart 3.** Select the armor **Type**. Record TL, Range, Mass, Armor Values, and Cost.

Select the Armor **Descriptor**. Record TL, Range, Mass, Armor Values, qreBs (Burden), and Cost.

Select an appropriate **Burden** and record its TL, Range, Mass, Armor Values, qreBs (Burden), and Cost.

Select an appropriate **Stage** and record its TL, Range, Mass, qreBs (Burden), and Cost. Observe the requirements under Comment.

**Chart 4.** Select and record an appropriate **User**.

Review the Armor Type, Descriptor, and Stage for applicable notes and record this information.

**Fillform.** For each column, compute the totals. Tech Levels sum. Some entries under Mass may multiply. Burdens sum. Some costs multiply.

Complete the QREBS entries with the calculated Burden (and add any other QREBS entries dictated by comments).

**Return To Chart 4.** Calculate the performance details of the Armor for Strength, Dexterity, and Endurance.

**Record The Armor Information.**

### Random Creation

The random creation process begins with a blank Armor Fillform and the Random Armor Creation Chart 8.

Using 1D and 2D as directed, roll for each element of the weapon on Chart 9 from **right to left** in the order:

Type, Descriptor, Burden, Stage, and User.

**Simple Armor.** A simple armor system can be created directly from the chart (Tech Levels are included).

**Complete Armor Descriptions.** Using the information created from Chart 8, return to Deliberate Armor Design and determine its details from the Charts.

**Some Designs Are Impractical.** Some combinations of elements may not make sense PLtBS-7 Prototype Light Battle Suit-7. It is the Referee's responsibility to discard the design as nonsensical or to justify the design based on local sophont cultural preferences.

## UNDERSTANDING THE ARMOR ELEMENTS

Each Element of the Armor description has meaning. Once Armor has been created, consult the supporting paragraphs for a better understanding of its function and operation.

### ARMOR TYPES

Armor falls into five distinct Types based on size, function, and use: Dress, Armor, Suit, Unit, and Item.

Armor is further distinguished by three specific characteristics: Power, Morph, and Braced.

**Power.** An Armor system may be Powered or Unpowered. Powered systems have greater or enhanced physical capabilities; Unpowered systems depend on the physical capabilities of the user.

**Morphic.** Systems may be Morphic (similar in shape to the user, or Non-Morphic (structured without regard to the shape of the user). Morphic indicates a similarity to the shape of the user, rather than an ability to change shape.

**Braced.** A system may be Braced (internally structured to withstand extremes of force, primarily recoil) or Unbraced (without specific reinforcement).

Dress is Powered, Morphic, and Braced.

Armor (as a type) is Powered, Morphic, and Unbraced. Thus, Armor is Unbraced Dress, or Dress is Braced Armor.

Suits are Unpowered, Morphic, and Unbraced.

Units are Powered, Non-Morphic, and may be Braced or Unbraced.

Items are individual components: specific pieces of armor or protection (helmets, cuirasses, or greaves, for example).

		Morphic		Non-Morphic	
		Braced	Unbraced	Braced	Unbraced
Power	Powered	<b>Dress</b>	<b>Armor</b>	<b>Unit or Item</b>	
	Unpowered	impractical	<b>Suit</b>	impractical	impractical

### Dress

The term Dress is derived from Battle Dress: a standard combat uniform worn by soldiers. Over time, the Dress element has become the term for the ultimate in military powered armor.

The significant element of Dress is that it is braced against high recoil.

### Armor

All non-Dress powered morphic battlefield or military protection are called Armor.

### Suit

Protective unpowered morphic coverings (both on or off the battlefield) are Suits, as in Vacc Suit or Space Suit. They range from simple Environ Suits and Vacc Suits to Hazmat Suits or Police Suits. Suits may have an armor component.

### Unit

The distinction between Armor and Vehicle becomes

blurred with the introduction of Units. Units are non-morphic: their shape and size are not specifically linked to the user. A human-operated Unit is not necessarily (or even usually) human-shaped nor human-sized.

### Item

Items are stand-alone pieces of equipment which serve to protect the bearer. For example, a buckler is an unpowered armor item.

### ARMOR DESCRIPTORS

Descriptor is a statement of the specific function or purpose of the system, or of the effect which it counters. When paired with an Armor Type, it provides a basic statement of the Armor and its function.

A Descriptor may apply to several different types of Armor, but not necessarily to every Armor Type.

**(blank).** The Armor has no modifications or effects based on Descriptor.

**< > Carrier.** The system is designed as a weapon carrier, typically integral to, or mounted on, the system. Select a weapon which the system is capable of carrying.

**Assault.** The (relatively) lightweight system is intended for short-term (hours) operations against an enemy force.

**Battle.** The system incorporates protections against most dangers, attacks, and threats on the battlefield.

**Boarding.** The system is tailored for zero-G operations against interplanetary and interstellar vessels.

**Cold.** The primary purpose of the system is protection against environmental low temperatures.

**Combat.** The system is intended for medium-term operations (days) against an enemy force.

**Drop.** The system is structured to protect against extremes temperatures of orbital entry and against battlefield dangers.

**Environ.** The system protects against typical and ordinary world surface environmental threats: temperature, vacuum, light.

**Combat Environ.** The system adds protection against the threats of the battlefield to the elements of Environ.

**Exploration.** The system is designed for long-term (multiple days) use while providing protection against typical and ordinary world surface environmental threats: temperature, vacuum, light.

**Hazmat.** The system protects against hazardous materials and situations. HazMat can be produced as Armor, but rarely (if ever) as Dress.

**Hostile Environ.** The system includes a variety of protections against extreme environmental conditions.

**Hot.** The primary purpose of the system is protection against environmental high temperatures.

**Police.** The system incorporates protections against hazards in a law enforcement environment.

**Prospector.** The system adds survey and search tools to a hostile environ capability.

**Sapper.** The system adds combat engineer functions to combat environ capabilities.

**Vacc.** The system provides protections against vacuum



and functionality in a zero-G environment.

**Labor.** The system provides enhanced Strength to perform manual labor functions.

## BURDEN

Burden identifies the spectrum of effects based primarily on weight, mass, and bulk.

**Disposable.** The armor is manufactured from inexpensive materials to reduce cost; it has a usable lifetime measured in days.

**Heavy.** The armor is significantly heavier than the standard armor, but provides greater protection.

**Light.** The armor is significantly lighter than the standard armor and thus easier to use, but at a cost in protection.

**Medium** (the term is often omitted). The armor has no specific enhancements with the Burden classification.

**Vlight.** The armor is extremely light, but at a reduction in protection.

**Oversize.** The armor is oversized: approximately twice the size of standard armor.

**Titan.** The armor is approximately triple the size of standard armor.

## STAGE

Stage identifies the spectrum of effects based on the technological product development cycle.

**(blank).** The armor has no modifications or effects based on Stage.

**Advanced.** The armor is significantly better than the standard version, and features lower weight and excellent ergonomic design.

**Alternate.** The armor uses an alternate technology to achieve its effects.

**Basic.** The armor is a stripped down design with greater weight and lower cost.

**Early.** The armor is a preliminary design with the bugs not yet worked out.

**Enhanced.** The armor includes additional features.

**Experimental.** The armor is an early test model.

**Improved.** The armor features small improvements.

**Modified.** The armor features improvements.

**Prototype.** The armor is a hand made model.

**Standard (often omitted).** The armor has no specific enhancements with the Stage classification.

**Remote.** The armor is remotely operated. The controller maintains control through a data link and operates the armor in real time.

**Ultimate.** The weapon represents the technological pinnacle of the design cycle.

## USERS

User indicates the typical or intended user, either by species or by manipulator type.

**(blank).** The armor has no modifications or effects based on User. The default user is Man or Human.

If no User is specified, the armor is intended to be operated by a Human or similar being.

**Universal.** The weapon has compromise controls which are usable by most sophont users.

## By Sophont

User may be described as a sophont.

**Man.** The intended user is Human (the military user term Man was adopted during the Second Empire to refer to Humans in general; although archaic in other uses, it is the accepted term here).

**Aslan.** The intended user is Aslan.

**Hiver.** The intended user is Hiver.

**Vegan.** The intended user is Vegan.

**<Sophont>.** The intended user is a specific Sophont, and various details are custom determined. For example, Plexxan (where Plexxan is a Sophont familiar to the characters, or otherwise described in available data banks).

## TECHNOLOGY LEVEL

The weapon Tech Level indicates the relative level of technological sophistication required for manufacture. Any world with the indicated Tech Level and appropriate machinery can produce this item.

## QREBS

Any acquired armor is ordinarily assumed to be QREBS=50000 (no effects under QREBS system).

If the Armor Design System imposes any QREBS elements (for example, B= -2), that imposed element applies to the armor.

**As Issued.** A armor with only the imposed QREBS elements is considered As Issued. It is typical of the armor as used in service. Most armors are in this state, and any reasonable character can research and determine this information.

**Used.** Any character may ask for a Used armor instead. The Referee then evaluates the armor under QREBS and records this information.

For example, Eneri Dinsha has acquired a Prototype Vheavy Gauss Carbine with QREBS Burden -5. The other elements are all zero. In an attempt have a better armor, he specifies it is Used. The Referee rolls for all five QREBS elements. -1 +2 -3 +4 -1. The +4 brings the existing Burden up to -1. The Used armor becomes QREBS -1 +2 -3 -1 -1. Eneri is better served by looking for a better armor.

## OPTIONAL ACCESSORIES

Some armors are enhanced with mods or accessories.

## Comms

Armor systems have standard and optional communications systems.

**Battlefield.** Provides radio voice and data contact to Range= 6, with subchannels for individual communications.

**Grid.** Provides individual access to the local communications grid. Operates within Range=6 of a commercial communications center/tower. Charges may apply.

**Standard.** Open channel radio broadcast system to Range=5.

**Command.** Enhanced Battlefield system to Range=8. Typically installed in Officer's systems for communications with higher levels.

LOS. Direct Line-Of-Sight (Laser or similar) system. Secure against eavesdropping. Self-directed (user direction not required). R=6.

LR LOS. Direct Long Range Line of Sight (Laser or similar) system for communication. R= 10.

Relay Option. Automatic capability to receive and retransmit Battlefield or LOS to the intended recipient.

### Power and Life Support

Armor systems have standard and optional power and life support systems.

**Day.** System power and life support is sufficient for approximately one day of operation. Standard storage racks recharge the system when not in use.

The system provides breathing gases, user accessible drinks and snacks, and basic waste systems suitable for approximately one day.

**Days.** System power and life support is sufficient for several (= 2 to 3 ) days of operation. Standard storage racks recharge the system when not in use.

The system provides breathing gases, user accessible energy-supplement drinks and snacks, and waste systems suitable for several (= 2 to 3) days.

**Week.** On-board fusion power module supports operations for approximately one week of operation. The system is recharged by replacement of a fusion power cartridge.

The system provides breathing gases, user accessible drinks and meals, and basic waste systems suitable for approximately one week.

The system includes an on-board diversion system with music, audio, video, and interactive entertainment.

**Extended.** On-board fusion power module supports operations for approximately more than a week (9-10 days). The system is recharged by replacement of a fusion power cartridge.

The system provides breathing gases, user accessible drinks and meals, and basic waste systems suitable for approximately one week.

The system includes an on-board diversion system with music, audio, video, and interactive entertainment.

### Reserve Power and Life Support

Most systems include a reserve system with 1D additional hours of power.

### Sensors

Armor systems have standard and optional Sensor systems.

**Basic Data.** Every system provides a basic instrumentation package: speed, direction, and systems status (icons illuminate to warn of impending device failures).

**Additional Data.** The additional instrumentation package provides sophisticated instrumentation, including heads-up displays,

**Direct.** The system includes direct sensory input to the user through a faceplate and external audio sensors.

The operator can See and Hear external stimuli.

The system may have FlashProof and SoundProof to protect against sensory overload.

**Enhanced.** The system enhances sensory information processes external sensor information as requested by the user.

Each Enhanced Sensor package increases the Sense Constant for TWO senses by +08. If Vision is included, its Color sensitivity is increased TWO adjacent Colors.

Additional packages can be installed for additional sensitivity.

### Sophonts

Systems created for non-humans provide tailored sensory input based on the sophont's specific sense structure.

**Aware and Percept.** Awareness and Perception are unimpeded by the physical structure of the armor system. The user can use the two senses normally.

### CONTROLS

Systems have standard and optional control systems.

**Self.** Suits are unpowered and do not require control systems.

**Feedback.** Feedback systems respond directly to the user's limb movement to operate the powered systems. The details of operation are transparent to the user.

**Manual.** A system of controls (hand, manipulator, foot, head-movement, voice, and other) operate the unit

**Wafer.** The user is directly connected to the operating controls via his wafer jack. Operation is similar to the feedback system, and transparent to the user.

**AutoPilot Option.** Powered systems can be equipped with the AutoPilot option. The operator enters a destination and the system self-operates while the user sleeps or attends other functions.

**Fine Control Option.** The manipulators are tuned to increase their functional C2 (primarily as an offset to the system's diminished C2)

### Other Options

Additional options are available.

**Reflec.** The surface of the armor is reflective: it deflects Laser attacks totally. However, Reflec imposes Mod +2 for visibility or to be spotted.

**Treat C3 as Stamina.** The Dress or Armor treats the users C3 as Stamina.

## DRAWBACKS

Every system is a balance of features and drawbacks: for every feature added to a system, a drawback must be included.

For each Option added to an Armor, consult the Drawbacks Table. Cycle through the tables: the first roll is on Table 1 (and table 1 won't be used again), the second on Table 2, the third roll is on Table 3. The fourth roll is on Table 4. The fifth roll is on Table 2 again.

Uninstalling the Option removes the associated drawback (but you can't reinstall and roll again).

**Fixing The Drawbacks.** If drawbacks were easily fixed, they would not be Drawbacks. Each involves a Hopeless Diagnosis and a Hopeless Repair.

### 1 Options- Minor Drawbacks

Use this table only once.

**Cramped.** Interior is very small. Reduce C3 minus 1.

**Irritating Interior Noise.** A non-specific interior noise continues unrelentingly. Reduce Hearing Constant minus 02. After C3 hours, reduce San minus 1.

**Bad Taste in On-Board Drinks.** Although there is no specific effect to this Drawback, the user is constrained to complain about it after each mission.

**Interior Runs Hot.** The equipment was created for a Hot World Sophont. Its standard temperature (incapable of adjustment out of its Hot range) imposes Hot-1 per Round. Perhaps the user needs to wear a Cold Suit while using it?

**Interior Runs Cold.** The equipment was created for a Cold World Sophont. Its standard temperature (incapable of adjustment out of its Cold range) imposes Cold-1 per Round. Perhaps the user needs to wear a Hot Suit while using it?

**Poor Quality Diversion Unit.** Although there is no specific effect to this Drawback, the user is constrained to complain about it after each mission.

### 2 Options- Drawbacks

Drawbacks reduce the comfort or survivability of the equipment.

**Vibration.** The equipment has an unsettling and uncomfortable vibration. Reduce C minus 1.

**Heavy Vibration.** The equipment has several distinct vibrations which go in and out of phase. Reduce C3 minus 2.

**Waste Heat Plume.** The equipment is constructed to exhaust heat in a Size-6 plume visible in Bands NIFXZ,

**Externally Loud.** The equipment operates with deafening noise. Impose Bang-2 at vehicle exterior per Round.

**Hard To Use.** The operating controls for the equipment are poorly designed. EaseOfUse= -2.

**Dangerous to Use.** The equipment is poorly designed and poses a hazard to users. Safety= -2.

### 3 Options- Major Drawbacks

Major drawbacks severely degrade performance.

**Faulty Manipulator Joints.** The components of the manipulators are faulty. Reduce C2 Half.

**Faulty Limb Joints.** The components of the limbs are faulty. Reduce Strength half.

**Poor Manipulator Design.** The manipulators are poorly designed. Treat C2 as Agility.

**Highly Visible Shape or Finish.** The equipment is poorly designed for concealment. Impose Visibility Mod +2.

**Mag Flashes.** Mechanism produces Mag Intensity = 5 when in operation.

**Contaminated Life Support.** There is a continuing contamination in the Life Support system. Check Endurance to avoid Infection-1.

### 4 Options- Ultimate Drawbacks

Ultimate drawbacks impose active hazards to the user.

**Strange Internal Harmonics.** The equipment produces a variety of sounds and vibrations that create extreme discomfort. Check San daily.

**Unsteady.** The equipment is unsteady in operation. Randomly every hour, Check World Size (2D) for a stability failure. Failure produces a fall.

**Rapid System Fatigue.** The system is fatiguing to the user. Treat C3 as Vigor.

**Distracting Feedback.** The equipment produces a variety of distracting input. Skill and Int halved.

**Randomly Locks.** The joints of the system randomly lock up. In active use, roll 2D for 12, in which case the equipment cannot move for one Round.

**Hangar Queen.** A piece of equipment which users avoid if at all possible (hence, it rules the Hangar). Check Reliability daily.

## ITEMS

Armor Items are independent pieces of equipment rather than system. Each is acquired individually.

### The Basic Body Armors

The basic body armors are personal protections worn by characters as a natural effort to avoid injury, especially in combat.

**Jack.** Natural or synthetic leather jacket or body suit covering the torso and upper arms and legs. Jack is better than ordinary clothing in providing basic protection.

**Mail.** Flexible metal shirt providing basic protection against most attacks.

**Mesh.** Jacket or body suit made of natural or synthetic leather and reinforced with a lining of flexible metal mesh, similar to chain mail but lighter and stronger.

**Cloth.** Heavy-duty body suit tailored from ballistic cloth.

**Quilt.** Improved version of Cloth.

**Plate.** Protective unit of personal body armor constructed of ceramic or metal plates (often articulated to allow movement or flexibility).

**Ablat.** Protective (against laser fire) clothing fashioned from a material which will ablate (vaporize) when hit by laser fire. The vaporized material carries away the energy of the laser, protecting the user. Ablat has a basic protective value against attacks and is doubled against K (Burn) attacks.

**Reflec.** Flexible applied coating for personal armor which entirely deflects Laser. When worn as an outer protection, it increases visibility (Visibility Mod +2). It can be worn under clothing or other armor, but when hit by Laser, reduces the outer armor layer double the damage inflicted by penetrating it.

**Coat.** Basic cold weather clothing unit.

**Heavy Coat.** More effective cold weather clothing unit.

### The Breathers

Breathers provide support in strange atmospheres.

**Respirator.** Small compressor allowing breathing in Air-3 (Vthin Atmosphere). Alternatively called a Compressor.

**Filter.** Breathing filter which protects against taint in Air-7 and Air-9. It is effective only against T (Poison).

**Combination.** Breathing apparatus combining Filter and Respirator. It allows breathing Air-2 and Air-5. It is effective only against T (Poison).

**Air Tanks.** Complete set of air reservoirs and the appropriate breathing mask to allow independent breathing in smoke, dust, gas, or exotic atmospheres. The tanks are filled with the appropriate breathing gases (for example, Air-4, Air-8) for the user. This apparatus can be used underwater.

**Breather.** Apparatus which removes waste gases and recycles breathing gases to the user. The

**Rebreather.** Improved version of the Breather for better performance and efficiency.

**Gill.** Breathing apparatus for air breathers which extracts oxygen from water.

### Helmets and Head Protection

There are a variety of protections for heads and senses.

**Military Helmet.** Basic head protection for protection against fragments from and some bullets.

**Full Helmet with Visor.** Improved military helmet providing full head protection.

**Ear Protectors.** Basic Soundproof ear protection.

**Flash Goggles.** Basic Flashproof eye protection

**Sunglasses.** Non-military Flashproof eye protection.

**Cool Sunglasses.** Non-military

Flashproof eye protection. Wearing Cool Sunglasses improves perceived Social Standing or Charisma +1.

**Psionic Shield.** Apparatus to protect against psionic activity.

### HazMat and HazSit Equipment

Hazardous Material and Hazardous Situation equipment provides some degree of safety when dealing with hazardous events.

**Thermal Blanket.** Basic reflective sheet which protects against Hot or Cold.

**Fire Shield.** Enhanced Thermal Blanket which also protects against fire.

**Rescue Ball.** Collapsed protective structure providing shelter in emergency situations. The ball will hold and support four individuals for a week.

**Desert Cloak.** Basic fabric article of clothing which provides a degree of protection against the desert environment.

### SKILLS AND KNOWLEDGES

Armor systems are governed by a variety of skills and knowledges.

BattleDress governs Dress and Armor.

Vacc Suit governs Suits.

Driver: Legged governs most Units.



Aslan warrior in traditional Q-9 Quilt armor.

## RATING AN ARMOR SYSTEM

The performance of a system depends on the physical characteristics C1 C2 C3 of the **operator**.

Suits reflect the user's Characteristics and may reduce C2 and C3.

Armor and Dress (because they are Powered) multiply Strength. Oversize and Titan provide greater Strength multiplication.

Using the Evaluating A System Chart, determine the changes to Characteristics that are dictated by the System. For reference, record the temporarily altered characteristics in the format:

User is 777777

Armor Name = Str= Dex= End=

BattleDress-13 = Str= (70) Dex= 5 End= 6

Note Increased Strength in Parens as a real number: A character with Str-7 notes his increased Strength in Parens. If this is Dress with an increase of x10, it would be (70).

For example, young Imperial Reserve Star Marine Lieutenant Sir Dulinor Astrin 88888B discovers, when reporting for his monthly drill and training session, that they have just been re-equipped with

AltH DD-14 Alternate Heavy Drop Dress -14

They spend the day checking out the new equipment and scanning the manuals.

DD-14s are Dress, so the governing skill is BattleDress.

DD-14 multiplies Strength x 10, reduces Dexterity -2, and reduces Endurance -1. The Captain functions as

AltHDD-14 = Str=(80) Dex= 6 End= 7

"But wait!" says the Captain, "There are options. Option-t. Fine Control, and..."

AltHDD-14 = Str=(80) Dex= 9 End= 7  
(the Fine Control Option adds back +3 to C2)

"Option-w, PsiShield, and  
"Option-u Reflec anti-laser coating, and  
"Option-y, Stamina."

AltHDD-14 = Str=(80) Dex= 9 Sta= 7

They try one of them out that afternoon and he starts to see the drawbacks to the system as well.

"Ugh. That thing is cramped.

AltHDD-14 = Str=(80) Dex= 9 Sta= 6

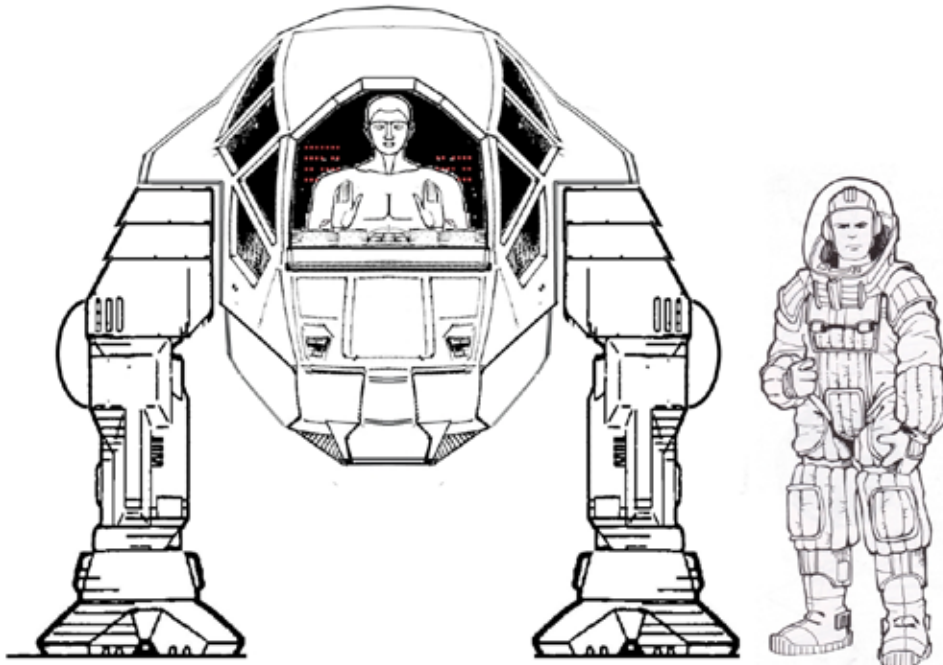
"And it's really hard to use.

qrEbs= -2.

"And the manipulators are very poorly designed."

AltHDD-14 = Str=(80) Agi= 9 End= 6  
(treat C2 as Agility).

In addition, he hasn't yet seen that it Locks Up on a 12. Maybe he'll notice that in combat?



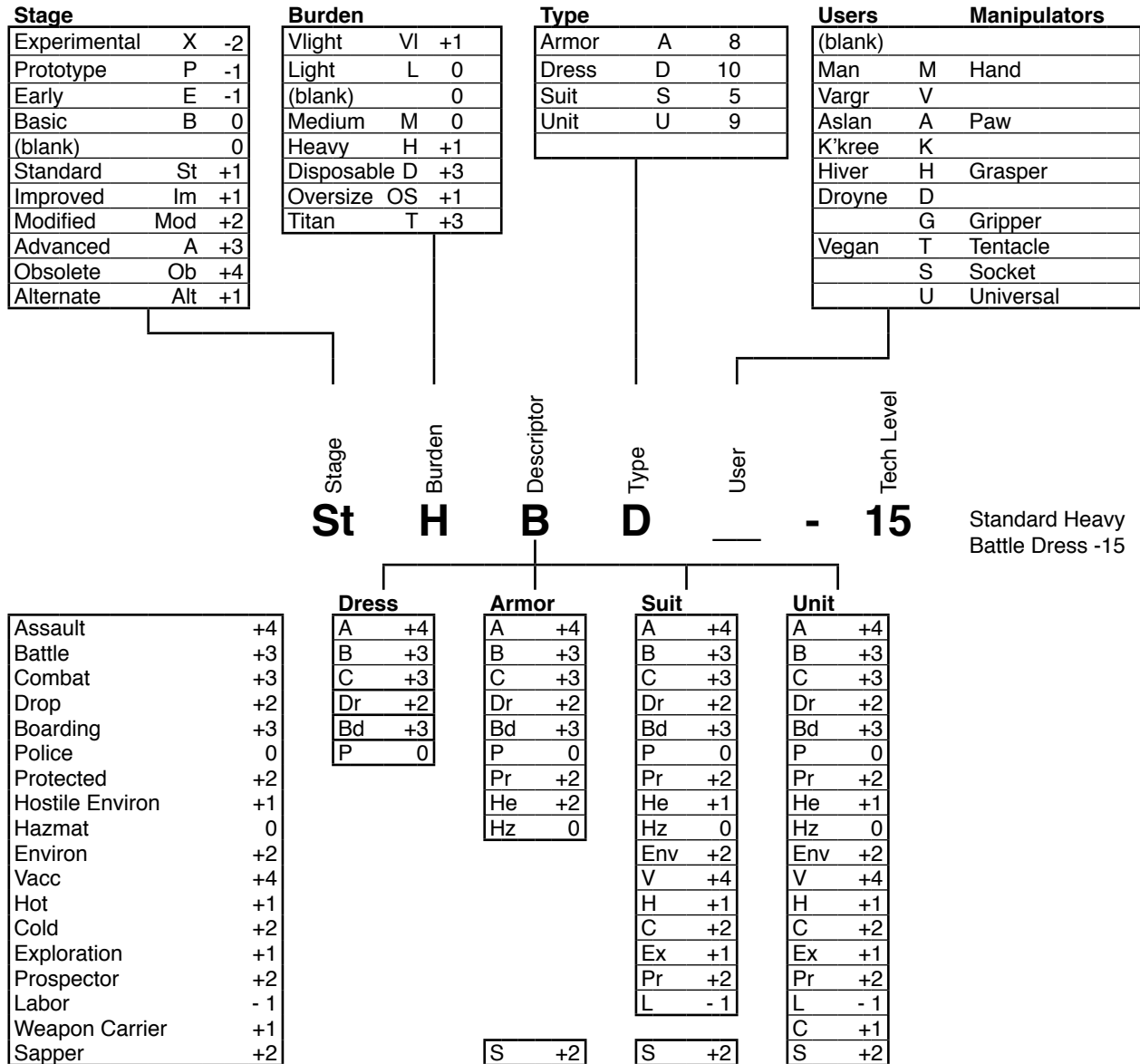
OSEnvU-12- OverSize Environmental Unit-12 (shown with VS-9 Vacc Suit-9).

# Armor

Quick-Create Armor by selecting elements and totalling the TL values.

Decode Armor abbreviations using this chart.

# ArmorMaker 01



For Example:

Experimental -2	VeryLight +1	Assault +4	Armor +8	= XVIAA-11
Standard +1	Heavy +1	Environ +2	Suit +5	= StHES-9
Alt +1	Heavy +1	Drop +2	Dress +10	= AltHDD-14
		Vacc +4	Suit +5	= VS-9
	Oversize +1	Environ +2	Unit +9	= OSEnvU-12



# 02 ArmorMaker

## Armor FillForm

As armor is designed, insert the details into this Fillform. Values may be inserted in any order: the ultimate requirement is that the values balance and properly reflect the charts and tables.

### BUILDING ARMOR

This Fillform allows an interactive design process which ultimately produces a final armor design.

**Tech Level.** Tech Level for a armor is the minimum level required for manufacture.

Manufacturer		
Surface or Orbital?	TL	Law Level

ARMOR		Q	R	E	B	S	Model	TL	Mass	Ar=	Ca=	Fl=	Ra=	So=	Ps=	In=	Se=	KCr ,000	Cr ,000
04	Descriptor																		
	Burden																		
	Stage																		
	User																		
	Controls																		
05	Sensors																		
	Comms																		
	Power & LS																		
	Add-Ons																		
	QREBS=																		
	Totals																		

### ARMOR DESCRIPTION

Model LongName (Stage-Burden-Descriptor-Type-User-Portability-TL)

--	--

The basic information required to describe armor.

### AX: ARMOR EXTENSION

Cost Mass QREBS Ar= Ca= Fl= Ra= So= Ps= In= Se=

AX:	Cr=	kg										
-----	-----	----	--	--	--	--	--	--	--	--	--	--

The basic information required to use a weapon.

# Armor

Decode the elements describing armor using this chart.

# ArmorMaker 03



ARMOR													
Code	Type	TL	Mass	Ar=	Ca=	Fl=	Ra=	So=	Ps=	In=	Se=	Comment	Cr
J	Jack	1	1	5	1	-	-	-	-	4	-	--	50
Ma	Mail	4	3	6	2	-	-	-	-	-	-	--	400
M	Mesh	7	2	10	1	-	-	-	-	2	-	--	150
K	Cloth	8	2	14	1	-	-	-	-	6	-	--	250
Q	Quilt	9	1	18	1	-	-	-	-	9	-	--	600
P	Plate	6	4	22	1	-	-	-	-	-	-	B=+2	900
A	Ablat	9	2	12	3	-	-	-	-	8	-	B=+3 2x vs K*	375
R	Reflec	10	1	-	-	-	-	-	-	-	-	deflects Laser	10
C	Coat	1	1	2	-	-	-	-	-	-	5	-	100
hC	Heavy Coat	2	2	3	-	-	-	-	-	10	-	-	200
Sh	Shield	2	3	12	3	-	-	-	-	-	-	-	100
aSh	Advanced Shield	8	2	14	2	-	8	-	-	-	-	-	400
F	Filter	3	1	-	-	-	-	-	-	-	3	Air-79 only vs T*	10
F	Filter	8	1	-	-	-	-	-	-	-	8	Air-79 only vs T*	40
F	Filter	10	0	-	-	-	-	-	-	-	10	Air-79 only vs T*	80
B	Breather	7	2	-	4	-	-	-	-	-	6	Air-23479A	200
B	Breather	8	2	-	8	-	-	-	-	-	6	Air-23479A	400
B	Breather	10	1	-	10	-	-	-	-	-	6	Air-23479A	600
C	Combination	5	1	-	4	-	-	-	-	-	12	Air-24 only vs T*	150
C	Combination	8	1	-	8	-	-	-	-	-	12	Air-24 only vs T*	300
C	Combination	10	1	-	10	-	-	-	-	-	12	Air-24 only vs T*	500
R	Respirator	5	1	-	4	-	-	-	-	-	12	Air-3	100
R	Respirator	8	1	-	8	-	-	-	-	-	12	Air-3	100
R	Respirator	10	1	-	10	-	-	-	-	-	12	Air-3	100
aT	Air Tanks	5	4	-	-	-	-	-	-	-	12	Air-234579A	500
aT	Air Tanks	9	3	-	-	-	-	-	-	-	12	Air-234579A	500
aT	Air Tanks	11	2	-	-	-	-	-	-	-	12	Air-234579A	500
rB	ReBreather	10	1	-	10	-	-	-	-	-	12	Air-234579A	200
G	Gill	11	4	-	-	-	-	-	-	-	18	Water	4000
H	Military Helmet	4	1	8	-	-	-	5	-	-	-	B= +1	100
H+Full	Helmet with Visor	8	1	10	5	12	5	5	-	5	-	B= +2	300
ch	Crew Helmet	8	1	6	6	-	-	-	-	5	-	B= +1	300
eP	Ear Protectors	4	-	-	-	-	-	12	-	-	-	-	100
G	Goggles	4	-	-	-	6	-	-	-	-	-	-	50
fG	Flash Goggles	8	-	-	-	12	-	-	-	-	-	-	200
sG	Sunglasses	4	-	-	-	6	-	-	-	-	-	-	100
sG+	Cool Sunglasses	5	-	-	-	6	-	-	-	-	-	-	200
PsiS	Psi Shield Helmet	12	1	3	-	-	-	4	15	-	-	-	3000
-	Shemagh	2	-	-	2	-	-	-	-	2	-	-	10
-	Beret	4	-	-	-	-	-	-	-	-	-	-	10

Basic Body Armors

Breathers

Helmet/ Head protection





# 04 ArmorMaker

## Armor FillForm

As armor is designed, insert the details into this Fillform. Values may be inserted in any order: the ultimate requirement is that the values balance and properly reflect the charts and tables.

ARMOR														
	Code	Type	TL	Mass	Ar=	Ca=	Fl=	Pa=	So=	Ps=	In=	Sp=	Comment	Cr
Item	A	Armor	8	30	7	3	3	3	3	1	3	3		20,000
	D	Dress	10	40	9	6	6	6	6	1	6	6		40,000
	S	Suit	5	10	2	1	1	1	1	1	1	1		1,000
	U	Unit	9	200	4	2	2	2	2	1	2	2		60,000
Descriptor	0	(blank)	0	1	x1	x1	x1	x1	x1	x1	x1	x1		x 1
	Wpn	<> Carrier	1	2	x8	x1	x1	x1	x1	x1	x1	x1		x 3
	A	Assault	4	1.5	x2	x2	x2	x2	x2	x2	x2	x2		x 3
	B	Battle	3	2.5	x5	x5	x5	x5	x5	x5	x5	x5		x 5
	B	Boarding	3	1.2	x4	x1	x4	x1	x2	x1	x1	x3		x 4
	C	Cold	2	0.2	x1	x1	x1	x1	x1	x1	x6	x1		x 0.2
	P	Combat	3	2	x4	x4	x4	x4	x4	x4	x4	x4		x 4
	C	Combat Environ	7	2.5	x7	x4	x5	x5	x5	x1	x5	x5		x 6
	D	Drop	2	3	x8	x1	x8	x1	x8	x1	x1	x8		x 3
	En	Environ	2	0.5	x4	x4	x4	x1	x4	x1	x20	x10		x 1.5
	Exp	Exploration	1	1	x5	x1	x1	x1	x5	x1	x8	x8		x 7
	Haz	Hazmat	0	1.3	x2	x6	x6	x6	x6	x1	x12	x12		x 9
	HE	Hostile Environ	1	1.2	x8	x1	x1	x8	x1	x1	x8	x12		x 8
	H	Hot	1	0.3	x2	x7	x5	x5	x5	x1	x5	x5		x 0.6
	L	Labor	-1	0.7	x1	x1	x1	x1	x1	x1	x6	x6		x 4
	P	Police	0	0.6	x3	x1	x5	x1	x1	x1	x1	x2		x 1.7
	Pr	Prospector	2	2	x2	x2	x1	x1	x1	x1	x3	x5		x 6
	Pr	Protected	2	2	x2	x2	x2	x2	x2	x1	x3	x4		x 7
	S	Sapper	2	1.2	x5	x6	x6	x1	x6	x1	x8	x8		x 7
	V	Vacc	4	1	x5	x5	x0	x1	x1	x1	x5	x5		x 10
Burden		(blank)	0	1	0	0	0	0	0	0	0	0		x 1
	D	Disposable	3	0.9	-5	-5	-5	-5	-5	0	5	-5		x 0.5
	H	Heavy	1	1.3	8	10	10	10	10	0	15	10		x 2
	Lt	Light	0	0.7	-3	-3	-3	-3	-3	0	5	-3		x 1.1
	M	Medium	0	1	0	0	0	0	0	0	10	0		x 1
	S	Small	0	0.5	0	0	0	0	0	0	5	0		x 0.5
	VI	Vlight	1	0.6	-5	-5	-5	-5	-5	0	-2	-5		x 2
	OS	Oversize	1	8	12	8	8	8	8	0	8	8		x10
T	Titan	3	27	16	8	8	8	8	0	8	8		x30	
Stage		(blank)	0	1	0	0	0	0	0	0	0	0		x 1
	A	Advanced	3	0.8	10	10	10	10	10	3	30	10		x 2
	Alt	Alternate	1	1.1	5	5	5	5	5	0	15	5		x 1.1
	B	Basic	0	1.3	-5	-5	-5	-5	-5	0	-5	-5		x 0.7
	E	Early	-1	1.7	-2	-2	-2	-2	-2	0	-2	-2		x 1.2
	En	Enhanced	1	2	3	3	3	3	3	0	9	3		x 4
	X	Experimental	-2	2	-8	-8	-8	-8	-8	0	-8	-8		x 4
	Im	Improved	1	1	6	6	6	6	6	0	18	6		x 1.1
	Mod	Modified	2	0.9	3	3	3	3	3	0	9	3		x 1.2
	Ob	Obsolete	4	0.7	3	3	3	3	3	0	9	3		x 0.5
	P	Prototype	-1	1.9	-4	-4	-4	-4	-4	0	-4	-4		x 3
	St	Standard	1	1	0	0	0	0	0	0	0	0		x 1
	Re	Remote	2	1.5	0	0	0	0	0	0	0	0		x4
Sl	Slaved	2	1.5	0	0	0	0	0	0	0	0		x4	

# Options

Armor types can be fitted with options, but at the cost of a variety of drawbacks. Most personal and military armor can be created using this chart.using this chart.

# ArmorMaker 05



## STANDARD SUBSYSTEMS

	Comms	Sensors	Controls	Power
Dress	<b>c</b>	<b>c</b>	<b>b</b>	<b>a</b>
Armor	<b>h</b>	<b>h</b>	<b>h</b>	<b>h</b>
Suit	<b>q</b>	<b>q</b>	<b>z</b>	<b>r</b>
Unit	<b>7</b>	<b>3</b>	<b>1</b>	<b>3</b>

OS/Titan **+Wafer**

## OPTIONS

	Code	Descriptor	Comment
Comms	a	Standard	R= 5
	b	Grid	R= 6
	c	Battlefield	R= 6
	d	Command	R= 8
	e	LOS	R= 6
	f	LR-LOS	R=10
Sensors	g	Relay Option	
	h	Basic	
	i	Additional	
	j	Direct	
Controls	k	Enhanced1	
	l	Enhanced2	
	m	Enhanced3	
	n	Self	
	p	Feedback	
	q	Manual	
Other	r	Wafer	Requires WJack
	s	AutoPilot	
	t	Fine Control	C2 +3
	u	Reflec	Plus Visible Mod
Power / LS	v	Spot Armor	
	w	PsiShield	
	x	Stealthy	Minus Visible Mod
	y	Stamina	C3 = Stamina
0	Not Applicable		
1	Day		
3	Days		
7	Week		
9	Extended		

## DRAWBACKS

Options have no cost. For each Option added, consult the Drawbacks Table. Cycle through the tables: roll first on Table 1 (and Table 1 won't be used again), roll second on Table 2, roll third on Table 3. Roll fourth on Table 4. Roll fifth on Table 2 again.

Uninstalling the Option removes the associated drawback (but you can't reinstall and roll again).

### 1 Minor Drawbacks (only Once)

1 Cramped.	C3 -1.	One
2 Irritating Interior Noise.	Hearing Mod -2.	
3 Bad Taste In Drinks.	No specific effect.	
4 Interior Runs Cold.	Cold-1 per Round.	
5 Interior Runs Hot.	Hot-1 per Round.	
6 Poor quality diversion unit.	No specific effect.	

### 2 Drawbacks

1 Vibration.	C3 -1	Two
2 Heavy Vibration.	C3 -2	
3 Waste Heat Plume.	Mod +4 for IR Detection	
4 Externally Loud.	Bang-2 per Round	
5 Hard To Use.	qrEbs= -2.	
6 Poorly Planned Interior.	qrebS= -2.	

### 3 Major Drawbacks

1 Faulty Manipulator Joints.	Reduce C2 Half.	Three
2 Faulty Limb Joints.	Strength Reduced Half.	
3 Poor Manipulator Design.	Treat C2 as Agility.	
4 Highly Visible Shape	Visibility Mod +2.	
5 Mag Flashes	Mag Intensity = 5	
6 Contaminated Life Support	Infection Chance	

### 4 Ultimate Drawbacks

1 Strange Internal Harmonics.	Check San daily.	Four
2 Unsteady.	Flux=-5 = Trip and Fall	
3 Rapid System Fatigue.	Treat C3 as Vigor.	
4 Distracting Feedback.	Skill and Int halved.	
5 Randomly Locks Up	2D= 12 locks up.	
6 Hangar Queen.	Check Reliability daily.	

## EVALUATING A SYSTEM

	C1	C2	C3	Skill	Max Speed
Dress	<b>x10</b>	<b>- 2</b>	<b>-1</b>	<b>BattleDress</b>	<b>2</b>
Armor	<b>x10</b>	<b>- 2</b>	<b>-2</b>	<b>BattleDress</b>	<b>1</b>
Suit	<b>x1</b>	<b>- 2</b>	<b>- 3</b>	<b>Vacc Suit</b>	<b>1</b>
Unit	<b>x10</b>	<b>- 2</b>		<b>Legged</b>	<b>2</b>
OS	<b>x100</b>	<b>- 4</b>			<b>2</b>
Titan	<b>x1000</b>	<b>- 4</b>			<b>2</b>



# 06 ArmorMaker

## Random Creation

Most armor can be created using this random creation table.

	USER	MANIPULATOR
<b>2D</b>	2 <S1>	Socket
	3 Droyne	Socket
	4 Vegan	Tentacle
	5 Vargr	Universal
	6 <blank>	Hand
	7 Man	Hand
	8 <blank>	Hand
	9 Aslan	Paw
	10 Hiver	Grasper
	11 K'kree	Gripper
	12 <S2>	Gripper

<b>2D</b>	1 Slaved		
	2 Enhanced	1 <blank>	0
	3 Prototype	-1 Titan	3
	4 Early	-1 Disposable	3
	5 Basic	0 Heavy	1
	6 <blank>	0 Light	0
	7 Standard	1 <blank>	0
	8 Modified	2 Medium	0
	9 Improved	1 Small	0
	10 Advanced	3 Oversize	1
	11 Alternate	1 Vlight	1
	12 Obsolete	4 <blank>	0
	13 Remote		

	COMMS	CONTROLS	POWER
<b>1D</b>	1 Standard	Self	Day
	2 Grid	Feedback	Day
	3 Battlefield	Manual	Days
	4 Command	Wafer	Days
	5 LOS	AutoPilot	Week
	6 LR-LOS	Fine Control	Extended

	CONTROLS	ADD-ONS
<b>1D</b>	1 Basic	Reflec
	2 Additional	Spot Armor
	3 Direct	PsiShield
	4 Enhanced1	Stealthy
	5 Enhanced2	Stamina
	6 Enhanced3	Reactive

	DESCRIPTOR	ITEM
<b>1D</b>	1 Assault	<b>1</b> Dress Powered. Morphic, Braced
	2 Battle	
	3 Boarding	
	4 Combat	
	5 Drop	
	6 Police	

<b>2D</b>	2 Assault	<b>2</b> Armor. Powered, Morphic, Unbraced
	3 Battle	
	4 Boarding	
	5 Combat	
	6 Drop	
	7 Environ	
	8 Hazmat	
	9 Hostile Environ	
	10 Police	
	11 Protected	
	12 Sapper	

<b>3D</b>	3 Boarding	<b>3</b> Suit Unpowered, Morphic, Unbraced.
	4 Drop	
	5 Assault	
	6 Battle	
	7 Combat	
	8 Cold	
	9 Exploration	
	10 Environ	
	11 Vacc	
	12 Hostile Environ	
	13 Hot	
	14 Police	
	15 Prospector	
	16 HazMat	
	17 Protected	
	18 Sapper	

<b>3D</b>	3 Drop	<b>4</b> Unit Powered, NonMorphic, Braced.
	4 Assault	
	5 Battle	
	6 Cold	
	7 Combat	
	8 Weapon Carrier	
	9 Labor	
	10 Environ	
	11 Exploration	
	12 Hostile Environ	
	13 HazMat	
	14 Sapper	
	15 Hot	
	16 Boarding	
	17 Police	
	18 Prospector	

# ArmorMaker 07



## BUILDING ARMOR

This Fillform allows an interactive design process which ultimately produces a final armor design.

**Tech Level.** Tech Level for a armor is the minimum level required for manufacture.

Manufacturer		
Surface or Orbital?	TL	Law Level

ARMOR		Q	R	E	B	S	Model	TL	Mass	Ar=	Ca=	Fl=	Ra=	So=	Ps=	In=	Se=	KCr ,000	Cr ,000	
Chart	Item	Description																		
04	Descriptor																			
	Burden																			
	Stage																			
	User																			
05	Controls																			
	Sensors																			
	Comms																			
	Power & LS																			
	Add-Ons																			
	QREBS=																			
	Totals																			

## ARMOR DESCRIPTION

Model LongName (Stage-Burden-Descriptor-Type-User-Portability-TL)

The basic information required to describe armor.

## AX: ARMOR EXTENSION

Cost Mass QREBS Ar= Ca= Fl= Ra= So= Ps= In= Se=

AX:	Cr=	kg										
-----	-----	----	--	--	--	--	--	--	--	--	--	--

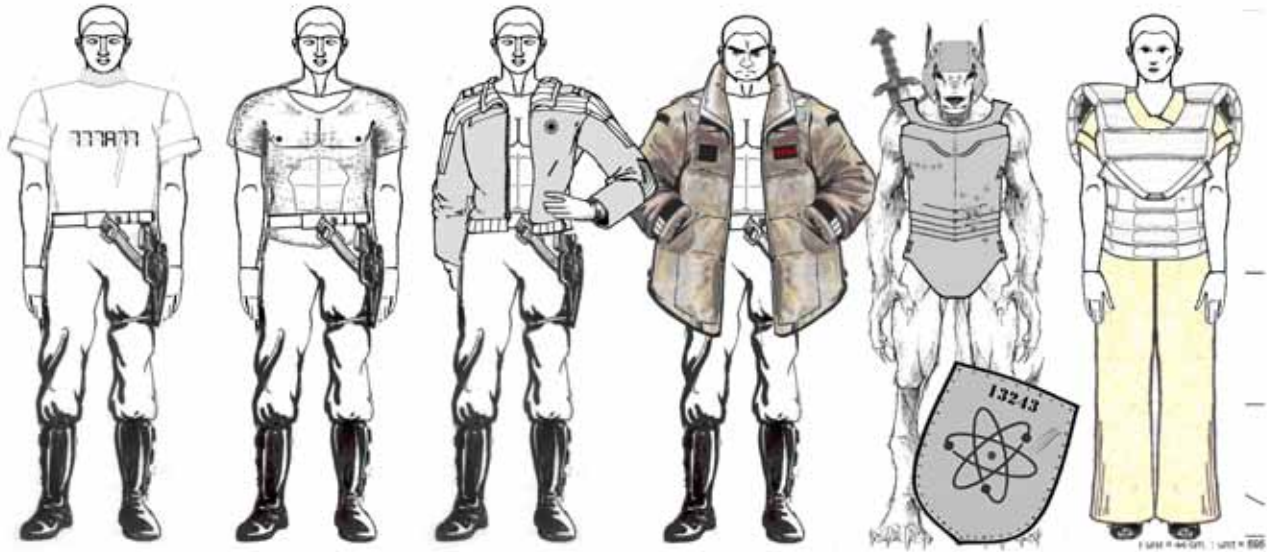
The basic information required to use a weapon.



# 08 ArmorMaker

## The Armor Catalog

Typical armor examples provide insights into the armor generation system.



Left to Right: Unarmored. Mail. Jack. Heavy Coat. Plate (and Helmet and Shield). Ablat (Vest).



Left to Right: Goggles-4. Cool Sunglasses-5. Flash Goggles-8. Ear Protectors-4. Filter-5. Respirator-5 (Combination-5 looks the same). Gill-9. Respirator-5 (Aslan). Combination-5 (Plexxan).

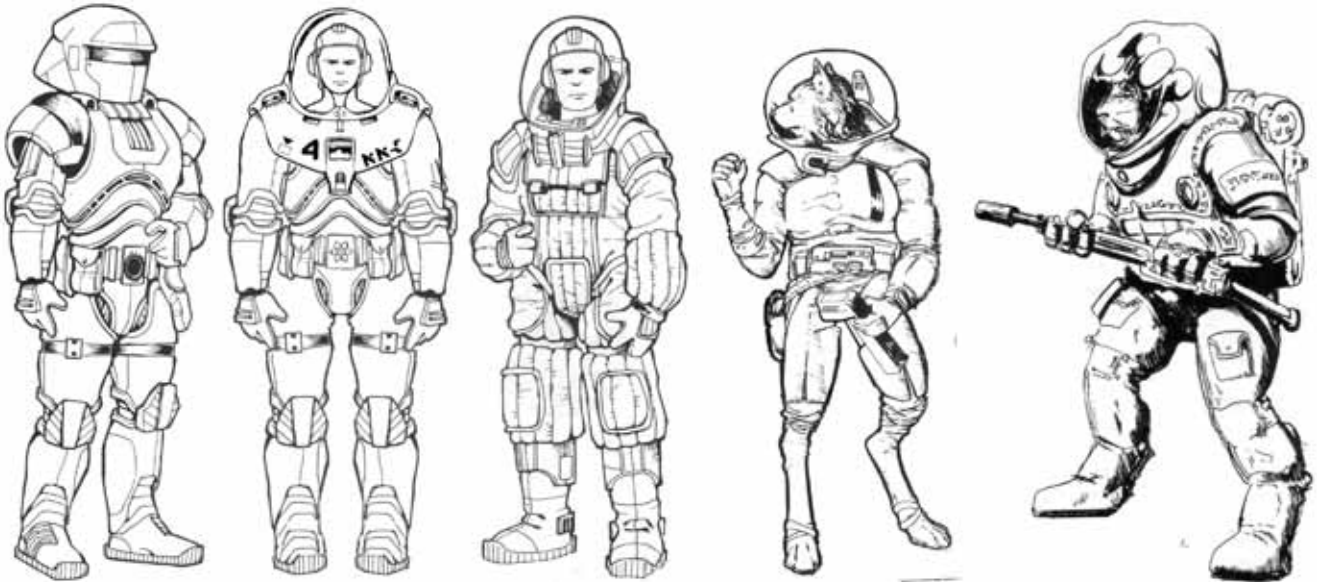


Left to Right: Beret. Full Helmet with Visor-8. Crew Helmet-9. Psionic Shield Helmet-12. Desert Scarf / Shemagh-2. Military Helmet-4. Military Helmet-4 (Vargr). Desert Cloak. Respirator-5 (K'kree).

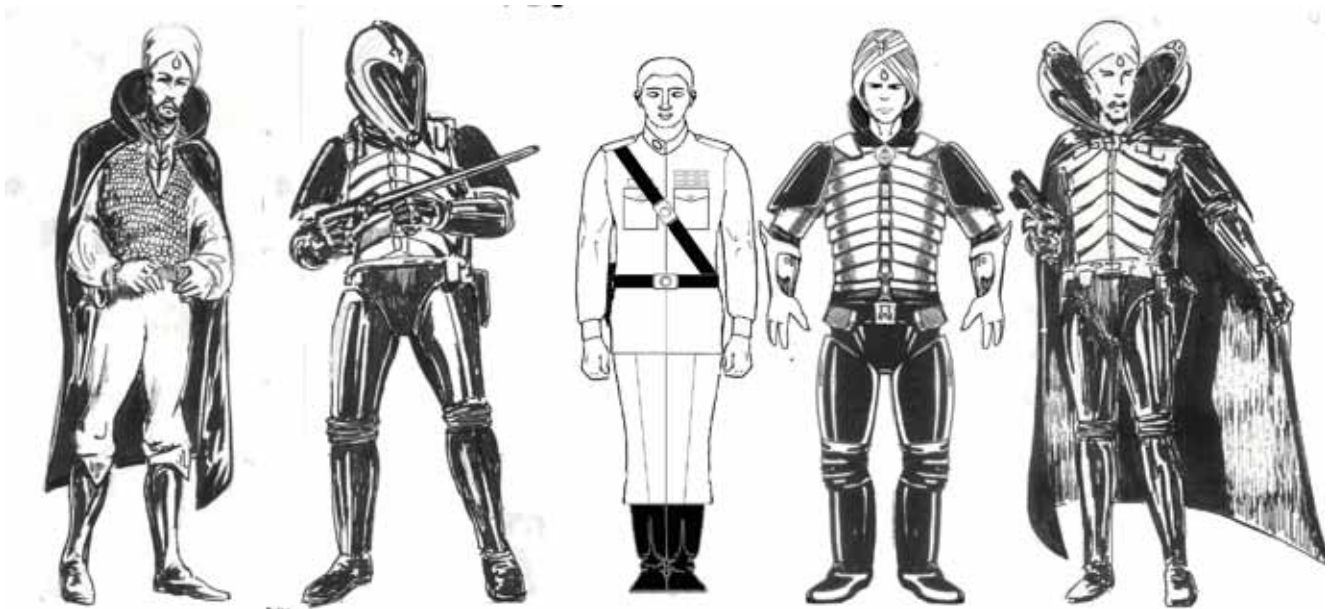
## More Armor Catalog

Typical armor examples provide insights into the armor generation system.

# ArmorMaker 09

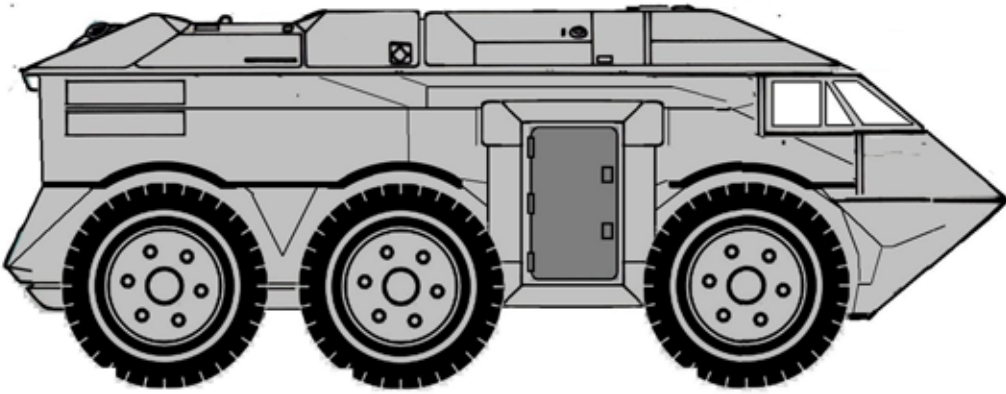
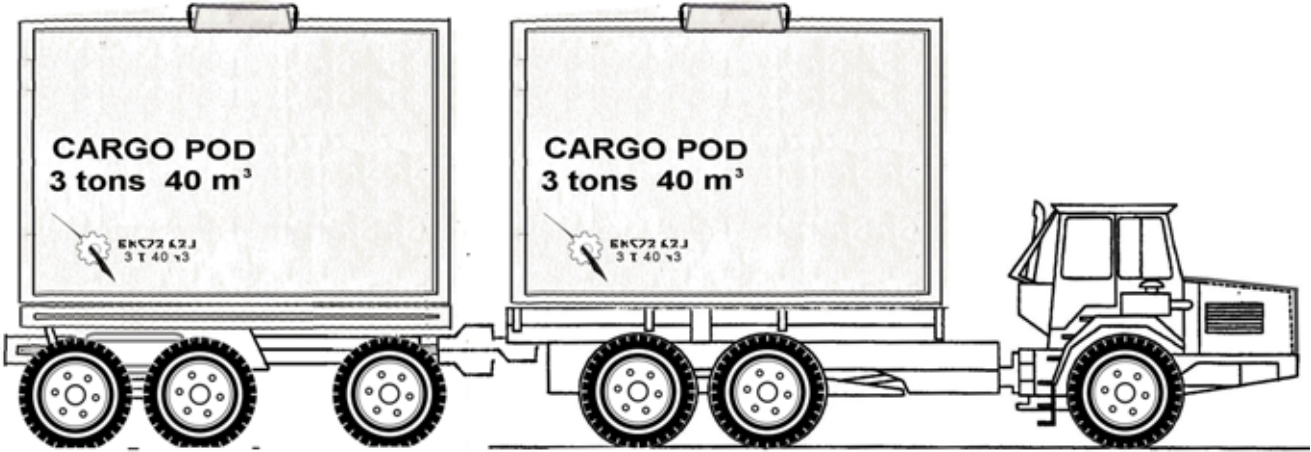
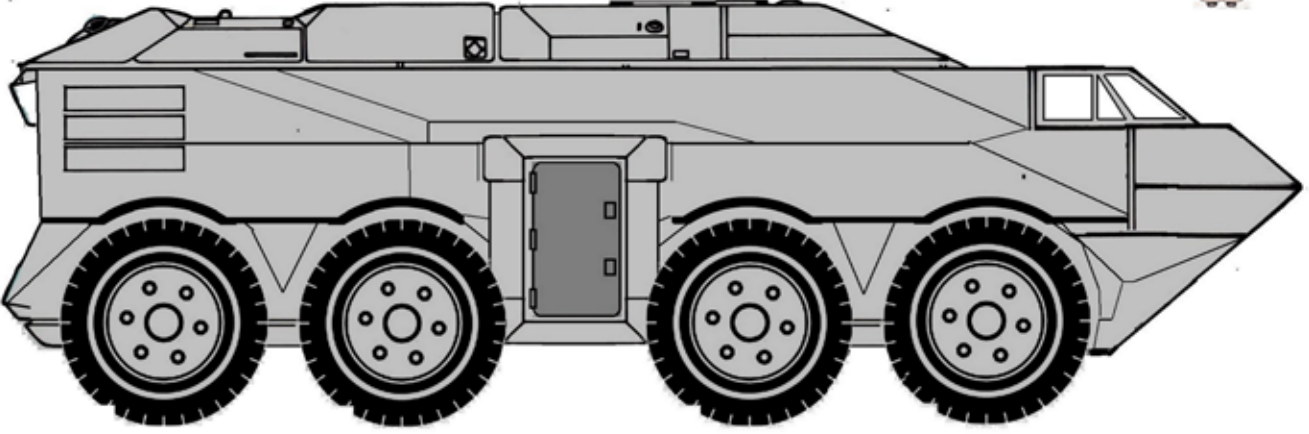
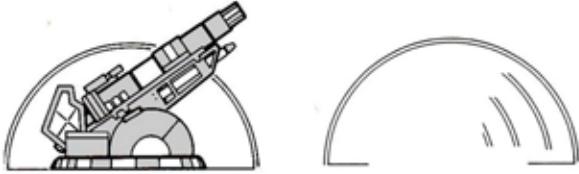


**Left to Right:** Battle Dress-13. Heavy Hostile Environment Armor-10. Vacc Suit-9. Improved Vacc Suit-10 (Vargr). Combat Armor-11 (Aslan).



**Left to Right:** Zhodani Noble (street clothes; no armor). Combat Armor-11 (Zhodani with characteristic clamshell helmet). Zhodani Intendant (military uniform). Battle Armor-11 (Zhodani with characteristic clamshell helmet and Ablat cape).





# VehicleMaker

Vehicles are essential tools for **Travellers**: they extend the ability of characters to move to other locations with both ease and relative safety.

The term vehicle is used for any independent device that can move passengers or freight from one location to another. Although starships and spacecraft are technically within this definition, they are handled separately.

## UNDERSTANDING VEHICLES

Vehicles are a basic component of any technological society. With an understanding of Vehicles and Terrain (and Weapons, Armor, and Combat), players can generally make use of any available Vehicles.

### Types of Vehicles

Vehicles are available in five basic types, each with its own importance and governing rules:

**Ground Vehicles** are civilian passenger and cargo ground transport. They include road and offroad vehicles, and wide-ranging exploratory vehicles.

**Military Vehicles** are troop and weapon ground transport. They are intended for use on the battlefield, and include armored fighting vehicles and tanks.

**Flyers** travel above world surfaces, generally in atmospheres and unimpeded by terrain. They include both civil and military vehicles.

**Watercraft** travel on and under oceans or bodies of water. They include surface craft and submersibles.

### Grav and Lifter Vehicles

Some vehicles within each of these types are based on Grav or Lifter technology. They are classified according to their primary use: Ground, Military, Flyer, or Watercraft.

## DESCRIBING VEHICLES

Vehicles can be described in many ways depending on the format and information required: any format which presents the required information is acceptable.

### The Vehicle Description

Vehicles are described in a series of elements to form the LongName or abbreviated to form the Model. The LongName or Model contains enough information to allow a character to describe a Vehicle.

Elements of a LongName which are not necessary for a proper understanding may be omitted. The LongName consists of the following elements:

Bulk - Motive - Mission - Type - User - TL

**Type** identifies the basic function of the Vehicle.

**Mission** elaborates on the activity the Vehicle is designed for. For example, Cargo or Explorer.

**Motive** details the Vehicle's transport mechanism. For example, Wheeled, or Tracked.

**Bulk** describes the Vehicle's relative weight, mass, or bulk. For example, Vlight, Light, Heavy, or Vheavy.

**User** identifies the intended or designed user. Blank assumes the user is Human or Man. For example, Man or Hiver.

Tech Level identifies the Technological Level at which the Vehicle is commonly manufactured. TL is required.

Model. LongName elements have abbreviations which are used to create the Vehicle Model.

Model is a jargon-abbreviated Longname. Once a character is familiar with a specific Vehicle, references to it devolve to its abbreviation. Given the restrictions of the alphabet, element abbreviations are not necessarily unique.

### The Vehicle Extension

The capabilities of a Vehicle are contained in the Vehicle Extension: a string of values detailed enough to allow a character to use a Vehicle. The Vehicle Extension is a variable length string: only required information should be included.

The Prefix Vx identifies the information as pertaining to a vehicle.

The Elements follow the prefix and include:

Vx: Tons - Speed - Load - Stage - Environ -  
Endurance - QREBS - Options

**Tons** is the calculated Volume Tonnage.

**Speed** is calculated Speed of the Vehicle.

**Load** is calculated cargo or transport space for the Vehicle in tons.

**Stage** is the Vehicle's position in the spectrum of sophistication in the developmental life cycle.

**Environ** is the Vehicle's structural protection against hostile environments.

**Endurance** is the Vehicle's duration of operation before it requires refueling or maintenance.

**QREBS** is the Vehicle's values on the QREBS scale.

**Options** states the installed options for the Vehicle.

### The Armor Extension

Most vehicles have some form of Armor. The Armor val-



## VEHICLE DESCRIPTION

Model	LongName (Bulk - Motive - Mission - Type - User - TL)
The basic information required to describe a vehicle.	

## VX: VEHICLE EXTENSION

	Tons	Speed	Load	Stage	Environ	Endur	QREBS	Options
Vx:								
The basic information required to use a vehicle.								

ues for the Vehicle are shown with an Armor Extension. Because the Armor is integral to the Vehicle, note that values for Cost, Mass, and QREBS are not required.

The Armor Extension is more fully described in Armor-Maker.

### USING VEHICLES

The essential purpose of vehicles is to transport passengers and cargo between locations.

Vehicle operation is governed by skills and knowledges. Vehicle movement is constrained by terrain (including roads) for surface vehicles and watercraft, and by atmosphere for flyers. Vehicles can be damaged or destroyed by natural events, or by attacks.

The Vehicle Operations Chart details the tasks associated with vehicle operations.

The Traveller Vehicle System creates five distinct Types of Vehicles: Ground Vehicles, Military Vehicles, Flyers, Watercraft, and Small or Space Craft. Each has its own distinct uses and advantages; each has its own specific restrictions and shortcomings.

### CREATING VEHICLES

Vehicles can be designed and created (randomly or with purpose) using the Vehicle Design Tables.

**The Vehicle Charts.** Each Vehicle (one for each Type of Vehicle) provides the basic information about possible Vehicles, their Mission or Use, and their Motive Power. Selecting the details from the Chart produces a basic or common version of the Vehicle.

**The Options.** The Options Chart provides additional features for Vehicles to customize them for specific uses.

**The Vehicle Fill Form.** The Vehicle Fillform provides a standardized process for creating Vehicles. The final information it produces documents the capabilities and costs of the vehicle.

**The Combat Chart.** The Combat Chart provides a ready reference for the Vehicle and is supports use of the

vehicle in combat or adverse situations.

### VEHICLE TYPES

Vehicle type is a descriptive term identifying function.

#### Civil Vehicles

Civil vehicles are used in ordinary society for personal, commercial, and recreational purposes.

**Car.**(often **GroundCar**). A basic vehicle for transporting people and a small quantity of luggage.

**Van.** A utility vehicle with enclosed passenger space for 2-6 occupants and an enclosed cargo bed.

**Truck.** A basic vehicle for transporting cargo.

**Mover.** A vehicle design to pull cargo or passengers modules, but with no cargo capacity of its own..

**Transport.** A cargo vehicle generally larger or more powerful than a truck.

**Vehicle.** A means of transport not otherwise defined.

#### Military Vehicle Types

Military vehicles are specialized vehicles used by armed forces in their operations.

**Tank.** A military vehicle capable of powerful attacks, strong defense, and rapid movement over a variety of terrain types.

A Tank carries a turret or vehicle-mounted major weapon, strong or extensive armor and protections.

**Carrier.** An armored fighting vehicle with an available cargo space which can be used for a variety of purposes.

A Carrier features strong or extensive armor and protections. It is essentially a tank-like vehicle which replaces the tank's turret or vehicle-mount weapon with an available cargo (or other function) space.

**Vehicle.** A military fighting vehicle which does not qualify for the Tank or Carrier designation.

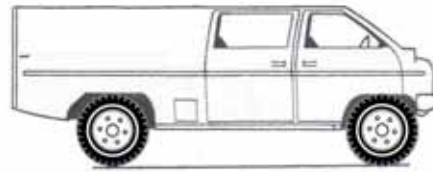
#### Watercraft Types

Watercraft are based on four types of locomotion.

## AX: ARMOR EXTENSION

	Cost	Mass	QREBS	Ar=	Ca=	Fl=	Ra=	So=	Ps=	In=	Se=
Ax:	Cr=	kg									
The basic information required to use armor.											

## TRACKED AND WHEELED CARGO TRANSPORTERS



**Ship.** The vehicle moves floating on water.

**Sail.** The vehicle moves on water and is propelled by local winds.

**Sub.** The vehicle moves fully submerged beneath the surface of bodies of water.

**Grav.** The vehicle moves using the Gravitic Drive (G-Drive). Grav Watercraft operate near water surfaces and are governed by Watercraft skill.

### Flyer Types

Flyers are available in six types:

**Wings.** Winged craft include airplanes and lifting bodies; they are the most common type of Flyers. Wings provide lift and allow aircraft to move efficiently in atmosphere.

**Add-On Wings.** Other Flyer types may have Add-On Wings; despite this addition, the Flyer retains its non-Wing character (that is, Flapper, Rotorcraft, LTA, or Liftcraft).

**Rotorcraft.** Rotorcraft include helicopters (and a variety of esoteric systems of no practical value: autogyros, gyro-dynes). Rotors provide lift for aircraft and allow vertical take-off and landing. The typical rotorcraft is a helicopter.

**Flappers.** Flappers are moving wings in imitation of bird wings. They provide lift through a flapping wing motion.

**LTA Lighter Than Atmosphere** Craft use buoyant gases to provide lift.

**Liftcraft.** Aircraft with lifters create a cancelled or counteracted gravity effect which lifts them above a world surface. Lifters do not require atmosphere.

Lifters provide very small horizontal or vectored thrust. Additional thrust can be provided through the High Powered Option.

**Grav.** Grav vehicles use a Gravitic or G-Drive to provide lift. G-Drives are more powerful than Lifters and provide greater horizontal thrust.

### MISSION

Mission is the differentiating descriptor for some Vehicles; it provides greater insight into the vehicle's purpose.

### Ground Vehicles

**Passenger.** The vehicle carries passengers.

**Cargo.** The vehicle carries cargoes or freight.

**Utility.** The vehicle is capable of carrying passengers or cargo or both. Designed for a wide range of assignments.

**Explorer.** The vehicle is designed for exploratory duties.

### Watercraft

Watercraft missions include:

**Cargo.** The vehicle carries cargoes or freight.

**Patrol.** The vehicle is designed for security or recon missions.

**Explorer.** The vehicle is designed for exploration.

**Transport.** The vehicle is designed to carry freight or cargo, especially bulky or oversized objects.

### Military

Military Vehicle missions include:

**Weapon.** The vehicle carries a large Weapon.

**Troop.** The vehicle carries troops on the battlefield.

**Supply.** The vehicle is designed to transport goods and supplies on the battlefield or under extreme conditions.

**Recon.** The vehicle is designed for observation duties.

### Flyers

Flyer missions include:

**Attack (or Combat).** A flyer for offensive missions.

**Bomber.** A flyer carrying destructive power to targets.

**Cargo.** A flyer designed to carry freight or cargo.

**Protector.** A flyer designed for defensive missions.

**Scientific.** A flyer designed for research or exploration.

**Flyer.** A flyer not otherwise defined.

### MOTIVE

The foundation of vehicle classification is their system of locomotion. Locomotion types differ between ground vehicles, flyers, and watercraft.

### Ground Vehicle Locomotion

Ground vehicles use a variety of motive systems.

**Wheeled.** The vehicle moves on wheels.

**Tracked.** The vehicle moves on endless tracks.

**Air Cushion.** The vehicle moves on a bed of high pressure atmospheric gases.

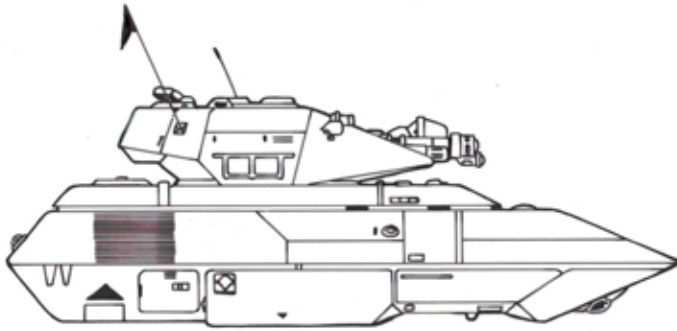
**Legged.** The vehicle moves on articulated legs. Legged vehicles are Units created using the Armor rules.

**Mole.** The vehicle is equipped to burrow under a world surface. A Mole is usually equipped with Tracks.

**Lifters.** The vehicle moves on anti-gravity lifter plates. Lift Ground Vehicles operate close to the surface and are governed by Driver skill.

**Grav.** The vehicle moves using the Gravitic or G-Drive.

## GRAV TANK



Grav Ground Vehicles operate close to the surface and are governed by Driver skill.

### Flyer Locomotion

Flyers may be based on five distinct locomotion types.

**Winged.** The flyer moves using lift generating by wings (or lifting body surfaces). An airplane is a winged flyer.

**Rotor.** The flyer moves using a rotary wing which generates lift. A helicopter is a rotary wing flyer.

**Flapper.** The flyer moves using flapping wings which generate lift. An ornithopter is a flapping wing flyer.

**LTA Lighter Than Atmosphere.** The flyer is constructed to be less dense than surrounding atmosphere. A blimp or dirigible is an LTA flyer.

**Lifters.** The vehicle moves on anti-gravity lifter plates. Lift Flyers operate at higher levels of the atmosphere and are governed by Flyer skill.

**Grav.** The vehicle moves using the Gravitic or G-Drive. Grav Flyers operate at higher levels of the atmosphere and are governed by Flyer skill.

### Watercraft Locomotion

Watercraft do not add Motive to their Type.

### Small Craft

Small craft are spacecraft powered by Gravitic Drives (G-Drives).

### BULK

Vehicles may be identified by their bulk or relative size.

**Vlight.** The vehicle is small and light. Its performance and capabilities are at the low end of those available.

**Light.** The vehicle is smaller than standard.

**Medium (or Blank).** The vehicle size and capabilities are typical or customary.

**Heavy.** The vehicle is built to carry loads larger than the Medium vehicle carries.

**VHeavy.** The vehicle is large and massive. Its capabilities are at the upper limits for this type of vehicle.

### ENVIRONMENT

Vehicles are designed to cope with local environment.

**Air.** The vehicle depends on local air for ventilation and

breathing gases. The vehicle provides environmental controls for heating and cooling. Interior Air equals Atm for the world. For example, if Atm= 4 Thin Tainted, then the air in the interior of the vehicle is also 4 Thin Tainted.

**Air-N.** The vehicle processes local atmosphere to produce Air-N. An Air-6 Standard vehicle on an Atm=4 world processes the local Atm=4 Thin Tainted to remove (filter) the Taint and compress it from Thin to Standard.

**Enclosed.** The vehicle is enclosed to protect against the elements: wind, rain, snow, and weather.

**Sealed.** The vehicle is Sealed against exterior air pressure. Internal Air can be programmed to any of the Atm levels (from 3 Thin to 9 Dense). For those sophonts who require it, Taint of common types can be added.

Sealed is a Protection; the standard level provided is =20.

**Double Sealed.** In addition to Sealed, the vehicle includes an Air Lock which enables occupants to enter or leave the vehicle without losing air pressure or exposing those inside to outside environment.

**Protected.** The vehicle has Protections against most environmental threats. Minimum Armor=12, Sealed =20. Insulated=18.

**Insulated.** Most vehicles with an enclosed passenger space are Insulated = 12.

### STAGE

Stage is the spectrum of effects based on the technological product development cycle.

**Standard or (blank).** The vehicle has no modifications or effects based on Stage.

**Fossil.** The vehicle is powered by (more-or-less) readily available fossil fuels or petrochemicals.

**Renewables.** Power is supplied by renewable fuels, most commonly organically-produced alcohol.

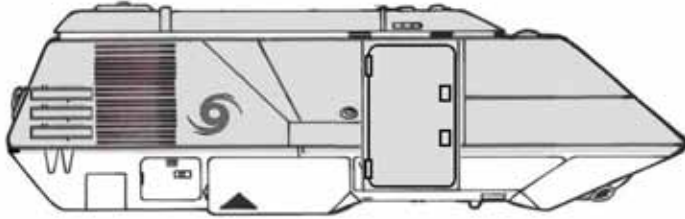
**PowerCell.** Vehicle power is supplied by electric storage batteries.

**Advanced.** The vehicle is significantly better than the standard version, and features additional features and efficiencies.

**Early.** The vehicle is a preliminary design with the bugs not yet worked out.

**Improved.** The vehicle features small improvements.

## GRAV ARMORED TROOP CARRIER



**Alternate.** The vehicle uses an alternate technology for some or all of its functions.

### ENDURANCE TYPES

Vehicles are classified by the time they can operate between refuelling, and by the planetographic distances they can travel. Endurance is calculated as the final step in the design sequence.

#### Endurance

Vehicle Endurance is the time that a vehicle can operate before it needs refueling, resupply, or maintenance. For most vehicles, Endurance is measured in hours: the vehicle does not accommodate sleeping, meals, or general living.

Endurance is selected as a component during the process of Vehicle Design.

**Hours.** The Vehicle can operate for Hours (varies from 1 to 24) but less than a Day.

**Days.** The Vehicle can operate for Days (varies from 1 to 7) but less than a Week.

**Weeks.** The Vehicle can operate for Weeks (varies from 1 to 4) but less than a Month.

**Months.** The Vehicle can operate for Months (varies from 1 to 12) but less than a Year.

**Years.** The Vehicle can operate for Years (varies from 1 to 3).

#### Range

Range is the expected distance that a Vehicle can travel based on its Endurance and its Speed. The Endurance to Range Table converts Vehicle Endurance to Range.

**Local.** The vehicle can travel in and around a specific location and within a Terrain Hex. A car used for city driving or a delivery truck are Local. Such vehicles occasionally venture into adjacent Terrain Hexes.

**Regional.** The vehicle can travel within a Region (a World Hex). Many Cargo Trucks or Truck Trains are Regional; they may occasionally venture into adjacent World Hexes.

**Continental.** The vehicle can travel within a Continent (a World Triangle).

**World.** The vehicle can travel anywhere on the World.

A territory classification assumes the vehicle will venture occasionally into neighboring territories. For example, a

Regional vehicle will sometimes or even often visit adjacent regions.

### THE CALCULATED VALUES

During the Vehicle Creation process produces three calculated values: Tons, Speed, and Load.

**Tons is the tonnage of the vehicle.** This value is an approximate measure.

**Speed is the Vehicle Speed Value.** Its equivalent in Kph is provided by the Base Vehicle Speed Table.

**Load** is the available payload capacity of the vehicle.

### QREBS

Any acquired vehicle is assumed to be QREBS=50000 (no effects under QREBS system). If the Vehicle Design System imposes any QREBS elements (for example, B= -2), that imposed element applies to the Vehicle.

**As Issued.** A Vehicle with only the imposed QREBS elements is considered As Issued. It is typical of the Vehicle as used. Most Vehicles are in this state, and any reasonable character can research and determine this information.

**Used.** Any character may ask for a Used Vehicle instead. The Referee then evaluates the vehicle under QREBS and records this information.

### THE CARGO MODULE

Commercial vehicles are built around Cargo Modules: a standardized container for goods. Cargo Modules exist in a variety of sizes based on deck plan squares and starship design cubes.

One Cube (1.5 meters on a side) is one-quarter-ton.

Four Cubes (arranged in any reasonable fashion) is one ton (= 13.5 cubic meters).

Cargo Modules are produced in multiples of one ton.

### VEHICLE FITTINGS

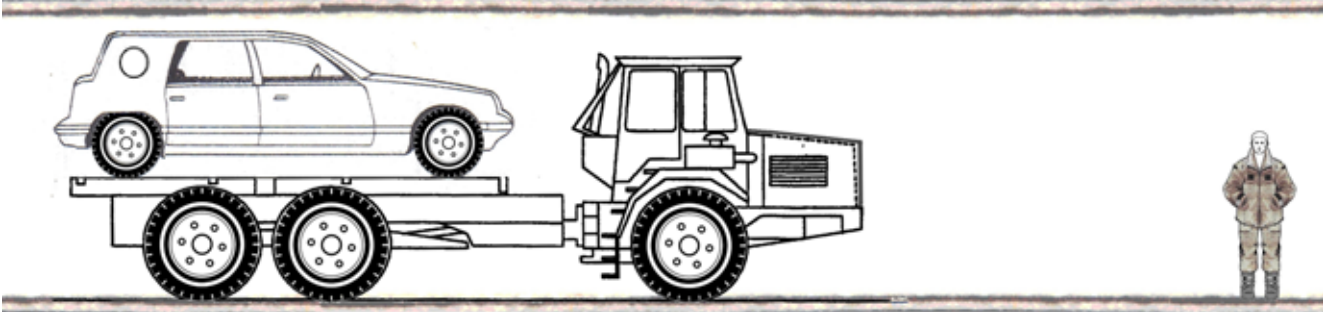
Vehicle Fittings include controls and communications.

#### Controls

Vehicles are controlled by an operator through an established set of controls. All vehicles include at least rudimentary manual controls.

**Manual.** A system of physical controls (hand, manipula-

## VEHICLE TRANSPORTER WITH GROUND CAR (IN TUNNEL)



tor, foot, and other) operate the unit. Manual controls are present on Vlite and Lite vehicles.

**Powered Controls.** A system of controls (hand, manipulator, foot, head-movement, voice, and other) operate the unit, assisted by power boosts and other enhancements. Power controls are the equivalent of Power Steering and Power Brakes (or Fly-By-Wire).

Power Controls are present on Medium, Heavy, and Vheavy vehicles (and are an option on Lite Vehicles).

**AutoPilot Option.** Powered systems can be equipped with the AutoPilot option. The operator enters a destination and the system self-operates while the user sleeps or attends other functions.

AutoPilot is non- intelligent. The software is sophisticated, but the process is algorithm-driven without an intelligence behind it.

AutoPilot is distinct from Grid: AutoPilot is self-contained on the vehicle; Grid is a centralized traffic control system. Requires Power Controls.

**Grid Connection.** Vehicles operating in Grid Terrain must be equipped with a Grid Connection to allow centralized traffic control. Requires Power Controls, AutoPilot Option, and Grid Controller Channel.

**Wafer.** The user is directly connected (plug-in, wireless) to the operating controls via his wafer jack. Vehicle operation requires the conscious attention of the Driver, but all control manipulation is mental. Requires Power Controls and Vehicle TL 11+.

### Communications

Vehicles may be fitted with a communications system.

**Entertainment Channel.** Reception of entertainment broadcasting.

**Grid Controller Channel.** Communication with the Central Traffic Control Grid (required on Hi Pop worlds). Connects the vehicle controls to the central Traffic Grid.

**Net.** Provides individual access to the local communications network. Operates within Range=6 of a commercial communications center/tower. Charges may apply.

**Standard.** Radio broadcast system to Range=5.

**LOS.** Direct Line-Of-Sight (Laser or similar) system. Secure against eavesdropping. Self-directed (user direction not required). R=6.

**LR LOS.** Direct Long Range Line of Sight (Laser or similar) system for communication. R= 10.

**Battlefield (Military Vehicles).** Provides radio voice and data contact to Range= 6, with subchannels for individual communications.

**Command (Military Vehicles).** Enhanced Battlefield system to Range=8. Typically installed in Officer's systems for communications with higher levels.

**Relay Option (Military Vehicles).** Automatic capability to receive and retransmit Battlefield or LOS to the intended recipient.

### Flyer Options

A variety of options are available for Flyers.

**High Powered.** The Flyer has greater than standard performance based on improved engines or thrusters.

**Slave.** The Flyer is intelligently piloted by computer. It flies in formation with the Master aircraft and reproduces its maneuvers and operations.

**Remote.** The Flyer is remotely operated by a pilot or operator on the ground or on another aircraft.

**VTOL Mod.** The Flyer (usually Winged) is modified to allow Vertical Takeoff and Landing. The Flyer can use any Landing Ground.

**STOL.** The Flyer (usually Winged) is modified to enable it to use shorter runways. The Flyer can use an Airport one size smaller than that normally required. Available on Heavy or smaller Flyers.

**Wilderness Kit.** The Flyer (usually Winged) is adapted to landing on open flat ground and does not require a runway. This kit includes STOL capability. Available on Heavy or smaller Flyers.

**Weapon Mount.** The Flyer has a weapons mount.

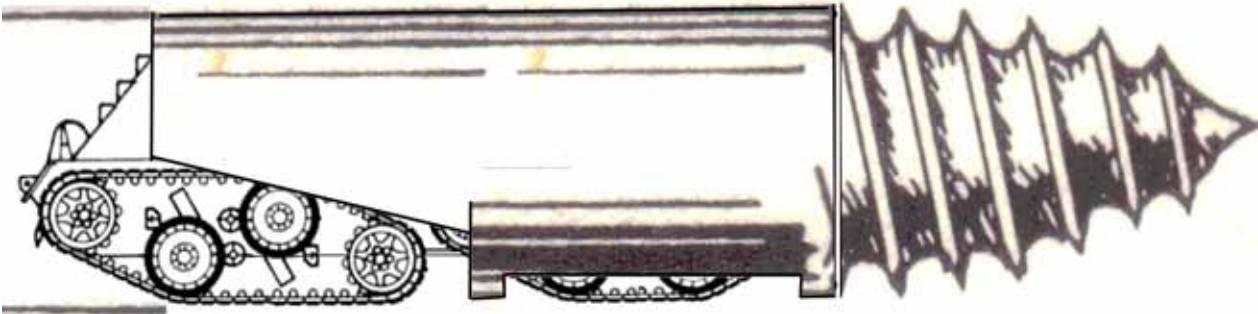
**Floats.** The Flyer has flotation landing gear allowing landing on water.

**Hybrid VTOL.** The Hybrid Vertical Take-Off and Landing option allows a winged aircraft to eliminate the need for an Airport by installing additional mechanisms (vectored thrust jets, tilt-rotors, lifters, or G-drives).

**Add-On Wings.** Some non-winged aircraft may add Wings to provide greater lift.

**Parasite Nipple.** Provision for an in-flight connection by a flyer to a larger Mother Flyer in flight.





**On-Board Brain**

A Vehicle with Power Controls and TL 11+ may be equipped with an On-Board Brain OBB. The installation transforms the vehicle into an intelligent Strangeform Robot capable of self-directed movement.

Requires Power Controls and AutoPilot Option.

**The Vehicle's Hobby.** An OBB requires a Hobby (an outside interest) to maintain sanity. Select the Hobby from the Citizen Life Table.

**Beginning and Final Intelligence.** Brains are purchased based on their tested C4 Int as they leave the factory. Actual C4 Int gradually settles in over the course of the first year. At the one-year anniversary of the brain construction, apply Flux to each D.

**PASSENGERS AND CREW**

The number of persons a Vehicle can carry is determined by a variety of factors.

A Vlite can carry one operator.

A Lite can carry one operator and one passenger.

Standard or larger Vehicles can carry operators and passengers equal to tonnage.

Free or available transport tonnage on a Vehicle can be modified to carry passengers (appropriate seating, access

doors) at up to 4 passengers per ton.

**Military Vehicles.** A Tank has a crew equal to its tonnage divided by 2. Supply Vehicles can carry passengers (soldiers, troops) equal to five times cargo capacity (in tons). Passengers on military Vehicles are merely transported rather than carried in comfort.,

**Non-Human Passengers.** If a passenger is substantially larger than a human, adjust capacity on the basis of one per two humans or one per three humans.

**One More.** Regardless of stated capacity, an emergency will usually allow adding **one more** passenger: a Vlite which normally carries only an operator can also add a passenger; a

**LANDING GROUNDS**

Airports and Landing Grounds are facilities specifically constructed for the use of aircraft. Virtually all aircraft (Flyers) can land and take off anywhere. Restrictions apply for Winged Flyers.

Most winged flyers require a specified or dedicated landing ground.

A Landing Ground can accept any Winged Flyer equal or less than its Bulk (a Medium Landing Ground can accept Medium, Light, or Vlite flyers).

**AIRPORTS AND LANDING GROUNDS**

Size	Terrain	Type	Length	Facilities	Which Flyers?	Additional Locations?
1	91	AirPad		None	Non Wing.	City. Suburb. Town. Arcology. Starport.
2	92	Vlite Airstrip	2000 m	None	Vlite Winged	
3	93	Light Airstrip	3000 m	Sparse	Light Winged	Town.
4	94	Medium Airport	4000 m	Standard	Medium Winged	Suburb.
5	95	Heavy Airport	5000 m	Very Good	Heavy Winged	Arcology.
6	96	Vheavy Airport	6000 m	Excellent	All Flyers	City
1	11	Open Field	1000 m	None	Non-Winged	Clear Single Hex
	35	Open Water		None	Flotation equipped	Lake. River. Shore. Ocean.
	44	Ice Field				
2	61	Road	2000 m	None		
4	62	Highway	4000 m	None		

**Length:** The Length of the facility in meters including clear Air Corridor approaches. The actual runway length is approximately half the Length shown.



# 02 Operations

## Operations

Vehicles operations (Driver, Flyer, Seafarer) are very similar, using skills and characteristics in much the same way, regardless of the environment.

### TASKS FOR VEHICLE OPERATIONS

Vehicle operation is governed by Characteristics, Skills, and Knowledges. Vehicles may be operated by characters, by the Grid, or by an On-Board Brain.

### TASKS FOR VEHICLE OPERATIONS

Vehicle operation is governed by Characteristics, Skills, and Knowledges. Vehicles may be operated by characters, by the Grid, or by an On-Board Brain.

### VEHICLE OPERATION TASKS

Vehicle Operation is based on a standard set of tasks.

**Routine Vehicle Operations** present little danger or difficulty; the vehicle is operating within its design parameters.

Routine Operations are resolved per World Hex; they are automatic if C+S for the Operator is 12 or greater.

**Special Operations** (marked with \*) are resolved per Terrain Hex (or per Local Hex if operating at that level).

### Terrain

Terrain marked **Yes** on the Terrain Chart is **Allowed Terrain**: operations are routine.

Terrain marked **No** on the Terrain Chart is **Prohibited Terrain**: a vehicle cannot enter.

Terrain not marked **Yes** or **No** is **Disallowed Terrain**: operation is possible but more difficult.

### Vehicle Operations Failure

Failure of a Vehicle Operation Task generates an **Emergency**: roll 1D for level.

1	Emergency-1	Easy 1D	C2
2	Emergency-2	Average 2D	C2
3	Emergency-3	Difficult 3D	C2
4	Emergency-4	Formidable 4D	C2
5	Emergency-5	Staggering 5D	C2
6	Emergency-6	Hopeless 6D	C2

**Vehicle Emergency Failure** generates a Malfunction: roll 1D for level and consult Malfunctions.

**BUT:** Immediate Action may forestall the Emergency.

### VEHICLE SKILLS AND KNOWLEDGES

Skill	Knowledge
Driver	Wheeled
Driver	Tracked
Driver	Legged
Driver	ACV
Driver	Grav
Driver	Mole
Flyer	Winged
Flyer	Rotor
Flyer	Flapper
Flyer	Grav
Flyer	LTA
Seafarer	Ship
Seafarer	Sub
Seafarer	Boat
Seafarer	Grav
Pilot	Small Craft
Pilot	ACS
Pilot	BCS

### THE GRID

Vehicles operating on the Grid are under centralized Grid Computer control. Operations are automatic.

Centralized controls allow all vehicles to operate at optimum speed in the same traffic flow.

### PREPARATIONS

Task	Difficulty	Char	C+S
Pre-Journey Checks	Average 2D	C5	12
Begin	Average 2D	C5	12

### DRIVING

Routine Road	Easy 1D	C2	6
Allowed Terrain	Average 2D	C2	12
*Disallowed Terrain	Staggering 5D	C2	
*Speed +1	= Difficulty +1		
*Speed - 1	= Difficulty - 1		
*Evasive	= Difficulty +1		

### FLYING

Routine Flight	Average 2D	C2	6
Air Corridor	Easy 1D	C2	6
*Disallowed Terrain	Staggering 5D	C2	
*Speed +1	= Difficulty +1		
*Speed - 1	= Difficulty - 1		
*Evasive	= Difficulty +1		
*Landing	Difficult 3D	C2	

### SEAFARING

Routine Sailing	Easy 1D	C2	6
*Disallowed Terrain	Staggering 5D	C2	
*Speed +1	= Difficulty +1		
*Evasive	= Difficulty +1		
*Rough Seas	= Difficulty +1		

### SPACEFLIGHT

Routine Flight	Easy 1D	C2	6
Climb To Orbit	Difficult 3D	C2	
*Disallowed Terrain	Staggering 5D	C2	
*Speed +1	= Difficulty +1		
*Evasive	= Difficulty +1		
*Hit Jump Point	Difficult 3D	C5	
*Enter Atmosphere	Difficult 3D	C2	
*GG Level Change	Difficult 3D	C2	

### CONCLUSION

Shutdown	Easy 1D	C2	6
----------	---------	----	---

### ON-BOARD BRAINS COMPUTER-CONTROLLED VEHICLES

A Vehicle with an On-Board Brain may be computer-controlled (if the operator relinquishes control). An On-Board Brain essentially transforms the Vehicle into a Strangeform Robot.

When brain-controlled, vehicle operation is based on the Brain's C+S. Be sure to note the On-Board Brain's Hobby (if applicable).

## Accessibility

Yes= Accessible

Grid= Accessible if Grid-equipped.

No= Prohibited.

\*\*= Disallowed (legally).

# Terrain Effects 03



SURFACE TERRAIN		Cars	ACV	Wheel	Track	Legged	Lifters	G-Drive	
Terrain	People	Trucks	OffRoad	STV	MTV	ATV	Units	Grav	Grav
Air Corridor	No	No	No	No	No	No	No	Grid	Grid
Grid	No	Grid	Grid	**	**	**	No	Grid	**
Highway	Yes	Yes	Yes	**	Yes	**	No	Yes	**
Road	Yes	Yes	Yes	**	Yes	Yes	Yes	Yes	**
Trail	Yes	**	**	**	**	**	Yes	**	**
Clear	Yes	**	Yes	Yes	Yes	Yes	Yes	**	**
Clear Wooded	Yes	**	**	**	**	Yes	Yes	**	**
Wetland	Yes	**	**	Yes	**	**	Yes	**	**
Wetland Wooded	Yes	**	**	**	**	**	Yes	**	**
Rough	Yes	**	**	**	Yes	Yes	Yes	**	**
Rough Wooded	Yes	**	**	**	**	Yes	Yes	**	**
Mountain	Yes	**	**	**	**	Yes	Yes	**	**
River, Canal	**	**	**	Yes	Yes	Yes	**	**	**
Lake	No	No	No	Yes	Yes	**	**	**	**
Ocean	No	No	No	Yes	No	No	No	**	**

FLYERS TERRAIN		Wing	Flap	Rotor	LTA	Lifters	G-Drive	M-Drive
Terrain	People					Grav	Grav	Grav
Orbit	No	No	No	No	No	Yes	Yes	Yes
Upper Atm = 7	No	No	No	No	No	Yes	Yes	Yes
Mid Atm=6	No		No	No	No	Yes	Yes	Yes
Low Atm= 3-4-5-	No					Yes	Yes	Yes
NOP =2	No	Yes	Yes	Yes		Yes		
< 5 meter	Yes			Temp	Temp	Yes	Temp	Temp
Atm=0 Vacuum	No	No	No	No	No	Yes	Yes	Yes
Atm=1 Trace	No	No	No	No	No	Yes	Yes	Yes
Atm=2 Vthin	No	Yes	No	No	No	Yes	Yes	Yes
Atm=3 Vthin	No	Yes	No	No	No	Yes	Yes	Yes
Atm=4 Thin	No	Yes	No	No	No	Yes	Yes	Yes
Atm=5 Thin	No	Yes	No	No	No	Yes	Yes	Yes
Atm=6 Standard	No	Yes	No	Yes	Yes	Yes	Yes	Yes
Atm=7 Standard	No	Yes	No	Yes	Yes	Yes	Yes	Yes
Atm=8 Dense	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Atm=9 Dense	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Atm=A Exotic	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Atm=B Corrosive	No	Yes		Yes	Yes	Yes	Yes	Yes
Atm=C Insidious	No	Yes			Yes	Yes	Yes	Yes
Atm=D Dense-Hi	No	----- Dependent on other details -----				Yes	Yes	Yes
Atm=E Ellipsoid	No	----- Dependent on other details -----				Yes	Yes	Yes
Atm=F Thin-Low	No	----- Dependent on other details -----				Yes	Yes	Yes

SEAFARING TERRAIN		Boat	Ship	H-Foil	Sub
Terrain	People				
Ocean	No	**	Yes	Yes	Yes
Islands	No	Yes	**	Yes	**
Shore	No	Yes	**	Yes	**
River	No	Yes	**	**	**
Sea Port	No	Yes	Yes	Yes	Yes





# 04 Altitudes

## Altitudes

Atmospheres have levels based on Range Bands. UWP Atmosphere varies by Altitude, which in turn dictates which levels are available to Flyers.

### LEVELS OF THE ATMOSPHERES

Altitude	R=	Level	Vacc	Vthin	Thin	Standard	Dense	Exotic	Corrosive	Insidious	Dense High	E1 Polar	E2 Arctic	E3 Tropical	E4 Equatorial	Thin Low	Comments	
			0	2	4	6	8	A	B	C	D	E	E	E	E	F		
250,000 km	11	Satellite	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	For Luna= 384,000 km
50,000 km	10	Geo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	For Terra= 36,000 km
5,000 km	9	Far Orbit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	MEO = Medium Earth Orbit
500 km	8	Orbit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	LEO = Low Earth Orbit
50 km	7	Upper	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
30 km	6.8	Mid8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
20 km	6.6	Mid6	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	
12 km	6.4	Mid4	0	0	0	1	2	2	2	2	2	1	0	0	0	0	0	
8 km	6.2	Mid2	0	0	1	2	4	4	4	4	4	2	1	0	0	0	0	
5 km	6	Mid	0	1	2	4	4	4	4	4	4	4	2	1	0	1		
1000 m	5	Airspace5	0	1	2	4	6	6	6	6	6	4	4	2	0	2		
500 m	4	Airspace4	0	2	4	6	8	A	A	A	A	6	4	2	1	2		
150 m	3	Airspace3	0	2	4	6	8	A	A	A	A	6	4	2	1	2		
50 m	2	NOP	0	2	4	6	8	A	A	A	A	6	4	2	1	2		
5 m	1	Near Surface	0	2	4	6	8	A	A	A	A	6	4	2	1	2		Typical Grav Altitude
1.5 m	T		0	2	4	6	8	A	A	A	A	6	4	2	1	2		
0.5 m	R		0	2	4	6	8	A	A	A	A	6	4	2	1	2		Typical Lifter Altitude
Surface	0	Surface	0	2	4	6	8	A	A	A	A	6	4	2	1	2		
500 m	-4	Chasm Rim	0	2	4	6	8	A	A	A	A	6	4	2	1	2		
1000 m	-5	Chasm Wall	1	4	6	8	A	A	A	A	A	8	6	4	2	4		
5 km	-6	Chasm Floor	2	4	6	8	A	A	A	A	A	8	6	4	2	4		

On This Table: 2= Very Thin. 4= Thin. 6= Standard (=Earth. =Terra). 8= Dense (regardless of Taint). A+ = Very Dense. For example, for a world with UWP Atm= Dense (at the world surface), atmosphere effect at Level= Mid is Thin.

VEHICLES AND LEVELS OF THE ATMOSPHERES			Winged	Rotor	Flapper	LTA	Lifter	Grav	Rocket HEPLaR	Comments
Altitude	R=	Level	Atm not Required							
50,000 km	10	Geo	No	No	No	No	No	No	Yes	For Terra= 36,000 km
5,000 km	9	Far Orbit	No	No	No	No	No	Yes	Yes	MEO = Medium Earth Orbit
500 km	8	Orbit	No	No	No	No	Yes	Yes	Yes	LEO = Low Earth Orbit
200 km	7.4	Upper4	No	No	No	No	Yes	Yes	Yes	
100 km	7.2	Upper2	Yes	No	No	No	Yes	Yes	Yes	Distinct sublevels within Range=7.
50 km	7	Upper	Yes	No	No	No	Yes	Yes	Yes	
5 km	6	Mid	Yes	No	No	Yes	Yes	Yes	Yes	
1000 m	5	Airspace5	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
500 m	4	Airspace4	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
150 m	3	Airspace3	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
50 m	2	NOP	**	Yes	Yes	Yes	Yes	Yes	Yes	Typical Grav Flyer Altitude
5 m	1	Near Surface	**	Yes	Yes	Yes	Yes	Yes	Yes	
1.5 m			**	Yes	Yes	Yes	Yes	Yes	Yes	
0.5 m			**	Yes	**	Yes	Yes	Yes	Yes	Typical Lifter Flyer Altitude
Surface		Surface	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Landing Grounds

Table shows Atmosphere Levels available to Flyers based on Motive. No= Not accessible. Yes= Accessible as shown.

\*\* Winged Flyers pass through these levels when landing or taking off.

## Depths

Bodies of water (or fluid) have depths corresponding to Range Bands. Pressure increases with depth.

# Depths 05



### DEPTHS OF THE OCEANS

Distance	R=	Descriptor	Pond	Stream	Lake	River	Large Lake	Harbor	Bay	Shore	Sea	Ocean	World Ocean	Pressure	Comment
150 m	<b>3</b>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					
50 m	<b>2</b>	Tsunami	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					4 if Tsunami
5 m	<b>1</b>	Vbig Waves	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					3 if Vbig Waves
1.5 m	<b>T</b>	Big Waves	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>						2 if Big Waves
0.5 m	<b>R</b>	Waves	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>									1 if Waves
Surface	<b>0</b>	Surface													
0.5 m	<b>-R</b>	Wading													Beast Swimmers
1.5 m	<b>-T</b>	Fording													Beast Swimmers
5 m	<b>-1</b>	Pond													1 Beast Swimmers
50 m	<b>-2</b>	Thermocline	<input type="checkbox"/>												5 Pond Bottom
150 m	<b>-3</b>	Shelf	<input type="checkbox"/>	<input type="checkbox"/>											15 Continental Shelf
500 m	<b>-4</b>	Lake Bottom	<input type="checkbox"/>	<input type="checkbox"/>											50 Lake Bottom
1000 m	<b>-5</b>	Deep Lake	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>				<input type="checkbox"/>					100 Deep Lake
5 km	<b>-6</b>	Bottoms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>					500 Ocean Bottom
50 km	<b>-7</b>	Depths	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>				5,000 Max Non Ocean World
500 km	<b>-8</b>	Abyss	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			50,000 Ocean World Abyss
5,000 km	<b>-9</b>		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			500,000 Never Encountered?

= Not a Depth (above ocean or liquid surface, or below liquid bottom).

S= Swimmers (Beast and Sophonts) encountered at Depth=- R, - T, - 1.

Pressure-2 or greater requires suitable equipment and protection.

Pressure in Bar (= one Atmosphere). Pressure-1 inflicts 1D hits per minute.

#### On This Table:

#### DAMAGE

Any object under water is subject to Pressure as shown. Pressure-1 inflicts 1D hits per minute on Armor. If Armor is penetrated, Sealed is also penetrated.

**Inverse Damage.** A native from a specified depth requires protected enclosures equal to the difference in Pressure when venturing out of its native level.



# 06 Beastpower

## Beastpower

Beastpower is a measure of relative work or power when comparing vehicles

**B BEASTPOWER**  
 Beastpower is a standardized evaluation of the power of the engine in a vehicle.

**Steady BP.** For long term work, Speed=1 (thus BP= mass tons).

**Peak BP.** Maximum (very short term) BP for an animal uses the formula.

$$\text{ONE BEASTPOWER} = \text{BP} = \text{Tons} \times (\text{Speed}^3)$$

Beastpower compares the relative power of different vehicles.

### BP BEASTPOWER

	Kph=	5	10	20	30	50	100	300	500	700	1000	2000	3000	5000
Tons	Speed=	1	2	3	4	5	6	7	8	9	10	11	12	13
Half-lan			0.01	0.2	0.3	0.6	1							
1 lan		0.01	0.1	0.3	0.6	1.2	2	3	5	7	10	13	17	22
1 emthree		0.08	0.6	2	5	9	16	26	38	54	75	99	129	164
1 roup		0.1	0.8	3	6	12	20	30	50	70	100	133	172	220
1 cube		0.3	2	7	16	31	54	85	128	182	250	332	432	549
1 sq		0.5	4	13.4	32	62	108	171	256	364	500	666	864	1098
1 ton		1	8	27	64	125	216	343	512	729	1000	1331	1728	2197
2		2	16	54	128	250	432	686	1024	1458	2000	2662	3456	4394
3		3	24	81	192	375	648	1029	1536	2187	3000	3993	5184	6591
4		4	32	108	256	500	864	1372	2048	2916	4000	5324	6912	8788
5		5	40	135	320	625	1080	1715	2560	3645	5000	6655	8640	10985
6		6	48	162	384	750	1296	2058	3072	4374	6000	7986	10368	13182
7		7	56	189	448	875	1512	2401	3584	5103	7000	9317	12096	15379
8		8	64	216	512	1000	1728	2744	4096	5832	8000	10648	13824	17576
9		9	72	243	576	1125	1944	3087	4608	6561	9000	11979	15552	19773
10		10	80	270	640	1250	2160	3430	5120	7290	10000	13310	17280	21970
11		11	88	297	704	1375	2376	3773	5632	8019	11000	14641	19008	24167
12		12	96	324	768	1500	2592	4116	6144	8748	12000	15972	20736	26364
13		13	104	351	832	1625	2808	4459	6656	9477	13000	17303	22464	28561
14		14	112	378	896	1750	3024	4802	7168	10206	14000	18634	24192	30758
15		15	120	405	960	1875	3240	5145	7680	10935	15000	19965	25920	32955

### COLUMN SHIFT

Based on Vehicle Type

Vheavy	Speed +1
Vlite	Speed - 1
High Power	Speed +1
Protected	Speed +1
Armored	Speed +2
Watercraft Ship	Speed +3
Watercraft Sub	Speed +2
Watercraft Boat	Speed +1
Hydrofoil	Speed - 1

For example, Speed-3 Vheavy ATV reads Beastpower on the Speed 4 (= Speed-3 +1) column.

### SUBUNITS OF THE [VOLUME] TON

Unit	Tons	Comment	Liters
Ton	1.00	= [Standard] Ton	13,500
** Square	0.5	= half-ton	6750
*** Cube	0.25	= quarter-ton	3370
Roup	0.10	= tenth-ton	1350
Lan	0.01	= hundredth ton	135
Half-Lan	0.005	= 72 liters	72
Liter	0.00007	=1/1350 ton	1
Kiloliter	0.075	= cubic meter	1000

\*\*Square= 1.5 x 1.5 x 3 meters.

\*\*\*Cube= 1.5 x 1.5 x 1.5 meters.

### 1 Ton= 13.5 cubic meters

For beasts and beast-drawn vehicles, 1 ton (a measure of volume) is also 1000 kg in a wheeled cart on level ground.

A human is about a half-Lan, 72 liters, or 0.005 tons.

On the chart, human output ranges from 0.01 to 0.03 BP depending on Speed.

# Speed

Vehicles have Speeds, which determine ability to travel, and collision damage values. Speed and Endurance are used to determine Range.

# Speeds 07



## VEHICLE SPEEDS

SpeedFlux	SpeedV	SpeedC	kph	Air	Water	Land	Land	Gravitics	Damage	Speed	
0	-7	Not Moving	Still	0						0	
1	-6	Creep	Walk	5		Person	Mole		1 D	1	
2	-5	Crawl	Run	10		Legged			4 D	2	
3	-4	Xslow	Sprint	20		OffRoad		Lifters	9 D	3	
4	-3	Vslow	Charge	30		Boat	ATV	Tracked	16 D	4	
5	-2	Slow	Fast	50	LTA	Ship	MTV	Wheeled	G-Drive	25 D	5
6	-1	Standard	Vfast	100	Flapper	Sub	STV	Air Cushion		36 D	6
7	0	Cruise		300	Rotor			Road	M-Drive	49 D	7
8	+1	Fast		500	Wing					64 D	8
9	+2	Vfast		700						81 D	9
10	+3	Sonic		1000						100 D	10
11	+4	Ssonic		2000						121 D	11
12	+5	Hsonic		3000						144 D	12
13	+6	Xhsonic		5000						169 D	13
14	+7			10,000						196 D	14
15	+8			20,000						225 D	15
16	+9	Meteoric	Meteor	30,000						256 D	16
17	+10									289 D	17
18	+11									324 D	18
19	+12									361 D	19

Typical speeds for vehicles. User may push the vehicle to Speed +1 subject to mishap. Gravitics speeds represent NOP Nap Of Planet operations. Vehicles may not exceed Speed-10 in atmosphere unless designed for greater than Speed-10.

An impact by an object at Speed inflicts Damage at the level shown per ton. The damage inflicted is Blow.

**Relative Speed.** A Collision between two Vehicles uses the sum of their two speeds (if they are travelling in the same direction, uses the difference between the two speeds).

**Reciprocal Damage.** Each Vehicle in the collision receives Damage x Opposite Vehicle.

## ENDURANCE AND RANGE

Vehicle Range is the expected distance that a Vehicle can travel before it needs maintenance, resupply, or refueling. Range is based on Vehicle Speed and Endurance.

### CONVERT ENDURANCE TO RANGE

	Kph=	5	10	20	30	50	100	300	500	700	1000	2000	3000	5000	
	Speed=	1	2	3	4	5	6	7	8	9	10	11	12	13	
Endurance	Minutes=	Local													
	Hours=	Local					Regional			Continental			World		
	Days=	Regional				Continental				World					
	Weeks=	Continental			World										
	Months=	Contin		World											
	Year=	World													

## VEHICLE OCCUPANTS

For Time=	Vlite	Lite	Std, Hvy, Vhvy
Hours	1	2	1 per 1 ton
Days	no	1	1 per 2 tons
Weeks	no	no	1 per 3 tons
Months	no	no	1 per 4 tons
Year	no	no	1 per 5 tons

Assumes occupants (Size=100 or less)

## FLYER RANGE BAND MOVEMENT

Flyers move one surface Range Band per Round.  
 Actual Range to a Flyer with Altitude and Range is the greater of the two values:  
 a Flyer at Vlong Range R=5 and Altitude= NOP = 2 is at Range=5  
 Flyers may maintain Range unchanged (the equivalent of Hover or Circling)  
 Flyers move at their designed Speed unless a deliberate change is made.  
 A Winged Flyer must maintain a minimum Speed = 6 to remain airborne.



# 08 The Design Box

The Tonnage Design Box allows a rough calculation of the (displacement) tonnage of vehicles as they are designed.

## THE TONNAGE DESIGN BOX

Vehicle dimensions can be estimated using known vehicle tonnage and the Vehicle Design Box.

Tonnage can be estimated using known vehicle dimensions and the Vehicle Design Box.

### Vehicle Dimensions

If the tonnage of a vehicle is known, select a tonnage row and determine the Length, Width, and Height dimensions for the vehicle.

### Vehicle Tonnage

If the dimensions of a vehicle are known, select a row with the appropriate dimensions and determine the tonnage for the vehicle.

### Adjustments

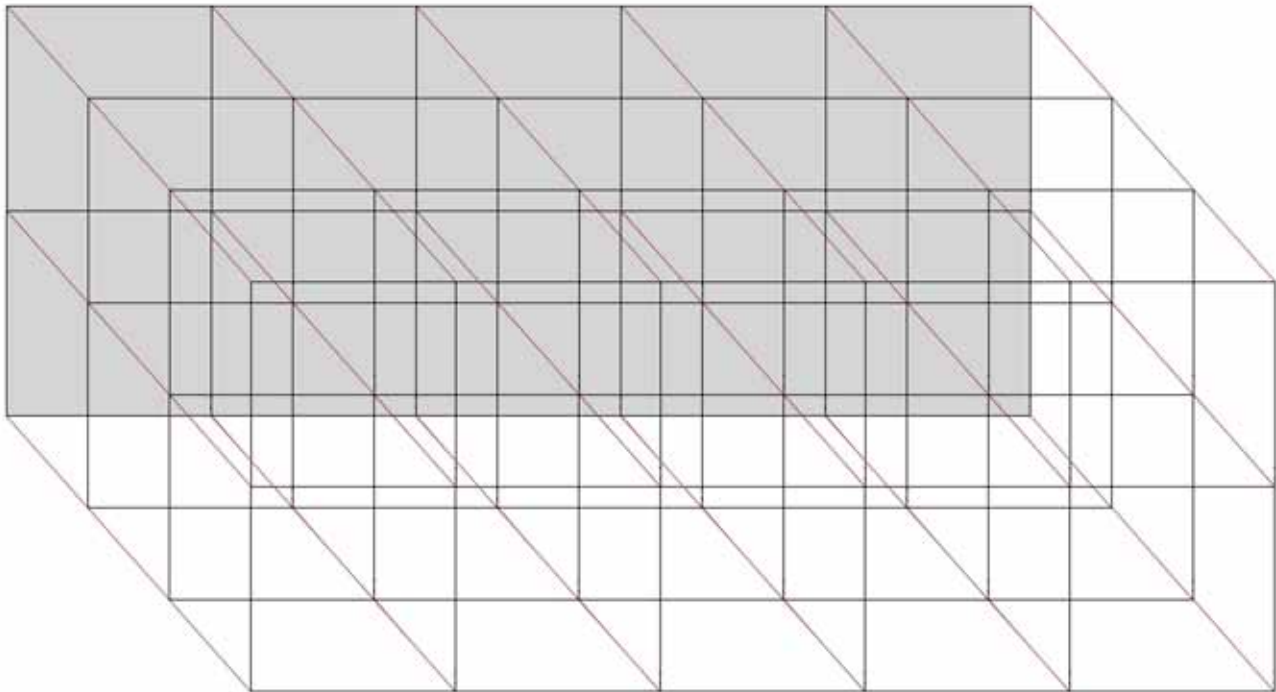
Dimensions should be reasonably compact; adjust them as necessary. Ignore wings and wing tonnage.

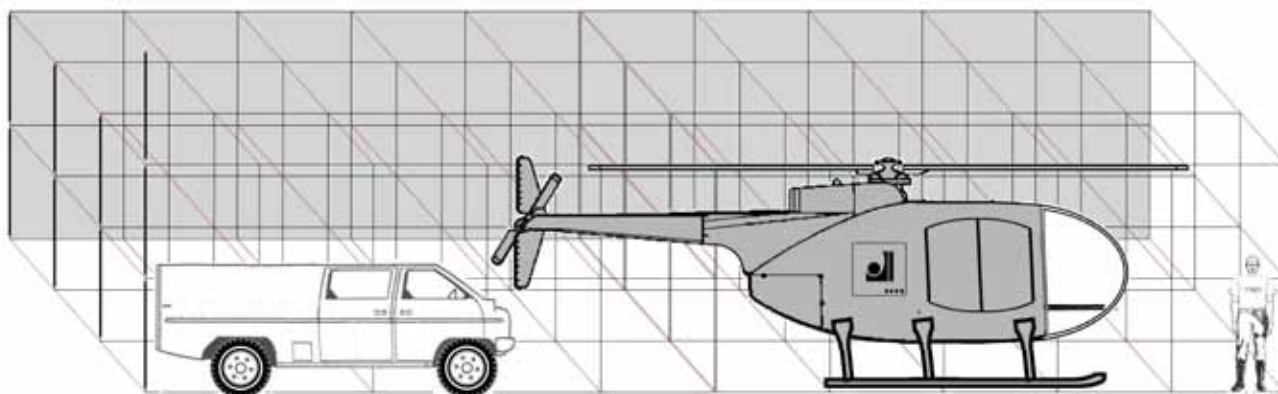
## THE DESIGN BOX

Each division on the box is approximately 1.5 meters (=5 feet). One cube is one-quarter ton; 4 cubes is a ton.

## VEHICLE SIZE

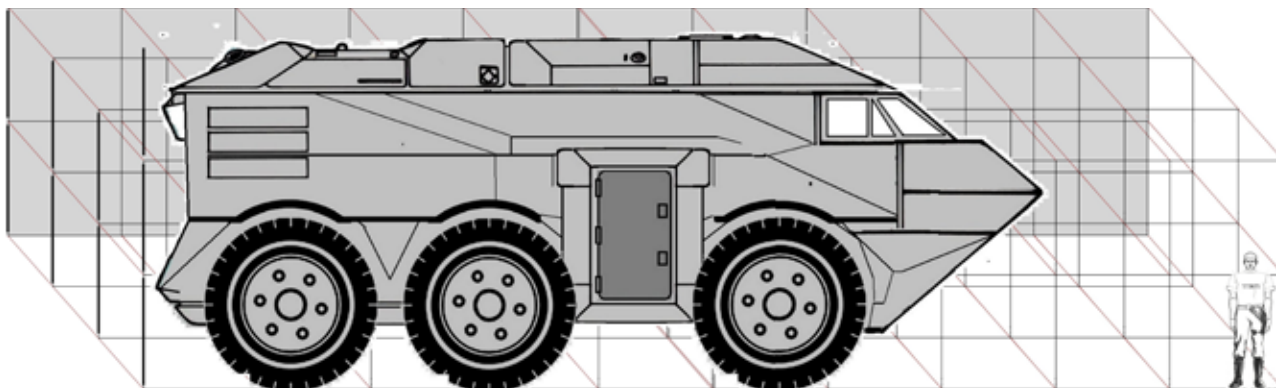
Tons	----- Meters -----			----- Squares -----		
	Length	Width	Height	Length	Width	Height
0.25	1.5	1.5	1.5	1	1	1
0.50	3.0	1.5	1.5	2	1	1
0.75	4.5	1.5	1.5	3	1	1
1	3	3	1.5	2	2	1
1	6	1.5	1.5	4	1	1
2	6	3	1.5	4	2	1
3	9	3	1.5	6	2	1
4	12	3	1.5	8	2	1
5	7.5	3	3	5	2	2
6	9	3	3	6	2	2
7	10.5	3	3	7	2	2
8	12	3	3	8	2	2
9	9	4.5	3	6	3	2
9	13.5	3	3	9	2	2
10	15	3	3	10	2	2
11	10.5	4.5	3	7	3	2
12	12	4.5	3	8	3	2
13	13.5	4.5	3	9	3	2
15	15	4.5	3	10	3	2
16	16.5	4.5	3	11	3	2



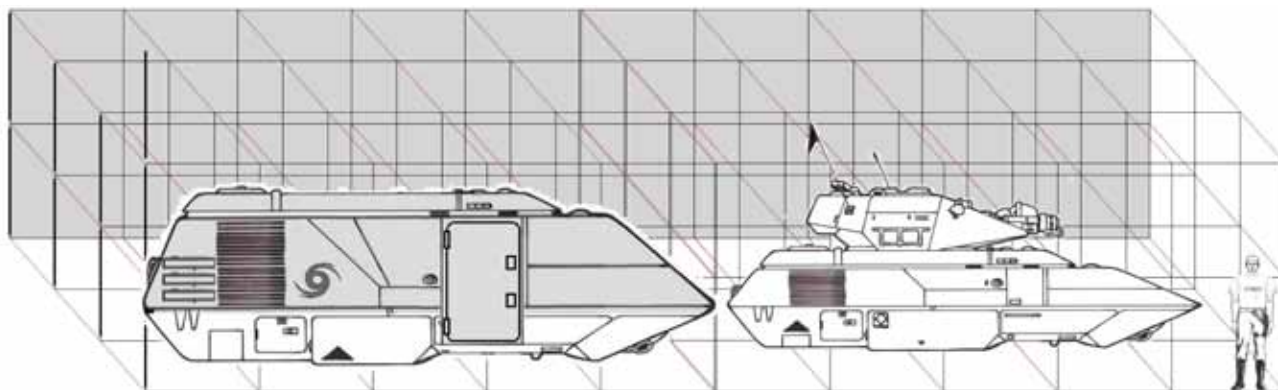


The panel truck placed on the Design Box fills roughly 3 squares long, 2 squares wide, and 1 square high (=  $3 \times 2 \times 1 = 6$  cubes = 1.5 tons). A Van-Utility-Wheeled with Option: Light is approximately 1.5 tons.

The helicopter placed on the Design box is 6 squares long by 2 squares wide by 2 squares high (=  $6 \times 2 \times 2 = 24$  cubes = 8 tons). A Flyer-Utility-Rotor with Option: Advanced is 8 tons.



The MTV Most Terrain Vehicle placed on the Design Box fills roughly 7 squares long, 2 squares wide, and 3 squares high (=  $7 \times 2 \times 3 = 42$  cubes = 10.5 tons). A Vehicle-Explorer-Wheeled with Option: Heavy is 10 tons. If the Vehicle width is instead 3 cubes wide, it would be about 16 tons, consistent with Option: Vheavy.



The Carrier placed on the Design Box fills roughly 5 squares long, 2 squares wide, and 5 squares high (=  $5 \times 2 \times 5 = 50$  cubes = 12.5 tons). A Military Carrier-(Blank)-Lifter is about 12.5 tons.

The Tank placed on the Design Box fills roughly 4 squares long, 2 squares wide, and 1 square high (=  $4 \times 2 \times 1 = 8$  cubes, plus another 2 cubes for the turret = 10 cubes = 2.5 tons). A Military Tank-Recon-Grav is about 2.5 tons.



# 10 Ground Vehicles

Ground vehicles (civil or military) operate on or near world surfaces.

<b>G</b>																		
<b>Ground Vehicles</b>		Code	Descriptor	Tech Level	Tons	Speed	Load	Armor	Cage	FlashProof	RadProof	SoundProof	PsiShield	Insulated	Sealed	Note	KCr	
																		,000
<b>A</b>	<b>Type</b>	C	Car	-	2	-	1	-	-	-	-	-	-	-	-	-	-	20
		-	Van	-	3	-	2	-	-	-	-	-	-	-	-	-	-	30
		T	Truck	-	4	-	3	-	-	-	-	-	-	-	-	-	-	50
		V	Vehicle	-	5	-	3	-	-	-	-	-	-	-	-	-	-	60
		M	Mover	-	3	-	-	-	-	-	-	-	-	-	-	-	-	50
		T	Transport	-	5	-	4	-	-	-	-	-	-	-	-	-	-	40
<b>B</b>	<b>Mission</b>	-	(blank)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		P	Passenger	-	-	-	-	5	-	-	-	-	-	12	-	-	-	10
		C	Cargo	-	-	-	-	5	-	-	-	-	-	6	-	-	-	10
		U	Utility	-	-	-	-	5	-	-	-	-	-	6	-	-	-	10
		X	Explorer	-	-	-	-	20	10	10	10	10	-	20	20	-	-	100
<b>C</b>	<b>Motive</b>	ACV	Air Cushion	8	+2	6	-	-	-	-	-	-	-	-	-	-	-	x2
		W	Wheeled	6	0	5	-	-	-	-	-	-	-	-	-	-	-	-
		L	Lifter	9	+1	3	-	-	-	-	-	-	-	-	-	-	-	x2
		G	Grav	10	-1	5	-	-	-	-	-	-	-	-	-	-	-	x3
		T	Tracked	7	+2	4	-	-	-	-	-	-	-	-	-	-	-	x2

**Quality** = 5+Motive TL minus Actual TL.

ACV Explorer Vehicle is also called **STV Some Terrain Vehicle**.

Wheeled Explorer Vehicle is also called **MTV Most Terrain Vehicle**.

Tracked Explorer Vehicle is also called **ATV All Terrain Vehicle**.

<b>M</b>																		
<b>Military Vehicles</b>		Code	Descriptor	Tech Level	Tons	Speed	Load	Armor	Cage	FlashProof	RadProof	SoundProof	PsiShield	Insulated	Sealed	Note	KCr	
																		,000
<b>A</b>	<b>Type</b>	T	Tank	*	5	3	-	50	10	10	10	20	0	20	20	NoteT	700	
		C	Carrier	*	4	4	2	40	10	10	10	20	0	20	20	NoteC	500	
		V	Vehicle	*	2	5	1	30	10	10	10	20	0	20	20	NoteV	300	
<b>B</b>	<b>Mission</b>	W	Weapon	-	+2	--	-	-	-	-	-	-	-	-	-	NoteV	100	
		T	Troop	-	+1	--	-	-	-	-	-	-	-	-	-	-	--	
		S	Supply	-	+3	-1	+1	-10	-	-	-	-	-	-	-	-	-	--
		R	Recon	-	-1	+1	-	-10	-	-	-	-	-	-	-	-	-	100
<b>C</b>	<b>Motive</b>	W	Wheeled	6	0	5	-	-	-	-	-	-	-	-	-	-	-	-
		T	Tracked	7	+2	4	-	-	-	-	-	-	-	-	-	-	-	x2
		ACV	Air Cushion	8	+2	6	-	-	-	-	-	-	-	-	-	-	-	x2
		Z	Lifter	9	+1	3	-	-	-	-	-	-	-	-	-	-	-	x2
		G	Grav	10	-1	5	-	-	-	-	-	-	-	-	-	-	-	x3
L	Legged	10	+1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	

**Quality** = 5+Motive TL minus Actual TL. \* Determined by Motive selection.

A Military vehicle automatically has weapons mount capabilities.

**NoteT.** Install TWO weapons: one Vehicle-Mount and one Turret-Mount.

**NoteC.** Install ONE turret mount weapon.

**NoteV.** Install ONE fixed mount weapon (supercedes NoteT or NoteC).

Flyers and Watercraft are special purpose vehicles.

# Flyers / Boats 11



<b>F</b>																		
<b>Flyers</b>		Code	Descriptor	Tech Level	Tons	Speed	Load	Armor	Cage	FlashProof	RadProof	SoundProof	PsiShield	Insulated	Sealed	Note	KCr	
																		,000
<b>A</b>	Type	F	Flyer															
		G	Glider													Note G		
		B	Balloon													Note B		
<b>B</b>	Mission	A	Attack, Combat	+2	x2	+1	x2	20	0	20	0	20	0	10	1			x3
		B	Bomber	+1	x3		x3	10	0	20	0	20	0	10	1			x2
		C	Cargo	0	x4	0	x2	5	0	20	0	20	0	10	1			x1
		P	Protector	+1	x2	+1	x1	10	0	20	0	20	0	10	1			x3
		S	Scientific	-1	x4	0	x2	5	0	20	0	20	0	10	1			x2
		U	Utility				x3	0	0	20	0	20	0	10	1			x10
<b>C</b>	Motive	W	Winged	7	10	8	2											300
		R	Rotor	8	10	7	0.5											400
		F	Flapper	10	10	6	0.5											500
		LTA	Lighter-Than-Air	6	40	5	10											600
		L	Lifter	9	8	2	1											600
		G	Grav	10	9	4	3											700

**Quality** = 5+Motive TL minus Actual TL. \* Determined by Motive selection.

**Light-Than-Atmosphere.** LTA final tonnage equals 10x the calculated tonnage.

Note G. Requires Motive= W and unpowered.

Note B. Requires Lighter-Than-Air and unpowered.

<b>W</b>																		
<b>Watercraft</b>		Code	Descriptor	Tech Level	Tons	Speed	Load	Armor	Cage	FlashProof	RadProof	SoundProof	PsiShield	Insulated	Sealed	Note	KCr	
																		,000
<b>A</b>	Type	S	Ship	5	1000	4	600	10	0	0	0	0	0	0	0			1,000
		U	Sub	6	100	4	60	20	0	0	0	0	0	0	20			1,000
		B	Boat	5	10	4	6	5	0	0	0	0	0	0	0			100
		G	Grav	10	/5	4	**											
<b>B</b>	Mission	C	Cargo			-1												
		P	Patrol	+2		+1		x2										
		E	Explorer	+2											x2			
<b>C</b>	Motive	S	Standard															
		U	Unpowered	-3		0												/2
		H	Hovercraft	6	x2	5	3											200

**Quality** = 5+Motive TL minus Actual TL. \*\* = No Change..





# 12 Enhancers

The character of vehicles can be changed with the addition of Options.

	Code	Descriptor	Tech Level	Tons	Speed	Load	Armor	Cage	FlashProof	RadProof	SoundProof	PsiShield	Insulated	Sealed	Note	KCr ,000	
<b>D</b>	<b>Bulk</b>	VI	Vlight	-1	/3	+1	-2	/3		/3		/3	/3			/3	
		L	Light	-1	/2	+1	-1	/2		/2		/2	/2			/2	
		M	Medium (blank)	-	-	--	-								--		
		H	Heavy	+1	x2	-1	+2	x2			x2	x2		x2	x2		x3
		Vh	VHeavy	+2	x3	-2	+3	x3			x2	x2		x3	x3		x9
<b>E</b>	<b>Stage</b>		Fossil	-2	+2			-10			-10				Note1		
			PowerCell	-1	+1	-2	-2	-5			-5				Note1	10	
			Renewable	-1	+1	-1	-1								Note1	20	
		Pro	Prototype	-2	+1	-1	-1									20	
		Ear	Early	-1	+1			-10				-10				10	
		Std	Standard	0	0												
		Imp	Improved	+1	-1			+10				+10				20	
Adv	Advanced	+3	-2	+1	+1	+20				+20				40			
<b>F</b>	<b>Environ</b>		Air (Open)	-2	0												
			Enclosed	-1				4		4		4		12			
			Sealed	-	0			6	2	6	0	8	0	16	20		2
			DoubleSealed	-	+1			8	4	6	0	12	0	30	20		5
			Insulated	-				8	4	6		12		30	20		10
			Protected	+1	+1			10	10	10	10	12	0	10	20		20
			Armored	+2	+1			20	10	10	10	12	0	20	20		30
			UpArmored	+3	+2			30	20	20	20	20	0	30	20		40
			AltArmored	+3	+2			60	20	30	30	30	0	30	30		50
<b>G</b>	<b>Options</b>		High Powered	+1	+1	+1	-1									100	
			Slave	+1	-1												10
			Remote	+1	-2												20
			Weapon Mount	-			-1										
			Luxury	-												Q= 9 or A	x 2
			Fast	+1	+1	+1	-2										30
			Passenger Module	-			-3									20 pass	100
			Cargo Module	-	+1	-1	+1									one ton	20
	Redundancy	+1	+1												60		
<b>G</b>	<b>More Options</b>	ground	OffRoad	-												30	
		ground	Mole	+1	x3	=1									Note 2.	400	
		water	HydroFoil	+1	+1	+1											30
		flyer	Stubs	-												Grav or Lifter	20
		flyer	VTOL Mod	-		-1	-2									Med or less	100
		flyer	STOL Mod	-			-1									Hvy or less	50
		flyer	Lifting Body Hull	-	+4	+1	x2										200
		flyer	Add-On Wings-1	-	x2	+1	x1									B= +1	100
		flyer	Add-On Wings-2	-	x3	+2	x2									B= +1	200
		flyer	Add On Wings-3	-	x4	+3	x3									B= +1	300
		flyer	Float Landing Gear	-	-1	-1											100
		flyer	Parasite Nipple	+1			-1										100

Note1. May not be Grav or Lifter. Note 2. Only if Ground Vehicle, Explorer, not ACV.

# Design Checklist 13



## VEHICLE DESIGN CHECKLIST

Prepare a blank Vehicle Fillform Chart 14. This form is the documentation for the Vehicle's capabilities.  
 Prepare a blank Vehicle HitForm Chart 15. This form locates and records damage to a Vehicle.

### Vehicle Category (Charts 10-11)

- G Ground Vehicle
- M Military Vehicle
- F Flyer
- W Water Craft

### Additional Steps

- Create weapons for Vehicle Weapons Mounts (using Weapons Creation).
- If desired, install an On-Board Brain (using Vehicle Operations).
- Calculate Range (using Speed and Endurance Chart 07).
- Calculate Vehicle Occupants (using Speed and Endurance Chart 07).

### Type-Mission-Motive (Charts 10-11)

- A Type.
- B Mission.
- C Motive.

### Vehicle Hitform Data

- 14 Create the Vehicle Identification (Model, Bulk-Mission-Motive-Type) and transfer it to the Vehicle Hitform.
- 15 Create the Vehicle Extension and transfer it to the Vehicle Hitform.
- 16 Transfer Weapon information to the Vehicle Hitform.
- 17 Record Armor/ Protection on the Vehicle Hitform.

### Vehicle Enhancers (Chart 12-13)

- D Bulk
- E Stage.
- F Environ.
- G Options.
- H Endurance (Default is Hours).
- J. Special Options.

H	Code	Descriptor	Tech Level	Tons	Speed	Load	Armor	Cage	FlashProof	RadProof	SoundProof	PsiShield	Insulated	Sealed	Note	KCr		
Endurance	H	Endurance	Hours	-	0*													
			Days	+1	1*												20	
			Weeks	+2	2*													50
			Months	+3	3*													100
			Year	+4	4*													

\* this value times Vehicle Speed.

CONVERT ENDURANCE TO RANGE														
	Kph=	5	10	20	30	50	100	300	500	700	1000	2000	3000	5000
	Speed=	1	2	3	4	5	6	7	8	9	10	11	12	13
Endurance	Minutes=	Local												
	Hours=	Local				Regional				Continental				World
	Days=	Regional				Continental				World				
	Weeks=	Continental				World								
	Months=	Contin		World										
Year=	World													



# 14 Vehicle FillForm

The details of vehicles can be changed with Options.

## BUILDING VEHICLES

This Fillform allows an interactive design process which ultimately produces a final vehicle design.

Tech Level. Tech Level for a vehicle is the minimum level required for manufacture.

Manufacturer		
Surface or Orbital?	TL	Law Level

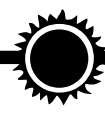
VEHICLE	Q R E B S					Code	TL	Tons	Speed	Load	Ar=	Ca=	Fl=	Ra=	So=	Ps=	In=	Se=	KCr ,000	Cr ,000		
	Chart	Item	Description																			
10		A Vehicle																				
		B Mission																				
		C Motive																				
11		A Vehicle																				
		B Mission																				
		C Motive																				
12		D Bulk																				
		E Stage																				
		F Environ																				
		G Option1																				
		G Option2																				
		G Option3																				
13		H Endur																				
		H Range																				
	QREBS=																					
	Totals																					

## VEHICLE DESCRIPTION

Model	LongName (Bulk - Motive - Mission - Type - User - TL)
The basic information required to describe a vehicle.	

## VX: VEHICLE EXTENSION

	Tons	Speed	Load	Stage	Environ	Endur	QREBS	Options
Vx:								
The basic information required to use a vehicle.								



### VEHICLE HITFORM

Vehicle

Manufacturer

Surface or Orbital?

TL

Law Level

### VEHICLE DESCRIPTION

Model LongName (Bulk - Motive - Mission - Type - User - TL)

The basic information required to describe a vehicle.

### VX: VEHICLE EXTENSION

Tons Speed Load Stage Environ Endur QREBS Options

Vx:

The basic information required to use a vehicle.

### WX: WEAPON EXTENSION

Range Cost Mass QREBS Effects

Wx:

R=

Cr

kg

B=

The basic information required to use a weapon.

### AX: ARMOR EXTENSION

Cost Mass QREBS Ar= Ca= Fl= Ra= So= Ps= In= Se=

Ax:

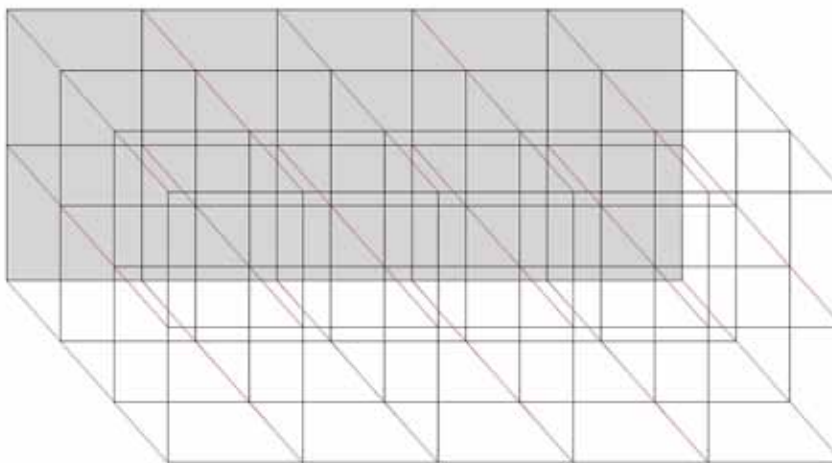
Cr=

The basic information required to use armor.

## L1 DAMAGE LOCATION

### 2D Vehicle

- 2 Comms
- 3 Cargo
- 4 Sensors
- 5 Protections
- 6 Life Support
- 7 Locomotion
- 8 Power Source
- 9 Body Panels
- 10 Weaponry
- 11 Navigation
- 12 Computer

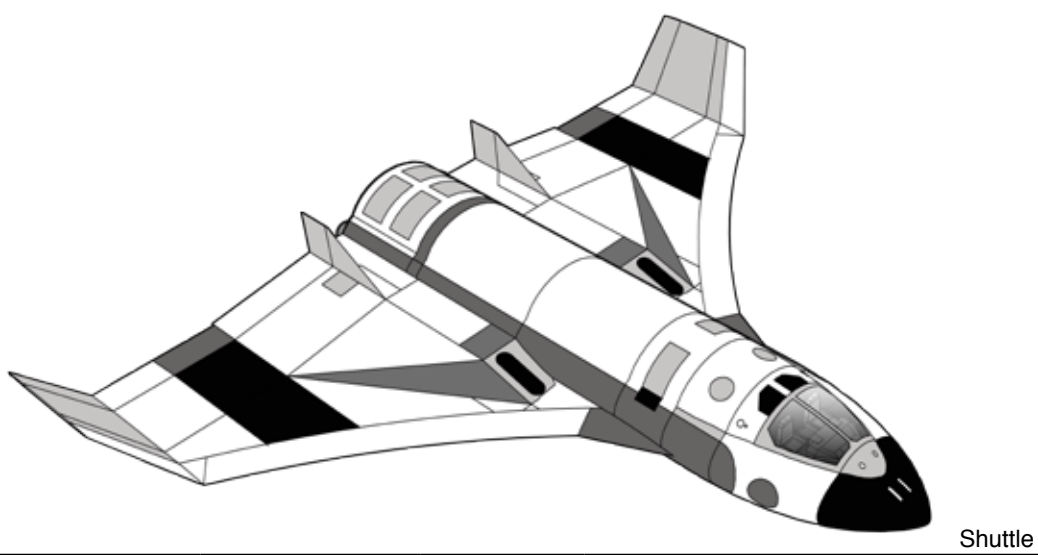
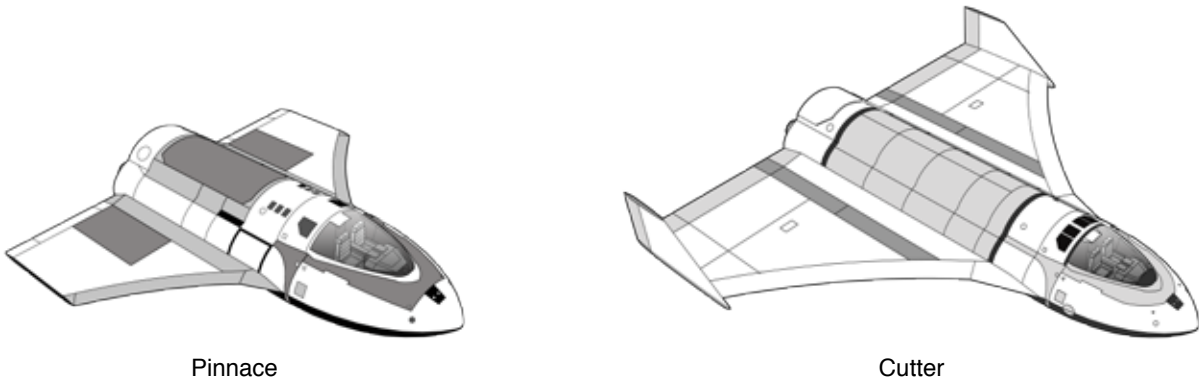
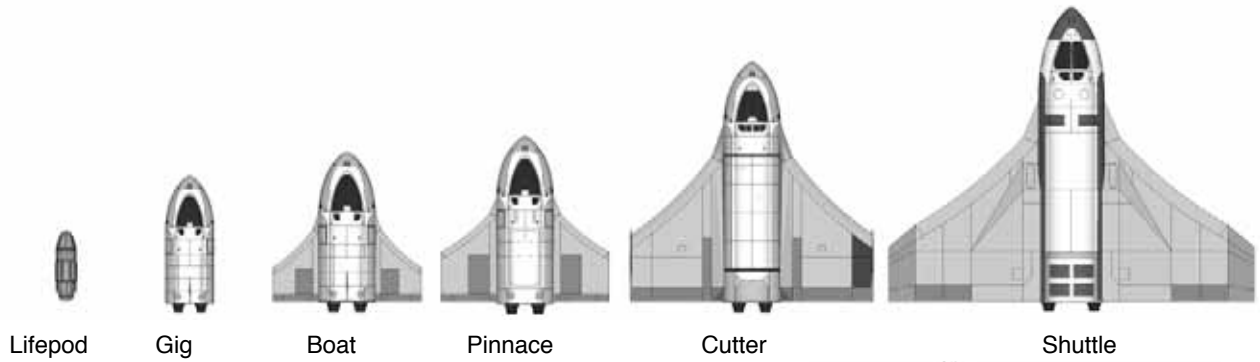
Insert image of Vehicle with human figure for scale. 1.5 meter cubes shown.

Mark Hits with N= Diagnosis Severity.  
Resolve Immediate Action (if possible).  
In Repair, determine Damage Severity.

When an attack against a vehicle succeeds, determine the Hit Location and mark Damage Diagnosis.  
Any Diagnosis beyond 1D Easy renders the Hit Location inoperable.  
If possible, resolve Immediate Action, which may remove the Damage Diagnosis.  
In a follow-up repair situation, proceed to determine Damage Severity.



SMALL CRAFT (TYPICALLY IN SERVICE)





## SMALL CRAFT

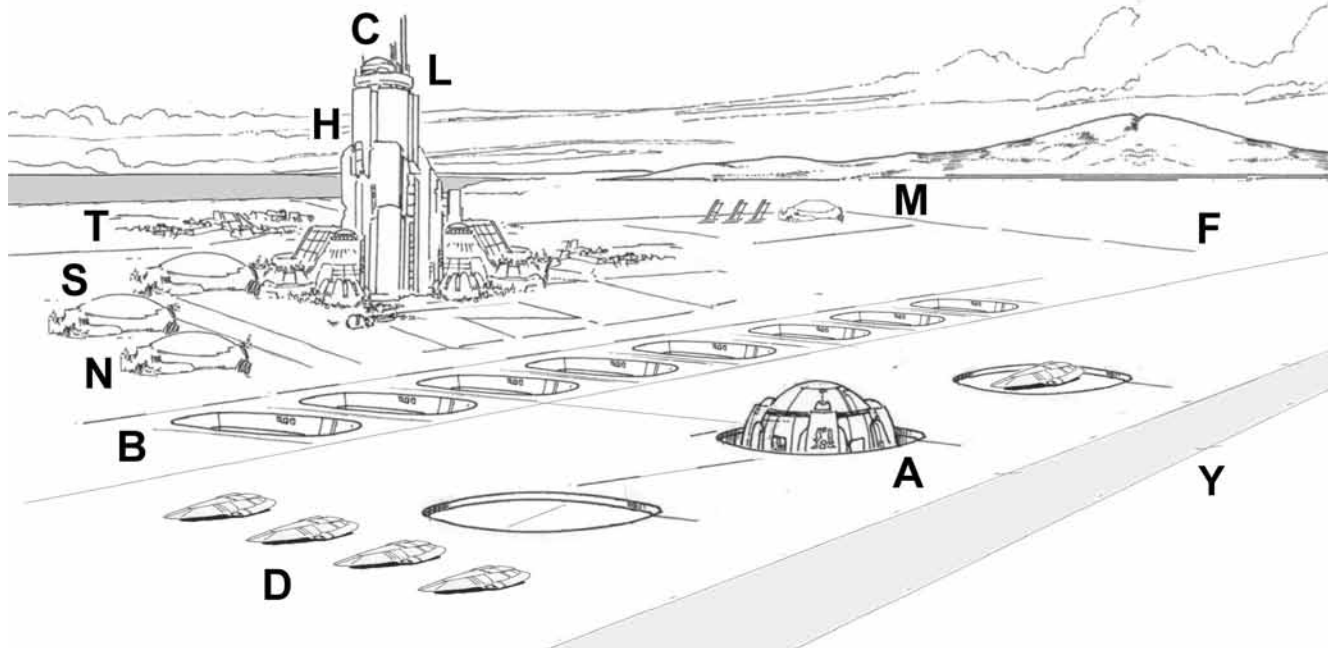
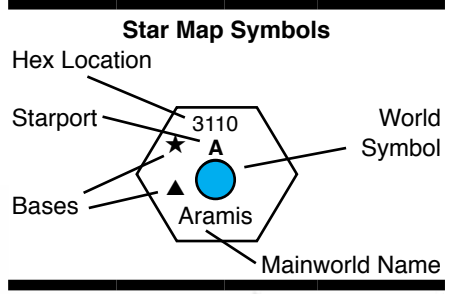
Code	Descriptor	Tech Level	Tons	Speed	Load	Armor	Cage	FlashProof	RadProof	SoundProof	PsiShield	Insulated	Sealed	Note	MCr
Q AL	Light Lifepod	11	3	2	2	10	10	20	10	10	10	10	2		2
Q F	Std Fighter	11	10	6	1	40	10	10	10	10	10	10	9		9
Q G	Gig	12	20	7	15	40	10	10	15	10	10	10	28		28
Q LF	Fast Launch	13	20	4	5	20	10	10	10	10	10	10	9		9
Q LS	Slow Launch	11	20	1	15	20	10	10	10	10	10	10	7		7
Q BF	Fast Boat	13	30	6	14	30	10	10	10	10	10	10	8		8
Q BS	Slow Boat	11	30	3	24	30	10	10	10	10	10	10	6		6
Q NF	Fast Pinnace	15	40	5	20	30	10	10	10	10	10	10	10		10
Q NS	Slow Pinnace	13	40	2	30	30	10	10	10	10	10	10	8		8
Q CY	Modular Cutter	13	50	4	31	40	10	10	20	10	10	10	13		13
Q S	Std Shuttle	11	70	4	42	20	10	10	20	10	20	10	11		11
Q SA	Assault Shuttle														
Q ST	Cargo Shuttle	10	95	3	67	10	10	10	20	10	10	10	16		16
Q SP	Passenger Shuttle	11	90	4	57	20	10	10	20	10	20	10	15		15
Q SF	Fast Shuttle	12	70	5	37	20	10	10	20	10	20	10	12		12
Q SE	Light Shuttle	10	35	5	21	10	10	10	10	10	10	5	5.5		5.5

- Notes A A: Similar to a DC-3.  
 C C: High-powered, offroad-capable, weapon mount included.  
 G G: Turret weapon sold separately.  
 T T: Vehicle mount weapon and Turret weapon sold separately.

## FLYERS

Code	Descriptor	Tech Level	Tons	Speed	Load	Armor	Cage	FlashProof	RadProof	SoundProof	PsiShield	Insulated	Sealed	Note	KCr
	Cargo Hauler Aircraft	4	25	9	17	9	0	24	0	24	0	22	1	A	305
	GroundCar	5	2	5	1	9	0	4	0	4	0	24	0	C	35
	Agent's GroundCar	7	2	6	0	30	10	10	10	20	0	20	20		2505
	Enclosed Air/Raft	8	7	3	5	9	0	4	0	4	0	24	0		145
	Light Grav Speeder	9	3.5	7	4	9	0	4	0	4	0	24	0		245
	Tracked AT	9	5	4	1	50	20	20	20	32	0	40	40		625
	GCarrier	12	8	4	4	100	30	40	40	50	0	50	50	G	1555
	Torgee-1 Grav Tank	12	8	5	3	110	30	40	40	50	0	50	50	T	2455

- Notes A A: Similar to a DC-3.  
 C High-powered, offroad-capable, weapon mount included.  
 G Turret weapon sold separately.  
 T Vehicle mount weapon and Turret weapon sold separately.



**TYPICAL STARPORT CLASS A**

A Typical Populated World Starport

Many good quality services for main trade route business, plus support for ships travelling to the subsector's backwaters, and base support for the Navy and Scout Service.

**A. Premium Landing Bays.** Elevator platforms retract to the subsurface level. Sheltered access; includes protection from the elements; priority resupply.

**B. Safe Bays.** Elevator platforms retract to the subsurface level. As with Premium Landing Bays, Safe Bays have sheltered access; protection from the elements; priority resupply. There are some ship size restrictions.

**C. Control Complex.** The space traffic control complex includes the personnel and computers that manage the arrival and departure of ships.

**D. The Cheap Seats.** Inexpensive ship parking or storage. Ships are exposed to the elements; access requires walking or driving across the tarmac to a ship.

**F. Perimeter Fence.** Protective barriers limited access to the starport. The fence is both a security barrier limiting access to unauthorized personnel, and a safety barrier preventing access by animals or locals.

**H. Travellers' Aid Society Hotel and Complex.** Accommodations for travelers and ship crew.

**L. The Lone Star.** A popular meeting place for ship crews (and for gawking tourists and wannabees).

**M. SDE Starport Defense Establishment.** Note the defensive anti-ship missile launchers.

**N. Naval Base.** Naval administration and offices.

**S. Scout Base.** Scout Service administration and offices.

**T. Startown (outside the starport perimeter).** The local community which supports the starport labor force. Many businesses in Startown supply goods and services for travelers and ship crew.

**Y. Landing Strip.** Supports winged ships requiring an Air Strip.

**Not Shown.** Underground access to Premium and Safe Bays and the vast concourse of services available. Not all starports will have all of the facilities shown here.

Every adventure begins and ends at a starport. Starports are the central crossroads that all interstellar traffic must pass through. It stands to reason, then, that interstellar travellers naturally gravitate to starports... to meet starships and crew, to buy and sell cargoes, and to begin and end their adventures.

Starports offer two opportunities for adventure. Travellers can board a ship and travel to the next world, or they can follow the concourse to the main gate and move out to explore the world they are on. In both cases, there is an infinity of opportunities for adventure.

**Beginning Adventures.** An adventure can start anywhere, but for convenience and for continuity, some starting point must be assigned. That assignment says that an adventure begins at a starport. When characters enter a starport, their intent is to find adventure. The details of that adventure may not become clear until later, but it clearly begins at the starport.

**Ending Adventures.** Likewise, the details, the climax and even the payoff for adventures may take place anywhere, but every adventurer knows in his or her heart that it's not over until they reach the starport.

**The Endless Cycle.** So, at the very moment that an adventure ends, a new one begins. The endless cycle in **Traveller** is the end of an old adventure and the beginning of a new one; each builds on the previous, and the cycle never ends until the characters stop going to the starport.

## THE SITUATION IN-SYSTEM

A star system is composed of a primary star and one or more stellar companions. Orbiting these stars are a variety of planets, planetoid belts, and gas giants. Orbiting planets and gas giants are a variety of satellites. But the focus is always one world... the mainworld... which is the overall best planet or satellite in the system.

That mainworld has a starport which, for all practical purposes, is the destination of interstellar traffic entering the system. Starports vary in their capabilities and facilities, depending on the details of the world itself.

## CLASSIFICATION OF STARPORTS

Starports (and spaceports) are classified by their capabilities and by their location.

### Starport Types (and Capabilities)

Starport type is based on a simple letter classification system (from A to E) detailing their basic facilities.

**A. Excellent Quality Starport.** Facility with refined and unrefined fuel available on site. Facilities include capability to perform annual overhaul and new starship construction (TNAS-certified designs).

A naval base may be present. A scout base is usually not present. A surface installation is present. A highport may be present.

**B. Good Quality Starport.** Refined and unrefined fuel available on site. Facilities include capability to perform annual overhaul and new spacecraft construction (TNAS-certified designs).

A naval base and scout base may be

present. A surface installation is present. A highport may be present.

**C. Routine Quality Starport.** Unrefined fuel available on site. Facilities include some capability for repair (primarily replacement of TNAS-certified parts).

A naval base is usually not present. A scout base may be present. A surface installation is present. A highport is usually not present.

**D. Poor Quality Starport.** Unrefined fuel available on site or close by. It has no repair or construction facilities. A naval base is not present. A scout base may be present. A surface installation is present. A highport is not present.

**E. Frontier Starport.** With no facilities, the installation is little more than a flat expanse of bedrock and a sign. This designation effectively means there is no starport, but there have been previous landings and that location is indicated in astrogation records.

**X. No Spaceport Or Starport.** The world has no space access capability.

### Spaceport Types (and Capabilities)

Worlds other than the mainworld in a system may have lesser quality installations: **spaceports**.

**F. Routine Quality Spaceport.** Unrefined fuel available on site and minor repair facilities.

A system defense field may be present. A military base may be present. A surface installation is present. There is no highport. This designation is a poor cousin to starport type B.

**G. Poor Quality Installation.** Unre-

## STARPORTS AND SPACEPORTS

Starports	A	Excellent Starport
	B	Good Starport
	C	Routine Starport
	D	Poor Starport
	E	Frontier Starport
Spaceports	X	No Starport
	F	Routine Spaceport
	G	Poor Spaceport
	H	Primitive Spaceport
	Y	No Spaceport



## STARPORT AVAILABILITY

A world with a starport has a surface Downport.  
Starport A and Population 7+ adds a Highport.  
Starport B and Population 8+ adds a Highport.  
Starport C and Population 9+ adds a Highport.  
An Asteroid Mainworld has a Beltport instead.

fined fuel available nearby. No repair facilities are available.

A system defense field may be present. A military base may be present. A surface installation is present. There is no highport. This designation is an inferior version of starport type C.

**H. Primitive Quality Installation.** There are no facilities beyond a beacon identifying the location. Unrefined fuel may be available nearby. This is a surface installation; there is no highport.

A system defense field may be present. A military base may be present. This designation is a less-capable version of starport type D.

**Y. No Spaceport Or Starport.** The world has no indigenous space access capability (and is not a Mainworld).

### Location

Every world with a starport has a landing site on the world surface and may have orbital facilities (ports in asteroid belts are a special case).

**Down.** A starport on a world surface is identified by the world name. Yori Starport is the main starport on Yori. If the world also has a Highport, then the surface port has Down somewhere in the name: Sylea Down, Sylea Downport, or Sylea Down Starport.

**Why a surface port?** Landing close to the market is convenient for all concerned. If the environment is at all tolerable, then life support and labor costs are minimized. Some worlds can't justify at the expense of both a Downport and a Highport, and a surface port is easier to maintain.

**Highport.** If circumstances justify the costs, a world may also have Highport (orbital starport). Such orbital installations include High in the name: Sylea Highport, Highport Sylea, or High Sylea.

**Why a Highport?** Many very large ships never land on

a world surface; the cargo they carry is off-loaded in orbit and shuttled down. Some worlds are naturally inhospitable (bad surface weather, a water world, fluid oceans, or perhaps government type D or E) and ship owners prefer not to risk their equipment venturing down to the surface.

**Beltport.** If the mainworld is an asteroid belt, then the starport is located in the belt, close to population or trade facilities. A starport in a belt is a Beltport (a spaceport in a belt is a Baseport).

**Spaceports.** There is typically one major starport in a star system. Other facilities, especially those on smaller, less important worlds in a system, are called **spaceports**. They are established primarily in support of in-system travel.

Good quality spaceports are often established in support of farming projects, mining projects, or small colonies.

The distinction between a starport and a spaceport is based on facilities and capabilities; the relationship is similar to that between local and international airports.

## THE ELEMENTS OF THE STARPORT

A starport at its simplest is a bare spot of bedrock capable of supporting a ship which wants to land. The remaining elements of a starport are added later to support and maintain the traffic that passes through the port.

### The Basic Elements

Each starport is characterized by a few basic elements. Without them, the starport is not really a starport.

**The Beacon.** The location of the starport is broadcast throughout the system from a central beacon. At its simplest, the beacon puts out a continuous signal which allows ships to home on its position. In more complex systems, the beacon provides range and position information for ships in the system, traffic control information on sister frequencies.

**The Landing Pad and Runways.** Starships approach from beyond the atmosphere. When starships set down, most make a smooth, relatively slow approach along designated flight corridors using their particular maneuver drive. Because such drives may not be adequate, some ships use wings or lifting surfaces, and the landing pad includes long, broad runways.

## STARPORTS ON THE MAINWORLD

Type	Quality	Yards	Repairs	Fuel	Downport	Highport	Time To Refuel
A	Excellent	can build Starships	Overhaul	Both	Yes	if Pop =7+	2D Hours
B	Good	can build Spacecraft	Overhaul	Both	Yes	if Pop =8+	2D Hours
C	Routine	No	Major Damage	Unrefined	Yes	if Pop =9+	4D Hours
D	Poor	No	Minor Damage	Unrefined	Yes	No	4D Hours
E	Frontier	No	No	No	Beacon	No	
X	None	No	No	No	No	No	

## SPACEPORTS ON THE NON-MAINWORLDS

Type	Quality	Yards	Repairs	Fuel	Downport	Highport	Time To Refuel
F	Good	No	Minor	Unrefined	Yes	No	4D Hours
G	Poor	No	Superficial	Unrefined	Yes	No	4D Hours
H	Basic	No	No	No	Beacon	No	
Y	None	No	No	No	No	No	

**Beacons.** In some cases, a beacon for a long-established frontier starport may no longer be operational.

**Type X or Y.** Indicates the world has no designated starport or spaceport.

For highports and beltports, there is a designated holding area administered by traffic control.

**Sensor Arrays.** The starport includes a variety of sensors to detect and track traffic within the system.

**Traffic Control Facility.** Space traffic controllers provide basic information to ships within the system, vectoring them safely in their approaches or departures. The traffic control facilities are located at the starport.

### The Terminal

The starport terminal houses the basic services for passengers and freight.

**The Concourse.** Passenger services are handled at the concourse. Ticketing, baggage check, and final boarding all take place at this facility.

**Freight Docks.** Freight (materials carried by ships for a fee) is loaded and unloaded at the freight docks. Speculative cargoes are held until sold at the cargo market.

**Customs and Immigration.** Applicable laws concerning the people and goods moving to the world are enforced by Customs and Immigration.

**Cargo Market.** Speculative cargo is bought and sold at the Cargo Market. A variety of brokers handle the transactions and make the process relatively simple.

**Accommodations.** Passengers passing through the starport can stay at the on-site starport hotel, buy meals at a variety of restaurants, purchase basic goods and souvenirs at the shops, and pass time at theaters, museums, or entertainment complexes. The level of accommodations available varies widely.

**Data Terminals.** Information is available about the world, its products and services, and recreation at a variety of data terminals. On some worlds, the data terminal is a computer; on others, they are staff people with prodigious memories; on yet others, they are librarians.

**Message Center.** Access to communications (physical mail, electronic mail, express mail, telegraph, telephone, and video) is generally available at the message center.

**Emergency Medical.** Suitable facilities are provided for emergency medical treatment. The medical staff has the training and experience to deal with a wide variety of medical emergencies.

### Peripheral Facilities

Situated around the edges of the starport are a variety of associated activities and facilities.

**SDE Starport Defense Establishment.** In addition to security personnel (who function as law enforcers or police), a starport may have an SDE (with a military function).

The SDE exists to defend the starport against threats of

## THE ELEMENTS OF THE STARPORT

Basics	Beacon	
	Landing Pad and Runways	
	Sensor Arrays	
Traffic Control Facility		
<hr/>		
Terminal	The Concourse	
	Freight Docks	
	Customs and Immigration	
	Cargo Market	
	Accommodations	
	Data Terminals	
Peripherals	Message Center	
	Emergency Medical	
	<hr/>	
	Starport Defense Establishment	
	Auxiliary Traffic Control Facility	
	Scout Base	
	Naval Base	
	Consulates	
	System Defense Field	
	Shipyards	
Unofficial	Repair Shops	
	Transport Hub	
	Industry	
	<hr/>	
	The Scout Lounge	
	The Hiring Hall	
	The Lone Star	
	The Traveller's Aid Society	
	Startown	

a higher level than ordinary criminal activity: riot, terrorist, pirate, or military attack, or even disaster response. Its equipment may include troops, fighter craft, missile defenses, and artillery. The SDE (to maintain its independence from the local world) may be an independent local military unit, or a mercenary force specifically created for the job.

Since an SDE is rarely larger than absolutely necessary, it is possible to evaluate the magnitude of local perceived threats to a starport by observing the size and equipment of the SDE.

**Auxiliary Traffic Control Facility.** In some systems, an auxiliary traffic control facility is located in an outer orbit. It senses incoming and outgoing ships and communicates with them.

**Scout Base.** The exploratory scout service may maintain a port facility for the support and maintenance of its vessels (including those vessels which it may have out on loan to detached duty scouts). It is possible that the world on which a scout base is located is not a member of the interstellar community which the scout service serves (for example, Imperial Scout bases may be located outside the Imperium).

Many scout bases make the information they have accumulated available outside of their service (including maps, charts, and world surveys).

**Naval Base.** The Navy may maintain a port facility for the support and maintenance of its vessels. The base includes administrative sections, warehouses for provisions and resupply, and some security personnel.

The continuing interest of naval personnel in their service makes naval bases favorite stopovers for veterans (even of other navies).

Sometimes a specific naval base may be considerably more extensive than the typical installation. Their facilities and equipment come to dominate the starport rather than complement it.

**Consulates.** Neighboring worlds and neighboring interstellar governments may maintain embassies near the seats of government, but they maintain consulates where they are most effective: at starports.

Foreign governments provide basic services to their citizens through a series of consulates at starports. A consulate may be an office building, a suite, or even just a simple office through which the consul can provide documentation, resolve legal or cultural issues, and generally help its citizen travellers on their way.

The head of a consulate is the Consul. For large governments, the Consul is a full-time post with an accompanying staff. For smaller governments, the Consul is a local who is appointed (often to an honorary post with no budget or remuneration). In extreme cases, a single individual is the Consul

for several governments and charges fees consistent with the services provided.

**System Defense Field.** The interplanetary defense forces of a system may maintain a facility for the support of their vessels (system defense boats) as they rotate off station from the outer reaches of the systems. The field has a minimum of facilities (provisions are trucked in when needed; repair trucks call as required).

**Shipyards.** Ships are built at shipyards. For ships of moderate size which will be streamlined and capable of landing on worlds, construction often takes place on world surfaces at starport shipyards.

Most shipyards specialize in the construction of a specific assembly (which local industry has shown itself capable of producing) such as jump drives, avionics, detectors, or even stateroom modules. Other components are purchased from other shipyards and imported as part of the TNAS-certified parts system.

Warehouses on-site store components until they are ready for assembly. Ships themselves are constructed in open-air bays (or in enclosed assembly structures if the local environment requires).

**Repair Shops.** Minor repairs to ships are often performed on the landing pad. More complex or extensive repairs require that the ships be moved to repair bays at the edge of the starport. Support installations near the bays house the instrumentation and equipment necessary for repairs.

**Transport Hub.** The starport is usually integrated into the global transportation net, and arriving passengers transfer from the terminal to the transport hubs. Depending on the world, the hubs may support sea or undersea transport, air transport, or ground rail transport. In addition, personal vehicle rental is available.

**Industry.** Many industrial processes are best carried out in zero-G and/or vacuum. What better place for such operations than adjacent to a major orbital transportation center? Industrial modules attached to the Highport create products or commodities which benefit from immediate access to the ships calling at the port. Some factories have long-term supply contracts with the highport itself.

### Organization of the Starport

A starport has an organizational structure which includes

---

#### The Mission Of The Starport

The starport, as an organization, is committed to a mission (that mission may or may not be clearly or publicly stated). Typical missions may be

---

To efficiently provide facilities and services necessary to accommodate interplanetary and interstellar traffic for this world.

---

To produce a maximum of income for the organization which operates this starport.

---

To produce a maximum of income for the organization which operates this starport.

---

To meet the minimum requirements for maintaining interstellar trade.

---

a leader and a mission; the details of each starport are different, although they are generally variations on a basic theme.

**The Port Authority.** Regardless of the local government in power on the world, the governing authority for the starport is the Port Authority. Financed by a variety of charges and levies on passengers, cargo, and ships, the Authority uses its money to build and maintain its facilities, and to provide variety of services. Like starports, Port Authorities vary widely in structure and approach to their responsibilities. Some are strong corporate organizations devoted to the pursuit of profit; others are non-profit organizations which view their responsibilities more as services to the citizenry; yet others consider themselves a quasi-official arm of local government.

**The Port Warden.** The person in complete charge of the starport is the Port Warden. Appointed by the Port Authority, the Warden is the chief executive officer for the facility, and wields great, but not unlimited power.

**Regulation Enforcement.** The police and security arm of the Port Authority has the responsibility of protecting the orderly operation of the starport and of enforcing its regulations. It consists of enforcers and emergency technicians.

The typical enforcer carries out the role of helpful police officer, often assisting passengers in mundane tasks. Behind the scenes, however, a stronger, better armed force stands ready to back them up if necessary.

Emergency technicians provide basic services such as paramedical response, rescue operations, and fire fighting. Emergency tech stations are situated throughout the starport, providing the ability to make a quick response anywhere within the starport's boundaries.

### UNOFFICIAL FACILITIES

Not all facilities at a starport come under the jurisdiction of the Port Authority.

**The Scout Lounge.** Those who conduct surveys of star systems and who continually venture out into unexplored or under-explored space are a special type of people. After long periods of time alone or with their fellow crew, they naturally gravitate to others of their kind... to share stories and experiences which may help them survive. The typical starport has a Scout Lounge for this type of people.

The Scout Lounge operates as a semi-private club; theoretically anyone can use its services, but in practice it is only patronized comfortably by scouts, their friends and guests, and those with an affinity for scouts.

**The Lone Star.** Many starports have a recreation facility which welcomes and serves all comers. At its tables, people meet and enjoy light music or video, conversation, and meals. To many the Lone Star is an opportunity to meet others on a casual basis, to develop acquaintances, and even grow them into friendships.

Individual establishments may have different names, but everyone understands what is meant when the suggestion is made to "meet at the Lone Star."

**The Travellers' Aid Society.** Some individuals make travel their primary vocation. If they are able, they join the Travellers' Aid Society, which provides facilities to its members. The Travellers' Aid Society is a joint operation of sev-

eral large hotel chains, which provide the facilities within or adjacent to their own hotels and restaurants.

Members join by depositing a large sum of money as an annuity, with the proceeds paying for the benefits they receive.

**The Hiring Hall.** Crew members looking for work gather at the hiring hall. Ships calling at the starport look first to the hiring hall when they need new or replacement crew. Because of ship schedules which must be met, it is possible for a crew person to be hired and off world within a few hours notice.

**Startown.** Although starports are often established near large cities, the community which springs up at the gates to the starport has come to be called (generically) Startown. This community is the home of many of the starport employees and houses many stores, restaurants, and meeting places that serve those who want to wander outside of the starport's boundaries.

Startown is not a city so much as a neighborhood; a small (but often important) part of a larger community.

## EXTERNAL CONTROLS

Starports and spaceports exist to participate in interplanetary or interstellar trade. They belong to a network of similar installations, and each depends on the other to provide the traffic that gives meaning and purpose to the installation.

Starports and spaceports must be responsive to three distinct external controls or powers.

**Local World or System Government.** Local government exercises considerable power over a starport (or spaceport). Because of taxation and law, the starport is dependent on the goodwill of local government. This influence is primarily felt in the statement of the mission of the starport.

**Interstellar Government.** Interstellar government has a vested interest in creating and maintaining viable starports on worlds where trade produces economic benefits. Interstellar government influences starports through pressure on local government, and by establishing bases (naval or scout) which increase the viability of the local starport.

**The Ship Owners and Operators.** Ship owners and operators serve starports which allow them to make profits. Even high service fees, taxes, and assessments do not deter them if there are profits to be made.

**The Passengers and Freight Shippers.** Passengers and Freight Shippers are rarely organized, but their power is felt if they do not patronize a starport.

The organization representing the passengers is the Travellers' Aid Society, which works with starports to improve facilities and services as is economically feasible.

The organization representing the shippers is the Traders' Guild, which works to maintain efficient operations for the benefit of independent ship owners.

## Travel Zones

A Travel Zone is a notification that a specific world may be dangerous to travellers.

**Amber Travel Zones.** An Amber Travel Zone label is cautionary: the location may present some level of hazard to travellers. That hazard may be natural (disease, local preda-

tors or parasites), sociological (uncommon or strange social practices), or governmental (repressive, intolerant, or xenophobic policies). Travellers are warned to be aware of these hazards and guard against them. The Amber Travel Zone label is applied by the Travellers' Aid Society.

**Red Travel Zones.** A Red Travel Zone label is interdictive: the location presents such a level of danger that travel to the location is prohibited. The Red Travel Zone label may be applied by the Travellers' Aid Society, or by an interstellar government (for the worlds within a system), or by local government (for a world within a system).

## The Green List

The TAS maintains its MSL Master Ship List of all ships calling at worlds with TAS facilities; the information is compiled and published at regular intervals. The TAS makes available to its members the Green List: a subset of the MSL, usually including commercial ships currently present, or expected to be present, within about 20 parsecs. It also includes naval and private ships in the region. The TAS Green List codes ships in a spectrum Green-Amber-Red based on dependability, safety, and customer service.

Passenger ships make a point to check in with local TAS facilities so their data is included in the MSL.

## UNDERSTANDING STARPORTS

The key to understanding a starport is a continuing awareness of its purpose. Starports exist to foster traffic, and thus trade, between the stars. Governments may attempt to control or suppress the activities of starports, but when they do, they naturally suppress the benefits of trade and commerce for their worlds. The natural state of starports is to flourish; if the starport's world has resources which can be profitably marketed to other worlds, the starport generate economic benefit.

**Extra-Territoriality.** In order to foster interstellar traffic, starports are extra-territorial. Just as embassies are treated as if they are the territory of their owning nations, starports are treated like they are off-world space. Passengers and crew alike are allowed to leave their starships and wander freely (subject to security and safety restrictions) throughout a starport. Goods are not subject to customs or taxes until they leave a starport. The laws of the world do not apply to until a traveller leaves the starport.

**Law and Order.** There must be some law and order within a starport, and the means of achieving that order is the local Starport Regulations. Established by the Port Authority, these regulations define in detail what behaviors are permitted and prohibited. For most people, ordinary behavior is sufficient to stay within the regulations. Strange requirements are typically posted clearly.

**Ship Construction and Repair.** Starships and spacecraft require an extensive system of construction and repair sites, and the overhead of designing and maintaining the many parts which go into ships can be overwhelming. Consequently, many starports subscribe to the TNAS (Quality Ship Design Scheme): a set of standard component specifications which are manufactured on worlds with the appropriate tech level and industrial capacity, but which can be

---

## THE STARPORT VISIT

The ship enters the new system, probably near the MainWorld, leaving JumpSpace at 100 diameters out S=7 or R=12. The approach to the starport takes perhaps a day, during which the appropriate comm interaction and identification procedures are completed.

At the world, the ship begins a descent to the world surface. Although it could conceivably land anywhere, the starport is the place where the ship can be serviced, cargoes and passengers negotiated, and legalities completed. The landing maneuver is supervised by voice and data contact with the local space traffic controller.

Once at the tarmac, the ship moves to an assigned landing bay. Depending on schedules, preferences, and finances, there may be a scurry of ground crew off-loading, reprovisioning, fuelling, and repairing; or the crew may save fees by doing it themselves.

The Captain (or his First Officer) calls on the Port Warden's office with papers and reports; the Steward checks for passengers wanting transport to the next world on the schedule; the FreightMaster similarly checks for possible shipments; the Engineer supervises refuelling. The Astrogator checks local starcharts for the best routes to nearby systems. Once the work is done, the entire crew takes a well-needed break to visit Startown looking for interesting things, pleasant recreation, and perhaps adventure.

Soon enough, departure time approaches. Cargo must be loaded, passengers boarded, and flight plans filed. At the appointed hour, the ship gently lifts off, rises to orbit, and then ventures out (taking about a day) to the 100D limit and a jump to the next world on the route.

**The Gas Giant Detour.** Some ships insert in their journey a detour to the local Gas Giant, either before they visit the starport, or after they leave. The reason is economy: the raw hydrogen fuel the ship's Power Plant and Jump Drive need is free for the skimming (as opposed to Cr10,000 or more at the starport's pumps). Then again, the detour adds a week or so to the journey, and for some buying fuel is cheaper than wasting a week in system.

---

assembled and maintained at any starport of the appropriate type, regardless of local tech level or industrial capacity.

**Money.** Ultimately, every starport must make money if it is to remain in operation. Starports cannot give their services away, but most find a way to hide those charges away from the consuming public. Restaurant prices include a surcharge that supports the starport; starship lines pay a portion of their ticket price and freight charges to the starport. Since all of this is concealed from the typical passenger, the continuing impression is that the starport is a free facility.

## STARPORT AMBIENCE

When travellers arrive at a starport the atmosphere and the condition of the facilities create an impression that will stay with them for a long time. Starport appearance may range from modern or new to old and decayed. Starport staff may be respectful and attentive, or rude and obnoxious. Starport officials may be straightforward and honest, they may be corrupt and self-serving, or they may occupy any

intermediate position between the two extremes.

## MANY DIFFERENT PORTS

There are as many variations in Starports as there are worlds. Each is unique in the way they provide their services, based on world trade classifications, the elements of the UWP, and other less clear factors.

**Water World.** With land at a premium, starships land in the water (perhaps sheltered by natural or artificial islands) and are serviced by boats.

**Asteroid Belt.** Ships dock in the microgravity of beltport. The starport may be an improved planetoid or a free-standing station.

**Stormworlds.** If a world has an exceptionally turbulent or violent atmosphere, most traffic may choose to call at the Highport and shuttle cargoes and passengers down on craft specifically engineered for local conditions.

**Corrosive and Insidious Atmospheres.** To facilitate ship access for passengers and cargo, and for repair and maintenance, the starport provides large containment bays with decorrosive sprays and habitable environments.

**High Law Levels.** Worlds with high law levels and a correspondingly oppressive culture impose restrictions on access to the starport. The perimeter interface between the starport and the world is heavily guarded.

## THE SPECIAL CASES

There are two special cases for starports: the Depot and the Way Station.

**The Depot.** A depot is a world-dominating naval base capable of supporting extraordinary numbers of ships (primarily warships) and extraordinary levels of repairs.

A depot is present on about one world in a thousand.

**The Way Station.** A way station is a larger-than-normal scout base dedicated to support of official interstellar courier activity. The Imperium's xboat system carries communications between worlds on an expedited basis. The way station services and maintains the xboats. A way station is located on main xboat routes about one per 40-50 parsecs.

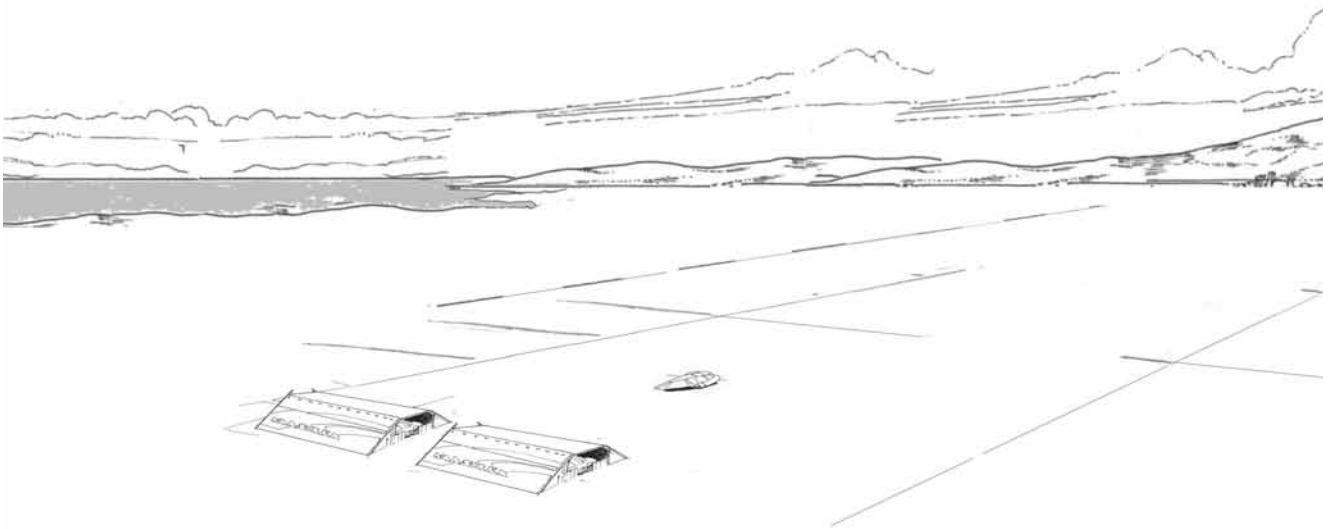
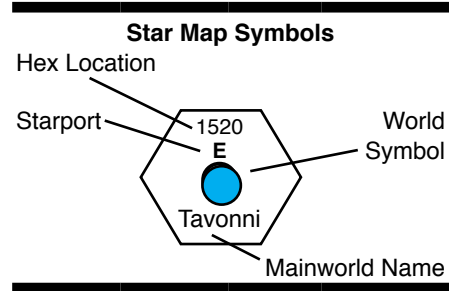
## DISTRIBUTION OPERATIONS

Worlds with high levels of space traffic and a Highport may find that channeling all goods through the Downport is inefficient and adopt orbital delivery procedures.

Cargo containers addressed to specific locations on the world below are offloaded in orbit and tethered in a holding area until picked up. Small craft shuttles or transports load the goods and carry them directly to their destination, bypassing the Downport entirely.

For example, Golden Pharma on Rhyllanor's southern continent has ordered a 10-ton container of anti-virals. On most worlds, the container would be landed at the starport and offloaded. From there, the container is shipped by truck, transport line, air, or even boat to the southern continent.

Taking delivery in orbit, the company sends (or hires) a cutter to pick them up in orbit and deliver them directly to the warehouse. The process saves time and effort for everyone involved.



**A TYPICAL STARPORT CLASS E**

A Typical Frontier Starport

No facilities beyond a broad flat expanse of exposed bedrock capable of supporting a starship landing pads.

The sheltered bay in the background allows ships to refuel (and water landings).

Note the trading company sheds providing temporary shelter (and security) for cargo.

# Starship Design and Construction

Starships are designed and constructed for specific missions: naval, exploratory, trade, research. The process of design and construction (the field of naval architecture) carries the ship designer through a series of steps which identify ship component requirements and address them.

Ship design is a continuous feedback process: each step seems to mandate changes in what had been decided before. Eventually, however, the ship design appears complete and can be finalized with a ship name.

## ACS ADVENTURE CLASS SHIPS

Adventure Class ships are starships and spacecraft suitable for use by groups of player characters. The ships are large enough to carry profitable cargos but small enough that the activities of the individual characters matter.

**Tonnages.** Adventure Class Ships are built using standard hulls between 100 tons and 2400 ton displacement.

Vessels smaller than 100 tons are Small Craft. Ships larger than 2400 tons are BCS Battle Class Ships. Ships and Small Craft use this ACS Design System; Battle Class Ships use a different design system.

**Drag And Drop Components.** The components for ACS ships are standardized for selection from tables (as opposed to being created by formulas or percentages as in BCS ships).

## THE NAVAL ARCHITECTURE PROCESS

Starships are designed for missions: specific activities of a commercial, military, scientific, or recreational nature.

**Designed in Tons.** Ships are designed in hull volume Tons which then easily translate into volumetric cubes and deck plan squares.

**Budgeted in MegaCredits.** Ship component costs are expressed in MegaCredits (and sometimes decimal fractions). Costs below MCr0.01 (about KCr 10 or Cr10,000) are inconsequential and ignored. For example, a Maneuver Drive may cost MCr10 and the cost is important to the final ship design; several rifles in the Ship's Locker may cost Cr1,000 each and their cost can be ignored.

**Designed Interactively.** The design charts are part of an interactive process: changing one parameter may require other changes throughout the design.

The design process ultimately interacts with other systems within **Traveller**; the combat system, the trade system, the use of sensors, environmental effects, and various interactions with the environment all interact with the decisions made during the ship design process.

## THE COMPONENTS OF A STARSHIP

A starship consists of a variety of components, each with its own particular importance and requirements.

**The Hull.** The starship hull is the container into which

all other components must be fitted. Hulls are defined by a Size (in tons), a Structure and a Configuration (shape and streamlining).

**Armor.** Ships may be equipped with armor to protect them against attack and from hostile environments.

**Drives.** Ships may be equipped with a variety of drives providing power and the ability to move both between planets and between star systems.

**Sensors.** A ship has a set of technological eyes and ears for exploring systems and detecting other ships.

**Weapons.** A ship may be armed for its own protection and to accomplish its mission.

**Defenses.** A ship may be equipped with a variety of defensive capabilities.

**Operations.** Some portion of the ship may be dedicated to specialized activities in support of the ship's mission: medical sections, data processing, resource processing, command and control, repair bays, or other mission responsibilities. Operations includes Life Support (equipment to maintain environment, atmosphere, liquids, and food).

**Controls and Crew.** A ship is equipped with a set of controls and positions for crew members to operate them. Crew abilities are enhanced by computers to handle the detail, tedium, and complexity of ordinary ship operation.

**Payload.** A ship may be structured to carry passengers, cargo, freight, ordnance, and mission-essential equipment.

## Describing A Ship

The goal of Naval Architecture is the creation of a starship which can be described by:

**The FillForm.** A worksheet recording the components as they are assigned to the ship.

**The ShipSheet.** A final record of the components of the ship and used to record malfunctions or battle damage.

**The Quick Ship Profile QSP.** A short coded description of the mission and capabilities of the ship. The QSP may be enhanced with the Crew Extension (detailing the various crew members for the ship) and the Vehicle Extension (detailing the vehicles and small craft carried by the ship).

**The Evaluations.** Brief statements of the relative performance of the ship in terms of passenger demand, crew comfort, and control ergonomics.

## DESIGNING A SHIP

The Design Charts (01 to 27) manage the Naval Architecture Process. Begin with Chart 01 (the Checklist) and proceed through the process. The player who is designing the ship is variously referred to as the Naval Architect or the Ship Designer. Before beginning the design process, the designer must make some basic decisions about the process:

The **Building World** is a designated world with an associated UWP. The world should have a Starport A (thus a shipyard capable of building starships), or Starport B (capable of building spacecraft or small craft). The Building World UWP data also specifies the Base Tech Level for the ship. This information will be inserted into the header for the ship design FillForm.

### Ship Design Tech Levels

The Building World's base Tech Level constrains the capabilities of the shipyard constructing the ship. Unless otherwise specified, all mechanisms on the ship will be at the base tech level.

**Imported Components.** Some components and mechanisms can be imported from neighboring shipyards with the appropriate tech level.

Standard mechanisms at TL +1 are available and can be imported at their standard cost plus 10%.

Early, Prototype, and Experimental mechanisms are available locally.

In a mapped situation (where the local subsector or sector is mapped), player characters can import any higher tech level mechanisms they find in the course of play.

**Tech Level Limits.** Within the Imperium, the maximum shipyard Tech Level is 15. Within this ship design system, the maximum available Tech Level is 21.

## CREATE THE FILLFORM

The three-page Starship Fillform identifies the various ship components and allows the designer to make selections, record them (and delete or change them), and create a record of the overall design.

**The FillForm Is A Worksheet.** Make a copy of the Fillform and enter information as needed. Preserve a clean completed copy of the FillForm as a record.

**Fillform Rows.** The information on the FillForm is a transcription of the details from the various Ship Design Charts. Note sufficient detail as necessary for calculation of the ship's costs, available tonnage, and performance.

## 01 THE CHECKLIST

The Ship Design Checklist details the process of creating starships. The step-by-step instructions guide the naval architect through the decisions of the design process.

The design process is not necessarily linear. A ship designer may jump to various steps out of sequence, and may return to change previous decisions. The objective is to produce a completed design at the end of the sequence.

## 02 STARSHIP MISSIONS

Every starship is constructed for a purpose. That purpose (its mission) guides the design process. A ship intend-

ed to explore new star systems will be different from a ship designed for naval attacks.

### Selecting A Mission

Starship Missions are organized in a progression of steps: Service, Activity, Type, and Qualifier.

Selecting each of these steps produces the final Mission. An additional step - Modifier- gives further definition.

For example, a naval strategist deciding on a ship to routinely defend a system chooses: Naval- Combat- Defensive-Principal = Monitor. To resupply the Monitor, he selects Naval-Auxiliary-Supply-Major =Transport. Alternatively, he could use a contractor: Civil-Merchant-Unscheduled-Freight= Transport.

**Duplicative Mission Symbols.** The letter codes are abbreviations which can be interpreted in multiple ways. Where clarity is necessary, attach appropriate explanatory notes.

## 03 UNDERSTANDING STARSHIP MISSIONS

Additional information about starship missions is provided in this chart for reference.

## 04-05-06 HULLS

Starship hulls are the envelopes which enclose the starship drives, controls, payload, and other components. The challenge is to fit all of the desired components into the selected hull. Hulls are created over the course of four Charts covering Tonnage, Configuration, Fittings, and Jump Fields.

### Hull Sizes

Hulls are available in increments of 100 tons.

**Hull Identification.** Hulls are identified with letters from A to Z. Hull-A is a 100-ton hull; Hull-Z is a 2400-ton hull.

Total Squares indicates the total expected deck squares (each 1.5 meters by 1.5 meters) for the ship when creating deck plans. Total Cubes provides the total expected Cubes (one-fourth ton; 1.5 meters cubed).

**Overtonnage and Undertonnage.** It is impractical to begin with hulls in less than multiples of 100 tons (for example, a 343 ton hull is not available as a starting point). Conversely, fine tuning in the final design is possible by attaching appropriate tonnage Pods or Subhulls.

In the final design, the Hull may be more or less than the initial design tonnage. Slight undertonnage (49 or fewer tons under design hull tonnage) positively impacts performance by increasing Agility. Slight overtonnage (49 or fewer tons over design tonnage) negatively impacts performance by decreasing Agility. Gross overtonnage (50 or more tons) requires rounding the Hull Identifier to the next higher size.

### Basic Hull Costs

Hull Costs are priced in MCr based on Tonnage, Configuration, and Structure. The Hull Costs table details costs.

Most Hull Structures have no effect on costs, but:

Organic Hull cost is half the Hull Costs table value.

Charged Hull cost is twice the Hull Costs table value.

### Pods and Subhulls

Portions of a ship can be built with Pods or Subhulls.



---

## HULL CONFIGURATION

---

- C. Cluster.** An accumulation of compartments.
  - B. Braced Cluster.** Structured for higher acceleration.
  - P. Planetoid.** A hollowed nickel-iron asteroid.
  - U. Unstreamlined.** Protrusions increase drag.
  - S. Streamlined.** Cowlings and fairings decrease drag.
  - A. Airframe.** Winged for performance in atmosphere.
  - L. Lifting Body.** Radically streamlined lifting-surfaces.
- 

A **Pod** is an enclosure less than 100 tons. A **Subhull** is an enclosure of 100 tons or more. Pods and Subhulls are constructed and identified in the same manner as Hulls. For example, the individual cargo compartments of a Cluster Hull are usually Pods. Drop Tanks designed to carry fuel but discarded before jump are Pods or Subhulls.

**Configuration.** A Hull with attached Pods or Subhulls is restricted to the least favorable Configuration capabilities of the components. A Lifting Body Hull with an attached Unstreamlined Pod is treated as Unstreamlined.

**Connectors.** Pods and Subhulls are connected to a parent Hull with Grapples or Cradle Plates.

**Jump Field.** A parent hull equipped with a Jump Bubble automatically envelopes any attached Pods or Subhulls within that bubble. Otherwise, a Pod or Subhull must be equipped with Jump Plates or Jump Grid if its parent hull is to carry it into Jump.

Different Configurations allow distinct paths to achieving specific results.

An **Airframe Hull** includes wings and fins in its tonnage; a Streamlined Hull can be upgraded to Airframe, but its wings and fins are **added** to the Hull tonnage.

A **Cluster Hull** and a **Braced Cluster Hull** include several distinct component units, but are not intended for operation in Atmosphere. Cluster Hulls more suited to atmospheric operations can be built using a variety of component streamlined Pods or Subhulls.

### Airframe Versus Winged Streamlined

Compare some important differences:

An **Airframe Hull** has Wings, Fins, and Landing Wheels included within the total hull tonnage.

A **Streamlined Hull** has no Wings and Fins. Adding Wings and Fins increases total hull tonnage.

Adding **Fins** (but not Wings) increases Agility +1 when operating in Atmosphere.

**Wing and Fin** tonnage is also available for other uses: hollow Wings may also be assigned as fuel tankage, or for sensors, or even (if large enough) for accommodations.

### Hull Structure

Hull Structure defines the construction technique (which is restricted by Configuration) and the base Armor Value AV=. Some Structures have additional benefits.

### The Structure Types

There are six types of Hull Structure.

**Frame and Plate.** The default ship construction technique constructs a series of frames onto which solid plates

are fastened. The result is a strong hull suitable for most ship missions.

**Shell** creates an external skin to support much or most of the load; it dispenses with most of the internal frames of Frame and Plate. Shell is best adapted to atmospheric flight.

**Polymer** creates a hull out of specialized plastics selected for their advantageous characteristics. Polymer is capable of self-healing: damage to the hull (within limits) is naturally repaired by the polymer.

**FeN** structure consists of rigid nickel-iron walls remaining after a Planetoid hull is hollowed out. FeN structure is inexpensive and the raw material provides substantial armor.

**Organic** creates a living, space-dwelling organism. Organic hulls may be the non-living shells of dead organisms, or they may be still living organisms whose interior spaces are used for ship components.

A living Organic Hull is capable of restoring damaged elements and replacing destroyed elements over time.

Charged is an improvement to Plate. The charged technique applies power to increase the hull strength.

### Base Armor Value AV=

Hull Structure defines default AV Armor Values for the Hull. For Structures other than FeN, Armor Value AV is based on the ship Tech Level.

### Hardpoints and Firmpoints

Hardpoints and Firmpoints are locations for the installation of weapons and defenses on hulls.

**Hardpoints.** A Hardpoint is a location on the hull which allows the installation of a weapon system (or, in some cases, other devices). It includes appropriate power and control connections, and is strengthened to withstand acceleration and environmental stresses.

Every Hull automatically has one Hardpoint per 100 tons. It imposes no tonnage burden on the Hull. It is not possible to install a Hardpoint on a Pod; the minimum tonnage to support a Hardpoint is 100 tons.

**Firmpoints.** A Firmpoint is a small Hardpoint with restricted capabilities primarily for pods and small craft (although they may be installed on Hulls).

Any Pod or small craft Hull (less than 100 tons) may have one Firmpoint per 35 tons. The first Firmpoint may be installed on a Pod or Subhull between 10 and 35 tons.

A Hull may substitute three Firmpoints per Hardpoint.

For example, a 100-ton Hull-A can have one Hardpoint, or three Firmpoints. A 10-ton Pod-A1 can have one Firmpoint. A 30-ton Pod-A3 can have one Firmpoint. A 40-ton Pod-A4 can have two Firmpoints. An 80-ton Pod-A8 can have three Firmpoints.

For example, a Laser-10 in a 1-ton turret has range R=7. Reducing the mount to R=6 also reduces the tonnage of the turret by half (to half-ton) and makes it eligible for a Firmpoint. The Hull can install three Firmpoint mounted Laser-10s R=6 in place of one Hardpoint mounted Laser-10 R=7.

A Firmpoint will accept any mount which is less than one ton (mounts less than one ton are usually created by applying World Range changes) and contains a World Range Weapon, Defense, or Sensor.

Hardpoints and Firmpoints may be distributed throughout the structure, or they may be clustered together.

**GunMaker Installations.** Any weapon less than 500 kg created by GunMaker can be installed in a weapon Mount (less than 1 ton) on a Firm Point.

GunMaker weapons damage inflict one-tenth damage in the Starship Combat environment: divide damage by 10 and round down; less than 1D has no combat effect; 1D fits in a T1; 2D fits in a T2; 3D fits in a T3.

**External Ordnance.** Any Firmpoint not otherwise used can accept attachment of up to one Hull Ton of external Ordnance (Bombs) with penalty Agility minus 1 per attachment.

**Internal Ordnance (Bomb Racks).** Any Firmpoint not otherwise used can be used to discharge internally carried Ordnance (at the rate of up to 1 ton per turn). There is no Agility penalty.

### HULL FITTINGS

Hull performance is enhanced with fittings, including: Landing Gear, Wings and Fins, and Flotation,

#### Landing Gear

Landing gear supports the weight of the hull.

**Landing Skids.** Horizontal bars transmit the weight of the ship to the surface (which is bedrock, or a prepared landing surface). The surface must be level; the skids have no inherent leveling capability. The bars do not actually "skid"; the ship is immobile when landed.

**Landing Legs.** The ship has retractable legs ending in pads. The pads may rest on any reasonably stable surface. The landing legs adjust to compensate for uneven terrain.

The ship is immobile when landed.

**Landing Wheels.** The ship has retractable landing legs terminating in wheels. The hull may land anywhere that Landing legs with pads can, but for the wheels to be usable, a landing strip is required.

#### Wings and Fins

Wings and Fins enhance the operation of the hull operating in Atmosphere 2+, or if Pressure= 1+.

**Fins.** Fins increase Agility +1.

**Wings.** Wings increase the performance of a ship's Maneuver or Gravitic Drive +1G if operating in Atmosphere.

**Lifters.** Lifters allow limited hover capability and an ability to reposition itself or move short distances.

**Lifting Body** Hulls have the effect of Wings but not Fins.

#### Flotation

Hulls are built to resist vacuum. They are not normally capable of long-term resistance to water (or other liquids), nor can they easily float.

**Flotation Hull** is sealed to resist long term exposure to water and other fluids. It naturally floats on a water surface.

The flotation hull undersurface is crafted to allow glide take-off and landing (and is a substitute for Landing Wheels), as well as powered movement on the water surface.

The hull is balanced and stable as it floats.

**Submergence Hull.** The hull (in addition to flotation capabilities) has the ability to submerge and to resurface.

## HARDPOINTS AND FIRMPPOINTS

	Hardpoint	Firmpoint
Capacity	One Mount	One Half-Ton Mount
Hull	1 per 100 tons	1 per 35 tons
Pod	No	1 per 35 tons
External Ordnance	1 ton per HP	1 ton per FP
Internal Ordnance	--- --- discharge	1 ton /turn --- --- (must be R=)

The ability of the hull to withstand pressure (based on its armor value) is doubled.

## 07 JUMP FIELDS

If the ship will have a Jump Drive, the hull must have a Jump Field installed. Select between Jump Bubble, Jump Plates, and Jump Grid.

**Safe Jump Distance.** Ships can generally jump safely at 100 diameters from a gravity source. The specific Jump Readiness Option determines the precise safe distance.

Because the formula uses Mods and Efficiency from the specific installed Jump Drive, return to this step after the Jump Drive is installed.

Low Jump Drive Efficiency increases the minimum Safe Distance. High Jump Drive Efficiency decreases minimum Safe Distance.

## 08-09 ARMOR

Armor protects a starship hull against damage from attacks, and from environments.

Armor Layers are added inward from the Hull surface; Armor Layers provide general protection for the ship. Specific Layers may be further crafted to provide protection against specific combat and environmental threats. For example, identifying a Layer as Anti-Blast increases its ability to counter Blast effects.

A Coating may be applied to the exterior of the Hull for specialized protection.

**Cost.** Armor imposes no additional cost; its disadvantage is loss of available tonnage.

#### Layers of Armor

Armor is determined by Structure, applied in Layers, and capable of customization against specific threats.

**Structure.** Hull Structure determines Armor Type. Structure= Plate shows the ship is constructed of Plate, which is its Armor.

**Layers.** Armor is installed in layers. Layer1 is an automatic component of the starship hull and imposes no additional tonnage for the hull.

Each Layer after the first is approximately 4% of the total tonnage of the Hull. Armor tonnage for a ship does not increase total ship tonnage; it decreases available ship tonnage within the hull.

For example, a 100-ton Hull with 6 Layers of Armor allocates  $((6-1)*4)= 20$  tons for Armor.

**Tech Level.** Armor Value AV= for a Layer is ship Tech Level (potentially modifiable). Tech Level Stage Effects may be necessary to allow Armor at less than its Base TL.

**Anti- Layers** provide additional protection against spe-

cific threats. Anti-Layers are specialized versions of the ship's Armor. A TL-12 ship with Structure= Plate has Armor Layers built with Plate. It has a base AV= 12. One or more Layers can be designated Anti-Blast, which confers a multiplier x10 (AV= 100) against Blast, Bullet or Frag. Its AV against other attacks remains the same.

#### **AV Armor Value**

The base AV Armor Value for a layer equals its Tech Level. It may be modified by Stage Effects.

Armor Value for a layer stops hits in combat and from environments. Any event imposing hits is stopped if the imposed hits are equal to or less than the layer AV. If attacking hits exceed the layer AV, that layer is destroyed for that location on the Hit Location Table. Hits in excess of the layer AV are imposed on the next inner layer of armor (and if those hits exceed the AV of that layer, it is also penetrated).

**Layers Are Homogeneous.** The layers of Armor for a ship are all of the same type. Multiple Layers of identical Armor are summed to one AV equal to the total of the Layers.

A TL-12 ship with 4 Organic-12 Layers has AV=48.

**Non-Destructive Effects.** Some effects (EMP, Rad) are non-destructive; the effect penetrates without destroying.

---

## **10-11-12 STARSHIP DRIVES (IN GENERAL)**

Hulls are equipped with, as the mission requires, an in-system drive, an interstellar drive, and a power plant.

**Alternative Drives.** A ship may be equipped with more than one of any specific type of drive. For example, both a Power Plant and an Anti-Matter Plant.

**Redundant Drives.** A ship may be equipped with more than one of a specific drive. For example: Jump-Drive-A and a Jump Drive-B. Or, it may be equipped with a Jump Drive N2 (two yoked Jump Drive-N).

### **Understanding Drive Potential (Chart 12)**

The performance of a starship drives and power plants is based on an interaction between the size of the drive and the size of the hull in which it is installed. This relation is governed by the Drive Potential Table.

**Drive Potential** states the maximum performance of drives and the maximum output for power plants, and the two must be matched.

For example, a Jump Drive-A installed in a 100-ton Hull-A has Potential =2. The Jump Drive can produce a maximum of Jump-2. The same Jump Drive-A installed in a 200-ton Hull-B can produce a maximum of Jump-1. Finally, Jump-Drive-A installed in a 300-ton Hull-C produces a "no" result: the J-Drive won't function in the hull.

For example, a Maneuver Drive-F installed in a 100-ton Hull-A has potential-9 (a smaller M-Drive-E would be more efficient).

For example, both Jump Drives and Maneuver Drives require a supporting Power Plant with at least equal potential. Equal potential can be achieved by selecting a Power Plant with the higher drive code, or it can be determined by consulting the Drive Potential Table. A Jump Drive-A in Hull-A requires a Power Plant-A (or a Power Plant with Potential= 2, which is the same thing).

---

### **Anti-Layers**

Any Layer can be designated as an Anti-Layer with added protection against a specific form of attack. Its abilities against other attacks is unchanged. Designating a Layer as an Anti-Layer imposes no additional cost or tonnage.

### **Special Armor Variations**

Several armor variations are possible.

**Self Healing Armor.** Polymer is Self-Healing; it repairs damage equal to its TL every turn. Organic is Slow Self-Healing; it regenerates damage equal to its TL every day.

**Regenerating Armor.** Organic is Regenerating. A layer of destroyed Regenerating Armor is restored after one week.

### **Armor Coatings**

Armor, in addition to layers, can be coated for additional protection. If a destructive attack is ultimately successful on a hit location which has a coating, the coating effects are eliminated for the remainder of the battle (and until repaired).

**Reflec.** A mirror-bright reflective coating provides protection against Burn.

**Ablat.** A coating of heat absorbent material absorbs heat and burns off, thus protecting the Layer below. Ablat must be replaced after it burns off. Ablat burns in increments equal to its tech level. Thus, TL-10 Ablat has ten increments.

**Slick.** A coating of gravitic circuitry provides protection against the influence of tractors and pressors.

## **10 STARSHIP DRIVES**

Starships require drives to move and power systems to provide them energy.

Drives are divided into three categories:

**Interplanetary Drives or InSystem Drives** are capable of moving a ship between worlds in a star system. They include Maneuver Drives and Gravitic Drives. Lifters (installed as a Hull Fitting) are a very low power Interplanetary Drive.

**Interstellar Drives** capable of moving a ship between star systems. The Jump Drive is the principal system because it can propel a ship in multiples of parsecs in weeks. The NAFAL Not As Fast As Light Drive is capable of significant fractions of light speed, but still requires years to move between star systems.

**Power Systems** capable of providing the energy that the drives need. The Power Plant is a fusion power system using Hydrogen as fuel. The High Tech Anti-Matter Plant is vastly more efficient. The exotic Collector requires greater time to recharge but is independent of specific fuels.

### **POWER SYSTEMS**

Ships require a power source to support its drives and routine operations. Power Systems process fuel (or do other things) to provide the energy required.

**Terminology.** The general term for the power supply for a starship is Power Plant or P-Plant. If not otherwise noted, the Power Plant is a standard starship fusion Power Plant.

For some ships, the Power Plant is an alternative system (an Anti-Matter Power Plant or a Collector). Where necessary, the specific type should be stated.

### Centralized Or Dispersed

The power system organization for a ship can take one of two distinct forms:

**Centralized Power.** The ship's primary power source supplies all power to the operating mechanisms of the ship. Individual mechanisms or areas have short-term emergency power backups (= ship TL in minutes).

Normal operations are powered from the Power Plant. If the Power Plant is damaged, disabled, or destroyed, individual mechanisms switch to emergency power and can continue in operation for a short period of time.

**Decentralized Power.** The ship's primary power source supports its interplanetary and interstellar drives. Individual mechanisms (sensors, most weapons, control consoles) are self-powered and independent of the central power source.

- **Power Cells.** Although individual mechanisms are routinely connected to the Power Plant, they are supported by Power Cells (compact high capacity power storage cells) as an independent power source. Individual components can operate for hours (= ship TL in hours) after disconnection from the central power supply.

- **Fusion Plus.** The individual ship mechanisms are self-powered by Fusion Plus (compact cold fusion modules) as their independent power source. Individual components can continue to operate indefinitely (= ship TL in months) without a central power supply.

Fusion Plus may be available at TL 10 (but not all ship builders have access to Fusion Plus technology).

### TYPES OF POWER PLANTS

**P A C U**

Power Anti-Matter Collector Fission

### P STARSHIP FUSION POWER PLANTS

The Power Plant is an adaptation of standard planetary-based fusion power plants: it produces energy from hydrogen fusion.

The system uses hydrogen, available at many starports, as its fuel. Some ships can skim hydrogen or hydrogen compounds from the atmospheres of Gas Giants, or can distill hydrogen from water or ice.

### A ANTI-MATTER PLANTS

The Anti-Matter is a sophisticated power supply which produces energy from matter-anti-matter reactions.

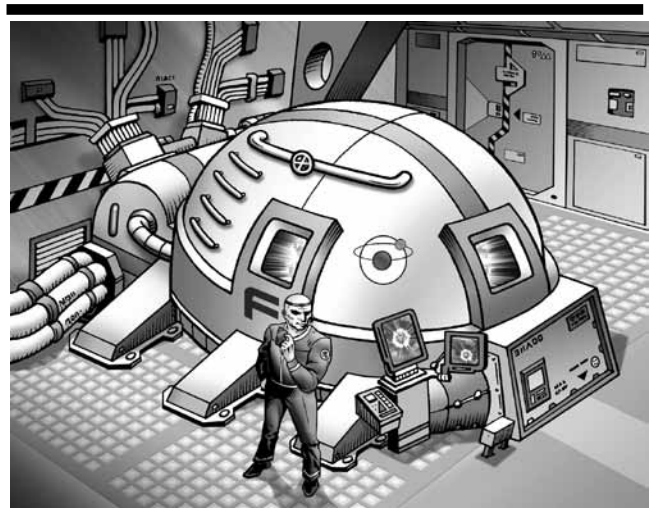
The system uses anti-matter in magnetically or gravitationally isolated Anti-Matter slugs.

### C COLLECTORS

The Collector is a specialized alternative Power Source. It slowly absorbs exotic particle energy and releases it in a burst which can fuel interstellar drives. A Collector is half internal mechanism and half external extendable canopy.

**Routine Energy Use.** A Collector is unsuitable as a routine energy supply (the mechanisms of the ship must be powered by other sources); it only powers the Jump Drive.

**Powering Jump Drive.** One full charge provides the power requirement for a Jump Drive of equal Drive Potential.



**FISSION POWER PLANT**

**Charging.** A Collector absorbs its charge while its canopy is deployed.

### U Fission Power Plant

The Fission Power Plant is an variant of standard planetary-based fission power plants: it produces energy from radioactives.

The system uses fuel Rods fashioned from radioactives (typically Uranium or Thorium) and available at better starports. Rods can also be custom-fashioned for a ship.

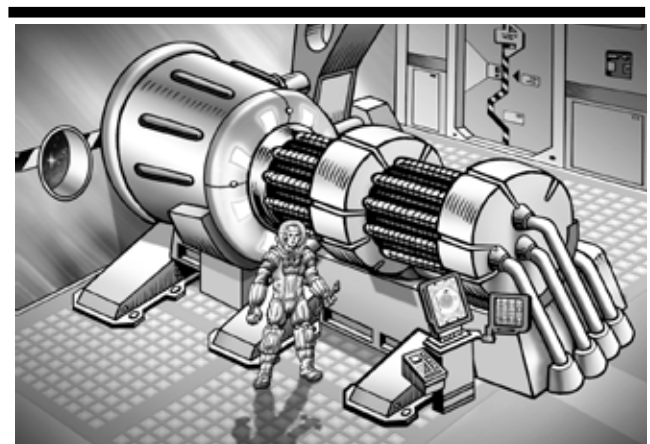
A Fission Plant cannot supply power in bursts intense enough to support Jump or Hop drive (although it can support Skip Drive).

### IN-SYSTEM DRIVES

An in-system drive allows a ship to maneuver between worlds (or, if possible, between world surface and orbit).

### TYPES OF MANEUVER DRIVES

<b>M</b>	<b>G</b>	<b>Z</b>
Maneuver	Gravitic	Lifters
1000D	10D	1D



**MANEUVER DRIVE**

## LESS COMMON STARSHIP TECHNOLOGY

### InterPlanetary Drives

Orion  
Reactionless Thrusters  
Rockets  
HEPlAR  
(discussed in How Maneuver Works)

### Interstellar Drives (in Jump)

Higher Order Jump Drives- Hop Skip and Beyond  
(Discussed in How Jump Works)

Reality Drive  
Albuquerque Drive  
Inertialless Drive  
(as yet only hinted at)

## M MANEUVER DRIVE

The Maneuver Drive M-Drive is a powerful drive system that interacts with gravity fields to produce thrust.

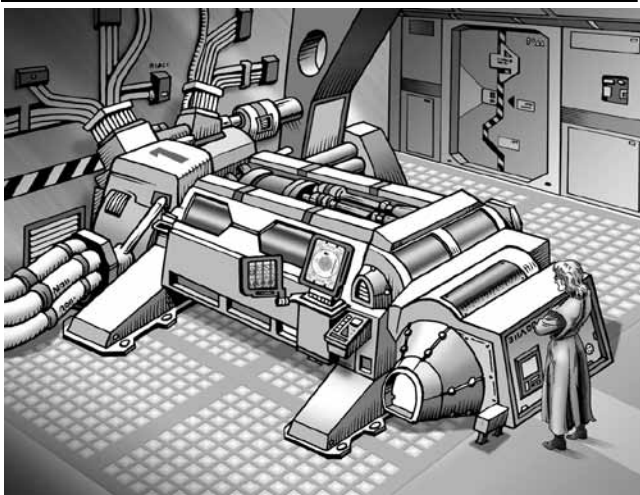
The M-Drive is installed as a drive. It requires a Power Plant with potential equal to or greater than the M-Drive. For example, a ship with Maneuver-5 requires a Power Plant with Potential-5, a Fission Plant with Potential-5, or an AM Plant with Potential-5. It cannot use a Collector.

A Maneuver drive requires fuel tankage to support its mission. The Maneuver Drive operates efficiently within 1000 D of a gravity source. Beyond that limit, its efficiency drops to about 1%.

**Performance.** M-Drive performance is evaluated in G (Drive Potential = Gs).

## G GRAVITIC DRIVE

The Gravitic Drive G-Drive is a self-contained, self-powered system that interacts with gravity fields to produce thrust. The G-Drive is installed as a drive. It is self-powered and does not require a Power Plant. Its minimal fuel needs



JUMP DRIVE

are refilled during the ship's annual maintenance.

The Gravitic Drive operates within 10 D of a gravity source. Beyond that limit, it operates at about 1% efficiency.

**Performance.** G-Drive performance is evaluated in G (Drive Potential = Gs).

## Z LIFTERS

Lifters are anti-gravity modules which effectively negate the force of gravity. Lifters are a hull component; they draw minimal levels of energy from a power source. Lifters operate within 1D of a gravity source; beyond that limit they operate at about 1% efficiency.

**Performance.** Lifter performance is minimal and related to the gravity source.

A Lifter effectively negates gravity and is able transform some of its lift into sidewise motion.

Lifters are a backup motion provider primarily used to adjust location on a world surface. Lifters can raise a ship off the ground before engaging maneuver or gravitic drive.

## INTERSTELLAR DRIVES

An interstellar drive allows travel between star systems.

### TYPES OF INTERSTELLAR DRIVES

<b>J</b>	<b>H</b>	<b>S</b>	<b>N</b>
Jump	Hop	Skip	NAFAL

## J JUMP DRIVE

The Jump Drive is the classic interstellar drive mechanism and the primary such drive in much of Charted Space.

The J-Drive is installed as a drive. It requires a Power Plant with potential equal to or greater than the J-Drive. The Jump drive consumes fuel equal to 10% of the hull volume of a ship per parsec of jump. For example, a 100-ton hull with a Jump Drive-A is capable of jump-2. To accomplish Jump-2, it requires 20 tons of fuel (= 10% of hull volume times jump-2).

The J-Drive interacts with gravity sources: a ship in jump is automatically precipitated out of jumpspace when its course brings it within about 100D of a gravity source. A ship which attempts to enter jump while within 100D of a gravity source may suffer a Misjump.

**Performance.** J-Drive performance is evaluated in Jumps measured in parsecs (Drive Potential = J).

## H HOP DRIVE

The Hop Drive is an order-of-magnitude enhancement of the Jump Drive: its base TL of 17 means that it is rarely encountered in Charted Space. Hop Drive performance is measured in tens of parsecs.

## S SKIP DRIVE

The Skip Drive is a second order-of-magnitude enhancement of the Jump Drive: its base TL of 20 means that it is very rarely encountered in Charted Space. Skip Drive performance is measured in hundreds of parsecs.

## N NAFAL NOT AS FAST AS LIGHT DRIVE

The N-Drive is a powerful version of the maneuver drive

that interacts with gravity fields to produce thrust. Performance is evaluated in G (Drive Potential = G/10).

## DRIVE EFFICIENCY

The various drives and power systems are presented, for convenience, as the Standard systems. Technology variations may alter their efficiency and fuel requirements.

**Usable Drive Potential.** The Drive Potential Table provides performance for Standard (Base TL) drives and power systems. TL Stages alter Design Drive Potential to Usable Drive Potential.

## Efficiency

The Efficiency column of the Drive Tech Level Efficiency table 10X applies to Drive Potential. Because Potential is an integer, round any efficiency results down.

Note that Drive Efficiency is the only opportunity to accomplish Drive Potential greater than 9.

## Fuel Requirements

The Fuel column of the Drive Tech Level Efficiency table 10X applies to Fuel Requirements. Multiply the Fuel value directly versus the calculated fuel requirements.

Fuel requirements are based on Design Drive Potential regardless of the Usable Drive Potential.

For example, a Standard Drive-K in a 1000-ton Hull-K requires shows P1 Design Drive Potential =2. Jump Drive-K could achieve Jump-2; Maneuver Drive-K can achieve 2G. Power Plant-K outputs Potential-2.

An Experimental Jump Drive-K shows 50% efficiency= Usable Drive Potential=1. It also shows Fuel Requirement 2.0 based on Design Drive Potential (= 2 x 2.0) = 4. The Drive requires 4 units of fuel for every 2 units of fuel the Standard model requires, and the Usable Drive Potential is halved.

# 13 FUEL REQUIREMENTS

The various drives and power systems require fuel.

**Fuel Storage.** Fuel requirements can be calculated based on the installed drives and their requirements.

The design process includes assigning an appropriate amount of fuel to support operations and movement.

**Gravitic Drives** are internally fueled by highly efficient Fusion Plus modules. They are refueled annually using several liters of water. Other drives have specific fuel requirements based on the combination of Power Plant and Drive.

# 14-15 SENSORS

Sensors are the data acquisition systems for a ship. Sensor use is governed by the Sensor system rules.

## Building A Sensor

A sensor installation consists of three components:  
a Sensor,  
a Mount, and  
a Control Panel.

The Sensor (from A Sensors table) determines the basic function of the installation. The Mount determines the tonnage required (larger mounts increase performance). The

Control Panel processes instructions and outputs data to the Console and Sensop.

**Select A Sensor.** Sensor table A provides a list of Sensors. Those with an S= value are Space Sensors and are typically used in space using Space Ranges; those with an R= value are world sensors typically used using World Ranges.

Sensor Table A also shows the minimum required Mount for the Sensor, its cost, and its base TL.

**Select A Mount.** Sensor Mounts table C shows the types of mounts available for sensors.

Most Sensor Mounts (with the exception of Surface and Antenna) occupy hardpoints, which may displace the ability to install weapons.

A Deployable Mount (only Turret or Barbette) can be detached from the ship (deployed to a position R= 5, 6, or 7 from the ship); it operates normally, but combat damage to a deployed Sensor Mount affects only that installation.

An Extendable Mount (only Turret or Barbette) is attached to a telescoping arm; when extended, it occupies any otherwise unoccupied on the Hit Location Chart.

A Surface Mount does not require a hardpoint and has no cost in tons or MCr.

An Antenna Mount does not require a hardpoint.

**Assign A Console.** Each Sensor and Mount combination has a Control Panel which must be associated with a Console (in the Controls section). Sensor Consoles which are co-located with the main ship controls (on the Bridge) are accorded some advantages.

**Modify Range Effects.** Sensor installations can be modified to increase their Range (at an increased tonnage and cost) or decrease their Range (at a savings in tonnage and cost). Range Effects Tons and Cost apply to the Mount.

For example, an Antenna Radar-9 has range S=7. It costs MCr 1.5 for the sensor and mount and requires 1 ton. A variety of alternate configurations can also be created (in order to achieve greater S= Space Range, a greater Mod, or some other benefit.

**Modify Stage Effects.** Tech Level Stage Effects can alter the capabilities of the installation. Cost and Mod apply to the Mount.

# 16-17 WEAPONS

Weapons and Defenses enable a ship to defend itself, attack others, and project power in support of its missions.

## Building A Weapon

A weapon installation consists of three components:

- a Weapon,
- a Mount, and
- a Control Panel.

The Weapon (from the Weapons table A) determines basic function of the installation; the Mount determines tonnage required (larger mounts increase performance); the Control Panel allows weapon control by the operator.

**Select A Weapon.** The Weapons table A provides a list of weapons. Those with an S= value are longer range weapons typically used in space using Space Ranges; those with an R= value are closer range weapons using World Ranges.

The Weapons Table also shows the minimum required Mount for the Weapon, its cost, and its base TL.

**Select A Mount.** The Space Weapon Mounts table shows the types of mounts available. Mounts occupy Hardpoints (or Firmpoints).

A Deployable Mount (only Turret or Barbette) can be detached from the ship (deployed to a position R=5, 6, or 7 from the ship); it operates normally, but damage to a deployed Mount affects only that installation.

An Extendable Mount (only Turret or Barbette) is attached to a telescoping arm; when extended, it occupies any otherwise unoccupied on the Hit Location Chart.

**Assign A Control Panel.** Each Weapon and Mount combination has a Control Panel which is associated with a Console (in the Controls section of ship design). Weapons Consoles may be located anywhere within the ship.

**Modify Range Effects.** Weapons installations can be modified to increase their Range (at an increased tonnage and cost) or decrease their Range (at a savings in tonnage and cost).

For example, a Single Turret Beam Laser-10 has range R=7 It costs MCr 0.7 for the weapon and mount and requires 1 ton. It inflicts 1 hit when attacking. A variety of alternate configurations can also be created.

**Modify Stage Effects.** Tech Level Stage Effects can alter the capabilities of the installation. Cost and Mod apply to the Mount.

## 18-19 DEFENSES

Some mechanisms can be used as defenses against attacks. In addition, many space weapons may be used defensively.

### Building A Defense

A defense installation consists of three components:

- a Defense,
- a Mount, and
- a Control Panel.

The Defense (from Defenses table A1) determines the basic function of the installation. The Mount determines the tonnage required. The Control Panel allows the defense to be controlled by the operator.

**Select A Defense.** The Defenses table provides a list of defenses.

Some Defenses operate in Absolute Mode against specific attacks (for example, a Meson Screen operates in Absolute Mode versus any attack by a G weapon Meson Gun).

Other Defenses are actually Weapons which were pre-

### Yet Other Specialist Possibilities

Accountant. Advisor. Advocate. Analyst. Bookkeeper. Broker. Cultural Officer. Diagnostician. Economist. Epidemiologist. Evaluator. Historian. Information Technologist. Inspector. Intelligence Officer. Liaison Specialist. Linguist. Meteorologist. Ombudsperson. Planetologist. Planner. Polyhistor. Polymath. Priest. Psionic Officer. Referee. Safety Officer. Science Officer. Security Officer. Strategist. Supply Officer. Surgeon. Systems Analyst. Tactician. Trader. Trouble Shooter. Union Representative. Volcanologist.

viously installed. Additional Weapons can be installed here to meet needs as Defenses.

**Select A Mount.** The Defense Mounts table shows the types of mounts available. Defense Mounts occupy hardpoints with the exception of the Bolt-In mount.

A Bolt-In mount can be installed anywhere within a ship. Absolute Mode Defense can install in a Bolt-In Mount.

**Assign A Control Panel.** Each Defense and Mount combination has a Control Panel which is associated with a Console (in the Controls section of ship design). Defense Consoles may be located anywhere within the ship.

### Using Space Weapons As Defenses

The Weapons on the Defenses table may be used defensively and react to incoming attacks.

AM Mode can respond to missile attacks.

AB Mode can respond to beam attacks.

## 20-21 OPERATIONS

Accomplishing the mission function for a ship may require a variety of crew, vehicles, and installations.

### Ship's Troops

In addition to crew (assigned later in this process), a ship may include Ship's Troops for security.

**Assigned In Squads.** Troops maintain military organization and discipline. They are organized in squads of five soldiers who live together in a squad bay (bunks and lockers) rather than staterooms.

Four squads is a platoon and requires an officer and sergeant for leadership.

Three platoons is a company and requires two officers, a sergeant, and a runner or driver for leadership.

Squad= R3 R2 R2 R1 R1  
Platoon= O1 R4 plus four squads  
Company= O3 O2 R4 R2 plus three platoons

### Specialists

Ship operations may call for a variety of specialists.

**Medical Specialists.** Ships require some provision for healthcare and health maintenance. Most ships require crew Medical skill levels equal or exceed total crew, specialists, and passengers.

**Counselling Support.** Most ships include a console (it does not require a crew member) capable of providing routine counseling for crew.

### Other Specialists

Non-medical specialists may be assigned to a ship consistent with its mission and the culture of its crew and owner.

While specialists may (at times) seem counter-productive or superfluous, they are assigned as indicators of the standards and goals of the operating organization. A Political Officer may be assigned to safeguard the interests of an oppressive government, or to ensure that all members of the crew are afforded opportunities to meaningfully participate in decision-making. A Negotiator may be assigned because the ship mission is focused on acquiring trade advantages.

**Political Officer.** An officer tasked to reinforce political values among the crew. In addition to teaching and monitoring functions, a Political Officer has the power to suspend individual crew members if they do not conform to the required political standards.

**Negotiator.** An individual tasked to interact with organizations. A Negotiator is typically involved in economic or trade activity, but he may instead have duties in other fields: military, diplomatic, cultural, or political.

**Linguist.** An individual tasked to understand languages.

**Translator.** An individual assigned to translate concepts and statements as a ship visits new worlds.

### Life Support

A ship requires Life Support to provide and control environment for crew and passengers.

**Short-Term Life Support** is automatic and sufficient for four days of operations. It has no additional cost or tonnage.

**Standard Life Support** is sufficient for 30 days of operations. Each installation is 1 ton, costs MCr1, and supports 10 crew or passengers.

Long-Term, Luxury, and Adaptable Life Support are also available.

Each Life Support installation requires a control panel and association with a console.

### Vehicles Or Small Craft VOSC

It is often impractical for a ship to move from location to location on a world or in orbit: it carries supporting vehicles and small craft to transport goods, crew, and other materials to and from the ship.

**VOSC Selection.** Vehicles or Small Craft supporting the ship mission are selected as necessary.

**VOSC Storage.** For each VOSC assigned to a ship, provision must be made to carry and secure it during flight.

**VOSC Connectors.** In addition, a ship may include provision for other craft to connect to deliver or offload goods.

## 22 CONTROLS

Operation of a ship would be impossible without an extensive network of controls.

**Mechanisms.** A mechanism is any of the drives, sensors, weapons, defenses, or other installations which equip a ship. If an installation is more than 35 tons, each 35 tons is treated as a separate mechanism.

**Functions.** In addition to mechanisms, a ship has a variety of functions: officer control responsibilities such as Pilot (control of ship movement), Astrogation (course determination; control of Jump), or Steward (bookkeeping).

### Control Panels

Every mechanism on a ship has a Control Panel: a rudimentary input output device attached directly to the mechanism. The Control Panel directly controls the device.

Because of the potential for interference, Control Panels are usually in a locked, protective enclosure. Control Panels are notoriously difficult to work with: similar to inputting binary code with a series of buttons or switches.

**Assigning Control Panels.** Control Panels are assigned on the FillForm Con column.

### Consoles

The user interface between mechanisms (and their control panels) and the crew is the Console: a data output device (a visual and audio display screen adapted to the sensory needs of the user) coupled with a data input device (touch and sound responsive).

**Types of Consoles.** A Console is a powerful computer capable of managing many routine activities without supervision. There are three types of Consoles:

A **General Console** or a **Workstation** allows the user to interact with data for administrative purposes. The Computer provides access to common office activities: language use, math, communications, information, and entertainment.

Public installations are called Data Stations.

An **Operating Console** allows the user to monitor the activities of a mechanism and to make adjustments to its operation, although not in real time. Operating Consoles are best adapted to mechanisms which operate continuously, and whose operation must be adjusted for efficiency or for changed circumstances.

An Operating Console is attached to the power plant or jump drive on a ship, or sensors.

A **Control Console** or **Command Console** allows specialized input to the Computer with special interfaces: a joystick, steering wheel, or tiller to convert fine hand or manipulator motions to control signals. It may have foot or ped controls to allow additional simultaneous additional input.

A Control Console is attached to a weapons turret, the pilot function on a ship, or the driver function for a vehicle.

**Assigning Consoles.** Each Console is assigned primary responsibility for one or more Control Panels.

Assign tonnage for the total consoles installed. Tonnage affects the ergonomics of the ship in later evaluations.

### Staffing Levels

The naval architect determines the number of Watches or Shifts which will be staffed. A merchant ship on a safe route probably uses minimalist staffing: one crew per three consoles. A naval cruiser on war patrol probably uses full crew staffing plus crew for weapons and defenses.

### Ship's Computer

Assign a Ship's Computer as the overall central server and data base for operations.

## 23 PAYLOAD

After requirements have been met; the remaining tonnage is payload space. Depending on the ship mission, the designer specifies passenger, cargo, or other payload space.

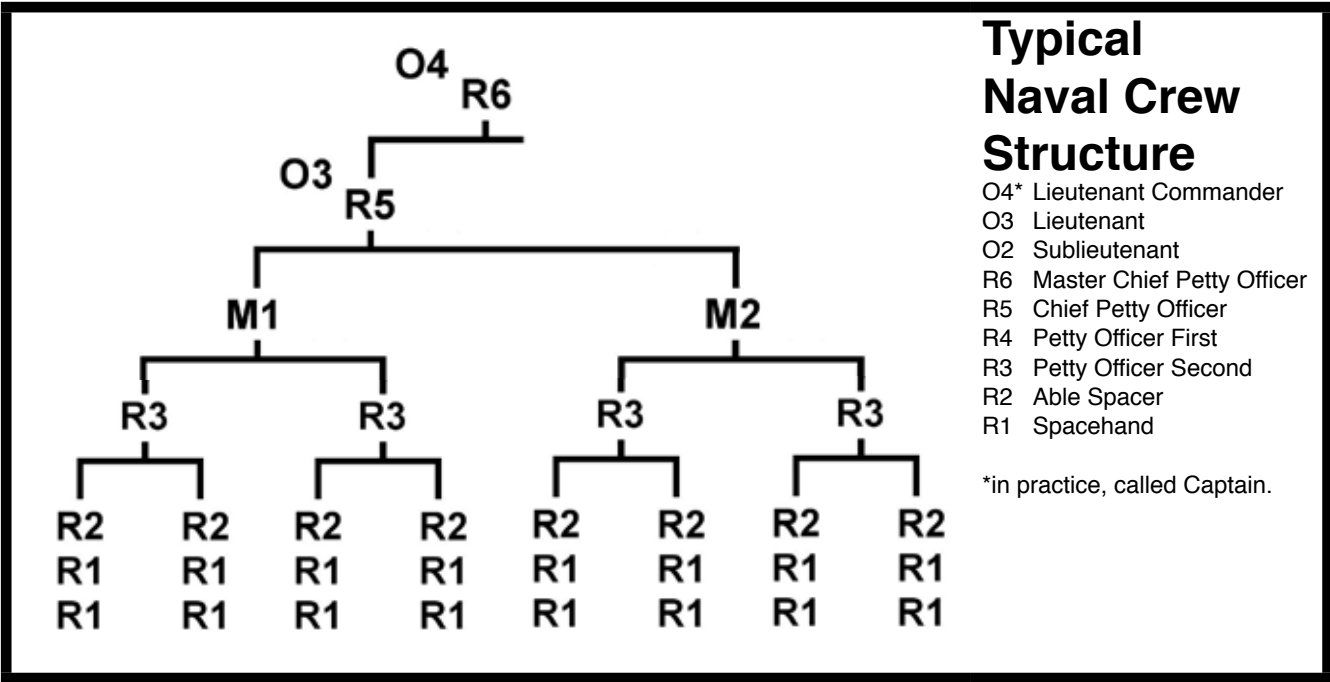
## 24-25 CREW

A ship requires a crew to control its activities and operate its mechanisms. The naval architect reviews the installed controls, mechanisms, and ship mission and determines the number of crew required.

### Crew Hierarchy

Crews are structured with a hierarchy based on rank. Each console is staffed by a relatively low rank; several are





supervised by the next higher rank, and in turn supervised by yet higher ranks.

**Naval Rank Hierarchy.** Ship crew is rigidly assigned by rank; consoles are staffed by the lowest ranks, supervised by and supervised by higher ranks. In emergencies or crises, higher ranks may be called upon to staff consoles.

**Merchant Rank Hierarchy.** Ideally, consoles are staffed with the highest level of the most appropriate skill. In practice, the drive for profit produces low staffing levels, and many consoles are set on automatic; there is an expectation that every crew person will learn every activity.

**Scout Rank Hierarchy.** The Scout Service has no rank structure for smaller ships and crew become Jacks-of-All-Trades capable of staffing any console at any time.

**Crew Structure Can Be Adapted For Ship Size**

On small ships, some crewmembers occupy two positions: pilot/astrogator, engineer/gunner, sensor tech/steward. Many positions are omitted or consolidated. With automation, a ship crew can be as small as one person.

On large ships, important (or constantly operating) mechanisms have more than one crew member. The ship has enough crew to fully staff in shifts. Crew are constantly training to improve skills or gain new ones (which is the justification for annual experience gains in skills).

**26 EVALUATING THE SHIP**

A completed starship design must be evaluated for its performance and efficiency.

**Mission Achievement.** Paramount in the evaluation process is mission achievement. This evaluation may be against a prior stated goal (long range fighter), a specification (at least jump-4), or an economic standard (can the ship be profitable?). In addition, a ship is evaluated on three standards which affect its performance.

**Passage Demand.** Potential passengers evaluate a

ship based on quarters and shared recreation space.

**Crew Comfort.** Crew Comfort increases (or decreases) the chance of individual crew sanity crises.

**Control Ergonomics.** Control Ergonomics increases (decreases) mishap chance during operations.

**The Bridge**

The availability of consoles as control stations throughout the ship lessens, but does not eliminate, the need for a central control Bridge, especially in emergencies.

**Bridge Defined.** A Bridge is a location on the ship in which the Ship's Computer and all Pilot, Astrogation, and Sensor consoles are installed. Redundant or backup consoles may be ignored.

**The Benefits Of A Bridge.** If a ship has a Bridge, then its Control Ergonomics Mod is increased +2.

**27 THE QUICK SHIP PROFILE**

The QSP provides a basic identification of the capabilities of a ship. It can be expanded with two extensions:

**The Vehicle Extension.** The Vehicle Extension Vx is a variable length string recounting the vehicles and small craft carried by the ship.

**The Crew Extension.** The Crew Extension Cx is a variable length string detailing the crew members for the ship.

**STARSHIP ANNUAL MAINTENANCE**

Annually, a starship should be given a complete overhaul to keep it in good working order. Such maintenance costs 0.1% (1/1000th) of the cash price of the ship, and requires two weeks at a class A or B starport. The owner must make provision for payment of the maintenance cost when it comes due. Crew members generally take their vacations at this time, but must still be paid. The ship owners must make provision for the expected loss of revenue while the ship is out of service.



Use this checklist to guide the design of starships.

Although this checklist provides a sequence, steps may be completed in any order. The major number divisions in this checklist correspond to the governing Ship Design Charts.

### The Ship FillForm (Charts 22 - 23)

Create a blank FillForm and use it to record design decisions. Enter the appropriate information (Code, Crew, CP Control Panels, Tons, Sq Squares, and Cost). If the entry is a TL other than the building TL, enter TL= N in Comments.

- A. Select a **name** for the ship.
- B. Identify planned tonnage.
- C. Identify the shipyard and TL.

## 01 Checklist.

This checklist.

## 02 Select Mission for the ship.

- A. State the Service.
- B. State the intended Activity.
- C. State the Type of Activity.
- D. Indicate a Qualifier.
- E. Mission including Mission Code.
- F. Mission Modifiers.
- Q. Note (any) Small Craft Mission
- V. Note (any) Vehicle Mission.

## 03 Confirm Mission Definition.

## 04 Begin Hull Creation.

- A. Select Hull Size.
- B. Subhulls and Pods (as required)

## 05 Begin Hull Creation.

- C. Select Hull Configuration.  
Friction, Agility. Stability.

## 06 Continue Hull Creation.

- D. Hull Structure. Base AV.
- E. Add Fittings.

## 07 Continue Hull Creation.

- F. Select Jump Field.
- G. Safe Jump Distance.
- H. Interference.

## 08-09 Armor

- A. Assign Armor Layers.
- B. Identify Armor Layer Type.
- C. Assign Anti-Layers.
- D. Assign (as required) Coating.

## 10-11 Starship Drives.

Note constructing Tech Level.

Select drives as required.

- InSystem Interplanetary Drives:  
M G R H
- Interstellar Drives  
J H S N
- Power Systems  
P U A C
- X. Note Drive Efficiency.

## 12 Drive Potential.

Calculate the Drive Potential for each installed Drive.

## 13 Fuel Requirements.

Note Power System Fuel Required:

P U A C

Note Interstellar Drive Fuel Required

J H S N

Note InSystem Fuel Required

M G

Note Thrust Fuel Required

R H

F. Fittings

## 14-15 Sensors.

- A. Select one or more Sensors.
- B. Apply TL Stage Effects.
- C. Select a Mount.
- D. Mod Space Sensors for S=.
- E. Mod World Sensors for R=.
- F. Install a Sensor Control Panel.

## 16-17 Weapons.

- A. Select one or more Weapons.
- B. Apply TL Stage Effects.
- C. Select a Weapon Mount.
- D. Mod Space Weapons for S=.
- E. Mod World Weapons for R=.
- F. Install a Weapon Control Panel.

## 18-19 Defenses.

- A. Select one or more Defenses.
- B. Apply TL Stage Effects.
- C. Select a Defense Mount.
- DE. Mod Defense Range Effects
- F. Install a Defense Control Panel.

## 20-21 Operations

- A. Ship's Troops and quarters.
- B. Specialists in Crew Structure
- C. Vehicles for the Ship.
- D. Small Craft for the Ship.
- E. Allocate Life Support.
- F. Assign Fuel Storage.
- G. Install Hull Connectors.

## 22 Controls

- A. Note available Control Panels.
- B. Install Consoles.
- C. Determine Staffing Level.
- D. Install Ship's Computer.

## 23 Payload.

- A. Available Payload: Tonnage.
- B. Assign Tonnage: Passengers.
  1. High and Middle.
  2. Low and Steerage.
- C. Crew Accommodations
- D. Life Support
- E. Access
- F. Cargo Hold capacity.

## 24-25 Crew Structure.

- A. Determine Total Crew Members.
- B. Crew Accommodation Tonnage.

## 26 Evaluate Ship Conditions.

- A. Crew and passenger Tonnage.
- B. Passenger Demand.
- C. Crew Comfort.
- D. Control Ergonomics.

## 27 Create the Ship QSP.

Ship FillForm Part 1-2-3  
Ship Combat Card



## Starship Construction

# 02 Starship Missions

Starships are created to accomplish missions. The descriptive terms for missions have specific meanings, but they are defined to allow broad interpretation and substantial overlap.

Select a mission for the ship (or assign it after the ship is designed)

State the mission as a one-, two- or (rarely) three- letter code.

Multiple identical letter codes (AA, AAA) may use a digit (A2, A3)

Apply Mission Modifiers as needed. State Mission first; while one or two modifiers follow.

### SELECT AN ACS SHIP MISSION

A Service	B Activity	C Type	D Qualifier	E Mission			
Naval	Combat	Offensive	Principal	Cruiser	<b>C</b>		
			Major	Frigate	<b>G</b>		
			Minor	Corvette	<b>E</b>		
		Siege	Attack	Ortillery	<b>H</b>		
			Invasion	Assault	<b>T</b>		
			Defender	Sentinel	<b>S</b>		
		Defensive	Minor	Escort	<b>E</b>		
			Major	Defender	<b>D</b>		
			Principal	Monitor	<b>B</b>		
		Independent	Anti-Shipping	Corsair	<b>P</b>		
			Anti-Commerce	Raider	<b>R</b>		
			Anti-Port	Marauder	<b>P</b>		
	Major		Transport	<b>T</b>			
			Barge	<b>W</b>			
			Resupply	Tender, Tug	<b>T</b>		
	Commerce	Merchant	Scheduled	Information	Corvette	<b>E</b>	
				Passenger	Liner	<b>M</b>	
				Cargo	Merchant	<b>R</b>	
UnScheduled			Freight	Freighter	<b>F</b>		
			Freight	Transport	<b>T</b>		
			Cargo	Trader	<b>A</b>		
Charter		Passenger	Packet	<b>U</b>			
		Recreation	Safari	<b>K</b>			
		Active	Expedition	<b>K</b>			
		Luxury	Yacht	<b>Y</b>			
		Gov NGO Private	Non-Combat	Information	Small Goods	Courier	<b>S</b>
					Data Files	Messenger	<b>S</b>
Goods and Files	Express				<b>X</b>		
First Look	Scout				<b>S</b>		
Re-Look	Survey				<b>N</b>		
Data Collection	Beagle				<b>B</b>		
Exploration	Medical Data			Med	<b>N</b>		
	Data Analysis			Lab	<b>L</b>		
	Resource Search			Prospector	<b>J</b>		
	Bureaucratic			Inspection	Picket	<b>P</b>	
				Enforcement	Patrol	<b>P</b>	
				Combat	Privateer	<b>P</b>	
Unclassified					<b>Z</b>		

The following terms apply consistently to ship missions.

**Freight.** Goods carried for a fee; Ownership remains with the shipper.

**Cargo.** Goods owned by the ship; carried in anticipation of sale at a profit.

**Passengers.** Individuals who travel on a ship in exchange for a fare.

**Crew.** Operating personnel on a ship.

**Staff.** Performs additional functions (ie, scientists on a Lab Ship).

### SELECT MISSION MODIFIERS

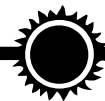
F Modifier	
Alternate, Improved, Armored, Attack.	<b>A</b>
Boat, Bulk, Battle, Big.	<b>B</b>
Close. Carrier, Communications.	<b>C</b>
Defense, Defending. Interceptor.	<b>D</b>
Escort. Essential.	<b>E</b>
Fast, Fat, Frontier, Far. Standoff, Free	<b>F</b>
Gunned, Upgunned, Gas.	<b>G</b>
Fuel, Tanker, Hydrogen.	<b>H</b>
Survey, Prospector, Interceptor.	<b>J</b>
Subsidized, Fast, Diplomatic.	<b>K</b>
Long Range, LR. Exploratory. Light.	<b>L</b>
Military. Militia. Motivator, Tug.	<b>M</b>
Naval, Nuclear, Fleet	<b>N</b>
Patrol, Plus, Passenger, Mercenary	<b>P</b>
Disguised, Decoy, Mothership.	<b>Q</b>
Recon. Rescue. Rider.	<b>R</b>
Slow, System. Special, Luxury, Small.	<b>S</b>
Tramp, Tender, Transport.	<b>T</b>
Unarmed, Hulk, De-activated.	<b>U</b>
Vehicle Carrier, Drone, Remote.	<b>V</b>
Unpowered.	<b>W</b>
Experimental. Special. Express.	<b>X</b>
Hull. Subhull. Pod. Rider. Modular.	<b>Y</b>
Unassigned.	<b>Z</b>

### Q SMALL CRAFT V VEHICLE

Lifepod	10	<b>A</b>	ACV
Ship's Boat	30	<b>B</b>	Boat, Sub
Cutter	50	<b>C</b>	Groundcar
Fighter	10	<b>F</b>	Winged Flyer
Gig	20	<b>G</b>	Military Flyer
Launch	20	<b>L</b>	Rotor Flyer
Pinnacle	40	<b>N</b>	Air/Raft
Pod	<100	<b>P</b>	Truck
Shuttle	95	<b>S</b>	ATV
Drone	varies	<b>D</b>	Tank. AFV.
			Trailer
			<b>2</b>

### SHIP MISSION Format EFF (examples)

CB	=Battle Cruiser
GA	=Attack Frigate
RGL	= Long Range Upgunned Raider
ECS	=Slow Close Escort
TN	=Naval Transport



### Fighting Ships

Fighting ships are ranked **Principal** or **Line** (the best available), **Major** (better than most) and **Minor** (merely acceptable).

A **Cruiser** is the principal type of offensive fighting ship (in both weapons and defenses). A **Frigate** (although less than a cruiser) is a major type. A **Corvette** is a minor type (a small craft in this mission is an Attack **Fighter**).

A **Monitor** is the principal type of defensive fighting ship (favoring armor over firepower). A **Defender** is a major defensive ship; an **Escort** is a minor type (a small craft in this mission is an Interceptor **Fighter**).

Ships for operations against worlds include **Ortillery** for firepower and bombardment, **Assault** to deliver troops and equipment, and **Sentinel** to counter attacks from the surface.

Independent naval forces include: **Corsair** to attack commercial shipping (specifically to steal its freight or cargo). **Raider** to attack and destroy commercial shipping. **Marauder** to attack ports and installations.

### Auxiliaries

Naval auxiliaries are not intended for combat. A **Transport** is a major multi-purpose ship carrying supplies and personnel (a small craft in this mission is a **Shuttle**). A **Barge** is an unpowered support hull (a small craft in this mission is a **Pod**). A **Tender** provides supplies and support to naval vessels.

A **Corvette** is often pressed into auxiliary service as a courier.

### Merchant Ships

Merchants are private business vessels. On scheduled routes: a **Liner** carries primarily passengers, a **Freighter** carries primarily freight, a **Merchant** carries primarily cargo.

For unscheduled routes: a **Packet** carries primarily passengers, a **Trader** carries primarily cargo, a **Transport** carries primarily freight.

An **Expedition** is chartered for travel to unexplored locations. A **Safari** is chartered to visit world surfaces for recreation and tourism.

A **Yacht** is a privately owned and operated pleasure ship.

### Couriers

A **Courier** carries small shipments of important goods. A **Messenger** carries communications or data files. An **Express** carries both goods and files (and the name implies extreme speed).

A **Corvette** is a naval courier.

### Explorers

A **Scout** is a small first-in ship compiling star system basic information. A **Survey** periodically visits known systems to gather or confirm data. A **Beagle** visits new systems to gather detailed scientific data.

A **Med** or **Med Ship** gathers data affecting to sophont health. A **Lab** or **Laboratory Ship** gathers scientific data with the ability to process it immediately.

A **Prospector** conducts planetological (or planetoidological) exploration, usually searching for exploitable resources.

### Bureaucratic

A **Picket** is a sentry charged with detection and inspection of ship traffic.

A **Patrol** enforces traffic and commerce regulations.

### Small Craft

Small Craft are less than 100 tons. Traditionally accepted small craft types (and suggested tonnages) are:

**Pod** (< 100 tons). Unpowered hull.

**Lifepod** (10 tons). Emergency escape and survival craft.

**Fighter** (10 tons). Armed (and possibly armored) combat craft.

**Launch** (20 tons). Small multi-purpose craft capable of landing on worlds.

**Gig** (20 tons). Utility craft for passenger and freight transfer between ships.

**Ship's Boat** (30 tons). Mid-sized utility craft assigned to a specific ship.

**Pinnace** (40 tons). Mid-sized utility craft capable of landing on worlds.

**Cutter** (50 tons). Mid-sized multi-purpose small craft.

**Shuttle** (90 tons). Large passenger and freight transporter capable of landing on worlds. Built to travel between two points (worlds; locations).

**Drone** (varies) Remotely controlled.

**Modifiers** are applied as needed.

**Alternate.** Different from normal.

**Armored. Up-Armored.** Armor is a substantial addition.

**Battle.** Includes added firepower.

**Boat.** No interstellar drives.

**Bulk.** Payload is solid (granular), liquid, or gas bulk freight.

**Carrier.** Equipped to transport ships, vehicles, or forces.

**Close.** Operates closely with other ships (typically the same Space Range).

**Defense. Defending.** Equipped for anti-intruder missions.

**Disguised.** Misleads adversaries.

**Escort.** For defense missions.

**Experimental.** Incorporates untried or untested technology.

**Far.** Greater than typical Jump.

**Fast.** Greater G Capability.

**Fat.** Higher hold capacity.

**Frontier.** For remote areas.

**Fuel. Tanker.** Fuel-related.

**Gunned.** More firepower.

**Hydrogen.** Fuel related.

**Improved.** Added performance.

**Light.** Smaller; less tonnage.

**Local. System.** Operates within a single system.

**Long Range. LR.** Sustained time or distance operations.

**Mercenary.** Military for hire.

**Military. Militia.** Supports Army.

**Minus.** Inferior capabilities.

**Modular.** Uses modules.

**Naval.** Supports Naval operations.

**Plus. Specialized.** Some capability has been enhanced.

**Passenger.** Carries people for hire.

**Patrol.** Operates within a defined region, but without scheduled routes.

**Recon.** Capable of military or naval intelligence gathering.

**Slow.** Lower G capability.

**Standoff.** Operates at Long Range.

**Subhull.** Component hull.

**Subsidized.** Operating costs are primarily paid by government.

**Tender.** Resupplies other ships.

**Tramp.** Flies unscheduled routes.

**Unarmed.** No weapons installed.



## Starship Construction

# 04 Hull Tons and Costs

Hull Size (in tons) has an cost determined by tonnage and configuration. It is possible to create a ship with more than one hull.

### CREATING A HULL

- A. Select a **Hull Size** to determine volume (and payload).
- B. Select **Component Hulls** (Pods, Barges, or Subhulls).

## A HULL COSTS

ID	Tons	-----Configuration Costs MCr-----								Total Squares	Total Cubes
		C	B	P	U	S	A	L			
A	100	2	3	1	5	8	+1	16	200	400	
B	200	4	6	2	8	14	+2	28	400	800	
C	300	6	9	3	11	20	+3	40	600	1200	
D	400	8	12	4	14	26	+4	52	800	1600	
E	500	10	15	5	17	32	+5	64	1000	2000	
F	600	12	18	6	20	38	+6	76	1200	2400	
G	700	14	21	7	23	44	+7	88	1400	2800	
H	800	16	24	8	26	50	+8	100	1600	3200	
J	900	18	27	9	29	56	+9	112	1800	3600	
K	1000	20	30	10	32	62	+10	124	2000	4000	
L	1100	22	33	11	35	68	+11	136	2200	4400	
M	1200	24	36	12	38	74	+12	148	2400	4800	
N	1300	26	39	13	41	80	+13	160	2600	5200	
P	1400	28	42	14	44	86	+14	172	2800	5600	
Q	1500	30	45	15	47	92	+15	184	3000	6000	
R	1600	32	48	16	50	98	+16	196	3200	6400	
S	1700	34	51	17	53	104	+17	208	3400	6800	
T	1800	36	54	18	56	110	+18	220	3600	7200	
U	1900	38	57	19	59	116	+19	232	3800	7600	
V	2000	40	60	20	62	122	+20	244	4000	8000	
W	2100	42	63	21	65	128	+21	256	4200	8400	
X	2200	44	66	22	68	134	+22	268	4400	8800	
Y	2300	46	69	23	71	140	+23	280	4600	9200	
Z	2400	48	72	24	74	146	+24	292	4800	9600	

ID= Hull Identifier (or Hull Code). + = Adds Airframe to Streamlined.  
Barges and Subhulls are also created using this table

## B POD COSTS

ID	Tons	-----Configuration Costs MCr-----								Total Squares	Total Cubes
		C	B	P	U	S	A	L			
A1	10	200	300	100	500	800	*	1600	20	40	
A2	20	400	600	200	800	1400	*	2800	40	80	
A3	30	600	900	300	1100	2000	*	4000	60	120	
A4	40	800	1200	400	1400	2600	*	5200	80	160	
A5	50	1100	1600	500	1700	3200	*	6400	100	200	
A6	60	1300	1900	600	2000	3800	*	7600	120	240	
A7	70	1500	2200	700	2300	4400	*	8800	140	280	
A8	80	1700	2500	800	2600	5000	*	10000	160	320	
A9	90	2000	2900	900	2900	5600	*	11200	180	360	

ID= Hull Identifier (or Hull Code).

\* If Parent Hull is Airframe, use Streamlined on this chart.

**Configuration.** If a Pod or Barge has a configuration different from the parent hull, the least beneficial set of capabilities is used.

**Jump Fields.** If the parent hull has Jump Grid, then the Hull Pod must have Jump Grid.

## STARSHIP TONS

Hulls are built in 100 ton increments ranging from 100 to 2400 tons.

Hull sizes are expressed in displacement or volume Tons (= 13.5 cubic meters).

**Ultimate Hull Tonnage May Vary.** Undertonnage improves performance. Overtonnage reduces performance. Gross overtonnage (more than 49 tons) is rounded to the next larger hull.

## HARDPOINTS

Hardpoints allow the installation of weapons and other important support items.

A Hull has one Hardpoint per 100 tons: a limit on the number of weapons that can be installed.

## BUILDING BARGE AND POD HULLS

Hulls may have detachable components.

A **Pod** is a detachable unit < 100 tons.

A **Barge** is a detachable hull (100+ tons) usually unpowered and incapable of independent action.

A **Subhull** is a component hull (100+ tons) which may be detachable.

Pods are created from the Pods Table; Barges and Subhulls are created on the Hulls table.

Pods, Barges, and Subhulls are attached to the parent hull with interlocking clamps called **Grapples**. One Grapple set consists of two 1-ton Grapples (one on the Pod, Barge, or Subhull; one on the parent hull). One set is required for each 35 tons of Pod, Barge, or Subhull.

## UNDERSTANDING PODS AND BARGES

Adding a Pod or Barge to a parent Hull increases the total tonnage for a ship, which potentially decreases the performance of its drives. Detaching a Pod or Barge from a Parent Hull decreases the total tonnage for a ship, potentially increasing its performance.

## Deck Plans For Starships

It is possible to create deck plans for starships based on their tonnage.

**Deck Squares.** One ton equals two deck squares when creating deck plans (assuming a 3 meter deck separation).

**Deck Cubes.** One cube is 0.25 tons. One ton equals four 1.5 meter cubes.



# Starship Configurations 05

Hull Configurations determine ship appearance and performance.

## CREATING A HULL

A. Select a Configuration and note ship performance characteristics including Friction, Agility, and Stability.

## C HULL CONFIGURATION CHARACTERISTICS

Type	Friction	Agility	Accel	Max G	Stability	Land
C Cluster	x2	- 5	--	1	- 3	An accumulation of compartments.
B Braced	x2	- 4	--	3	- 2	A cluster structured to allow higher acceleration.
P Planetoid	x1	- 2	--	9	- 1	A hollowed nickel-iron asteroid.
U Unstreamlined	/2	- 1	--	9	0	An enclosure whose protrusions increase drag.
S Streamlined	/3	0	--	9	+1	An enclosure with cowlings and fairings to decrease drag.
A Airframe	/4	+1	+1	9	+2	A winged enclosure for better performance in atmosphere
L Lifting Body	/5		+1	9	+3	A radically streamlined lifting-surface body

### HULL CHARACTERISTICS

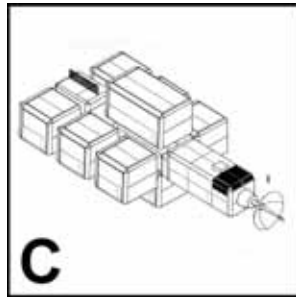
**Agility.** Mod on maneuver in atmosphere.

**Stability.** Mod on Turbulence when operating in Atmosphere.

**Friction.** Multiplier on Boost and Reentry friction heating.

**Acceleration.** Wing-based Mod (an increase) in the Acceleration produced by maneuver drives in atmosphere. A 1G drive on a winged hull can produce 2G.

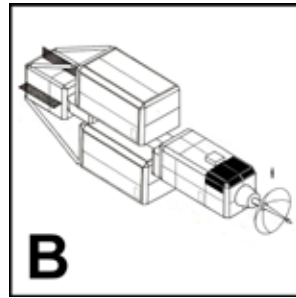
**Max G.** Maximum G a hull can withstand based on structural design and the limits of inertial compensators.



**Cluster Hull**

An accumulation of compartments and various connectors.

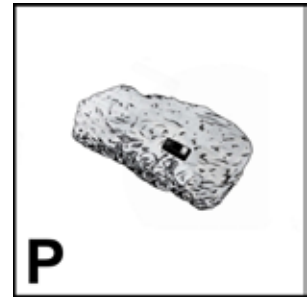
Least expensive of the hull types. Unsuitable for high acceleration; not intended for world landings.



**Braced Cluster Hull**

An upgraded Cluster Hull braced to allow relatively higher accelerations.

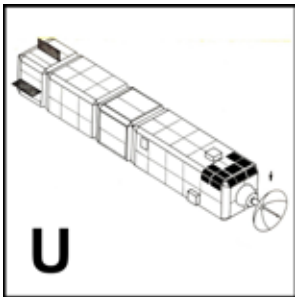
Cluster Hull upgraded to allow higher acceleration. Not intended for world landings.



**Planetoid Hull**

A small planetoid with a laser-tunnelled interior for drives, crew, and payload.

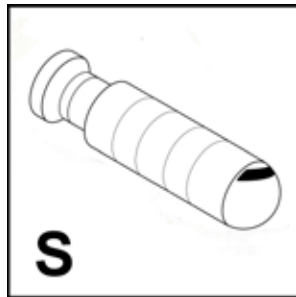
Relatively inexpensive and structurally very strong. Unsuitable for most world landings.



**Unstreamlined Hull**

A relatively compact hull marginally capable of entering atmosphere.

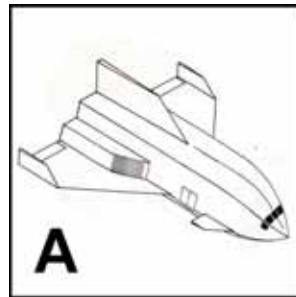
A commonly encountered hull type handicapped by its inattention to streamlining, but also less expensive.



**Streamlined Hull**

A relatively compact hull crafted to support maneuver in atmospheres.

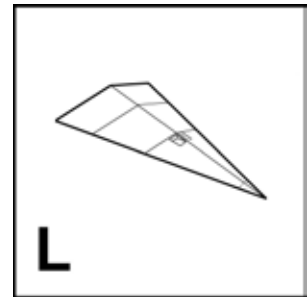
Common hull type designed for efficient atmospheric operations in addition to space travel.



**(Winged) Airframe Hull**

A streamlined hull with wings and fins to enhance maneuver in atmosphere.

Streamlined hull with the wings and fins intended for efficient atmospheric operations.



**Lifting Body Hull**

A hull with integral lifting surfaces to support maneuver in atmosphere. Most efficient of the atmosphere-capable hulls.

Lifting Body receives the effect of Wings but not Fins.



## Starship Construction

# 06 Starship Hull Fittings

Hull Structure determines the ship's construction technique and its base armor. Fittings enhance ship performance.

### CREATING A HULL

**D. Select a Hull Structure** to define the basic nature and construction technique of the Hull.

**E. Add Fittings** to allow for landing gear, flotation and submergence capability, and wings.

## D HULL STRUCTURE

Type	Configuration	TL=	AV=	Comment	Features
A Plate	C B - U S A -	8	8	=TL	Standard/ default. Also called Frame and Plate
S Shell	- - - S A L	9	5	=TL /2	Frameless alloy skin.
P Polymer	C B - U S A -	10	5	=TL /2	Specialized plastics. Self-Healing
F FeN	- - P U - -	11	20		Hollowed nickel-iron asteroid. Upgradable to U
O Organic	C B P U S A -	12	6	=TL /2	Captured or farmed organisms. Regenerating
C Charged	C B U S	14	28*	=TLx2	Powered improvement of Plate *AV= TLx2 when powered

Hull Structure is a naval architecture decision (the default is Plate).

Structure does not usually affect Hull cost; however, Organic Hull cost is halved; Charged hull cost adds MCr1 per 100 tons.

## E STARSHIP HULL FITTINGS

Fitting	C	B	P	U	S	A	L	Comment	TL	Tons**	MCr***
D Flotation Hull	+	+	+	+	+	+	=	Water Landing*	5	1.0	1.0
E Submergence Hull	+	+	+	+	+	+	+	Water Landing*	6	2.0	2.0
F Fins	No	No	No	+	+	=	=	Increases Agility in Atmosphere.	5	0.5	0.5
G Folding Fins	No	No	No	+	+	No	No	Increases Agility in Atmosphere.	8	0.0	0.5
W Wings	No	No	No	+	+	=	=	Increases performance in Atmos.	7	2.0	1.0
V Collapsing Wings	No	No	No	+	+	No	No	Increases performance in Atmos.	9	1.0	2.0
Landing Skids (Standard)	+	+	+	+	+	+	+	Tarmac Landing	7		
K Landing Legs with Pads	+	+	+	+	+	+	+	Allows Wilderness Landing	8	1.0	1.0
M Landing Wheels	+	+	+	+	+	+	+	Allows Glide Landing	5	3.0	1.5
Z Lifters	+	+	+	+	+	+	+	Allows limited hover and move	8	--	(0.5)

TL= Minimum TL to install fitting. Lifters are automatically installed (if TL is met). Reduce Hull Cost if they are not installed.

\*Includes Gliding Landing on Water. \*\*Tons per 100 tons of hull. \*\*\*MCr per 100 tons of hull.

+ Installation allowed on this Configuration. = indicates that the hull already has this benefit. No: Installation not allowed.

### LANDING GEAR

Landing Gear provides options for ship launch and landing capabilities.

**Landing Skids.** Retractable horizontal bars bear the ship's weight. Requires solid bedrock or tarmac landing site. Standard or default option.

**K. Landing Legs With Pads.** Retractable legs end in pads. Can tolerate uneven landing terrain.

**M. Landing Wheels.** Retractable legs end in wheels. Allows glide landing / takeoff from airstrip. Requires tarmac or bedrock landing site. Required if Wings are used for Liftoff and Landing.

### WINGS AND FINS

Wings and Fins enhance performance and efficiency in atmosphere.

**F. Fins.** Increase performance in atmosphere. Fins on a ship increase Agility +1 In Atmosphere.

**G. Folding Fins.** Functions as Fins when deployed; can be folded. Folded Fins occupy no Tonnage.

**V. Collapsing Wings.** Function as Wings when deployed; can be collapsed. Collapsed Wings occupy no Tonnage.

**W. Wings (includes Fins).** On a ship In Atmosphere (Atm= 2+, or P=1+) increase M-Drive or G-Drive performance +1 G.

**Z. Lifters.** Grav Plates provide limited hover capability and slow local movement (not NOP or fast maneuver).

### FLOTATION

Flotation Status allows a hull to float (whether in water or other liquid).

**D. Flotation Hull.** Sealed against prolonged water or fluid exposure. Allows glide landing or takeoff from water.

**E. Submergence Hull.** Sealed against prolonged water or fluid exposure. Includes ability to submerge and resurface. Allows glide landing / takeoff from water. Doubles the Pressure the hull (based on its Armor) can withstand.



Ships which will be equipped with Jump Drives require some form of Jump Field mechanism.

**CREATING A HULL**

Ships with Jump Drives require a Jump Readiness option.

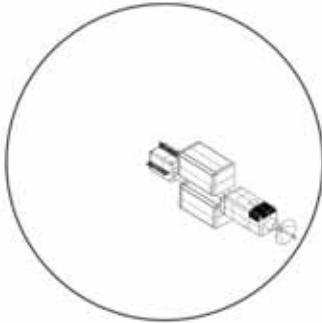
**F. Select Jump Field Type.** Choose a Jump Field option.

**G. Safe Jump Distance.** Calculate the distance.

**H. Interference.** Note formula to determine if Initiation Interference occurs.

**Jump Bubble**

A **Jump Bubble** creates a spherical field around the ship and centered on the jump drive. Jump Bubble requires the greatest distance from a gravity source to ensure safe jump; it does not interfere with armor and standard jump flash.



The Jump Bubble is especially suited to Cluster and Braced Cluster hulls, or the ships which vary in shape from mission to mission.

Jump Bubble allows a ship to vary its effective tonnage from mission to mission (which makes

Drop Tanks and Variable Jump Container Ships possible).

**Difficulties.** A Jump Bubble may enclose nearby debris, which may result in a Jump Mishap.



**Jump Grid**

A closely-conforming **Jump Grid** channels jump energy through a mesh of wires and cables embedded in the hull.

Jump Grid allows a reduced safe jump distance, making it possible for a ship to jump closer to a gravity source. On the other hand, the Jump Grid reduces the strength of armor and increases telltale jump flash.

**Difficulties.** Damaged Jump Grids are difficult to repair. (Jump Plates are bolted on to repair gaps in grid coverage, which converts it to Jump Plates).

**Jump Plates (Repair Plates)**

When a portion of hull containing Jump Grid is damaged, it is temporarily repaired by applying a bolt-on Jump Plate. The associated Jump Field extends several meters beyond the hull.

The effectiveness of the Jump Field is severely impaired (required Jump Distance is increased) when a Jump Plate repair is installed.

The Hull Armor at the repaired Compartment of Hit Location is reduced by half. The Jump Flash is unchanged.

**Advantages.** Jump Plates are a compromise between the cost of the Jump Grid and the misjump potential of the Jump Bubble. Jump Plates can be retro-fitted to an existing hull.

**F JUMP FIELDS**

Type	Strength	Comment	Armor Mod	Flash
Bubble	120	Default	std	std
Grid	100	Embedded in the Hull	Mod -1D	+1
Plates	140	1 Plate Per 10 Hull Tons	Mod /2	+1

Flash: Change in Jump Flash Size

**G CALCULATE SAFE JUMP DISTANCE**

The safe jump distance D for a specific ship is

$$D = S / E - K$$

**D= Diameters** (from the Gravity Source Center).

**S= Jump Field Strength** (based on Jump Readiness).

**E= Drive Efficiency** (from Chart 10).

**K= Jump Drive Engineer Skill and Knowledge.**

For example, Fat Trader *March Harrier* has Jump Plates (S= 110), a Standard Jump Drive (E= 1) and its Engineer is Jump Knowledge-3.  $D = 110 / 1 - 3 = 110 - 3 = 107$ . This ship can safely jump at 107 Diameters.

For example, Gunned Escort *Neon* has Jump Grid (S= 100), Advanced Jump Drive (E=1.2) and the Jump Engineer is Jump Knowledge-5.  $D = 100 / 1.2 - 5 = 83 - 5 = 78$ . The ship can safely jump at 78 Diameters.

**H INITIATION INTERFERENCE**

The safe jump distance D for a specific ship is

$$X = S / E - (D + K) (+Flux)$$

**X= Initiation Interference.** If  $X < 1$ , there is no jump interference. Flux is optional, but if rolled, must be used.

**D= Diameters** (from the Gravity Source Center).

**S= Jump Field Strength** (based on Jump Readiness).

**E= Drive Efficiency** (from Chart 10).

**K= Jump Drive Engineer Skill and Knowledge.**

For example, Fat Trader *March Harrier*, fleeing an unreasonable starport security inspection, reaches 100D.  $X = 110 / 1 - (100 + 3) = 110 - 103 = +7$ . X is greater than zero: there will be a misjump if the ship attempts jump (and Flux is not enough to change X to 0 or less).

For example, Gunned Escort *Neon* reaches 80D as it approaches an outpost when it suddenly encounters an overwhelming enemy force.  $X = 100 / 1.2 - (80 + 5) = 83 - 85 = -2$ . X is less than 1; the ship can safely jump.





# Iconographics

## 08 Starship Armor1

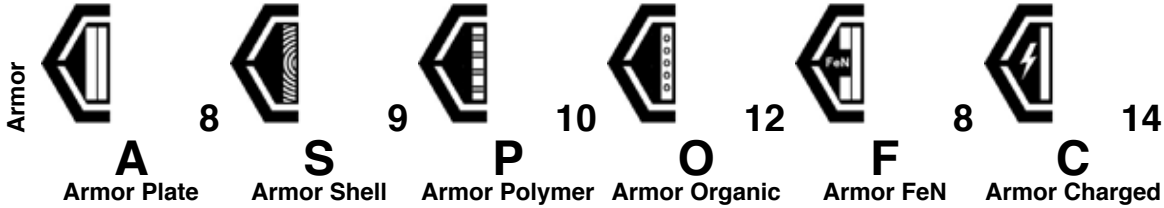


**TL**  
Armor Blank



Armor Generic

Base TL equals Shipyard TL



AV	= TL	= TL / 2	= TL / 2	= TL / 2	= 20	= TL x 2
BF	= TL x 10	= TL x 5	= TL x 5	= TL x 5	= 200	= TL x20
Pen	= TL x 10	= TL x 5	= TL x 5	= TL x 5	= 200	= TL x20
EMP	= TL x 10	= TL x 5	= TL x 5	= TL x 5	= 200	= TL x20
Rad	= TL x 10	= TL x 5	= TL x 5	= TL x 5	= 200	= TL x20
Heat	= TL x100	= TL x50	= TL / 2	= TL / 2	= 2000	= TL x20
Pres	= TL x 10	= TL x 5	= TL x 5	= TL / 2	= 200	= TL x20

Coatings and Anti-Layers							
	<b>N</b>	<b>P</b>	<b>Q</b>	<b>B</b>	<b>E</b>	<b>K</b>	<b>R</b>
	Ablat Coat	Reflec Coat	Slick Coat	Anti-Blast	Anti-EMP	Anti-Kinetic	Anti-Rad
AV	= 0	= 0	= 0	= TL	= TL	= TL	= TL
	Burn= TL x100	Heat = TL x100	Trac = TL x100	BF = TL x10	EMP = TL x10	Pen= TLx100	Rad= TLx100

Dampers			
	<b>12</b>	<b>11</b>	<b>19</b>
	<b>N</b>	<b>G</b>	<b>D</b>
	Nuclear Damp	Meson Screen	Proton Screen

Scramblers			
	<b>12</b>	<b>14</b>	<b>17</b>
	<b>E</b>	<b>Q</b>	<b>J</b>
	Elec Scrambler	Mag Scrambler	Grav Scrambler



# Starship Armor2

# 09

## ARMOR LAYERS

Armor is determined by Hull Structure, applied in Layers, and may be customized against specific threats.

**Structure** determines Armor Type. A Hull with Structure=Plate is constructed of Plate, which is the name of its Armor.

**Cost.** Armor imposes no additional monetary cost; its cost is the loss of available tonnage.

**Layers.** Armor is applied in Layers. Each Layer is approximately 4% of the total tonnage of the Hull.

**Tech Level.** Armor Value AV= for a Layer is the Tech Level of the ship (potentially modified by Stage Effects).

**Anti-Layers** protect against specific threats.

## ARMOR PROTECTS HULLS

Armor Layers are added inward from the Hull surface; Layers reduce available tonnage volume; they do not increase ship tonnage. Armor Layers are homogeneous: they are all the same type (but may be labelled with different Anti-Layer types). Note Hull Structure and Configuration.

A. Determine number and tonnage of Armor Layers.

B. Identify Armor Code, AV and number of Layers on the FillForm.

C. Identify Anti-Layers on ShipSheet (Potentially Deferred)

D. Identify Coatings on the FillForm.

## A HULL ARMOR LAYERS

ID	Tons	1	2	3	4	5	6	7	8	9
A	100		4	8	12	16	20	24	28	32
B	200		8	16	24	32	40	48	56	64
C	300		12	24	36	48	60	72	84	96
D	400		16	32	48	64	80	96	112	128
E	500		20	40	60	80	100	120	140	160
F	600		24	48	72	96	120	144	168	192
G	700		28	56	84	112	140	168	196	224
H	800		32	64	96	128	160	192	224	256
J	900		36	72	108	144	180	216	252	288
K	1000		40	80	120	160	200	240	280	320
L	1100		44	88	132	176	220	264	308	352
M	1200		48	96	144	192	240	288	336	384
N	1300		52	104	156	208	260	312	364	416
P	1400		56	112	168	224	280	336	392	448
Q	1500		60	120	180	240	300	360	420	480
R	1600		64	128	192	256	320	384	448	512
S	1700		68	136	204	272	340	408	476	544
T	1800		72	144	216	288	360	432	504	576
U	1900		76	152	228	304	380	456	532	608
V	2000		80	160	240	320	400	480	560	640
W	2100		84	168	252	336	420	504	588	672
X	2200		88	176	264	352	440	528	616	704
Y	2300		92	184	276	368	460	552	644	736
Z	2400		96	192	288	384	480	576	672	768

Armor Layer 1 is Included in the Hull.

Layer1 is integral to the Hull and has no tonnage cost.

Each layer after the first is 4% of Hull.

Additional Layers may be possible (conceivably down to about Layer24).

**On The FillForm.** Specify **Armor Layers**. Note **Armor Type** Code and AV=. All Armor on a ship is identical (Pods and Subhulls may differ).

**On The ShipSheet.** Note **Anti-Layer Type Code** in each Layer Box. Each Layer Box may have (as desired) a different Anti-Layer.

## B ARMOR LAYERS

Type	Configuration	TL=	AV=
A Plate	C B - U S - -	8	8 =TL
S Shell	- - - S A L	9	5 =TL/2
P Polymer	C B - U S A -	10	5 =TL/2
O Organic	C B P U S A -	12	6 =TL/2
F FeN	- - P U - - -	--	20 =20
C Charged	C B - U S - -	14	28 =TLx

## C ANTI-LAYERS

Type	Effect	Multiplier=
B Anti-Blast	vs Blast Bullet Frag	x 10
E Anti-EMP	vs EMP	x 10
K Anti-Kinetic	vs Pen	x 10
R Anti-Rad	vs Rad	x 10
(applies to all)	vs Heat not Organic, Polymer vs Pressure not Organic	x100

## D COATINGS

Type	Effect	Multiplier=
S Reflec	vs Burn	x100
T Ablat	vs Heat	x100
U Slick	vs Tractor	x100

## ARMOR TECH LEVEL STAGE EFFECTS

TL Stage	TL	Tons	Mod	Q	R	E	B	S
Exp Experimental	-3	x3	/2	Q	-2	-3	+3	-3
Pro Prototype	-2	x2	-4	Q	-2	-2	+2	-2
Ear Early	-1	x2	-3	Q		-1	+1	-1
Std Standard	0	x1	0	Q				
Bas Basic	0	x1	-1	Q		-1	+1	
Alt Alternate	0	x1	+1	Q	F	F	F	F
Imp Improved	+1	x1	+2	+1	+1	+1	-1	+1
Gen Generic	+1	/2	-2	+1	0	0	0	0
Mod Modified	+2	/2	+2	+2	+2	+2	-2	+2
Adv Advanced	+3	/2	+3	+3	+3	+3	-3	+3
Ult Ultimate	+4	/3	+4	+4	+4	+4	-4	+4

F= Flux (value varies by manufacturer). Q= Quality = 2D-2.

For example, on a 100-ton Configuration-S ship, Polymer Armor is Base TL=10. It can be installed on a TL-8 Hull as Prototype Polymer. Layer1 imposes no additional tons; AV= (8-4)= 4. Layer2 is double tonnage (=4 x 2)= 8 tons and has AV=4.



## Starship Construction

# 10 Starship Drives

### STARSHIP DRIVES

#### SELECTING DRIVES

A ship may require:

An **Interplanetary Drive** (M G R H) to allow travel within a star system and to and from world surfaces. The default system is M.

An **Interstellar Drive** (N, J, H, S) to allow travel between star systems. The default system is J.

A **Power System** (A, C, U, P) to supply the required energy for operations. The default system is P. In some cases, an alternative Power Source (B, H, F+) may be selected.

W. Tech Level Availability.

X. Drive Efficiency

Y. Drive Cost.

Z. Drive Potential.

#### Drive Efficiency

Drives (and Power Systems) produce 100 percent Potential (table Y) at base TL.

Other TLs may produce other Potentials based on Drive Efficiency.

Efficiency also affects fuel consumption (if applicable). Fuel is the multiplier for fuel required (or time required to charge for Collectors).

Category	Icon	Letter	TL
Power		P	8
		U	8
		A	19
		C	14
Maneuver		M	9
		G	8
		R	6
		H	
Interstellar		J	9
		H	17
		S	20
		N	9
Supplemental		B	5
		H	8
		F+	9

### W DRIVE TECH LEVEL AVAILABILITY

Drive	TL=	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
M Maneuver	-	-	1	3	5	7	9	-	-	-	-	-	-	-	-	-
G Gravitic	-	1	4	7	9	-	-	-	-	-	-	-	-	-	-	-
R Rocket	1	4	7	9	-	-	-	-	-	-	-	-	-	-	-	-
H HEPlAR	-	1	3	5	7	9	-	-	-	-	-	-	-	-	-	-
N NAFAL	-	-	1	4	7	9	-	-	-	-	-	-	-	-	-	-
J Jump	-	-	1	-	2	3	4	5	6	7	8	9	-	-	-	-
H Hop	-	-	-	-	-	-	-	-	-	-	-	1	-	2	3	4
S Skip	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
P P-Plant	-	1	2	3	4	5	6	7	8	9	-	-	-	-	-	-
A Anti-Matter	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	3
U Fission	1	2	3	4	5	6	7	8	9	-	-	-	-	-	-	-
C Collector	-	-	-	-	-	-	-	-	1	2	3	4	5	6	7	8

Tech Level Availability shows the Drive Potential available for a Standard drive at its Base Tech Level. For example, G-Drive Potential-1 is available at TL-8, and G-Drive Potential 2-3-4 is available at TL-9.

### X DRIVE TECH LEVEL STAGE EFFECTS

Stage	TL	Cost	Eff	Fuel	Tons
Exp Experimental	-3	x10	50%	2.0	x3
Pro Prototype	-2	x5	80%	1.2	x2
Ear Early	-1	x2	90%	1.1	x1
Std Standard	0	x1	100%	1.0	x1
Bas Basic	0	/2	90%	1.1	x1
Alt Alternate	0	x1	100%	1.0	x1
Imp Improved	+1	x1	110%	0.9	x1
Gen Generic	+1	/2	90%	1.1	x1
Mod Modified	+2	/2	110%	0.9	/2
Adv Advanced	+3	x2	120%	0.8	/3
Ult Ultimate	+4	x3	130%	0.7	/4

TL Stage Effects (Cost, QREBS) apply. Efficiencies round down (thus Early Jump-1 at 90% becomes Jump-0).



Ships can be equipped with Interplanetary and Interstellar drives, and power systems.  
The Drive Costs Table determines drive tonnage.

Y DRIVE TONS Drive	EP	In-System				Interstellar				Power Systems			
		M	G	R	H	J	H	S	N	A	C	U	P
A	100	2	9	2	1	10	10	10	2	31	20	15	4
B	200	3	18	4	2	15	15	15	4	32	30	20	7
C	300	5	27	6	3	20	20	20	6	33	40	25	10
D	400	7	36	8	4	25	25	25	8	34	50	30	13
E	500	9	45	10	5	30	30	30	10	35	60	35	16
F	600	11	54	12	6	35	35	35	12	36	70	40	19
G	700	13	63	14	7	40	40	40	14	37	80	45	22
H	800	15	72	16	8	45	45	45	16	38	90	50	25
J	900	17	81	18	9	50	50	50	18	39	100	55	28
K	1000	19	90	20	10	55	55	55	20	40	110	60	31
L	1100	21	99	22	11	60	60	60	22	41	120	65	34
M	1200	23	108	24	12	65	65	65	24	42	130	70	37
N	1300	25	117	26	13	70	70	70	26	44	140	75	40
P	1400	27	126	28	14	75	75	75	28	46	150	80	43
Q	1500	29	135	30	15	80	80	80	30	48	160	85	46
R	1600	31	144	32	16	85	85	85	32	50	170	90	49
S	1700	33	153	34	17	90	90	90	34	52	180	95	52
T	1800	35	162	36	18	95	95	95	36	54	190	100	55
U	1900	37	171	38	19	100	100	100	38	56	200	105	58
V	2000	39	180	40	20	105	105	105	40	68	210	110	61
W	2100	41	189	42	21	110	110	110	42	60	220	115	64
X	2200	43	198	44	22	115	115	115	44	62	230	120	67
Y	2300	45	207	46	23	120	120	120	46	64	240	125	70
Z	2400	47	216	48	24	125	125	125	48	66	250	130	73
N2	2600	50	234	52	26	140	140	140	52	88	280	150	80
P2	2800	54	252	56	28	150	150	150	56	92	300	160	86
Q2	3000	58	270	60	30	160	160	160	60	96	320	170	92
R2	3200	62	288	64	32	170	170	170	64	100	340	180	98
S2	3400	66	306	68	34	180	180	180	68	104	360	190	104
T2	3600	70	324	72	36	190	190	190	72	108	380	200	110
U2	3800	74	342	76	38	200	200	200	76	112	400	210	116
V2	4000	78	360	80	40	210	210	210	80	116	420	220	122
W2	4200	82	378	84	42	220	220	220	84	120	440	230	128
X2	4400	86	396	88	44	230	230	230	88	124	460	240	134
Y2	4600	90	414	92	46	240	240	240	92	128	480	250	140
Z2	4800	94	432	96	48	250	250	250	96	132	500	260	146
MCr/ton=		2	0.5	0.5	1	1	1	2	1	2	0.5	1.5	1

For example, a TL12 200-ton Hull can select a TL12 Jump Drive-D at a cost (Table Y) of 25 tons and MCr25.

**Example1.** At TL12, the maximum Jump the drive can produce (Table W) is Jump-3. The Drive (Table X) has standard tonnage and efficiency. Jump Drive-D in Hull-B can produce (Table Z) Jump-4, reduced to Jump-3 by the TL Constraints. The ship, assuming a Power Plant with equal potential, requires 3 x 10% x 200 tons = 60 tons of fuel for a Jump-3.

**Example2.** At TL12, maximum Jump for the drive is (Table W) Jump-3. The builders acquire a Generic Jump Drive-D TL13 with the same tonnage, Efficiency=90%, Fuel Requirement= 1.1. The Drive can produce Jump-4 while costing only MCr12.5. The ship, assuming a Power Plant with equal potential, requires 4 x 10% x 200 x 1.1 tons = 88 tons of fuel for a Jump-4.



Starship Construction

# 12 Starship Drive Potential

## Z1 DRIVE POTENTIAL

Determine Drive Potential (in table body) for a Drive (left column) installed in a Hull (top row).

Hull=	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U	V	W	X	Y	Z
Drive= A	2	1	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	A
B	4	2	1	1	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	B
C	6	3	2	1	1	1	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	C
D	8	4	2	2	1	1	1	1	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no	D
E	9	5	3	2	2	1	1	1	1	1	no	no	no	no	no	no	no	no	no	no	no	no	no	E
F	9	6	4	3	2	2	1	1	1	1	1	no	no	no	no	no	no	no	no	no	no	no	no	F
G	9	7	4	3	2	2	2	1	1	1	1	1	1	1	no	no	no	no	no	no	no	no	no	G
H	9	8	5	4	3	2	2	2	1	1	1	1	1	1	1	1	no	no	no	no	no	no	no	H
J	9	9	6	4	3	3	2	2	2	1	1	1	1	1	1	1	1	no	no	no	no	no	no	J
K	9	9	6	5	4	3	2	2	2	2	1	1	1	1	1	1	1	1	1	no	no	no	no	K
L	9	9	7	5	4	3	3	2	2	2	2	1	1	1	1	1	1	1	1	1	1	no	no	L
M	9	9	8	6	4	4	3	3	2	2	2	2	1	1	1	1	1	1	1	1	1	1	1	M
N	9	9	8	6	5	4	3	3	2	2	2	2	2	1	1	1	1	1	1	1	1	1	1	N
P	9	9	9	7	5	4	4	3	3	2	2	2	2	2	1	1	1	1	1	1	1	1	1	P
Q	9	9	9	7	6	5	4	3	3	3	2	2	2	2	2	1	1	1	1	1	1	1	1	Q
R	9	9	9	8	6	5	4	4	3	3	2	2	2	2	2	2	1	1	1	1	1	1	1	R
S	9	9	9	8	6	5	4	4	3	3	3	2	2	2	2	2	2	1	1	1	1	1	1	S
T	9	9	9	9	7	6	5	4	4	3	3	3	2	2	2	2	2	2	1	1	1	1	1	T
U	9	9	9	9	7	6	5	4	4	3	3	3	2	2	2	2	2	2	1	1	1	1	1	U
V	9	9	9	9	8	6	5	5	4	4	3	3	3	2	2	2	2	2	2	1	1	1	1	V
W	9	9	9	9	8	7	6	5	4	4	3	3	3	3	2	2	2	2	2	2	2	1	1	W
X	9	9	9	9	8	7	6	5	4	4	4	3	3	3	2	2	2	2	2	2	2	2	1	X
Y	9	9	9	9	9	7	6	5	5	4	4	3	3	3	3	2	2	2	2	2	2	2	2	Y
Z	9	9	9	9	9	8	6	6	5	4	4	4	3	3	3	3	2	2	2	2	2	2	2	Z
N2	9	9	9	9	9	8	7	6	5	5	4	4	4	3	3	3	3	2	2	2	2	2	2	N2
P2	9	9	9	9	9	9	8	7	6	5	5	4	4	4	3	3	3	3	2	2	2	2	2	P2
Q2	9	9	9	9	9	9	8	7	6	6	5	5	4	4	4	3	3	3	3	3	2	2	2	Q2
R2	9	9	9	9	9	9	9	8	7	6	5	5	4	4	4	4	3	3	3	3	3	2	2	R2
S2	9	9	9	9	9	9	9	8	7	6	6	5	5	4	4	4	4	3	3	3	3	3	2	S2
T2	9	9	9	9	9	9	9	9	8	7	6	6	5	5	4	4	4	4	3	3	3	3	3	T2
U2	9	9	9	9	9	9	9	9	8	7	6	6	5	5	5	4	4	4	4	3	3	3	3	U2
V2	9	9	9	9	9	9	9	9	8	8	7	6	6	5	5	5	4	4	4	4	3	3	3	V2
W2	9	9	9	9	9	9	9	9	9	8	7	7	6	6	5	5	4	4	4	4	4	3	3	W2
X2	9	9	9	9	9	9	9	9	9	8	8	7	6	6	5	5	5	4	4	4	4	4	3	X2
Y2	9	9	9	9	9	9	9	9	9	9	8	7	7	6	6	5	5	5	4	4	4	4	4	Y2

no= not possible. For example, Maneuver Drive-T (row T) in Hull-E (column E) produces Maneuver Drive Potential = 7.  
Table Z1 shows Jump Drive-K in Hull-K produces Potential 2 (indeed, any Drive Letter = Hull Letter produces Potential-2).

## Z2 DRIVE POTENTIAL

Determine the Drive (in table body) for a specific Potential (left column) for a Hull (top row).

Hull=	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U	V	W	X	Y	Z	Pot
Pot= 1	A	A	B	B	C	C	D	D	E	E	F	F	G	G	H	H	J	J	K	K	L	L	M	M	1
2	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U	V	W	X	Y	Z	2
3	B	C	E	F	H	J	L	M	P	Q	S	T	V	W	Y	Z	N2	P2	Q2	Q2	R2	S2	T2	T2	3
4	B	D	F	H	K	M	P	R	T	V	X	Z	N2	P2	Q2	R2	S2	T2	U2	V2	W2	X2	Y2	Z2	4
5	C	E	H	K	N	Q	T	V	Y	N2	P2	Q2	S2	T2	U2	V2	X2	Y2	Z2	no	no	no	no	no	5
6	C	F	J	M	Q	T	W	Z	P2	Q2	S2	T2	V2	W2	Y2	Z2	no	no	no	no	no	no	no	no	6
7	C	G	L	P	T	W	N2	P2	R2	T2	V2	W2	Y2	no	no	no	no	no	no	no	no	no	no	no	7
8	D	H	M	R	V	Z	P2	R2	T2	V2	X2	Z2	no	no	no	no	no	no	no	no	no	no	no	no	8
9	E	J	P	T	Y	P2	R2	T2	W2	Y2	no	no	no	no	no	no	no	no	no	no	no	no	no	no	9

no= not possible. For example, achieving Jump-6 (row 6) in a 1000-ton Hull-K (column K) requires Jump-Drive-Q2.



**FUEL REQUIREMENTS**

Determine drive and power system fuel requirements.  
 Allocate fuel tanks for (at least) one month of operations and (if equipped) one interstellar jump.  
 F. Allocate Fittings as required.



**G** Gravitic (Near World Drive) internally self-fueled; no fuel required)

		<b>Fuel</b>	<b>Power Plant</b> in Tons	<b>Fission Plant</b> in Rods	<b>Anti-Matter</b> in Slugs	<b>Collector</b> in Charges		
<b>M</b>		Maneuver	included in Operations	not possible	included in Operations	not possible	gravity-based interplanetary drive.	M
<b>R</b>		Rocket	uses Rocket Fuel	uses Rocket Fuel	not possible	not possible	thrust-based interplanetary drive.	R
<b>H</b>		HEPlAR	1 Burn***= P x H /100	1 Burn***= P x H /100	not possible	not possible	improved thrust-based interplanetary drive.	H
<b>J</b>		Jump					interstellar drive. fuel in addition to Operations.	J
<b>H</b>		Hop	Tons= P x H / 10	not possible	Slugs= P x H / 100	one full charge	interstellar drive. fuel in addition to Operations.	H
<b>S</b>		Skip					interstellar drive. fuel in addition to Operations.	S
<b>N</b>		NAFAL	Tons= P x H / 100 for 1 month	included in Operations*	included in Operations*	not possible	sublight interstellar drive. *If NAFAL in use, fuel use x2.	N
<b>Y</b>		Operations	Tons= P x H / 100 for 1 month**	Rods= P x H / 100 for 10 years**	Slugs= P x H /100 for 1 year**	not possible	general energy requirements for life support and activity.	Y

\*\* Decentralized power; if centralized, fuel use x2. P= Drive Potential. H= Hull Tonnage.

\*\*\* In addition to Rocket Fuel thrust requirements.

**F FUEL COSTS AND FITTINGS**

Item	Cost	TL	Comment	
Raw Fuel (Gas)	*	0	Gas= Skimmed from gas giants.	Hydrogen
Raw Fuel (Water)	*	0	Water= Pumped from oceans or lakes.	
Raw Fuel (Ice)	*	0	Ice= Gathered from ice caps, asteroids.	
Raw Fuel (Gas)	Cr100 / ton	2	at Starport ABCD	
Refined Fuel (Gas)	Cr500 / ton	3	at Starport AB	
S Fuel Scoop	KCr100 1 ton	8	Intakes 100 tons of gas / hour. Intakes gas into fuel tanks.	Power Plant
N Fuel Intake	KCr100 1 ton	8	Intakes 40 tons of water/ hour. Sucks liquid (hull ports / hoses).	
B Fuel Bin	KCr100 1 ton	8	Intakes 20 tons of ice/ hour. Accepts ice solids.	
P +Fuel Purifier	MCr1 1 ton	8	Converts raw fuel to refined fuel at the rate of the intake.	Power Plant
X Transfer Pump	MCr1 1 ton	10	Transfers 100 tons of Drop Tank fuel to P-Plant in seconds.	
U Fuel Rod	KCr400 / set	8	at Starports AB TL 8+. Set= 10 Rods. Store up to 200 Rods per ton.	U
C Canopy	=half Collector cost	14	at Starports AB TL 14+. Replaces old Collector Canopy.	C
A AM Fuel Slugs	KCr60 / set	18	at Starports AB TL 18+. Set= 10 Slugs. Store up to 1,000 Slugs per ton.	

**AM Slug Production.** AM Plants are intrinsically capable of operating "in reverse" and producing AM Slugs. Supported by energy from a Fusion Power Plant of equal potential, an AM Plant in production mode can produce 1 AM slug per 100 EP per day.



Starship Construction

# 14 Starship Sensors<sup>1</sup>

Base TL equals Shipyard TL



Sensor Generic



Sensor Blank TL

Comm/ Visual



8

**C**  
Communicator



9

**T**  
Scope



14

**V**  
Visor



15

**W**  
CommPlus



18

**H**  
Holovisor

Space Sensors



9

**R**  
Radar



10

**N**  
Neutrino Detector



12

**E**  
EMS



13

**G**  
Grav Sensor



19

**S**  
Scanner

World Sensors



8

**M**  
Mass Sensor



9

**B**  
Deep Radar



10

**D**  
Densitometer



10

**L**  
Life Detector



11

**A**  
Activity Sensor

Specialized



8

**U**  
Radiation Sensor



9

**K**  
Sniffer



10

**Y**  
Sound Sensor



10

**P**  
Proximeter



12

**F**  
Field Sensor

Deception



8

**J**  
Jammer



12

**Q**  
Stealth Mask



**X**  
Reserved



**Z**  
Reserved

Mounts



Surface



Barbette



Bay



Antenna



Big Antenna



Deployable



Extendable

\*Not Shown: Turret.



Sensors provide information about the ship's environment and nearby threats.

**A SENSORS**

	Type	TL	Mount	S=	R=	MCR
Com/Visual	<b>C</b> Communicator	8	Surf	7		1.0
	<b>H</b> Holovisor	18	Surf	7		1.0
	<b>T</b> Scope	9	Surf	7		1.0
	<b>V</b> Visor	14	Surf	7		1.0
	<b>W</b> CommPlus	15	Surf	7		1.0
Space	<b>E</b> EMS	12	Surf	7		1.0
	<b>G</b> Grav Sensor	13	Surf	7		1.0
	<b>N</b> Neutrino Detector	10	Surf	7		1.0
	<b>R</b> Radar	9	Surf	7		1.0
	<b>S</b> Scanner	19	Surf	7		1.0
World	<b>A</b> Activity Sensor	11	Surf		7	0.1
	<b>B</b> Deep Radar	9	Surf		7	0.1
	<b>D</b> Densitometer	10	Surf		7	0.1
	<b>L</b> Life Detector	10	Surf		7	0.1
	<b>M</b> Mass Sensor	8	Surf		7	0.1
Specialized	<b>U</b> Radiation Sensor	8	Surf		7	0.1
	<b>F</b> Field Sensor	12	Surf		7	0.1
	<b>K</b> Analyzer/ Sniffer	9	Surf		7	0.1
	<b>P</b> Proximeter	10	Surf		7	0.1
	<b>Y</b> Sound Sensor	7	Surf		7	0.1
Jam	<b>J</b> Jammer	8	Surf		7	1.0
	<b>Q</b> Stealth Mask	12	Surf	7		1.0

**C SENSOR MOUNTS**

Mount	Type	Tons	Mod	Skill*	MCR
T1	Single Turret	1	-2	Sensor	0.2
T2	Dual Turret	1	-1	Sensor	0.5
T3	Triple Turret	1	0	Sensor	1.0
T4	Quad Turret	1	+1	Sensor	1.5
B1	Barbette	3	+2	Sensor	3.0
B2	Dual Barbette	5	+3	Sensor	4.0
Bay	Bay	50	+5	Sensor	5.0
LBay	Large Bay	100	+8	Sensor	10.0
M	Main	200	+10	Sensor	20.0
Surf	Surface	0	0	Sensor	0.0
Ant	Antenna	1	+1	Sensor	0.5
BAnt	Big Antenna	10	+5	Sensor	2.0
Sp	Spine			Spine	
Ext	Extendable	+2	+3	Sensor	1.0
De	Deployable	+2		Sensor	3.0

**Deployable.** In addition to Turret or Barbette costs.

**D SPACE RANGE EFFECTS**

S=	Range	TL	Tons	Cost
0	<b>BR</b> Boarding	-3	/4	/4
2	<b>FR</b> Fighter Range	-2	/3	/3
5	<b>SR</b> Short Range	-1	/2	/2
7	<b>AR</b> Attack Range	0	x1	x1
9	<b>LR</b> Long Range	+1	x2	x3
12	<b>DS</b> Deep Space	+2	x3	x5

For Sensors using S= Space Range. Convert S=R-5. Applies to Mount.

**E WORLD RANGE EFFECTS**

S=	R=	Range	TL	Tons	Cost
0	<b>BR</b>	5 <b>VL</b> Vlong 1000 m	-2	/3	/3
1	<b>FR1</b>	6 <b>D</b> Distant 5 km	-1	/2	/2
2	<b>FR2</b>	7 <b>Vd</b> Vdistant 50 km	0	x1	x1
3	<b>SR3</b>	8 <b>Or</b> Orbit 500 km	+1	x2	x3
4	<b>SR4</b>	9 <b>Fo</b> Far 5,000 km	+2	x3	x5
5	<b>SR5</b>	10 <b>G</b> Geo 50,000 km	+3	x4	x6

For Sensors using R= World Range. Convert R=S+5. Applies to Mount

**INSTALLING SENSORS**

For each desired Sensor:

- Select a **Sensor**.
- Apply **TL Stage Effects** to the Sensor (consistent with ship TL) to modify cost, performance, and QREBS.
- Select a **Mount** for the Sensor.
- For Sensor with S=, adapt **Space Range** as desired. Change the corresponding Mount Tons, and Mount Cost. Sensor must have TL at least equal to changed TL.
- For Sensor with R=, adapt **World Range** as desired. Change the corresponding Mount Tons, and Mount Cost. Sensor must have TL at least equal to changed TL.
- Allocate a **Control Panel** each Sensor.
- Note the cost and tonnage.

A ship may have one **Hardpoint** per 100 tons of hull. A Hardpoint Mount must be at least 1 ton; round up if necessary.

A ship may have three **Firmpoints** per 100 tons (in lieu of one Hardpoint). A Firmpoint Mount must be less than 1 ton.

But, Surf and Antenna mounts do not require HardPoints or FirmPoints.

**B SENSOR TECH LEVEL STAGE EFFECTS**

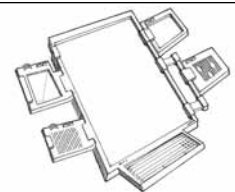
TL	Stage	TL	Cost	Mod	Q	R	E	B	S
Exp	Experimental	-3	x10	-3	Q	-2	-3	+3	-3
Pro	Prototype	-2	x5	-2	Q	-2	-2	+2	-2
Ear	Early	-1	x2	-1	Q		-1	+1	-1
Std	Standard	0	x1	0	Q				
Bas	Basic	0	/2	0	Q		-1	+1	
Alt	Alternate	0	x1	0	Q	F	F	F	F
Imp	Improved	+1	x1	+1	Q	+1	+2	-1	+1
Gen	Generic	+1	/2	0	5	0	0	0	0
Mod	Modified	+2	/2	+2	Q	+2	+2	-2	+2
Adv	Advanced	+3	x2	+3	Q	+3	+3	-3	+3
Ult	Ultimate	+4	x3	+4	Q	+4	+4	-4	+4

F= Flux (value varies by manufacturer).

Q= Quality = 2D-2. Applies to Sensor; not to Mount.

**F CONTROLS**

Install Control Panels.



One per Sensor.





Starship Construction

# 16 Starship Weapons<sup>1</sup>

Base TL  
equals  
Shipyards TL



Beams	<b>J</b> 8 Mining Laser	<b>K</b> 9 Pulse Laser	<b>L</b> 10 Beam Laser	<b>P</b> 11 Plasma Gun	<b>F</b> 12 Fusion Gun	<b>A</b> 11 Particle Accel				
	Missiles	<b>B</b> 9 Slug Thrower	<b>V</b> 10 Salvo Rack	<b>M</b> 7 Missile	<b>N</b> 12 KK Missile	<b>X</b> 20 AM Missile	<b>R</b> 12 Rail Gun			
		Exotics	<b>G</b> 13 Meson Gun	<b>T</b> 14 Jump Damper	<b>U</b> 16 Tractor/Pressor	<b>H</b> 17 Inducer	<b>W</b> 18 Disintegrator	<b>E</b> 21 Stasis		
			Special	<b>C</b> 8 CommCaster	<b>S</b> 9 SandCaster	<b>D</b> 10 DataCaster	<b>Q</b> 12 Ortillery	<b>Y</b> 10 Hybrid S-L-M	<b>Z</b> Reserved	
				Mounts						
					Turret	Barbette	Bay	MainWeapon	Deployable	Extendable



# Starship Weapons2

# 17

## A WEAPONS

	Type	TL	Mount	S=	R=	MCr
Beams FR	<b>J</b> Mining Laser	8	Turret		7	0.5
	<b>K</b> Pulse Laser	9	Turret		7	0.3
	<b>L</b> Beam Laser	10	Turret		7	0.5
	<b>P</b> Plasma Gun	11	Barbette		7	1.0
	<b>F</b> Fusion Gun	12	Barbette		7	1.5
Missiles FR	<b>B</b> Slug Thrower	9	Turret		7	0.2
	<b>V</b> Salvo Rack	10	Bay		7	10.0
	<b>R</b> Rail Gun	12	Bay	7		12.0
	<b>M</b> Missile	7	Turret	7		2.0
	<b>N</b> KK Missile	10	Bay	7		3.0
Exotic FR	<b>X</b> AM Missile	20	Barbette	7		5.0
	<b>T</b> Jump Damper	14	Barbette		7	15.0
	<b>U</b> Tractor/Pressor	16	Barbette		7	5.0
	<b>H</b> Inducer	17	Turret		7	1.0
	<b>W</b> Disruptor	18	Barbette	7		15.0
Special FR	<b>E</b> Stasis	21	Turret	7		5.0
	<b>D</b> DataCaster	10	Turret		7	1.0
	<b>S</b> SandCaster	9	Turret		7	0.1
	<b>Q</b> Ortilery	12	Bay		7	15.0
	<b>C</b> CommCaster	8	Turret	7		5.0
Special LR	<b>Y</b> Hybrid S-L-M	10	Turret	7*	7*	1.0
	<b>A</b> Particle Accel	11	Barbette	7*	7*	2.5
	<b>G</b> Meson Gun	13	Main	7		5.0
	<b>Z</b> Reserved					

\*Range varies by usage.

## C WEAPON MOUNTS

Mount	Type	Tons	Mod	Hits (D)	Skill*	MCr
T1	Single Turret	1	-2	1	Turret	0.2
T2	Dual Turret	1	-1	2	Turret	0.5
T3	Triple Turret	1	0	3	Turret	1.0
T4	Quad Turret	1	+1	4	Turret	1.5
B1	Barbette	3	+2	5	Turret	3.0
B2	Dual Barbette	5	+3	10	Turret	4.0
Bay	Bay	50	+5	20	Bay	5.0
LBay	Large Bay	100	+8	30	Bay	10.0
M	Main	200	+10	100	Spine	20.0
Sp	Spine				Spine	
Ext	Extendable	+2	+3		Turret	1.0
De	Deployable	+2			Turret	3.0

**Deployable.** In addition to Turret or Barbette costs.

**Hardpoints.** Each Mount occupies one Hardpoint.

\*Ortilery / Rail Gun are governed by Skill= Ortilery.

## INSTALLING WEAPONS

Weapons project power against adversaries and provide support for the ship's mission. For each desired Weapon:

A. Select a **Weapon**.

B. Apply **TL Stage Effects** to the Weapon (consistent with ship TL) to modify cost, performance, and QREBS.

C. Select a **Mount** for the Weapon.

D. For Weapon with S=, adapt **Space Range** as desired.

Change the corresponding Mount Tons, and Mount Cost. Weapon must have TL at least equal to changed TL.

E. For Weapon with R=, adapt **World Range** as desired.

Change the corresponding Mount Tons, and Mount Cost. Weapon must have TL at least equal to changed TL.

F. Allocate a **Control Panel** each Weapon.

G. Note the cost and tonnage.

A ship may have one **Hardpoint** per 100 tons of hull. Hardpoint Mount must be at least 1 ton; round up if necessary.

A ship may have three **Firmpoints** per 100 tons (in lieu of one Hardpoint). Firmpoint Mount must be less than 1 ton.

## B WEAPONS TECH LEVEL STAGE EFFECTS

TL Stage	TL	Cost	Mod	Q	R	E	B	S
Exp Experimental	-3	x10	-3	Q	-2	-3	+3	-3
Pro Prototype	-2	x5	-2	Q	-2	-2	+2	-2
Ear Early	-1	x2	-1	Q		-1	+1	-1
Std Standard	0	x1	0	Q				
Bas Basic	0	/2	0	Q		-1	+1	
Alt Alternate	0	x1	0	Q	F	F	F	F
Imp Improved	+1	x1	+1	Q	+1	+2	-1	+1
Gen Generic	+1	/2	0	5	0	0	0	0
Mod Modified	+2	/2	+2	Q	+2	+2	-2	+2
Adv Advanced	+3	x2	+3	Q	+3	+3	-3	+3
Ult Ultimate	+4	x3	+4	Q	+4	+4	-4	+4

F= Flux (value varies by manufacturer).

Q= Quality = 2D-2. Applies to Weapon; not to Mount.

## D SPACE RANGE EFFECTS

S=	Range	TL	Tons	Cost
0	<b>BR</b> Boarding	-3	/4	/4
2	<b>FR</b> Fighter Range	-2	/3	/3
5	<b>SR</b> Short Range	-1	/2	/2
7	<b>AR</b> Attack Range	0	x1	x1
9	<b>LR</b> Long Range	+1	x2	x3
12	<b>DS</b> Deep Space	+2	x3	x5

For Weapons using S= Space Range. Convert S=R-5. Applies to Mount.

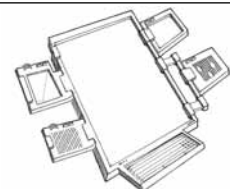
## E WORLD RANGE EFFECTS

S=	R=	Range	TL	Tons	Cost
0	<b>BR</b>	5 <b>VL</b> Vlong 1000 m	-2	/3	/3
1	<b>FR1</b>	6 <b>D</b> Distant 5 km	-1	/2	/2
2	<b>FR2</b>	7 <b>Vd</b> V Distant 50 km	0	x1	x1
3	<b>SR3</b>	8 <b>Or</b> Orbit 500 km	+1	x2	x3
4	<b>SR4</b>	9 <b>Fo</b> Far 5,000 km	+2	x3	x5
5	<b>SR5</b>	10 <b>G</b> Geo 50,000 km	+3	x4	x6

For Weapons using R= World Range. Convert R=S+5. Applies to Mount

## F CONTROLS

Install Control Panels.




One per Weapon.









Starship Construction

# 18 Starship Defenses<sup>1</sup>

Base TL equals Shipyard TL  TL  
Defense Blank



**Damper/Scrambler**

					
<b>N</b> 12	<b>G</b> 13	<b>D</b> 19	<b>E</b> 12	<b>Q</b> 14	<b>J</b> 17
Nuclear Damp	Meson Screen	Proton Screen	Elec Scrambler	Mag Scrambler	Grav Scrambler

**Globes**

			
<b>T</b> 16	<b>U</b> 20	<b>V</b> 22	<b>W</b> 24
Black Globe	White Globe	Silver Globe	Stasis Globe








**AM Weapons**

				
<b>K</b> 9	<b>L</b> 10	<b>P</b> 11	<b>F</b> 12	<b>Y</b> 10
Pulse Laser	Beam Laser	Plasma Gun	Fusion Gun	Hybrid S-L-M

**AB Weapons**

	
<b>S</b> 9	<b>Y</b> 10
SandCaster	Hybrid S-L-M

**Mounts**

						
Turret	Barbette	Bay	Bolt-In	MainWeapon	Deployable	Extendable



**A1 DEFENSES**

Type	S=	R=	TL	Mode	MCr
<b>N</b> Nuclear Damper	0	5	12	Nukes	1.0
<b>G</b> Meson Screen	0	5	13	G.	3.0
<b>Q</b> Mag Scrambler	0	5	14	E. Magnetics.	1.0
<b>J</b> Grav Scrambler	0	5	17	T. U.	2.0
<b>E</b> Elec Scrambler	0	5	12	T. U.	2.0
<b>R</b> Proton Screen	0	5	19	AM	1.0
<b>T</b> Black Globe	0	5	16	-all-	10.0
<b>U</b> White Globe	0	5	20	-all [except D]-	10.0
<b>V</b> Silver Globe	0	5	22	-all [except D]-	10.0
<b>W</b> Stasis Globe	0	5	24	-all [except D]-	10.0

**A2 WEAPONS USED DEFENSIVELY**

Type	S=	R=	TL	Mount	MCr
<b>F</b> Fusion Gun	2	7	12	Barbette	1.5
<b>K</b> Pulse Laser	2	7	9	Turret	0.3
<b>L</b> Beam Laser	2	7	10	Turret	0.5
<b>P</b> Plasma Gun	2	7	11	Barbette	1.0
<b>S</b> SandCaster	2	7	9	Turret	0.1
<b>Y</b> Hybrid S-L-M	2	7	10	Turret	1.0

**C DEFENSE MOUNTS**

Mount	Type	Tons	Mod	Skill	MCr
Bo	Bolt-In	1	0	Screens	1.0
T1	Single Turret	1	-2	Screens	0.2
T2	Dual Turret	1	-1	Screens	0.5
T3	Triple Turret	1	0	Screens	1.0
T4	Quad Turret	1	+1	Screens	1.5
B1	Barbette	3	+2	Screens	3.0
B2	Dual Barbette	5	+3	Screens	4.0
Bay	Bay	50	+5	Screens	5.0
LBay	Large Bay	100	+8	Screens	10.0
M	Main	200	+10	Spine	20.0
Sp	Spine			Spine	
Ext	Extendable	+2	+3	Screens	1.0
De	Deployable	+2		Screens	3.0

**Deployable.** In addition to Turret or Barbette costs.

**Hardpoints.** Each Mount occupies one Hardpoint.

**Skills.** Screens can substitute for Turret, Bay, or Spine.

**INSTALLING DEFENSES**

Defenses protect against attacks and environmental threats. The designer selects Defenses which support the ship's mission. For each desired Defense:

A. Select a **Defense**.

B. Apply **TL Stage Effects** to the Defense (consistent with ship TL) to modify cost, performance, and QREBS.

C. Select a **Mount** for the Defense.

D. For Defense with S=, adapt **Space Range** as desired.

Change the corresponding Mount Tons, and Mount Cost. Defense must have TL at least equal to changed TL.

E. For Defense with R=, adapt **World Range** as desired.

Change the corresponding Mount Tons, and Mount Cost. Defense must have TL at least equal to changed TL.

F. Allocate a **Control Panel** each Defense.

G. Note the cost and tonnage.

Minimum tonnage for a Mount is 1 ton (a turret cannot be less than 1 ton; a FR Barbette can conceivably be 1 ton; a FR Bay can conceivably be 16 or 17 tons). A ship may have one Hardpoint per 100 tons of hull, or three Firmoints per 100 tons. A ship may have one installation per Hardpoint, or one World Range installation per Firm Point.

**B SENSOR TECH LEVEL STAGE EFFECTS**

TL	Stage	TL	Cost	Mod	Q	R	E	B	S
Exp	Experimental	-3	x10	-3	Q	-2	-3	+3	-3
Pro	Prototype	-2	x5	-2	Q	-2	-2	+2	-2
Ear	Early	-1	x2	-1	Q		-1	+1	-1
Std	Standard	0	x1	0	Q				
Bas	Basic	0	/2	0	Q		-1	+1	
Alt	Alternate	0	x1	0	Q	F	F	F	F
Imp	Improved	+1	x1	+1	Q	+1	+2	-1	+1
Gen	Generic	+1	/2	0	5	0	0	0	0
Mod	Modified	+2	/2	+2	Q	+2	+2	-2	+2
Adv	Advanced	+3	x2	+3	Q	+3	+3	-3	+3
Ult	Ultimate	+4	x3	+4	Q	+4	+4	-4	+4

F= Flux (value varies by manufacturer).

Q= Quality = 2D-2. Applies to Defense; not to Mount.

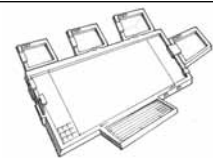
**DE DEFENSE RANGE EFFECTS**

S=	R=	Range	TL	Cost	Tons	Mount (Bolt-In)
	T	Talking	+6	x5	/100	0.01 =Size-3.6 (cubic)
	1 Vs	Vshort 5 meters	+5	x4	/20	0.05 =Size-4.2 (cubic)
	2 S	Short 50 meters	+2	x2	/10	0.10 =Size-4.5 (cubic)
	3 M	Medium 150 m	-1	x1	/4	0.25
	4 L	Long 500 m	-	/2	/2	0.50
0 BR	5 VL	Vlong 1000 m	+0	x1	x1	1
1 FR1	6 D	Distant 5 km	+1	x2	x2	2
2 FR2	7 Vd	VDistant 50 km	+2	x3	x3	3

For Defenses using R= World Range. Maximum Range for Defenses is R=7.

**F CONTROLS**

Install Control Panels



One per Defense



# Starship Construction

## 20 Starship Compartments

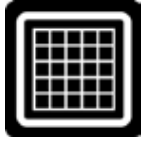
Starship compartment icons reflect most of the internal structural divisions with a ship.



Blank



Corridor



**A**  
Astrogation



**B**  
Bridge



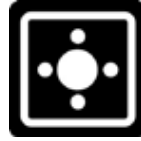
**C**  
Computer



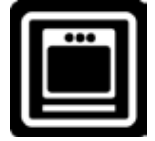
**D**  
Dining



**E**  
Ward Room



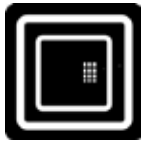
**F**  
Commons



**G**  
Galley



**H**  
Hold



**I**  
Vault



**J**  
Passengers



**K**  
Steerage



**L**  
Low Berth



**M**  
Clinic



**N**  
Armory



**O**  
Garage



**P**  
Hangar



**Q**  
Turret



**R**  
Barbette



**S**  
Bay Weapon



**T**  
Main Weapon



**U**  
Drives



**V**  
Makers



**W**  
Workshop



**X**  
Lab



**Y**  
Life Support



**Z**  
Sensors



Multiple  
Fuel Types



Air Lock



Barracks



Frozen Watch



Deployable



GravShaft



Hydrogen



Fresher



Vacc Suits



High Passenger



Extendable



Access



Radioactives



Baggage



Brig



Escape Pod



Emergency



Access



Lift



Anti-Matter



OPERATIONS

- Determine Operations fittings.
- A. Determine Ship's Troops.
- B. Determine Specialists.
- C. Determine Life Support.
- D. Assign Vehicles
- E Assign Small Craft.
- F. Assign Fuel Tankage.
- G. Assign Vehicle Storage.

SHIP'S TROOPS BARRACKS

Assign (as needed) Ship's Troops.

A TROOP ACCOMMODATIONS

Quarters	Tons	MCr
S Squad Barracks (5)	4	0.2
P Platoon Barracks (22)	18	1.0
C Company Barracks (70)	60	3.0

(N) = typical number of troops. The actual number assigned may vary.

Typical unit sizes are:

**Squad.** Five troops with ranks R1 R1 R2 R2 R3.

**Platoon.** Four squads, plus an officer O2 or O1 and a sergeant R4.

**Company.** Three Platoons, plus a command section O3, O2, R5, R3.

Each Ship's Troops Squad is assigned as the crew for one Weapon or Defense (per Squad).

F FUEL STORAGE

Fuel	Power System	Capacity
Liquid Hydrogen	Power Plant	one ton holds one ton
Anti-Matter	Anti-Matter Plant	one ton holds 1000 Slugs
Radioactives	Fission Plant	one ton holds 200 Rods
Particles	Collector	energy is stored in the Collector Canopy.

There is no cost associated with Fuel Storage systems.

G VEHICLE HULL CONNECTORS

Type	Function	TL	Tons	Configuration	MCr	Comment
B	Bracket	Exterior Vehicle	7	1	C B P U	1 1 per Vehicle (maximum 10 tons).
S	Streamlined Bracket	Exterior Vehicle	7	1	S A L	2 1 per Vehicle (maximum 10 tons).
N	Hull Niche	Exterior Vehicle	8	varies	C B P U S A L	1.5 Tons= Half Vehicle.
H	Hangar	Interior Vehicle	7	varies	C B P U S A L	Tons= Vehicle +10
C	Cargo Hold	Vehicle Storage	7	varies	C B P U S A L	Tons= Vehicle + 2.
G	Grapple	Exterior Pod	9	1	C B P U S A L	1 1 pair per 35 tons
R	Subhull Grapple	Exterior Subhull	9	1	C B P U S A L	1 Subhull requires 3 pairs per 100 tons
E	Connector	Permanent	9	0.5	C B P U S A L	1 Replaces Grapple; no disconnect.

Grapple Pairs located one per parent ship and one per carried Pod or Subhull. Brackets required only on the parent ship.

SPECIALISTS

Assign (as needed) specialists.

B SPECIALISTS

Assign Specialty Consoles:

Political Officer	Broker
Cultural Officer	Trader
Liaison Specialist	Linguist
Contact Specialist	Negotiator
Translator	Advocate
Specialty Sensop	Diplomat

consistent with the ship mission

LIFE SUPPORT

Assign tonnage for Life Support. Life Support is a job responsibility assigned to a Steward. Each Life Support mechanism has a Control Panel.

C LIFE SUPPORT

Type (days)	People	Tons	MCr
H Short Term (4)	(10)	0	0
S Standard (30)	(10)	1	1.0
L Long-Term (120)	(10)	2	2.0
U Luxury	(10)	1	1.0
A Adaptable	(10)	1	1.0

Adaptable required for non-human environments. Luxury required for High Passage staterooms.

VEHICLES

Assign vehicles to the ship for mobility, exploration, and mission support.

D VEHICLES

Code	Vehicle	Tons	KCr
W	ATV-W.	10	30
T	ATV-T. Tank.	10	50
C	GroundCar.	1	6
R	Air/Raft	4	60
F	Flyer-Winged.	10	350
H	Flyer-Rotor.	5	90
B	Boat. Sub.	100	250
	Truck	5	40
2	Trailer	5	20
A	Air Cushion ACV	8	300

E SMALL CRAFT

Code	Vehicle	Tons	KCr
P	Pod	10	10
A	LifePod	10	10
G	Gig	20	14
F	Fighter	10	18
L	Launch	20	14
B	Ship's Boat	30	16
N	Pinnace	40	20
C	Cutter	50	28
S	Shuttle	90	33

Vehicles carried by a ship occupy tonnage. Specialized connectors allow more efficient storage.

Install an appropriate Vehicle Hull Connector for each Vehicle. Each Vehicle Hull Connector has a Control Panel.

FUEL TANKAGE

Evaluate ship fuel requirements and assign appropriate fuel storage.



# 22 Starship Controls

## STARSHIP CONTROLS

Consoles are supervised by one or more Ship's Computers.

- A. Note available Control Panels.
- B. Install Consoles and associate each with one or more Control Panel. Note the three types of Console (Control, Operating, and Workstation).
- C. Select a Staffing Level and calculate the required number of crew.
- D. Install Ship's Computer(s), and (if necessary) note a Master Computer.

## CONTROL PANELS

Every mechanism and function has a Control Panel.

A **mechanism** is any of the drives, sensors, weapons, defenses, or installations that equip a ship. For any device greater than 35 tons, each 35 tons is treated as a separate mechanism.

**FillForm Control Panels.** Assign a Control Panel to each mechanism on the FillForm (or 1 per 35 tons if the mechanism is more than 35 tons). A simple penciled stroke is sufficient. Shaded Con boxes do not require Control Panels.

## A ASSIGN CONSOLE FUNCTIONS

Skill	Function
Astrogation	Plots courses.
Pilot	Flight controls.
Security	Internal barriers.
Counselling	Crew mental health.
Freight	Loading/ Unloading.
Steward	Passenger support.

## CONSOLES

Identify each console by a single Ehex identifier 0 through Z (above 33, assign double digit Ehex 00 to ZZ).

**Connections.** A Console controls one or more Control Panels; assign each CP to a Console (write Console ID for each CP in the Con Column).

**Multi-Tasking.** Any number of Control Panels, Mechanisms or Functions can be assigned to one Console; a Console Multi-Tasks by dividing its available C+S.

**Console Base TL** is the ship TL.

## B CONSOLES

Console	Tons	Sq	MCr
C Cramped	0.5	1	0.2
S Standard	1	2	0.2
R Roomy	1.5	3	0.2
P Spacious	2	4	0.2

## Console Staffing

Select a Staffing Level.

## C STAFFING LEVELS

Level	Crew Per Console
0 Minimal	1 per 3
1 One Shift	1
2 Two Shifts	2
3 Three Shifts	3

**Dangerous=** Add one Crew per weapon, defense, sensor, or vehicle, or small craft console.

A **Shift (a Watch)** is one-third of a day. Except for Dangerous Voyage, weapons and defenses are unstaffed (they are an additional responsibility).

## SHIP'S COMPUTER

Identify Computers by Model Number (equals Cells, or Console Equivalents). Model/0 is little more than a centralized server; Model/5 is five Console-Equivalents. Install Ship's Computers to support the consolenetwork.

## D STANDARD SHIP COMPUTERS

Model/	Tons	Sq	MCr	TL	Cells
0	0.5	1	0.1	8	0
0 bis	0.5	1	0.5	8	1
1	1	2	1.5	9	1
1 bis	1	2	3.0	9	2
2	2	4	5.0	10	2
2 bis	2	4	7.5	10	3
3	3	6	10.5	11	3
3 bis	3	6	14	11	4
4	4	8	18	12	4
4 bis	4	8	22	12	5
5	5	10	27	13	5
5 bis	5	10	33	13	6
6	6	12	39	14	6
6 bis	6	12	45	14	7
7	7	14	52	15	7
7 bis	7	14	60	15	8
8	8	16	68	16	8
8 bis	8	16	76	16	9
9	9	18	85	17	9

A Ship's Computer may allocate its C+S +K to a number of consoles equal to its Model Number (or Cells).

**Tons=** Model Number.

**Cells=** Model Number.

**Base TL=** Model Number + 8

**"Bis"** adds +1 Cell.

**C+S=** TL.

**MCr=** Model \* (Model+.5).

## CONSOLES AND CONTROLLERS

Type	C =	Difficulty	Tons	KCr	Comment
CC Control Console	C1 C2 C3 C4 C5	Standard	0.5	200	Includes analog input for piloting.
OC Operating Console	C4 C5	Standard	0.5	100	Standard input by keyboard or similar.
W Workstation	Edu****	Standard	0.5	50	Basic information processing.
M Portable Controller	C4 C5	Difficulty +1	*	100	Laptop equivalent.
H Hand Controller	from User	Difficulty +2	**	50	Tablet equivalent.
CP Control Panel	from User	Difficulty +3	***		Permanently part of a mechanism.

\* M in use occupies one square. \*\* H is portable by the User. \*\*\* CP is on the mechanism.

\*\*\*\* Human devices (based on Education). Others may be based on Instinct or Training.

0.5 ton occupies 1 square (2 cubes) on a deckplan.



**PAYLOAD**

Payload is the total discretionary load the ship can carry in addition to operations requirements. Payload is the available space (tonnage) after all other components have been assigned. In the simplest of ships, this remaining space is undifferentiated Cargo Hold. On other ships, this payload space is fitted out for specific functions, including passenger staterooms, specialized cargo areas, or labs.

- A. Determine available payload space.
- B. Allocate passenger accommodations.
- C. Allocate crew accommodations.
- D. Allocate required / optional Life Support.
- E. Assign access and air locks.
- F. Remaining space as cargo hold.

**A CALCULATE PAYLOAD**

Payload is the available space remaining after all other components have been assigned

**ACCOMMODATIONS AND LIFE SUPPORT**

Assign tonnage for accommodations for passengers and crew. Raw tonnage may be differentiated into staterooms and other locations.

**1. High and Middle Passengers.** Allocate total tonnage for High Passage (Luxury) and Middle Passage (Standard) accommodations.

**2. Low Passage and Steerage.** Allocate tonnage for Low Passage (Cold Sleep) and Steerage (Cramped Quarters and Hot Bunks).

**LIFE SUPPORT**

Assign Life Support:

**Commons.** Assign Commons as needed.

**Fresher.** Assign capacity of 1 Fresher per passenger and Crew.

**Medical.** Every ship requires a Medical Console. Each Medic in crew requires a Clinic.

**Access.** Assign Air Locks as needed.

**FITTED PAYLOAD**

Assign fitted spaces for specialized spaces, and sophisticated spaces.

**Specialized** tonnage (routinely occupied or used by crew for mission purposes) for costs MCr0.1 per ton.

**Sophisticated** tonnage (routinely used; furnished with custom equipment) such as Labs, Workspaces costs MCr1.0 per ton.

Undifferentiated cargo hold space has no additional cost.

**B PASSENGER ACCOMMODATIONS**

Description	Tons	MCr	Comment
Commons	1	0.0	For movement and recreation.
Standard Stateroom	2	0.1	1 passenger. No fresher NF
Luxury Stateroom	6	0.4	1 passenger. Includes fresher.
Standard Suite	4	0.2	2 passengers. No fresher
Stateroom Double	2	0.1	2 passengers in bunks. NF.
Stateroom Triple	2	0.1	3 passengers in bunks. NF.
Stateroom Cramped	2	0.1	4 passengers in bunks. NF.
Common Fresher	1	1.0	shared by up to 10 passengers.
Shared Fresher	0.5	0.5	shared by up to 4 passengers
Steerage	0.5	0	2 passengers = Space Bunks
Low Berth	0.5	0.1	One Low Passenger.

**C CREW ACCOMMODATIONS**

Description	Tons	MCr	Comment
Common Area	1	0.0	For movement and recreation.
Standard Stateroom	2	0.1	1 crew. No fresher.
Standard Suite	4	0.2	2 crew. No fresher
Stateroom Double	2	0.1	2 crew in bunks. NF.
Stateroom Triple	2	0.1	3 crew in bunks. NF.
Stateroom Cramped	2	0.1	4 crew in bunks. NF.
Common Fresher	1	1.0	shared by 10 crew.
Shared Fresher	0.5	0.5	shared by 4 crew
Spacer Niche	1	0	1 crew
Spacer Bunks	0.5	0	2 crew
Spacer Hotbunks	0.5	0	6 crew (2 per shift)
Emergency Low Berth	1	0.5	contains 4 individuals
Frozen Watch (also ELB)	2	1.0	contains 10 individuals
Emergency Capsule	1	1	for 10. LS for 15 days.

**D LIFE SUPPORT**

Description	Tons	MCr	Comment
Common Area	1	0.0	For movement and recreation.
Common Fresher	1	1.0	shared by 10 passengers.
Shared Fresher	0.5	0.5	shared by 4 passengers
Emergency Capsule	1	1	for 10. LS for 15 days.
Med Console	0.5	0.5	required on all ships
Medical Low Berth	1	0.5	
Clinic	2	1	basic medical supplies
Counsellor	1	0.2	booth with AI counselling.

**E ACCESS**

Description	Tons	MCr	Squares	Door Width	Door Height
Personnel Air Lock	0.5	0.1	1	1.5	2.5
Cargo Lock	2	0.4	2	3.0	2.5
Large Cargo Lock	9	1.8	10	4.5	2.5

**Typical:** One personnel Air Lock at no cost or tonnage per 100 tons of hull

**Non-Standard:** Create custom Air Locks at MCr0.1 per square.





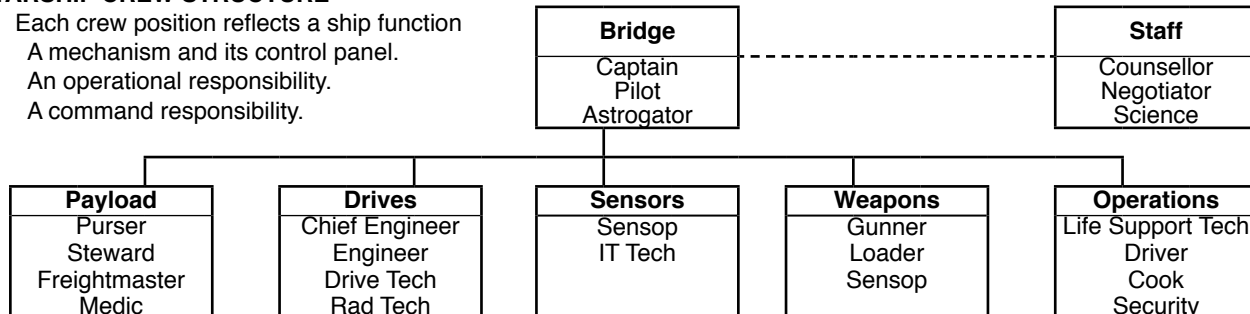
## Starship Construction

# 24 Starship Crew Structure

The ship crew is organized in a hierarchy based on abilities and responsibilities.

### STARSHIP CREW STRUCTURE

Each crew position reflects a ship function  
A mechanism and its control panel.  
An operational responsibility.  
A command responsibility.



### THE BRIDGE

The Bridge is the command center of the ship, staffed by the Command positions, ship operators, and some staff.

#### Command Positions

The senior (in rank) crew person is the **Captain** and is in charge of the ship.

The next senior (in rank) is the **Exec** (Executive Officer or First Officer) who is second-in-command.

The Captain and the Exec on small ships may fill other responsibilities (pilot, astrogator).

#### Ship Operators

The **Pilot** operates the ship's maneuver controls when in normal space.

The **Astrogator** computes the ship's course, both within a star system and through jump space. In jump space, the Astrogator controls ship operations.

#### Staff

The Bridge may include (required by individual cultures) staff such as:

A **Counsellor** to evaluate crew and passengers and advise the captain.

A **Political Officer** (or **Cultural Officer**) responsible for loyalty to the government or organization.

A **Specialist** (or **Analyst**) skilled in a specific field: negotiation, diplomacy, liaison, broker, trader, linguistics, or some other area.

### SENSORS

Sensors is the set of scanners, detectors, and comms for the ship. Sensors are co-located with the Bridge.

A **Sensop** operates sensors, communicators, and information systems. An **IT Tech** may be assigned.

### OPERATIONS

Operations is the set of activities which a ship is designed: research, survey, military operations, or emergency relief, transport, or other activities.

Life Support positions include **Clerk**, **Technician**, **Bookkeeper**, and **Cook**.

A **Driver** or **Vehicle Operator** has responsibility for operation and maintenance of specific vehicles or small craft.

A **Troop** is a member of a military unit assigned to the ship. Troops serve both internal security and external power projection functions.

**Marines** are elite Troops.

Operations also includes various installed facilities: labs, data banks, materials processors

### WEAPONS

Weapons covers the combined weapons and defenses of the ship.

A **Gunner** (or, on some installations, **Sensop**) operates a weapons or defense system. On some weapons, the Gunner is assisted by a **Loader**.

### DRIVES

Drives is the propulsion and power section of the ship. An **Engineer** is responsible for operation, maintenance, and repair of drives. Specialists may be assigned: **Rad Tech**, or **Drive Tech**.

The highest ranking Engineer is the Chief Engineer.

On smaller ships, an Engineer has responsibilities for all drives; on larger ships, each Engineer specializes on one specific type of drive.

### PAYLOAD

Payload is the set of passengers, freight, and specialized installations the ship carries.

A **Steward** is responsible for the welfare of the passengers. The highest ranking Steward is the **Purser**.

A **Freightmaster** is responsible for loading, securing, and offloading freight and cargo.

A **Medic** (or **Doctor**) is responsible for the health and welfare of passengers and crew.

## A CREW

Determine total crew members.

## B CREW ACCOMMODATIONS

Assign total crew accommodations tonnage.



Starship Crew

25

Starship crew icons reflect typical responsibilities within a ship staffing structure.



Crew Blank



Captain



A Pilot



B Astrogator



C Engineer



D Medic



E Steward



F Freightmaster



G Sensop



H Technician



I Drive Tech



J Rad Tech



K IT Tech



L Counsellor



M Life Spt Tech



N Cook



O Security



P Trooper



Q Marine



R Driver



S Science



T Gunner



U Loader



1 First Officer



2 Second Officer



3 Third Officer



4 Fourth Officer



Z Spacer



0 Recruit



alt B Bookkeeper



alt C Chief Engineer



alt E Purser



alt O Chief Security



alt P Trooper Vacc



alt P Trooper Leader



alt Q Marine Vacc



alt Q Marine Leader



## Starship Construction

# 26 Starship Crew Structure

### A CREW / PASSENGER TONNAGE

The tonnage for Passengers (combined High and Middle) is calculated in 19. Low Passage and Steerage are allocated separately.

The tonnage for Crew is calculated in 18A. Ship's Troops is calculated separately.

### B DEMAND

$$D = (T / P) - 5$$

**D= Passage Demand**

**T= Passenger Quarters Tons.**

Total tons allocated to passenger accommodations (but not Low and Steerage).

**P= Passengers.** Total number of available Middle and High passenger accommodations (stateroom beds).

Potential passengers evaluate a ship based on available quarters space and shared recreation space. Passage Demand is a Mod on the availability of High and Mid passengers, and on the premium the ship can charge over standard rates.

### P PREMIUM PRICING

Flux	High	Mid	Low
- 5	5,000	3,000	500
- 4	6,000	4,000	600
- 3	7,000	5,000	700
- 2	8,000	6,000	800
- 1	9,000	7,000	900
0	10,000	8,000	1,000
+1	11,000	9,000	1,100
+2	12,000	10,000	1,200
+3	13,000	11,000	1,300
+4	14,000	12,000	1,400
+5	15,000	13,000	1,500

Steerage is double the cost of Low.

#### Designing for Passenger Demand

Assign passenger tonnage based on the desired Demand level.

The specific allocation of staterooms and common areas is necessary only when deck plans are drawn.

### C COMFORT

$$C = (Q / M) - 5$$

**C= Crew Comfort (Livability)**

**Q= Crew Quarters Tons.** Total tons allocated to crew accommodations (which includes both common areas and staterooms).

**M= Crew Members.** The total assigned crew for the ship. If necessary, calculate Ship's Troops and Staff separately.

Crew quarters tonnage significantly influences crew morale, attitudes, and even sanity. Crew Comfort is a Mod on the daily Tension roll for the crew.

### T TENSION

$$T = C + FLUX$$

**T= Tension. C= Comfort**

**Roll Daily.** If T is less than Zero, every crew member Check Sanity.

#### Designing for Crew Comfort

Assign a total tonnage for crew consistent with the desired Livability level. The precise allocation of staterooms and common areas is made when (or if) deck plans are drawn for the ship).

The final ship design is evaluated for its effects on its crew and passengers.

### CALCULATE DEMAND, COMFORT, AND EASE-OF-USE

Ship designer's decisions influence the opinions of (potential) passengers and the performance of the crew.

- Calculate tonnage for Crew and Passenger Areas:
  - Passenger Stateroom Tons,
  - Crew Quarters Tons, and
  - Common Areas for Crew and Passengers.
- Determine Passenger Demand.
- Determine Crew Comfort.
- Determine Ship Ergonomics for controls.

### D SHIP ERGONOMICS

$$E = (F / C) - 5$$

**E= Ergonomic Quality**

**C= Total Consoles (in units).** Total number of Consoles installed on the ship.

**F= Free Space (in deck squares).**

The total deck squares occupied by the Consoles (= total Console Tonnage x2).

#### Control Ergonomics

Ergonomic environment affects Console users' work quality and their ability to operate without Mishap.

Control Ergonomics is a Mod on the daily Event roll for the ship..

### M MISHAP

$$M = E + FLUX$$

**M= Mishap. E= Ergonomics**

**Roll Daily.** If M is less than Zero, every console Check Quality.

**The Bridge.** A cluster of adjacent Pilot, Astrogator, (all) Sensor Consoles, and Ship's Computer is called the Bridge.

If no Bridge (Ergonomic Mod - 2).

#### Designing for Ergonomics

Assign console tonnage (at 0.5 tons per desired adjacent deck square) based on the desired level of Ergonomics.

The final ship design is abbreviated into an easily understood expression.

<b>Starship Construction</b>
<b>Quick Ship Profile</b>
<b>27</b>



### QSP QUICK SHIP PROFILE

A2 - 2 U 2 1

Mission    Hull    Config    Gs    Jump

**Mission:** Basic ship's purpose.

**Hull:** Hull ID (showing total tonnage).

**Config:** Hull configuration CBPUSAL.

**Gs:** Maximum acceleration.

For Interstellar Drives beyond Jump, prefix the Drive Letter: **Jump.** Maximum jump capability (in parsecs).  
 a Hop Drive capable of 40 parsec Hops is shown as H4

<b>1 QSP ENTRIES</b>				<b>2 QSP VEHICLE ENTRIES</b>			<b>3 QSP CREW ENTRIES</b>	
Hull	G	J	Config	Vehicle	Alternate	Crew Position	Alternate	
0		0		0		0	Recruit	
1	10	1		1		1	First Officer	
2	20	2		2	Trailer	2	Second Officer	
3	30	3		3		3	Third Officer	
4	40	4		4		4	Fourth Officer	
5	50	5		5		5		
6	60	6		6		6		
7	70	7		7		7		
8	80	8		8		8		
9	90	9		9		9		
<hr/>								
A	100		Airframe	A	ACV		Pilot	
B	200		Braced	B	Boat. Sub.		Astrogator	
C	300		Cluster	C	GroundCar		Engineer	
D	400			D			Medic	
E	500			E			Steward	
F	600			F	Winged Flyer		Freightmaster	
G	700			G	Grav Carrier		Sensop	
H	800			H			Technician	
<hr/>								
J	900			J			Drive Tech	
K	1000	0.1		K			Rad Tech	
L	1100	0.2	Lifting Body	L		Launch	IT Tech	
M	1200	0.3		M	Military Flyer		Counsellor	
N	1300	0.4	N (for NAFAL)	N		Pinnacle	Life Support	
<hr/>								
P	1400	0.5	Planetoid Hull	P	Pod		Cook	
Q	1500	0.6		Q			Security	
R	1600	0.7		R	Air/Raft	Rotor Flyer	Trooper	
S	1700	0.8	Streamlined	S		Shuttle	Marine	
T	1800	0.9		T	ATV-Tracked	Tank. Truck	Driver	
U	1900		Unstreamlined	U			Science	
V	2000	^4		V			Gunner	
W	2100	^5		W	ATV-Wheeled		Loader	
X	2200		Unknown	X				
Y	2300			Y				
Z	2400	> ^5		Z				



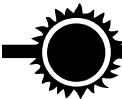
# Starship Fillform1

Base TL=

1  
....

Section	Component	Code	Comment	CP	Sq	Tons	TL	MCr	KCr
02	Mission	Ship Name							
		Mission	E-Mission	D- Qualifier	C- Type	B- Activity	A-Service		
		Mission Modifier	F- Mission Modifier						
04	Hull	A-Hull							
05		C-Configuration							
06		D-Structure							
		E-Fittings							
07	F-Jump Field								
10	Drives	Drive1-Power							
		Drive2-Maneuver							
		Drive3-Interstellar							
		Drive4-							
21	Operations								
22	CP								
23	Payload								
24	Crew								
Armor Fuel Hardpoints Weapons Defenses Sensors									
<b>Totals</b>				CP	Sq	Tons		MCr	KCr

# Starship Fillform2



2...

**SENSORS WEAPONS DEFENSES 13-14-15**

<b>02</b>	<b>Mission</b>	Ship Name	QSP
		Mission	
		Mission Modifier	

Base TL=

Section	Component	Code	Comment	CP	Sq	Tons	TL	MCr	KCr
<b>09</b>	<b>Armor</b>		Armor Layer1						
			Armor Layer2						
			Armor Layer3						
			Armor Coating						
<b>13</b>	<b>Fuel</b>		Fuel1						
			Fuel2						
			Fittings1						
			Fittings2						

	Hardpt	Stage	R = or S=		Mount	Type	TL	Q	R	E	B	S	CP	Sq	Tons	Base			
			Range	Range												TL	MCr	KCr	
<b>Hardpoints</b>		1																	
		2																	
		3																	
		4																	
		5																	
		6																	
		7																	
		8																	
		9																	
		10																	
		11																	
		12																	
<b>Ship Features</b>																			

**SubTotals** CP Sq Tons TL MCr KCr



# Starship Fillform3

3  
....

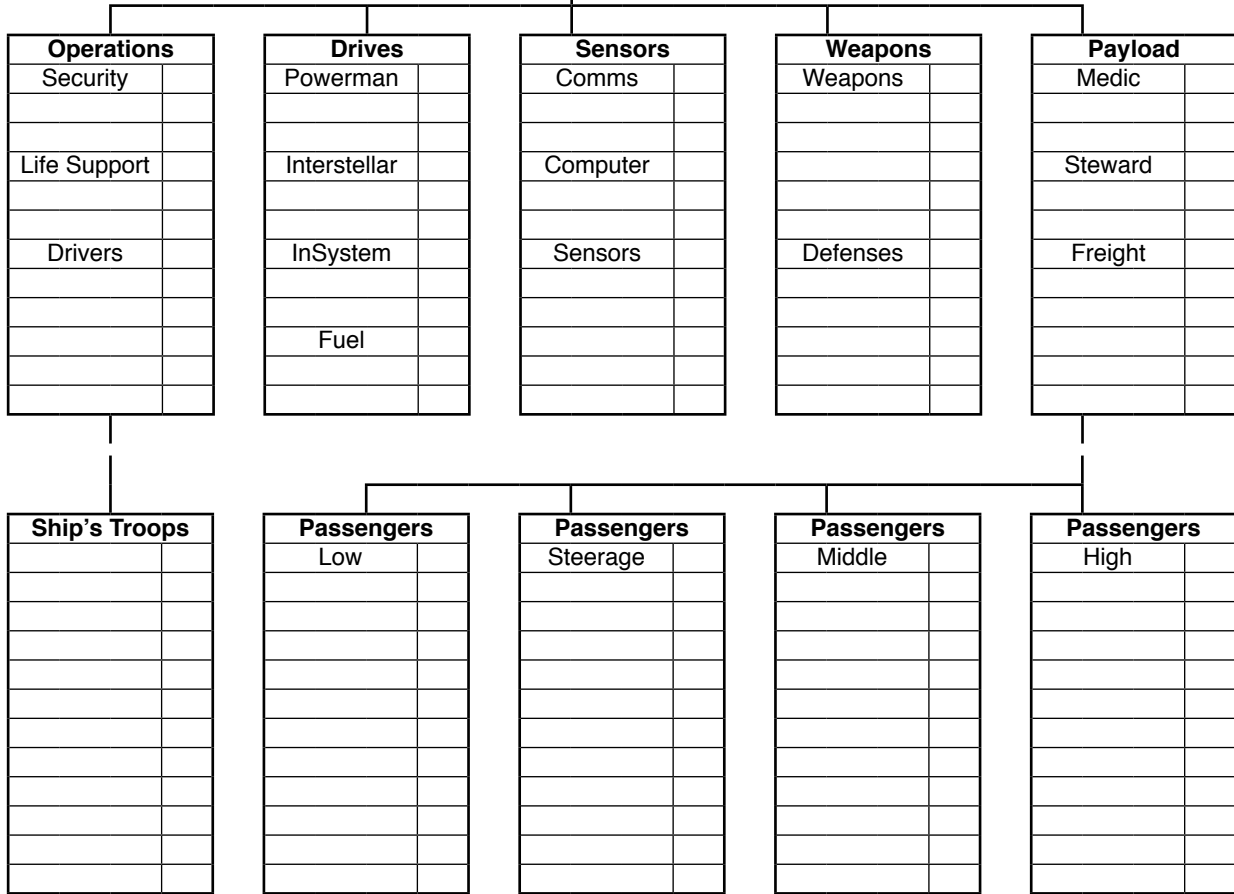
<b>02</b>	<b>Mission</b>	Ship Name	QSP
		Mission	
		Mission Modifier	

<b>24</b>	<b>Crew</b>	A-Total Crew
		B-Accommodations and Commons (Total Tons)
		C-Passenger Accommodations
		D-Troop Area Tons

Bridge	
Captain	
Pilot	
Astrogator	

Specialists	

Specialists	



<b>26</b>	<b>Evaluations</b>	<p><b>D Safe Jump</b></p> <p>Jump Field Strength</p> <p><b>S=</b></p> <p>Drive Efficiency</p> <p><b>E=</b></p> $D = \left( \frac{S}{E} \right) - K$ $X = \left( \frac{S}{E} \right) - \left( \frac{D}{K} \right) (+ Flux)$	<p><b>X Initiation</b></p> <p>Diameters from Gravity Source</p> <p><b>D=</b></p> <p>Jump Drive Engineer S+K</p> <p><b>K=</b></p>	<p><b>D Demand</b></p> <p>Total Passenger Tons</p> <p><b>T=</b></p> <p>Passengers</p> <p><b>P=</b></p> $D = \left( \frac{T}{P} \right) - 5$ <p><b>Passenger Pricing</b> is based on Demand</p>	<p><b>C Comfort</b></p> <p>Total Crew Quarters Tons</p> <p><b>Q=</b></p> <p>Crew Members</p> <p><b>M=</b></p> $C = \left( \frac{Q}{M} \right) - 5$ <p><b>Tension</b></p> $T = \frac{C}{M} + Flux$	<p><b>E Ergonomics</b></p> <p>Total Consoles</p> <p><b>C=</b></p> <p>Free Space (Deck Squares)</p> <p><b>F=</b></p> $E = \left( \frac{F}{C} \right) - 5$ <p><b>Mishap</b></p> $M = \frac{E}{C} + Flux$
-----------	--------------------	--	--	--	---	--

SMALL SHIP COMBAT CARD						QSP:				Mission	Hull	Config	Gs	Jump	for small craft and ships to 700 tons		
Ship Name and Data																	
LOC	Coating	1	2	3	Tons	+4	+3	+2	+1						HP	Wpn	
-6						1	1	1	1						12		
-5						2	2	2	2						10		
-4						3	3	3	3						8		
-3						4	4	4	4						6		
-2						5	5	5	5						4		
-1						6	6	6	6						2		
0										0						1	
+1										1						2	
+2										2						3	
+3										3						4	
+4										4						5	
+5										5						6	
										6						7	
																8	
																9	
																10	
																11	

Small Ship Combat Card

T5-018

SHIP COMBAT CARD						QSP:				Mission	Hull	Config	Gs	Jump	for ships to 2400 tons		
Ship Name and Data																	
LOC	Coating	1	2	3	Tons	-12	-11	-10	-9	-8						HP	Wpn
-15						1	1	1	1	1						24	
-14						2	2	2	2	2						22	
-13						3	3	3	3	3						20	
-12						4	4	4	4	4						18	
-11						5	5	5	5	5						16	
-10						6	6	6	6	6						14	
-9										-7	-6	-5	-4	-3	12		
-8										1	1	1	1	1	10		
-7										2	2	2	2	2	8		
-6										3	3	3	3	3	6		
-5										4	4	4	4	4	4		
-4										5	5	5	5	5	2		
-3										6	6	6	6	6	1		
-2						-2	-1	0	+1	+2						3	
-1						1	1	1	1	1						4	
0						2	2	2	2	2						2	
+1						3	3	3	3	3						1	
+2						4	4	4	4	4						3	
+3						5	5	5	5	5						5	
+4						6	6	6	6	6						7	
+5						+7	+6	+5	+4	+3						9	
+6						1	1	1	1	1						11	
+7						2	2	2	2	2						13	
+8						3	3	3	3	3						15	
+9						4	4	4	4	4						17	
+10						5	5	5	5	5						19	
+11						6	6	6	6	6						21	
+12						+12	+11	+10	+9	+8						23	
+13						1	1	1	1	1						25	
+14						2	2	2	2	2							
+15						3	3	3	3	3							
+16						4	4	4	4	4							
						5	5	5	5	5							
						6	6	6	6	6							

Ship Combat Card

T5-018



# The Elements Of The Shipsheet

---

The ShipSheet is a unique record of the starship, the locations of its component drives, weapons, and installations, and how damage affects them all.

ShipSheet Entries are custom-filled based on the ship designer's concepts within the constraints of the Ship Design Rules. Each ship is divided into a series of Hit Locations, which are further detailed as 6-entry Compartments. The various components of the ship are assigned to the various Compartments and the Sub Entries within the Compartments.

## The Combat Process

Space combat Hits on the ship are allocated by the Hit Location Table by Flux. Assuming the attack is aimed at Hit Location 0, Flux may distribute it to any location from -5 to +5 (although still most likely to Hit Location 0). The attack may be aimed at any Hit Location available, including several specifically identified as Center of Ship, Hot Spot, Active Weapon, or Active Sensor.

When an attack reaches a Hit Location, the specific SubCompartment table (with the same Hit Location Number) is consulted with 1D for a result 1 to 6. That Sub Entry or Line Number is Destroyed.

**Damaged Instead.** It is possible that Immediate Damage Control may convert the result to Damaged (and it may remain operational).

**Later Repairs.** After the battle is over, Destroyed or Damaged Locations may be repaired.

## A THE HIT LOCATION TABLE

Hit Locations are identified by a Number and have a corresponding Compartment table.

### Available Hit Locations

Using the Location And Compartment Tonnage table, note the number of Compartments available. Select that number of Hit Locations and enter the tonnage on the line for each.

Cluster and Braced Cluster Hulls may use any Hit Locations, and they need not be adjacent.

All other Hulls must assign adjacent Locations (although

exceptions are possible).

**Armor.** Enter the AV Armor Value for each layer (Layer1 is leftmost on the table). The column labelled C should contain any Coating.

Armor can be repositioned, subject to the Gradual Restriction: Armor Layers at a Hit Location cannot exceed Armor Layers at adjacent Hit Locations by more than 1.

For example, instead of all Hit Locations being assigned the same armor, one layer at Hit Location -4 can be re-allocated to Hit Location -3.

**Wings and Fins.** Hulls with Wings assign two empty Hit Locations as Wings (a Winged Hull is symmetrical; the second Wing occupies the negative Hit Location of the first).

Hulls with Fins may assign an empty Hit Location as Fins (including between two other Compartments).

**Drives.** If the ship has a Jump Bubble, the Drives must be in Hit location -1, 0, or +1.

If the ship has a Jump Grid or Jump Plates, Drives may be in any Hit Location.

## B THE HARDPOINTS TABLE

Enter the Type of Weapon, Defense, or Sensor for each Hardpoint. Sensors with Surface or Antenna mounts can be inserted in blank spaces.

## C THE COMPARTMENTS TABLES

For each Compartment table (numbered to correspond to a Hit Location), note the available tonnage for the compartment and fill the Compartment with entries.

For example, a 1000-ton Hull-K has 11 Compartments

---

## SS COMPLETING THE SHIPSHEET

### A. Hit Locations

Enter Ship Name and QSP

Note Available Hit Locations

Enter Tons for Each Hit Location

### B. Hardpoints

Enter Hardpoint Type for Each Hardpoint

### C. Compartments and SubCompartments

For each Hit Location.

Allocate elements to each Compartment and Sub.

Consult the Compartment table and identify the tonnage for each compartment. Insert a name for each compartment.

---

## IA IMMEDIATE ACTION DAMAGE CONTROL

Immediate Action is the trained automatic response to a problem, including damage due to combat, without regard to diagnosis or probable cause.

When an Entry (a Line Number) is Destroyed, Immediate Action may convert the result to Damaged.

### Check Double Skill (2D)

Use any appropriate skill.

Success converts the damage to Severity= Easy 1D and the component remains operable.

---

of 90 tons each; the six entries in the Compartment table are about 14 tons each.

Enter equipment, fittings, or mechanisms in the Compartment table. Larger mechanisms may be split across two or more entries.

**Compartment Variation.** Some compartments (and Sub-Compartments) may vary in tonnage; with their excess balanced by shortages in nearby locations.

**Hardpoints.** Any weapon, defense, or sensor occupying a Hard Point should be assigned to Entry 1 of the Compartment. If the Mount or item is larger than the entry tonnage, it is extended to adjacent sequential entries. If necessary, the Mount or entry must allocate additional tonnage to adjacent Hit Locations.

**Firmpoints.** Up to three Firmpoints can be substituted for a HardPoint. After the first, any weapon, defense, or sensor occupying a Firm Point should be assigned to Entries 2 and 3)of the Compartment.

### Targetting

Mark locations to allow attacker targetting: Hot Spots, Center of Ship, Firing Weapons, and Operating Sensors:

### Extended Objects

Some items are Extendable. When retracted, they are in the normal Hit location. When extended, they occupy a extend into an (otherwise) unoccupied Hit Location.

More than one Extended Object may extend into the same Hit Location.

HULL LOCATION AND COMPARTMENT TONNAGE							
Hull	Tons	Hit	Compartment	Sub	Span		
		Locations	Tons	Tons	Lower	Upper	
A	100	5	20	3	-4	+4	
B	200	8	25	4	-4	+4	
C	300	8	35	5	-4	+4	
D	400	8	45	6	-4	+4	
E	500	8	55	7	-4	+4	
F	600	9	65	9	-4	+4	
G	700	9	75	11	-4	+4	
H	800	11	70	12	-5	+5	
J	900	11	80	13	-5	+5	
K	1000	11	90	14	-5	+5	
L	1100	11	100	16	-5	+5	
M	1200	13	100	16	-6	+6	
N	1300	13	100	16	-6	+6	
P	1400	15	100	16	-7	+7	
Q	1500	15	100	16	-7	+7	
R	1600	17	100	16	-8	+8	
S	1700	17	100	16	-8	+8	
T	1800	19	100	16	-9	+9	
U	1900	19	100	16	-9	+9	
V	2000	21	100	16	-10	+10	
W	2100	21	100	16	-10	+10	
X	2200	23	100	16	-11	+11	
Y	2300	23	100	16	-11	+11	
Z	2400	24	100	16	-11	+11	

### TARGET POINTS

Description	Compartment
Center Of Ship	Hit Location Zero.
Hot Spot	a Power System or Drive.
Active Sensor	an Active Sensor.
Specific Sensor	a Specific Type Active Sensor
Active Weapon	a Firing Weapon.
Specific Weapon	a Specific Type Firing Weapon
Bridge	the Bridge.

### Deployable Mounts

Some items are in Deployable mounts. When deployed, they are separate objects at Location=0 on a separate Hit Location Table.

### SHIPSHEETS

The Small ShipSheet supports small craft and ships up to 700 tons.

The standard ShipSheet supports any size ship, but is optimized for larger ships 700 to 2400 tons.

POD LOCATION AND COMPARTMENT TONNAGE							
Pod	Tons	Hit	Compartment	Sub	Span		
		Locations	Tons	Tons	Lower	Upper	
A1	10	1	10	2	--	0 --	
A2	20	1	10	2	--	0 --	
A3	30	2	15	3	-1	+1	
A4	40	3	15	3	-2	+2	
A5	50	3	15	3	-2	+2	
A6	60	4	15	3	-3	+3	
A7	70	4	15	3	-3	+3	
A8	80	4	20	3	-4	+4	
A9	90	5	20	3	-4	+4	

### Pod and Compartment Information

**Hull.** Hull Code.  
**Pod.** Pod Code.  
**Hit Locations.** The number of available Hit Locations within the Hull. Hit Locations are Compartments and are numbered (as defined by Span) from - 11 through +11.  
**Compartment Tons.** Allowable tons per Compartment (although some variationis permitted).  
**Sub Tons.** Usual or typical value for tons assigned to each 1D entry in the Compartment.  
**Span.** Range of available Hit Locations (exceptions apply). Cluster and Braced Cluster may use any Hit Locations -11 to +11. Wings may be placed outside the Span (but adjacent to a filled Compartment). Fins may occupy an empty Compartment adjacent to, or between filled Compartments.



7.50 (8.00)

<b>SMALL SHIP COMBAT CARD</b>					<b>QSP:</b>	Mission	Hull	Config	Gs	Jump	for small craft and ships to 700 tons	
Ship Name and Data												
LOC	Coating	1	2	3	Tons	<b>+4</b>	<b>+3</b>	<b>+2</b>	<b>+1</b>		HP	Wpn
-6						1	1	1	1		12	
-5						2	2	2	2		10	
-4						3	3	3	3		8	
-3						4	4	4	4		6	
-2						5	5	5	5		4	
-1						6	6	6	6		2	
0										<b>0</b>	1	1
+1						<b>-4</b>	<b>-3</b>	<b>-2</b>	<b>-1</b>	1	2	2
+2						1	1	1	1	2	3	3
+3						2	2	2	2	3	4	4
+4						3	3	3	3	4	5	5
+5						4	4	4	4	5	7	7
						5	5	5	5	6	9	9
						6	6	6	6		11	11

Small Ship Combat Card

T5-018



7.50 (8.00)

# SHIP COMBAT CARD

**QSP:**

Mission

Hull

Config

Gs

Jump

for ships to  
2400 tons

Ship Name and Data

LOC	Coating	1	2	3	Tons
-15					
-14					
-13					
-12					
-11					
-10					
-9					
-8					
-7					
-6					
-5					
-4					
-3					
-2					
-1					
0					
+1					
+2					
+3					
+4					
+5					
+6					
+7					
+8					
+9					
+10					
+11					
+12					
+13					
+14					
+15					
+16					

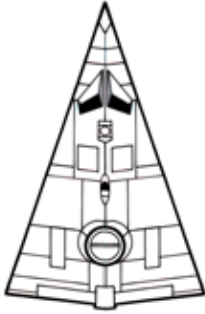
<b>-12</b>		<b>-11</b>		<b>-10</b>		<b>-9</b>		<b>-8</b>	
1		1		1		1		1	
2		2		2		2		2	
3		3		3		3		3	
4		4		4		4		4	
5		5		5		5		5	
6		6		6		6		6	
<b>-7</b>		<b>-6</b>		<b>-5</b>		<b>-4</b>		<b>-3</b>	
1		1		1		1		1	
2		2		2		2		2	
3		3		3		3		3	
4		4		4		4		4	
5		5		5		5		5	
6		6		6		6		6	
<b>-2</b>		<b>-1</b>		<b>0</b>		<b>+1</b>		<b>+2</b>	
1		1		1		1		1	
2		2		2		2		2	
3		3		3		3		3	
4		4		4		4		4	
5		5		5		5		5	
6		6		6		6		6	
<b>+7</b>		<b>+6</b>		<b>+5</b>		<b>+4</b>		<b>+3</b>	
1		1		1		1		1	
2		2		2		2		2	
3		3		3		3		3	
4		4		4		4		4	
5		5		5		5		5	
6		6		6		6		6	
<b>+12</b>		<b>+11</b>		<b>+10</b>		<b>+9</b>		<b>+8</b>	
1		1		1		1		1	
2		2		2		2		2	
3		3		3		3		3	
4		4		4		4		4	
5		5		5		5		5	
6		6		6		6		6	

HP Wpn

24  
22  
20  
18  
16  
14  
12  
10  
8  
6  
4  
2  
1  
3  
5  
7  
9  
11  
13  
15  
17  
19  
21  
23  
25

Ship Combat Card

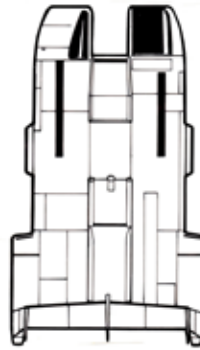
T5-018



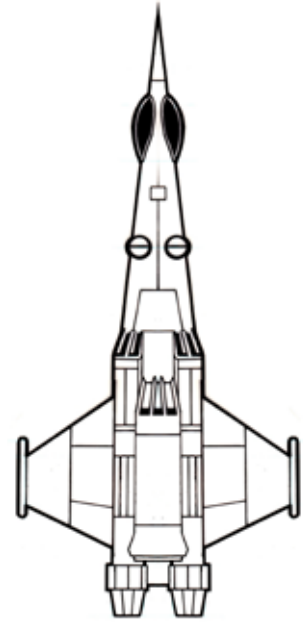
**Scout/Courier (S-AL22)**



**Free Trader (A-BS11)**



**Far Trader (A2-BS12)**



**Corvette (E-EA53)**

### ADVENTURE-CLASS STARSHIPS 1

Typical Starships Design plans for each are available for Cr100. The ship's Armor Value (AV) is rated equal to the ship's TL, unless otherwise stated. Images not to scale..

Ships are blank slates: beyond basic performance and tonnage specifications, their internal deck plans and their specific fittings vary based on specific assignments, missions, and circumstances. Ship descriptions detail only the most common features.

#### Scout/Courier (S-AL22)

Using a 100-ton TL10 lifting body hull, the scout/courier is intended for exploration, survey, and courier duties, with many in service throughout known space. It mounts drives giving it jump-2 and 2-G acceleration. Installed on its bridge is a computer Model/1bis and attack-range sensors (communicator, EMS, and scope). Detached duty versions have an open lounge where survey sensors would typically go.

The Scout, by its nature, is built as a one-person operation: a single crew person can handle all operations, albeit inefficiently. On the other hand, the Scout can carry several more in relative comfort.

#### Free Trader (A-BS11)

Using a 200-ton TL9 streamlined hull, the free trader is an elementary interstellar merchant ship plying the space lanes carrying cargo and passengers. It is fitted with drives giving it jump-1 and 1-G acceleration. Fuel tankage supports one jump-1 and two months of power plant operations. Fuel scoops are included. Installed on the bridge is a computer Model/1 and the default sensor suite.

Cargo capacity, the ship's most important feature, is 82 tons, plus a mail vault. The hull is streamlined, and can land on uneven terrain. The free trader requires a crew of four: pilot/astrogator, engineer, medic, and steward.

#### Far Trader (A2-BS12)

Using a 200-ton TL 10 streamlined hull, the far trader ranges far and wide, and deals with every world it finds. Even amber zones and red zones are not considered off limits by its captains, provided there is profit to be made and the risk of being caught is slight. It has drives capable of jump-2 and 1-G acceleration. Fuel tankage supports jump-2 and two months of operation, and the ship incorporates fuel scoops and fuel intakes for wilderness refueling. The

bridge is standard and has a computer Model/ 1bis and a basic sensor suite. There are six hardpoints, but no weapons are mounted.

Like the free trader, the far trader is built around its cargo bay, in this case 78 tons, plus passenger staterooms. A single air/raft is carried for various ship duties. The ship is streamlined, and can land on uneven terrain.

The far trader requires a crew of four: pilot/astrogator, two engineers, and steward.

#### Corvette (E-EA53)

Built on a 500-ton TL-13 winged airframe, the Corvette is the Navy's equivalent of the Scout/Courier, only bigger, faster, and better armed. It mounts drives capable of jump-3 and 5G, with fuel tankage to support both jump and three months of operations. It has fuel scoops to for gas giant skimming. Adjacent to the bridge is a Model/3 computer and an extensive sensor suite. There are five hardpoints filled with an array of powerful weapons.

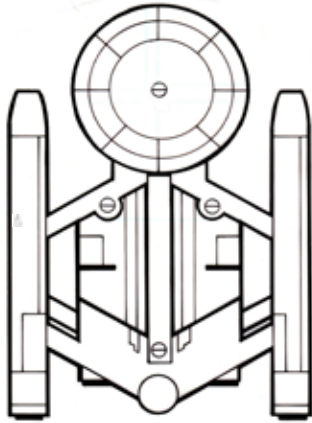
#### Yacht (Y-EU42)

Built on a 500-ton TL14 unstreamlined hull, the yacht is a noble's plaything for entertaining friends and undertaking political or commercial missions. It mounts drives giving it jump-2 and 4-G. Fuel tankage supports five months of power plant operations and allows two successive jump-2; it incorporates fuel intakes for refueling from a water source. Adjacent to the bridge is a Model/3 computer. Added to a basic sensor suite is a neutrino detector, stealth mask, and a standard proximeter.

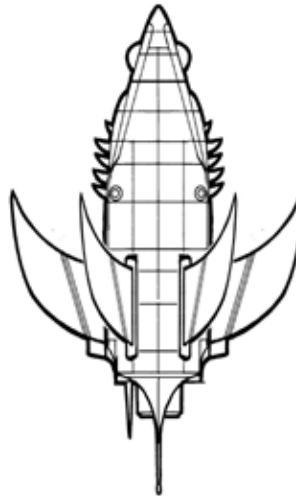
The yacht is built around its luxurious staterooms, including one double stateroom suite for the owner. There is five hardpoints, but no weaponry is installed. There are three ship's vehicles: an air/raft, a 30-ton ship's boat, and an ATV. The ship's boat is fitted to ferry the ATV from orbit to surface



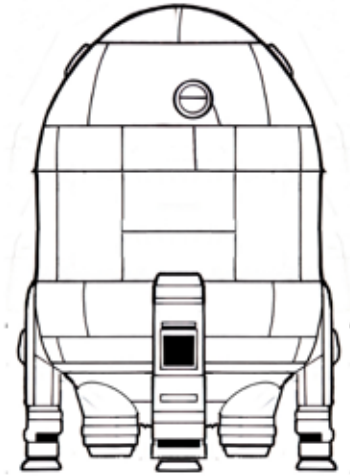
**Yacht (Y-EU42)**



**Frigate (G-FB43)**



**Corsair (P-GA42)**



**Cruiser (C-VS23)**

and back. Cargo capacity is 20 tons. The yacht is unstreamlined, and is capable of tarmac and water landings only. The yacht requires a minimum crew of four: pilot/astrogator, three engineers, and a steward/medic. In practice, it carries several more stewards.

#### **Frigate (G-FB43)**

Built on a 600-ton TL-11 braced cluster hull, the frigate is designed to support the cruiser, but also take independent action. Produced with a variety of interchangeable mission-related subhulls, the frigate can be sent on a long-range sensor sweep mission, return to base and change subhulls, and then return to duty as a missile ship, a hospital ship, or even a communications ship. At its core, the frigate includes drives that support up to Jump-3 and 4G, but the performance and endurance of any particular example will depend on the subhulls fitted.

#### **Corsair (P-DA42)**

Built on a 400-ton TL-12 winged airframe, the corsair is a pirate ship, ranging the star lanes in search of vulnerable freighters and their cargoes. Its drives support jump-2 and 4-G with fuel tankage for one jump and four months of operations.

The keys to the corsair are its firepower and its sensor suite, which varies widely between ships. It has four hardpoints, usually allocated to several bay weapons and powerful sensors.

#### **Cruiser (C-VS23)**

Built on an immense 2000-ton TL-12 streamlined hull, the cruiser is the workhorse of the Navy, assigned to patrol the trade routes (and beyond), keeping the peace and showing the flag. It mounts drives for jump-3 and 2-G with supporting fuel tankage for a jump and two months operations.

Equipped with a Model/5 computer and extensive sensors, it is also bristling with weapons filling its 20 hardpoints. Internal hangars carry an array of cutters and fighters to ex-

pand its reach, and unlike many ships, the cruiser carries crew to man every weapon on a few moments notice.

Equally important is the ship's platoon: more than 20 trained marines capable of defending the ship; boarding enemy vessels, and even operating on their own on world surfaces.

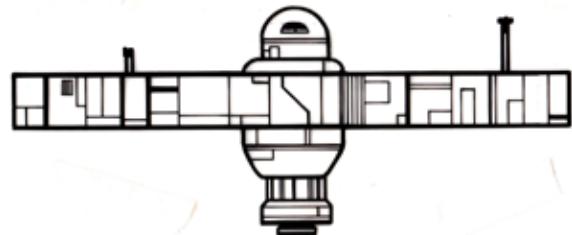
#### **Laboratory Ship (L-DC12)**

Using a 400-ton TL15 cluster hull, the laboratory ship is a mobile base for scientific analysis and investigation. It mounts drives for performance of jump-2 and 1-G acceleration. Fuel tankage supports a single jump-2 and five months of operations. Installed on the bridge is a Model/2 computer, and a powerful sensor suite.

The unusual hull of the lab ship allows spin-generated centrifugal gravity: to avoid the interference that gravitics might produce on some sensitive tests of experiments.










About half the ship is allocated to laboratory space and sample storage. The ship has four hardpoints, but no weapons are installed. There is one 40-ton pinnacle in a vehicle bracket, and two air/rafts.

The lab ship requires a crew of five: pilot, astrogator, two engineers, and medic, although most are also mission-related researchers as well.



**Laboratory Ship (L-DC12)**

**Interplanetary or In-System Drives**

Y DRIVE TONS Drive EP									
	M	G	R	H	O1	O2	O3	T	N
A 100	2	9	2	1	20	10	1	2	2
B 200	3	18	4	2	40	20	2	3	4
C 300	5	27	6	3	60	30	3	5	6
D 400	7	36	8	4	80	40	4	7	8
E 500	9	45	10	5	100	50	5	9	10
F 600	11	54	12	6	120	60	6	11	12
G 700	13	63	14	7	140	70	7	13	14
H 800	15	72	16	8	160	80	8	15	16
J 900	17	81	18	9	180	90	9	17	18
K 1000	19	90	20	10	200	100	10	19	20
L 1100	21	99	22	11	220	110	11	21	22
M 1200	23	108	24	12	240	120	12	23	24
N 1300	25	117	26	13	260	130	13	25	26
P 1400	27	126	28	14	280	140	14	27	28
Q 1500	29	135	30	15	300	150	15	29	30
R 1600	31	144	32	16	320	160	16	31	32
S 1700	33	153	34	17	340	170	17	33	34
T 1800	35	162	36	18	360	180	18	35	36
U 1900	37	171	38	19	380	190	19	37	38
V 2000	39	180	40	20	400	200	20	39	40
W 2100	41	189	42	21	420	210	21	41	42
X 2200	43	198	44	22	440	220	22	43	44
Y 2300	45	207	46	23	460	230	23	45	46
Z 2400	47	216	48	24	480	240	24	47	48
N2 2600	50	234	52	26	520	260	26	50	52
P2 2800	54	252	56	28	560	280	28	54	56
Q2 3000	58	270	60	30	600	300	30	58	60
R2 3200	62	288	64	32	640	320	32	62	64
S2 3400	66	306	68	34	680	340	34	66	68
T2 3600	70	324	72	36	720	360	36	70	72
U2 3800	74	342	76	38	760	380	38	74	76
V2 4000	78	360	80	40	800	400	40	78	80
W2 4200	82	378	84	42	840	420	42	82	84
X2 4400	86	396	88	44	880	440	44	86	88
Y2 4600	90	414	92	46	920	460	46	90	92
Z2 4800	94	432	96	48	960	480	48	94	96
MCr/ton=	2	0.5	0.5	1	2	1	1	0.5	

**COMBINING DRIVES**

Standard Drives are lettered A through Z (omit I and O to avoid confusion).

These 24 types are the only practical sizes easily constructable.

Drives can be ganged and their combined output harnessed using Nexi.

A **Nexus** (plural = **Nexi**) connects the output up to 9 identical mechanisms, allowing the joined devices to produce greater output.

For example, an N2 or NN G-Drive consists of two N G-Drives connected by a Nexus. The nexus is basically a connection; it adds no tonnage or cost.

A Nexus can create other: N3, K4, Z9. An A9 drive (consisting of nine Rocket-A drives and a nexus) outputs 900 EP, is (9 \* 2)= 18 tons, and costs MCr9.

Combined drives can themselves be combined (designated by a prefix digit): 4A4 indicates (4 x 4 = ) 16 Rocket-A. The largest drive available under ACS is 9Z9 (= 9 x 9 = ) 81 Drive-Z.

**DRIVE COMBINATION EXAMPLES**

Plant		tons	EP	
M-Drive	A	2	100	smallest possible
M-Drive	A9	18	900	
M-Drive	9A9	162	8,100	
G-Drive	N	117	1,300	
G-Drive	N2	234	2,600	
G-Drive	9N2	2,106	23,400	
Rocket	Z	90	2,400	
Rocket	Z9	810	21,600	
Rocket	9Z9	7,290	194,400	largest possible

**DRIVE POTENTIAL**

**The Power System Rule.** When installed in a starship, the Potential for an installed Power System must at least equal the greater Drive Potential of the interstellar and interplanetary drives.

Drive Potential for a specific drive is the EP (Energy Points) per Hull Ton; ignore fractions and round down.

The Starship Drive Potential table pre-calculates values for most common combinations of drive and hull.

# How Maneuver Works

Starships and spacecraft move within a star system using one of the several available in-system or interplanetary drives.

The activity that carries ships from world surface to orbit and between worlds in a system is collectively called maneuver.

**Gravity-Based Maneuver Drives.** The three commonly available in system drives are Maneuver (M-Drive), Gravitic (G-Drive), and Lifters (sometimes Z-Drive). A similar technology is the basis for Not As Fast As Light (N-Drive). Because the M-Drive carries the word Maneuver in its title, various references to Maneuver Drives can be confusing: the word may refer to a specific type of drive (the Maneuver Drive or M-Drive), or to a general class of drives that propel ships. The meaning can usually be derived from context.

**Non-Gravity-Based Drives.** In addition, several non-gravity based In-System drives are available (although not described here) and include: Rocket, HEPlaR, Orion, and Dean.

## HOW MANEUVER WORKS

Elementary instruction systems explain:

Maneuver drives interact with gravity to move spaceships. Parts of the drive reach out and grab the gravity of a world or a star and push against it to make the ship move. Isn't that neat?

Subsequent texts become increasingly more complex.

The M-Drives, G-Drive, Z-Drive, and N-Drive are Gravity-Based Vector Movement Drives. They propel ships between world surfaces and orbits, and between worlds.

**Maneuver Drives Are Gravity-Based.** The theoretical underpinnings of Maneuver involve the strength of gravitational fields from stars and worlds. The practical result is that In-System Drives operate within specific distances of stars

and worlds, and are essentially unusable beyond those distances.

**Compensators.** Integral to Maneuver Drives, Gravitic Drives, and Lifters are an inertial compensation component which counteracts the effects of acceleration on occupants of the ship.

## VECTOR MOVEMENT

Ships using Maneuver Drives (and most other In-System Drives) move using Vector Movement.

Maneuver drives produce position changes as vectors with a specific speed and direction. Changes in speed or direction involve adding vectors over time. Movement between locations involves acceleration for the initial portion of the route, an optional period of coasting, and deceleration to the destination.

## THE GRAVITY-BASED DRIVES



M



G



Z



N

### M-DRIVE

Maneuver is the standard in-system ship drive. It interacts with gravity sources to produce vectored movement. It requires a separate Power Plant.

M-Drives are manufactured with performance levels from 1G to 9G.

M-Drives are subject to the 1000D limit: beyond 1000D from a gravity source, the drive operates at only about 1% efficiency.

### G-DRIVES

Gravitic is a less efficient version of the M-Drive. Usually powered by an integral FusionPlus, it does not require a separate Power Plant.

G-Drives are manufactured with performance levels from 1G to 9G.

G-Drives are governed by the 10D limit, and are best suited to operation near worlds (or near stars). Beyond the 10 D limit, G-Drives operate at 1% efficiency.

### LIFTERS Z-DRIVES

Lifters are anti-gravity hull plates that negate local gravity and provide a limited ability to change location.

Lifters produce only a limited lateral movement vector and are not suited to long distance travel on a world. Lifters have an effective horizontal top speed of 50 kph.

Lifters operate optimally within 1D of a gravity source; they are ineffective at distances beyond 1D.

### NAFAL N-DRIVES

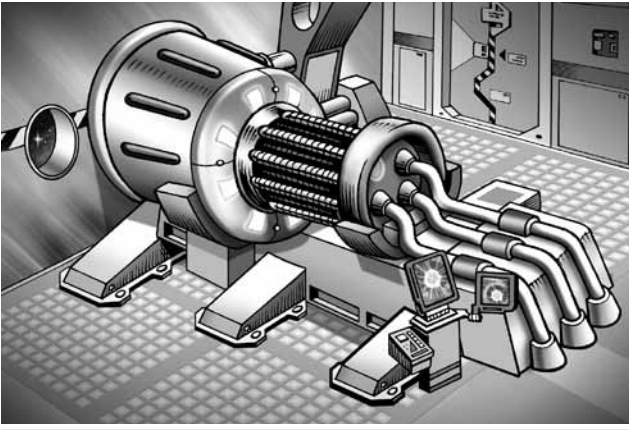
Not As Fast As Light Drives are energy-efficient gravity-based interstellar drives suitable for long-term acceleration to near-light speeds..

N-Drives are manufactured with performance levels from 0.1G to 0.9G (drive potential 1 for NAFAL = 0.1G).

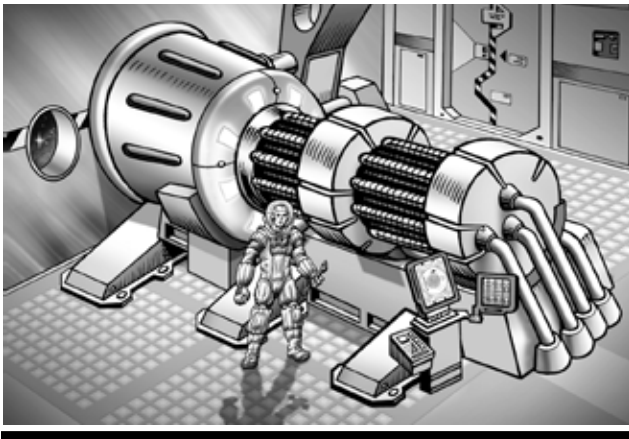
The N-Drive operates on the same general gravity manipulation principles as the G-Drive and M-Drive.



## GRAVITIC DRIVE



## MANEUVER DRIVE



**Range Bands.** Where possible, Vector Movement is ignored: actual acceleration, coasting, and deceleration are abbreviated to a simple description of movement between range bands. Where necessary, the vector movement courses of ships are drawn on paper as the ships interact.

**Vector= Length and Direction.** A Vector is an arrow drawn to represent the distance and direction a ship moves every turn. In the next turn (if no changes are made) the ship moves the same distance in the same direction. It continues to do the same in every following turn.

### MANEUVER SPEEDS NEAR WORLD SURFACES

Flux	Speed	Speed	Comment
-6	5 kph	1	Creep
-5	10 kph	2	Crawl
-4	20 kph	3	Xslow
-3	30 kph	4	Vslow
-2	50 kph	5	Slow
-1	100 kph	6	Standard
0	300 kph	7	Cruise
+1	500 kph	8	Fast
+2	700 kph	9	Vfast
+3	1000 kph	10	Sonic
+4	2000 kph	11	Ssonic
+5	3000 kph	12	Hsonic
+6	5000 kph	13	Xhsonic

**Course Changes.** A ship can change course by applying a new arrow [vector] of a length equal to the desired change and in a new direction.

**Adding Vectors.** Vectors are added by placing the new vector with a new length and direction at the head of the current vector and drawing a new vector from the tail of the previous vector to the head of the new vector.

For example, if the current vector is 25mm long and pointed directly North, adding a new vector 25mm long and pointed West will create a new vector about 35 mm long and pointed North West.

For example, if the current vector is 25mm long and pointed directly North, adding a new vector 25mm long and pointed directly South will bring the ship to a full stop.

### Movement Strategies

The D limits inspire several movement strategies.

**Accelerate-Decelerate.** Within proper D limits, a ship can use the standard movement strategy: accelerate to the midpoint to the destination and then decelerate to the destination. Note that while a ship may be beyond the D limit of a world, it may still be within the D limit of the nearby star.

Note that this requires the destination "D" to allow sufficient distance to decelerate! Accelerating for 100 diameters of Sol does not mean you can decelerate to a stop when you reach 100D of Pluto.

**Accelerate-Coast-Decelerate.** If a course carries a ship beyond the appropriate D limit, a different strategy is required: accelerate to the D limit, coast beyond the D limit until the ship reaches the D limit of the destination, and then decelerate to the destination.

**Accelerate to Jump Point.** Jump Points do not themselves have D limits. A strategy is: accelerate to the D limit, then coast to the jump point and jump. Note that the ship will emerge from jump with its movement vector; properly computed, the ship can then coast to the D limit of the destination and decelerate to the destination.

**NAFAL Acceleration.** The basic N-Drive strategy is: accelerate directly away from a star (or world) and continue acceleration until the ship reaches its vector limit, then coast until it nears (or identifies) its destination, and decelerate.

### OPERATION IN ATMOSPHERES

The performance of maneuver drives in atmosphere depends on the drive and on the specific hull configuration.

**From Place To Place.** Ships can move from one location to another on a world by flying there, or by moving to orbit and then returning to the surface.

It is often faster to boost to orbit and then return to the surface in a new location than to travel near the surface.

### To Orbit or From Orbit

The most common use of drives in atmosphere is transfer from surface to Orbit S=3 or orbit to surface.

**Drives.** The ship may use Maneuver, Gravitic, Lifters, NAFAL, or no Drive (for re-entry). If the Ship cannot produce acceleration equal to local gravity, the ship impacts the surface with Speed= 13. Note that Wings may allow an acceleration that the Drive itself cannot produce.

**Meteoric: Fast Boost or Fast Re-Entry**

A hull can move from surface to orbit (boost) or orbit to surface (re-entry) relatively quickly.

To Orbit in Minutes = World Size + Atm

**Friction.** Boost imposes Friction-1,000; Re-Entry imposes Friction-2,000.

Friction applies if Atmosphere 2+, modified by the Hull Configuration Friction Multiplier.

For example, the streamlined Fat Trader March Harrier arrives at Lanth A879533-B Siz=8 Atm=7. It can perform Fast Reentry from orbit to the surface in about 15 minutes. Re-entry friction is 2000 / 3 = 666.

If the world is a gas giant, the ship travels from orbit to Range R in R minutes. For example, from the Cloud Deck (R=0) to 50 km down (R=7) in seven minutes.

**Typical: Slow Boost or Slow Re-Entry**

A hull can move from orbit to surface (or surface to orbit) relatively slowly.

To Orbit in Hours = World Size

If the world is a gas giant, the ship travels from Orbit to Range R= in R hours.

**Friction.** Boost imposes Friction-100; Re-Entry imposes Friction-200.

Friction applies if Atmosphere 2+, modified by the Hull Configuration Friction Multiplier.

Streamlined Fat Trader March Harrier can move Slow Reentry from orbit to the surface in about 8 hours. Re-entry friction is 200 / 3 = 66.

**Safe Boost or Safe Re-Entry**

A hull can move from orbit to surface (or surface to orbit) using extreme caution.

To Orbit in Hours = 5 xWorld Size

If the world is a gas giant, the ship travels from orbit to Range R= in 5xR hours.

**Friction.** The ship encounters no friction heating.

**Gas Giant Fuel Skimming.** A ship which moves to a layer of gas giant atmosphere of a gas giant which contains clear H2 can fill its fuel tanks at the standard rate for its scoops. A ship in a layer other than clear H2 can fill its fuel tanks at half rate.

**LIFTERS Z-DRIVES**

Lifters are anti-gravity hull plates that negate local gravity and provide a limited ability to change location.

Standard Lifters produce only a limited lateral movement vector and are not suited to long distance travel on a world. Lifters have an effective horizontal top speed of Speed-4 (about 25 kph).

Lifters operate optimally within 1D of a gravity source; they are ineffective at distances beyond 1D.

**ATMOSPHERIC FRICTION**

Operation	Heat Effect	Speed	Drives		
Fast Boost	1,000	16	MG	RHOT	Boost
Slow Boost	100	13	MG	RHOT	
Safe Boost	0	5	MGZ	T	
Fast Re-Entry	2,000	16	MG	RHOT	Re-Entry
Slow Re-Entry	200	13	MG	RHOT	
Safe Re-Entry	0	5	MGZ	T	
Supersonic Flight	64	11	MG	RHOT	Flight
Subsonic Flight	0	7-8-9	MG	T	
Slow Flight	0	4-5-6-7	G	T	
Repositioning	0	1-2-3	GZ	T	
Drives:	M=Maneuver. G= Gravitic. Z= Lifters. R= Rocket. H= HEPlar. O= Orion. T=Thruster.				

**HULL STABILITY**

Type	Friction	Agility	Accel	Max G	Stability
C Cluster	x2	-5	--	1	-3
B Braced	x2	-4	--	3	.-2
P Planetoid	x1	-2	--	9	-1
U Unstreamlined	/2	-1	--	9	0
S Streamlined	/3	0	--	9	+1
A Airframe	/4	+1	+1	9	+2
L Lifting Body	/5		+1	9	+3

**ATMOSPHERIC TURBULENCE**

Hulls in atmosphere may experience Turbulence.

**T= Flux + S + P + Mod**

T= Turbulence. S= Hull Stability. P= Pilot skill.  
Mod= (if StormWorld) World Size.

Roll once per minute for Fast Boost/ Re-Entry  
Roll once per hour for Slow Boost/ Re-Entry.  
No rolls required for Safe Boost/Re-entry.  
If T less than Zero, a Turbulence Crisis occurs.

To Recover From A Turbulence Crisis  
Difficult (3D) < (Dex + Pilot)  
Failure inflicts Damage to one location on the ship.

L1	S	DAMAGE SEVERITY	IA	IMMEDIATE ACTION
2D Ship	1D	Damage	Check	Double Skill
2:Bridge	1	Easy 1D	Use any appropriate skill. Success converts the damage to Severity= Easy 1D and the component remains operable. Not Possible if Damage above 6D	
3:Hold	2	Average 2D		
4:Sensors	3	Difficult 3D		
5:Protections	4	Formidable 4D		
6:Life Support	5	Staggering 5D		
7:Drives	6	Hopeless 6D		
8:Power Plant	7	Impossible 7D		
9:Hull	8	Beyond 8 D		
10:Weaponry	9	Destroyed		
11:Astrogation				
12:Computer				

### NAFAL TIME AND SPEED CHART

Accel	Time to Max	Real Time	Perceived Time	Time Fraction
0.1	51	1700	1680	0.99
0.2	51	850	833	0.98
0.3	51	560	539	0.95
0.4	51	425	389	0.92
0.5	51	340	295	0.87
0.6	51	285	226	0.80
0.7	51	240	173	0.71
0.8	51	212	127	0.60
0.9	51	188	82	0.47

Gs	Weeks	Weeks	Weeks
----	-------	-------	-------

Using NAFAL, the drive requires approximately one year to accelerate to maximum speed, and approximately one year to decelerate at the destination system.

The ship and its payload are subject to near light-speed time dilation effects.

**In-System Travel Time Charts 8a 8b and 8c** show the expected travel time between range bands within a system. Any two locations (identified by orbit numbers and rough position within the system) can be converted to an S=Space Range Band, and then to a travel time.

### NAFAL VECTOR LIMIT

$$P * 1 / \pi^2 * C$$

P= drive potential. C= light speed. pi= 3.14159...

For Potential=1, the limit= 0.101321.

For Potential=9, the limit= 0.911891.

### NAFAL

The Not As Fast As Light Drive is a gravity-based vector-movement interstellar drive. N-Drive accelerations are expressed in tenth G (0.1G) increments (drive potential 1 for NAFAL = 0.1G). The N-Drive operates on the same general principles as the G-Drive and M-Drive. It has, however, two specific limitations:

**D Limit.** NAFAL can only accelerate within about one-eighth light-year (or about 51 weeks of acceleration) of a gravity source. It can similarly decelerate only within the one-eighth light year distance (also about 51 weeks).

**Vector Limit.** NAFAL has a vector limit (based on its potential) of about one-tenth light speed per potential. Drive potential 1 has a vector limit of 0.1c; drive potential 9 has a vector limit of 0.9c.

### The NAFAL Time Charts

Operations using NAFAL are constrained by the NAFAL Time Charts. The NAFAL Time and Speed Chart details the time (at various accelerations 0.1G to 0.9G) to achieve maximum speeds, and the elapsed time perceived by the occupants of a NAFAL ship as it travels at various speeds.

A ship operating with NAFAL accelerates to a fraction of light-speed and travels to a nearby stellar hex. The distance = 1 parsec = 3.26 light years= 170 light-weeks.

For example, Long Range Survey *Pride of Yothola* with NAFAL-1 Drive accelerates within its home system for 51 weeks at 0.1G. At that point, it is travelling at 0.1C. It crosses the one-parsec (3.26 light years) to its neighbor star in 1700 weeks. Time dilation effects at high speed mean the travellers have spent only 1680 weeks in travel. The ship then decelerates for 51 weeks and proceeds to explore the nearby system.

For example, Colony Ship *Nirst* with NAFAL-9 Drive can achieve 90% of light speed. Aimed at a system 10 parsecs distant, it accelerates for a year (51 weeks or so) within the home system, at which time it is at 0.9C. The *Nirst* travels the ten parsecs in (10 x 188=) 1880 weeks. Within the new system the ship decelerates for 51 weeks to investigate the newfound mainworld. The voyage of 10 parsecs (32 light-years) endures for (51+51+1880 weeks =) about 38 years. The time dilation effects of 0.9C mean that the ship's travellers experience only about half that time (51+51+820 weeks=) about 18 years.

### X DRIVE TECH LEVEL STAGE EFFECTS

Stage	TL	Cost	Eff	Fuel	Tons	Examples:	TL	Potential	Tons	MCr	Fuel%	Tons
Exp	Experimental	-3 x10	50%	2.0	x3	Exp M-Drive-B	7	1 ( 50%=1.0)	9	180		
Pro	Prototype	-2 x5	80%	1.2	x2	Pro M-Drive-B	8	1 ( 80%=1.6)	6	60		
Ear	Early	-1 x2	90%	1.1	x1	Ear M-Drive-B	9	1 ( 90%=1.8)	3	12		
Std	Standard	0 x1	100%	1.0	x1	Std M-Drive-B	10	2 (100%=2.0)	3	6		based on P-Plant
Bas	Basic	0 /2	90%	1.1	x1	Bas M-Drive-B	9	1 ( 90%=1.8)	3	3		
Alt	Alternate	0 x1	100%	1.0	x1	Alt M-Drive-B	9	2 (100%=2.0)	7	6		
Imp	Improved	+1 x1	110%	0.9	x1	Imp M-Drive-B	10	2 (110%=2.2)	3	6		
Gen	Generic	+1 /2	90%	1.1	x1	Gen M-Drive-B	10	1 ( 90%=1.8)	3	3		
Mod	Modified	+2 /2	110%	0.9	/2	Mod M-Drive-B	11	2 (110%=2.2)	2 (=1.5)	3		
Adv	Advanced	+3 x2	120%	0.8	/3	Adv M-Drive-B	12	2 (120%=2.4)	1	2		
Ult	Ultimate	+4 x3	130%	0.7	/4	Ult M-Drive-B	13	2 (130%=2.6)	1 (=0.7)	1.5		

TL Stage Effects (Cost, QREBS) apply.

Efficiencies round down (thus Early Jump-1 at 90% becomes Jump-0).

Variations based on Standard Maneuver Drive B TL-10 in Hull-B 200 tons with Drive Potential=2. Round against advantage (up for tonnage; down for potential). \* Potential increases or decreases with Efficiency.

\*\* P-Plant Fuel formula is Hull Tons times Potential divided by 100.

\*\*\*Base cost of MCr2 per ton (using final tonnage and cost multiplier).

<b>G</b>	Eff=50%	80%	90%	100%	110%	120%	130%		
TL	Experimental	Prototype	Early	Standard	Improved	Advanced	Ultimate		
5	Gravitic-0 (0.5)								
6	Gravitic-2 (2.0)	Gravitic-0 (0.8)							
7	Gravitic-3 (3.5)	Gravitic-3 (3.2)	Gravitic-0 (0.9)						
8	Gravitic-4 (4.5)	Gravitic-5 (5.6)	Gravitic-2 (3.6)	Gravitic-1					
9		Gravitic-7 (7.2)	Gravitic-4 (6.3)	Gravitic-4	Gravitic-1 (1.1)				
10			Gravitic-6 (8.1)	Gravitic-7	Gravitic-4 (4.4)				
11				Gravitic-9	Gravitic-5 (5.5)	Gravitic-1 (1.2)			
12					Gravitic-7 (7.7)	Gravitic-4 (4.8)	G-1 (1.3)		
13					Gravitic-9 (9.9)	Gravitic-8 (8.4)	G-5 (5.2)		
14						G-10 (10.8)	G-9 (9.1)		
15							G-11 (11.7)		

Performance shown in Gs of acceleration. Drives include corresponding inertial compensation.

<b>M</b>	Eff=50%	80%	90%	100%	110%	120%	130%		
TL	Experimental	Prototype	Early	Standard	Improved	Advanced	Ultimate		
6	Maneuver-0 (0.5)								
7	Maneuver-1 (1.5)	Maneuver-0 (0.8)							
8	Maneuver-2 (2.5)	Maneuver-2 (2.4)	Maneuver-0 (0.9)						
9	Maneuver-3 (3.5)	Maneuver-4 (4.0)	Maneuver-2 (2.7)	Maneuver-1					
10	Maneuver-4 (4.5)	Maneuver-5 (5.6)	Maneuver-4 (4.5)	Maneuver-3	Maneuver-1 (1.1)				
11		Maneuver-7 (7.2)	Maneuver-6 (6.3)	Maneuver-5	Maneuver-3 (3.3)				
12			Maneuver-8 (8.1)	Maneuver-7	Maneuver-5 (5.5)	Maneuver-1 (1.2)			
13				Maneuver-9	Maneuver-7 (7.7)	Maneuver-3 (3.6)	M-1 (1.3)		
14					Maneuver-9 (9.9)	Maneuver-6 (6.0)	M-3 (3.9)		
15						M-10 (10.8)	M-6 (6.5)		
16							M-11 (11.7)		

Performance shown in Gs of acceleration. Drives include corresponding inertial compensation.

<b>N</b>	Eff=50%	80%	90%	100%	110%	120%	130%		
TL	Experimental	Prototype	Early	Standard	Improved	Advanced	Ultimate		
6	NAFAL-0 (0.5)								
7	NAFAL-2 (2.0)	NAFAL-0 (0.8)							
8	NAFAL-3 (3.5)	NAFAL-2 (3.2)	NAFAL-0 (0.9)						
9	NAFAL-4 (4.5)	NAFAL-5 (5.6)	NAFAL-2 (3.6)	NAFAL-1					
10		NAFAL-7 (7.2)	NAFAL-6 (6.3)	NAFAL-4	NAFAL-1 (1.1)				
11			NAFAL-8 (8.1)	NAFAL-7	NAFAL-4 (4.4)				
12				NAFAL-9	NAFAL-7 (7.7)	NAFAL-1 (1.2)			
13					NAFAL-9 (9.9)	NAFAL-4 (4.8)	N-1 (1.3)		
14						NAFAL-8 (8.4)	N-5 (5.2)		
15						NAFAL-10 (10.8)	N-9 (9.1)		
16							N-11 (11.7)		

Performance shown in **tenth** Gs of acceleration. Drives include corresponding inertial compensation.

<b>Z</b>	Eff=50%	80%	90%	100%	110%	120%	130%	<b>SPEED</b>	
TL	Experimental	Prototype	Early	Standard	Improved	Advanced	Ultimate	Speed	kph
6	Lifter-2 (2.5)							2	10
7		Lifter-4 (4.0)						3	20
8			Lifter-4 (4.5)					4	30
9				Lifter-5				5	50
10					Lifter-5 (5.5)			6	100
11								7	300
12	Performance shown in <u>Speed</u> (convertible to kph).					Lifter-6 (6.0)		8	500
13	Includes corresponding inertial compensation.						Lifter-6 (6.5)	9	700

THE ALTERNATE MOVERS



R



H



O1  
O2  
O3



T

**ROCKET**

Liquid chemical fuels combine in an exothermic reaction to produce thrust. Rockets are high volume fuel users available at the lowest levels of technology.

**HEPLAR**

A power plant heats liquid hydrogen fuel to a plasma state and near fusion state, which is then released to produce an efficient and powerful thrust.

**ORION**

The Orion Drive detonates nuclear (fission, fusion, or anti-matter) devices externally behind a massive protective plate to produce powerful thrust.

**THRUSTER**

The drive converts circular motion to uni-directional thrust by a set of mechanical linkages. Thrusters are efficient: they do not require (or consume) reaction mass.

**THE ALTERNATE MOVERS**

In addition to the widely-available gravity-based vector movement drives, four other drives are available: Rockets, HEPLaR, Thrusters, and Orion drives.

**Rockets.** Chemical fuels combine in an exothermic reaction in a combustion chamber to produce thrust. Rockets are high volume fuel users.

**HEPLaR (High Efficiency Plasma Re-combustion).** A power plant heats liquid hydrogen fuel to a plasma state contained in a magnetic or gravitic field until nuclear fusion (mediated by nuclear dampers) begins. The released plasma produces a tremendous thrust.

**(Reactionless) Thrusters.** A motor produces conventional circular motion which is converted to uni-directional motion through a set of mechanical linkages. Thrusters are efficient: they do not require (or consume) reaction mass. An alternative name for Thruster is Dean Drive.

**Orion.** The spacecraft detonates small fission, fusion, or anti-matter explosives whose blast propels the ship.

**ROCKETS**

Because Rockets (including Rockets, HEPLaR, and Orion) produce thrust based on mass (rather than volume), fuel consumption details may become confusing. The calcu-

lations equate volume tons and mass tons and assume that mass tons are expended by the rockets. In effect, the calculations disregard the tonnage of empty fuel tanks.

**Rocket To Orbit S=8**

A Rocket Drive can carry a ship to orbit S=8 in Time= World Size in Minutes while burning one unit of fuel per second. The payload in units equals the fuel in units divided by World Size. For any specified payload, the fuel required to reach Orbit S=8 equals Payload times World Size.

For example, the 270-ton Space Shuttle (approximately 30 tons of payload) burns 240 tons of fuel during its 480 second flight to Orbit S=8.

For example, a 100-ton payload launched from a World Size = 5 requires fuel = Payload times World Size (=100 x 5 =) 500 tons. The fuel is burned over World Size x 60 = 300 seconds (= about 1.6 tons per second).

For example, an 11-ton payload launched from World Size =8 requires fuel= Payload times World Size (=11 x 8 = ) 88 tons. The fuel is burned over World Size x 60 = 480 seconds (= 0.18 tons = 2.5 cubic meters per second).

**The Effects of Atmosphere.** If Atmosphere is less than 2, reduce effective World Size by 1.

For example, the 2-ton Lunar Ascent Stage payload launching from Luna (World Size=2) requires (Payload times World Size= 2 x 2 ) = 4 tons of fuel. Because Luna has Atmosphere=0, reduce World Size to 1. The required fuel is 2 tons. Required tonnage for the Lunar Ascent Stage is 4 tons.

**Transfer To Orbit S=9 And Higher**

Once a ship reaches Orbit S=8, it may maneuver to:

**Transfer to Far Orbit S=9.** A transfer from Orbit S=8 to Far Orbit S=9 burns fuel equal to half Payload times World Size times 60.

**Transfer to Geo Orbit S=10.** A transfer from Orbit S=8 to Geo Orbit S=10 burns fuel equal to Payload times World Size times 60.

**TRANSFER ORBIT TO OTHER WORLDS**

Paradoxically, the fuel required to set out for other worlds is effectively the same at any of S=8 S=9 or S=10.

A transfer to an escape orbit burns fuel equal to Payload times World Size times 60. This process assumes an efficient Hohmann orbit which requires about a year to travel from one system orbit to the next one.

**ROCKET TO ORBIT**

Start Point	Fuel=			
Distance R= Descriptor	R=8	R=9	R=10	beyond
50,000 <b>10</b> Geo				<b>60</b>
5,000 <b>9</b> Far Orbit			<b>30</b>	<b>60</b>
500 <b>8</b> Orbit		<b>30</b>	<b>60</b>	<b>60</b>
Surface <b>0</b> Surface	<b>60</b>	<b>90</b>	<b>90</b>	<b>120</b>

Fuel Required=

**Fuel = Size x Payload**

Payload= ship tonnage exclusive of fuel.

Size= World Size

If World Atm= 0 or 1, reduce World Size -1.

**Rocket R-Drive.** Use table values as standard. Rocket uses LH and LOX.

**HEPLaR H-Drive.** Use one-tenth table values. HEPLaR uses standard (hydrogen or water) fuel.

**Orion.** Use one-hundred-thousandth table values. Orion uses fission, fusion, or AM detonators.

## ROCKET THRUST

Rocket Drives may apply thrust for maneuver purposes.

Thrust takes two forms: micro-thrust and vector change.

**Micro-Thrust.** The drive makes a small adjustment by expending one ton of fuel, producing a course change that will enter a stable **orbit around a world or satellite.**

**Vector Change.** The drive expends fuel units equal to 10% of its net tonnage (total ship tons minus tonnage of empty fuel tanks). The ship changes its vector by 1G.

For example, a 100-ton ship with full tanks for 90 tons of fuel expends 10 tons of fuel to change its vector 1G. It then has a net tonnage of 90 tons: it expends 9 tons of fuel to change its vector 1G. It then has a net tonnage of 81 tons: it expends 8 tons for fuel to change its vector 1G.

A 100-ton ship with full tanks for 90 tons of fuel expends 60 tons of fuel to change its vector 6G. The same ship with its tanks drained to only 25 tons of fuel has a net tonnage of 35 tons; it expends (3.5 x 6 =) 21 tons of fuel to change its vector 6G.

## HEPLAR

HEPLaR High Efficiency Plasma Re-combustion is an advanced rocket drive system. A power plant heats hydrogen fuel to plasma which is expelled as reaction mass. The resulting thrust is an order of magnitude higher than traditional chemical rockets.

HEPLaR H-Drives expend approximately 1% of net tonnage for Vector Change (versus 10% for Rocket Drives).

## ORION DRIVES

An Orion O-Drive ejects a stream of detonators which explode: the blast wave presses against a strong pressure plate at the back to the ship which moves the ship forward. Massive shock absorbers to smooth out the pulsed pressure of the propelling explosions.

**Why Orion?** Some civilizations have not developed the Gravity-based drives like Gravity, Maneuver, or Lifters. Others find a need to operate outside the restrictions of the 1000D Maneuver Drive or the 10D Gravitic Drive limits.

### Fission Orion (O1 Orion-1)

The crudest (the lowest tech) Orion makes use of fission detonators (which incidentally produce massive radioactive contamination in its wake).

### Fusion Orion (O2 Orion-2)

The mid-range development of Orion uses a combination of nuclear dampers, induced fusion, and inertial compensators to produce survivable thrust. Radioactive contamination is low to negligible.

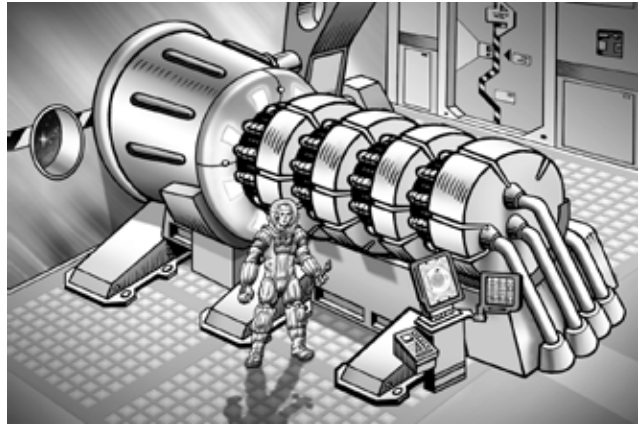
### AM Orion (O3 Orion-3)

The most advanced incarnation of Orion uses anti-matter detonators, stasis fields, and inertial compensators to produce survivable thrust. The thrust produces no radiation or environmental damage.

### Components of the Orion Drive

The Orion Drive is composed of three elements: the

## HEPLaR DRIVE



## FUEL CONSUMPTION BY ROCKET/ HEPLAR

Vector Change No.	----- Rockets -----		----- HEPLaR -----	
	Fuel Tons Required	Ship Tons Remaining	Fuel Tons Required	Ship Tons Remaining
1	10	90	1	99
2	9	81	1	98
3	8	73	1	97
4	7	66	1	96
5	6.5	59.5	1	95
6	6	53.5	1	94
7	5	48.5	1	93
8	5	43.5	1	92
9	4	39.5	1	91
10	4	34.5	1	90
11	3.5	31	1	89
12	3	28	1	88
13	3	25	1	87
14	2.5	22.5	1	86
15	2	20.5	1	85
16	2	18.5	1	84
17	2	16.5	1	83
18	1.5	15	1	82
19	1.5	13.5	1	81
20	1	12.5	1	80
21	1	11.5	1	79
22	1	10.5	1	78

Table values are per 100 tons of hull.

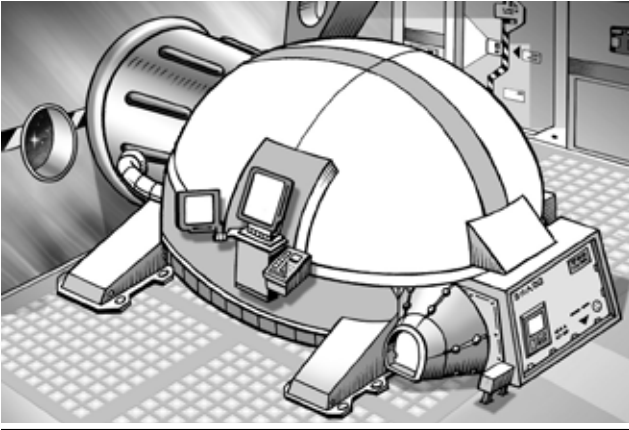
Pressure Plate, the Detonators, and the Feed Mechanism.

**The Pressure Plate.** The common denominator for Orion O-Drives is the massive pressure plate that absorbs the propelling explosive force and protects the ship from the blast.

For O1, the Pressure Plate is a massive structure occupying approximately 10% of the ship's tonnage. For O2, the Pressure Plate is less massive. For O3, the Pressure Plate becomes a simple barrier created by on-off stasis fields.

**The Orion Detonators.** Regardless of technology (fusion, fission, or AM), Orion detonators are self-contained exploders with a programmable yield based on the needs of the system (typically 0.2 kilotons; dialable from 0.01 to 1.0). Each is a cylinder 8 cm in diameter and 20 cm long (about 1

## ORION DRIVE



## ORION DRIVES

			Detonators	Plate	
Orion 1	O1	8	Fission 8	Plate	8
Orion 2	O2	12	Fusion 12	Damper	12
Orion 2bis	O2.5	18	AM 18	Damper	12
Orion 3	O3	21	AM 18	Stasis	21

Orion develops in three stages: Fission, Fusion, and AM.

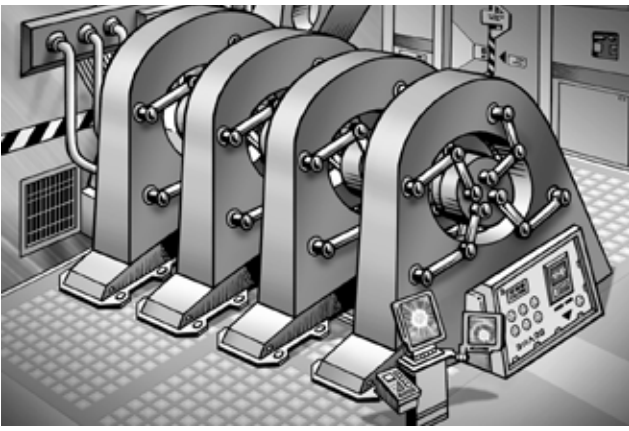
Stage O2.5 reflects the transition to Anti-Matter before a Stasis-protected pressure plate is practical.

## ORION FUEL

	Detonators	M3	Tons
One Second	1		
One Minute	60		
One Hour	3,600	7	0.5
One Day	86,400	166	12
One Week	604,800	1,167	86
One Month	2,592,000	5,000	370
Two Months	5,184,000	10,000	740
Three Months	7,776,000	15,000	1,111
One Year	31,536,000	60,900	4,500

Expending one detonator (appropriately dialed for yield) per second produces the appropriate acceleration from 1G to 9G (for any tonnage of ship up to 2400 tons).

## MECHANICAL THRUST DRIVE



liter), and designed for use with an automated feed system. The devices typically have a variety of fail-safe interlocks and codes, remote tracking and identifications, and other non-pubic protections.

The fuel feed mechanisms for Orion hold about 7,000 detonators per ton (whether fission, fusion, or AM).

**Fission Orion** detonators are small fission bombs activated by a remote signal.

**Fusion Orion** detonators are fusible elements which are externally activated by nuclear damper technology. They are safe outside of the Orion system.

**AM Orion** detonators are a small amount of magnetically-held anti-matter activated by a remote signal.

Orion O-Drive expends 0.001% (= one ten-thousandth) of net tonnage for Vector Change. For example, a 1,000-ton hull expends one-tenth of a ton (or about 700 detonators) for a Vector Change.

For example, a 1,000-ton payload launched from World Size =8 requires Fuel= Payload times World Size divided by 10,000 (=1,000 x 8 / 10,000 =) 0.8 tons, or about 5,600 detonators. The fuel is burned over World Size x 60 (= 8 x 60 =) 480 seconds (or about 10 detonators per second).

**Dialability.** Maximum yield selectability for each individual detonator is determined by the Drive Potential. Potential 1 = maximum yield 0.1 kt per detonator; Potential 9 = maximum yield 0.9 kt per detonator.

**Long Term Acceleration.** An Orion can produce acceleration over a very long time. Expending one detonator (appropriately dialed for yield) per second produces the appropriate acceleration from 1G to 9G. Although acceleration is selectable, a continuous acceleration greater than 1G is intolerable to humans without inertial compensators.

**Inertial Compensation.** Because the technology is not gravity-based, Orion does not include inertial compensation. If required, it must be supplied independently (installing Lifters is sufficient).

## THRUSTERS

Thrusters are mechanical devices which convert rotary motion into uni-directional motion through a series of mechanical linkages.

The mechanism is essentially a large motor driving a flywheel connected to a set of pistons oriented in the three spatial dimensions. As power is directed to some or all of the pistons, unidirectional motion (thrust) is created. Interestingly, the predominant skill involved in the operation and maintenance of thrusters is Mechanical.

Power for thrusters is supplied by the ship's Power Plant. The effect of the Thruster is equivalent to Rocket thrust but without the associated fuel expenditure.

Thrusters do not require reaction mass and operate independent of gravity.

**Inertial Compensation.** Because the technology is not gravity-based, Thrusters do not include inertial compensation. If required, it must be supplied independently (installing Lifters is sufficient).

T	Eff=50%	80%	90%	100%	110%	120%	130%
TL	Experimental	Prototype	Early	Standard	Improved	Advanced	Ultimate
7	Thruster-0 (0.5)						
8	Thruster-0 (0.5)	Thruster-0 (0.8)					
9	Thruster-0 (0.5)	Thruster-0 (0.8)	Thruster-0 (0.9)				
10	Thruster-1 (0.5)	Thruster-0 (0.8)	Thruster-0 (0.9)	Thruster-1			
11	Thruster-1 (1.0)	Thruster-0 (0.8)	Thruster-0 (0.9)	Thruster-1	Thruster-1 (1.1)		
12	Thruster-1 (1.0)	Thruster-1 (1.6)	Thruster-0 (0.9)	Thruster-1	Thruster-1 (1.1)		
13	Thruster-1 (1.0)	Thruster-1 (1.6)	Thruster-1 (1.8)	Thruster-1	Thruster-1 (1.1)	Thruster-1 (1.2)	
14	Thruster-1 (1.5)	Thruster-1 (1.6)	Thruster-1 (1.8)	Thruster-2	Thruster-1 (1.1)	Thruster-1 (1.2)	T-1 (1.3)
15	Thruster-1 (1.5)	Thruster-2 (2.4)	Thruster-1 (1.8)	Thruster-2	Thruster-2 (2.2)	Thruster-1 (1.2)	T-1 (1.3)
16	Thruster-1 (2.0)	Thruster-2 (2.4)	Thruster-2 (2.7)	Thruster-2	Thruster-2 (2.2)	Thruster-1 (1.2)	T-1 (1.3)
17	Thruster-2 (2.5)	Thruster-3 (3.2)	Thruster-2 (2.7)	Thruster-3	Thruster-2 (2.2)	Thruster-2 (2.4)	T-1 (1.3)
18	Thruster-3 (3.0)	Thruster-4 (4.0)	Thruster-3 (3.6)	Thruster-3	Thruster-3 (3.3)	Thruster-2 (2.4)	T-2 (2.6)
19	Thruster-3 (3.5)	Thruster-4 (4.8)	Thruster-4 (4.5)	Thruster-4	Thruster-3 (3.3)	Thruster-2 (2.4)	T-2 (2.6)
20	Thruster-4 (4.0)	Thruster-5 (5.6)	Thruster-5 (5.4)	Thruster-5	Thruster-4 (4.4)	Thruster-3 (3.6)	T-2 (2.6)
21	Thruster-4 (4.5)	Thruster-6 (6.4)	Thruster-6 (6.3)	Thruster-6	Thruster-5 (5.5)	Thruster-3 (3.6)	T-3 (3.9)
22		Thruster-7 (7.2)	Thruster-7 (7.2)	Thruster-7	Thruster-6 (6.6)	Thruster-4 (4.8)	T-3 (3.9)
23			Thruster-8 (8.1)	Thruster-8	Thruster-7 (7.7)	Thruster-6 (6.0)	T-5 (5.2)
24				Thruster-9	Thruster-8 (8.8)	Thruster-7 (7.2)	T-6 (6.5)
25					Thruster-9 (9.9)	Thruster-8 (8.4)	T-7 (7.8)
26						Thruster-9 (9.6)	T-9 (9.1)
27						Thruster-10 (10.9)	T-10 (10.4)
28							T-11 (11.7)

Performance shown in Gs of acceleration. Drives do not include corresponding inertial compensation.

O	Eff=50%	80%	90%	100%	110%	120%	130%
TL	Experimental	Prototype	Early	Standard	Improved	Advanced	Ultimate
5	O-0 (0.5)						
6	O-0 (0.5)	FissionOrion-0 (0.8)					
7	O-1 (1.0)	FissionOrion-0 (0.8)	FissionOrion-0 (0.9)				
8	O-1 (1.0)	FissionOrion-1 (1.6)	FissionOrion-0 (0.9)	FissionOrion-1			
9	O-1 (1.5)	FissionOrion-1 (1.6)	FissionOrion-1 (1.8)	FissionOrion-1	O1-1 (1.1)		
10	O-1 (1.5)	FusionOrion-2 (2.4)	FissionOrion-1 (1.8)	FissionOrion-2	O1-1 (1.1)		
11	O-2 (2.0)	FusionOrion-2 (2.4)	FusionOrion-2 (2.7)	FusionOrion-2	O1-2 (2.2)	O1-1 (1.2)	
12	O-2 (2.0)	FusionOrion-3 (3.2)	FusionOrion-2 (2.7)	FusionOrion-3	O1-2 (2.2)	O1-1 (1.2)	O1-1 (1.3)
13	O-2 (2.5)	FusionOrion-3 (3.2)	FusionOrion-3 (3.6)	FusionOrion-3	O2-3 (3.3)	O1-2 (2.4)	O1-1 (1.3)
14	O-2bis (2.5)	FusionOrion-4 (4.0)	FusionOrion-3 (3.6)	FusionOrion-4	O2-3 (3.3)	O1-2 (2.4)	O1-2 (2.6)
15	O2bis-3 (3.0)	Hybrid Orion-4 (4.0)	FusionOrion-4 (4.5)	FusionOrion-4	O2-4 (4.4)	O2-3 (3.6)	O1-2 (2.6)
16	O2bis-3 (3.0)	Hybrid Orion-4 (4.8)	Hybrid Orion-4 (4.5)	FusionOrion-5	O2-4 (4.4)	O2-3 (3.6)	O2-3 (3.9)
17	O2bis-3 (3.5)	Hybrid Orion-4 (4.8)	Hybrid Orion-5 (5.4)	Hybrid Orion-5	O2-5 (5.5)	O2-4 (4.8)	O2-3 (3.9)
18	O-3 (3.5)	Hybrid Orion-5 (5.6)	Hybrid Orion-5 (5.4)	Hybrid Orion-6	O2bis-5 (5.5)	O2-4 (4.8)	O2-4 (5.2)
19	O-4 (4.0)	AMOrion-5 (5.6)	Hybrid Orion-6 (6.3)	Hybrid Orion-6	O2bis-6 (6.6)	O2-6 (6.0)	O2-4 (5.2)
20	O-4 (4.5)	AMOrion-6 (6.4)	AMOrion-6 (6.3)	Hybrid Orion-7	O2bis-6 (6.6)	O2bis-6 (6.0)	O2-6 (6.5)
21		AMOrion-7 (7.2)	AMOrion-7 (7.2)	AMOrion-7	O2bis-7 (7.7)	O2bis-7 (7.2)	O2bis-6 (6.5)
22			AMOrion-8 (8.1)	AMOrion-8	O3-7 (7.7)	O2bis-7 (7.2)	O2bis-7 (7.8)
23				AMOrion-9	O3-8 (8.8)	O2bis-8 (8.4)	O2bis-6 (7.8)
24		O1= FissionOrion O1			O3-9 (9.9)	O3-8 (8.4)	O2bis-9 (9.1)
25		O2= FusionOrion O2				O3-9 (9.6)	O3-9 (9.1)
26		O2bis= HybridOrion O2.5				O3-10 (10.8)	O3-10 (10.4)
27		O3= AMOrion O3					
	Fuel=200%	Fuel=125%	Fuel=110%	Fuel=100%	Fuel=90%	Fuel= 85%	Fuel=75%
	Tons=200%	Tons=125%	Tons=110%	Tons=100%	Tons=90%	Tons= 85%	Tons=75%

Performance shown in Gs of acceleration. Drives do not include corresponding inertial compensation.





What Jumpspace Looks Like

# How Jump Works

The secret of interstellar travel is jump: a process that bypasses spacetime and allows ships to exceed lightspeed.

Jump moves a ship from one star system to another in about a week. Start World to Jump Point takes about a day, as does travel from the arrival Jump Point to the Destination World. Only if the unusual happens need details of jump be considered.

## JUMP DRIVES

The key to the stars is the jump drive: an almost magical technology that shifts a ship through a tear in the fabric of spacetime into an alternate universe where the generally accepted laws of physics don't apply.

Jump involves some logical disconnects:

- vast amounts of power are required to transition to jump space, but almost no power is required to move through it;
- the time spent in jump space has little or no relation to the distance travelled; and
- sometimes, jumpspace does not operate in logical or predictable ways.

Jump is possible because of Jump Space: an alternative space where the laws of physics of Real Space do not apply. Jump Space is truly alien: it is antagonistic to life and in some ways even to matter; time flows differently; distance is also strangely different. Only the jump field protects a hull and its contents from immediate destruction.

## Multiple Jump Spaces

Jump Space is a continuous series of alternative spaces, each with a slightly different set of different physical laws. Each of the Jump Spaces is infinite, but smaller (often much smaller) than Real Space.

Jump Space is classified by the distance it allows ships to travel. Jump-1 allows a ship to move about a parsec in about a week. Jump-2 allows a ship to move about two parsecs in about a week. The maximum Jump is Jump-9: nine parsecs in about a week.

Yet there is an infinite hierarchy of Jump Spaces, some of which become available to the appropriate technology. These increasingly powerful Jump Spaces carry their own names corresponding to about an order of magnitude greater performance: Hop Space allows travel in tens of parsecs; Skip Space allows travel in hundreds of parsecs; even higher performance is supported by additional levels.

But, access to these higher Spaces requires technology

## THE VOCABULARY OF JUMP

A variety of terms have specific meanings in reference to Jump.

**100 Diameter Sphere. 100D Sphere. 100D Limit.** A sphere centered on a gravity source with a radius equal to 100 times the diameter of the source.

**Blockage.** The presence of an object (or the 100 D sphere of that object) on a jumpline. Blockage occurs if the object is larger than the ship in jump.

**Collateral Damage.** Damage inflicted on nearby objects by the energy release of jump.

**Courseline.** A[n imaginary] line connecting the starting point and the ending point of a same jump.

**Diameter.** Twice the radius of a sphere. For a non-spherical object, use its greatest dimension. For a long, narrow objects (one dimension is more than ten times the sum of the other two dimensions), consider the longest dimension separately.

**Exit (or Breakout or Precipitation).** The act of ending a jump: transitioning from jumpspace to realspace.

**Failed Jump.** An unplanned consequence which results in no jump taking place.

**Gravity Source.** An all-inclusive term for a mass (or an operating gravitic device). The diameter of the source is the distance across its longest dimension (some exceptions apply to very long and narrow objects).

**Initiation (or Entry).** The act of beginning a jump: transitioning from realspace to jumpspace.

**Jump Mishap.** An unplanned consequence of jump resulting in damage to the ship, or to nearby objects.

**Jump Space.** Jump Space is an alternative space in which the laws of physics from the true universe do not apply. Jump Space itself is truly alien: inimical to life and even to matter; it is only the special protections of the jump field that protect a hull and its contents from immediate destruction. Jumpspace exists in multiple levels which are exploited by jump drives to produce different distances travelled. More specific names for portions of jumpspace include hopspace, skipspace, leapspace, boundspace, and vaultspace.

**Misjump.** A consequence of jump resulting in breakout in an unplanned location.

**Potential.** The relative strength of a specific drive, expressed as its output.

**Real Space.** The true universe; opposite of Jump Space.

**Unplanned Outcomes** The general term for a problem with the jump process: Failed Jump. Misjump.

**Voyage.** Any travel process. More specifically, a process through Jump Space (or one of the related spaces).

beyond the reach of most technological cultures in Charted Space. Most worlds and sophonts are restricted to Jump Space and Jump Drives, with some few capable of Hop Drives or even rudimentary Leap Drives. With good reason, the drives beyond Jump are sometimes called the Fantastic Drives.

### Jump Is A Technological Paradigm Shift

Discovery of jumpspace and jumpdrive technology requires simultaneous non-traditional breakthroughs in a variety of fields: power generation, short-term power storage, computing technology, field theory, and an understanding of the obscure properties of lanthanides.

Jump is a unique: a paradigm shift; a non-logical extension of no known technological sequence; its independent discovery is considered a mark of great species potential.

Jump drive technology is widely accepted as an indicator of social as well as technological power. It is also rare. Based on the historical sample of Charted Space, only one technological sophont species in 400 independently develops jump drive technology. Astrographically, jump drive technology develops about once in 20 to 40 sectors.

Of those sophonts who do independently discover jump drive, most develop the most basic technology: jump drive-1; over time, they then progress sequentially to jump-2 and then higher levels.

Some sophonts discover jump late in their technological climb: they discover a higher level drive (Hop, Skip, Leap, Bound, or even Vault) without developing the underlying technologies.

For example, the Schilrathen of Poros 3 (chronicled in the Logs of the Phoenix Missions) made punctuated advances in technology through most of their history, but were always restricted to NAFAL drives for interstellar exploration. Upon achieving TL 22, they independently discovered Leap Drive without understanding or producing any of the predecessor drive technologies. The Phoenix Mission fleet encountered one of their Leap Drive ships a thousand parsecs from home, struggling to overcome scatter (which see)

in order to ultimately astrogate back to their homesystem.

### Strange Effects

Jump Space has two very specific effects: constant time regardless of distance, and courses constrained by large masses in Real Space.

**Constant Time.** Time in Jump Space is independent of distance travelled. A ship entering Jump Space remains there for a constant length of time, typically a week (168 hours, more or less). A ship in JumpSpace-1 travels about one parsec in about a week. A ship in Jump Space-2 travels about two parsecs in about a week.

The actual time naturally varies: commercial ships expect a variation of Flux x 2 hours; finely tuned jump drives (naval) expect a variation of Flux x 1 hour.

**Courselines.** The starting and ending points (in Real Space) are connected by a Courseline (specifically for Jump Drives called a Jumpline): a straight line course traced in Real Space. The length of the course determines the distance of the jump: any distance up to 1 parsec (including in-system jumps) is Jump-1; any distance beyond that up to 2 parsecs is Jump-2. Courses cannot be changed once begun.

Gravity sources in Real Space affect Jumplines: a straight line course cannot pass through a bubble surrounding a mass of any appreciable size (within Safe Jump Distance of a gravity source larger than the ship).

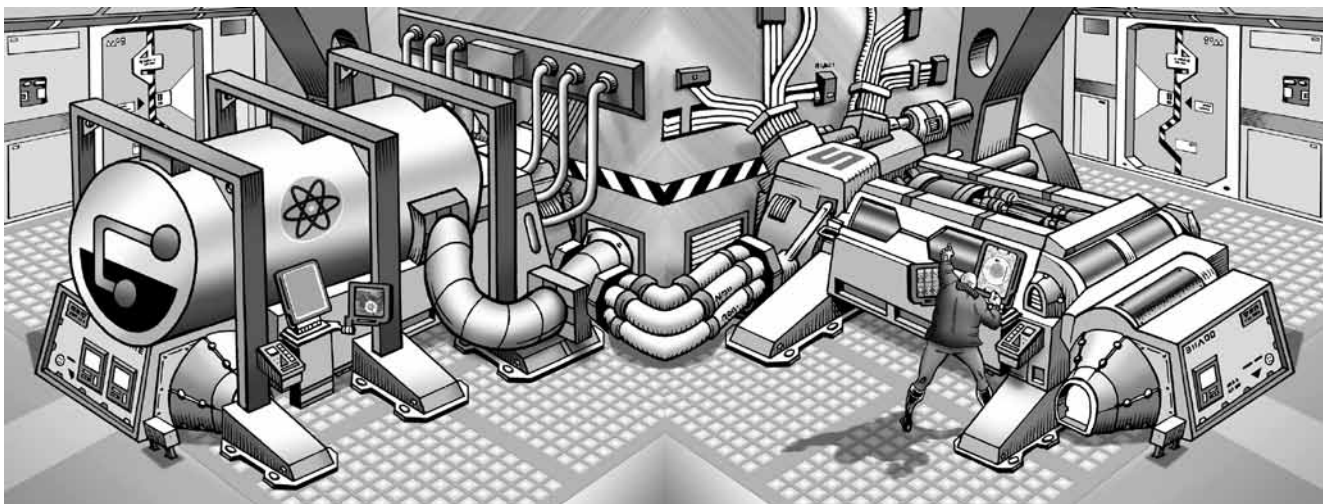
### JUMP FIELDS

A Jump Drive creates a Jump Field which drags the ship tonnage within it into Jumpspace. The Jump Field can be expressed as a jump bubble surrounding the ship, or as a jump grid closely conforming to the ship's hull:

### Jump Bubble

Without any additional mechanisms, the Jump Drive creates a quasi-spherical (often an egg-shaped oblate spheroid) bubble. The Naval Architect Manual computes the size of the Jump Bubble as:

### A Typical Drive Room



Fusion Power Plant to the left supporting a Jump Drive to the right.



$D = (\text{Tons} * 13.5)^{1/3} * 20$  (in meters)

For example, a functioning jump drive in a 100 ton ship creates a jump bubble with a diameter ( $=100 * 13.5^{1/3} * 20 = 11.05 * 20 =$ ) 220 meters.

For example, a functioning jump drive in a 2400 ton ship creates a jump bubble with a diameter ( $=2400 * 13.5^{1/3} * 20 = 32.3 * 20 =$ ) 640 meters.

For most purposes, a Jump Bubble is about five times the diameter of the average of Length, Width, and Height of the ship and centered on the Jump Drive.

**Cost.** The Jump Bubble is inexpensive; it is the default option for jump drives and imposes no additional cost for the drive or the hull.

**Advantages.** The Jump Bubble imposes the effects of the drive on all matter within the bubble. The Jump Bubble is well suited to Cluster and Braced Cluster hulls, or the ships which may vary in shape from mission to mission.

**Difficulties.** Occasionally, a Jump Bubble will enclose nearby debris. If the delicate balance of total ship tonnage is disrupted, the ship may experience a misjump.

The Jump Bubble affects each continuous object within it separately. A jump drive operates on the ship tonnage contained within its jump field. The ship with its Jump Drive almost always operates properly; other objects within the bubble suffer Jump Mishaps.

### Jump Grid

A Hull equipped with Jump Grid has a mesh of jumpfield conductive wires just below its surface; the Jump Drive effect is channeled through these elements to create an efficient field which closely conforms to the shape of the hull.

**Cost.** The Jump Grid adds MCr1 per 100 tons of hull (= KCr10 per ton of hull).

**Difficulties.** Damaged jump grids are difficult to repair (Jump Plates are often bolted over gaps in grid coverage).

Jump Grids cannot be effectively installed on Cluster and Braced Cluster Hulls.

**Advantages.** The Jump Grid has virtually no chance of misjump due to random nearby debris.

### Jump Plates (Repair Plates)

When a portion of hull containing Jump Grid is damaged, it is temporarily repaired by applying a bolt-on Jump Plate. The associated Jump Field extends several meters beyond the hull. One such plate covers approximately one deck square 1.5 x 1.5 meters. One plate is sufficient to repair a hull breach for one compartment on a ShipSheet.

The effectiveness of the Jump Field is severely impaired (Required Jump Distance is increased) when a Jump Plate repair is installed.

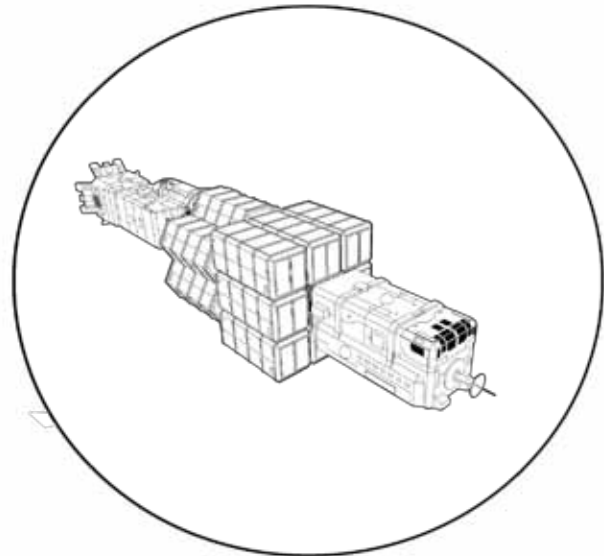
The Hull Armor at the repaired Compartment of Hit Location is reduced by half. The Jump Flash is unchanged.

**Advantages.** Jump Plates are a compromise between the cost of the Grid and the misjump potential of the Bubble. Jump Plates can be retro-fitted to existing hulls.

**Disadvantages.** Jump Plates cannot be effectively installed on Cluster and Braced Cluster Hulls. The effectiveness of the Jump Field is severely impaired (Required Jump Distance is increased) when a Jump Plate repair is installed.

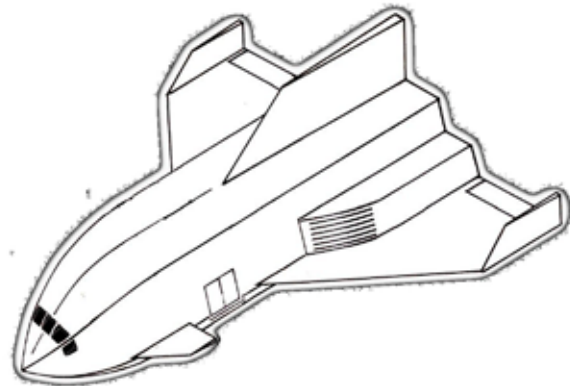
---

### Jump Bubble



---

### Jump Grid



---

### POTENTIAL

The gradations of effectiveness of a Jump Drive are called its Potential.

**Potential is a Multiplier** of basic drive capability. Jump Drive capability is expressed in parsecs; Potential multiplies this capability: Potential-1 is basic; Potential-2 is double, Potential-3 is triple. Potential ranges from 1 to 9.

A Jump Drive with Potential-1 is capable of Jumping one parsec (or one stellar hex) in the standard time. A Jump Drive with Potential-9 is capable of Jumping nine parsecs (or nine stellar hexes) in the standard time.

Potential equally applies as a multiplier to higher level drives: Hop, Skip, and Beyond. Hop-1 is capable of 10-parsecs; Hop-5 is capable of 50 parsecs. Skip-1 is capable of 100 parsecs; Skip-8 is capable of 800 parsecs.

**Potential is Based On Hull and Drive.** The specific Potential for a Drive varies with the hull in which it is installed

## Z1 DRIVE POTENTIAL (ABBREVIATED)

Hull=	A	B	C	D	E	F	G	H	J	K
Drive= A	2	1	no	no	no	no	no	no	no	no
B	4	2	1	1	no	no	no	no	no	no
C	6	3	2	1	1	1	no	no	no	no
D	8	4	2	2	1	1	1	1	no	no
E	9	5	3	2	2	1	1	1	1	1
F	9	6	4	3	2	2	1	1	1	1
G	9	7	4	3	2	2	2	1	1	1
H	9	8	5	4	3	2	2	2	1	1
J	9	9	6	4	3	3	2	2	2	1
K	9	9	6	5	4	3	2	2	2	2
L	9	9	7	5	4	3	3	2	2	2
M	9	9	8	6	4	4	3	3	2	2
N	9	9	8	6	5	4	3	3	2	2
P	9	9	9	7	5	4	4	3	3	2
Q	9	9	9	7	6	5	4	3	3	3
R	9	9	9	8	6	5	4	4	3	3
S	9	9	9	8	6	5	4	4	3	3

no= not possible.

Determine Drive Potential (in table body) for a Drive (left column) installed in a Hull (top row).

For example, Jump Drive-E (row E) in Hull-E (column E) produces Jump Drive Potential = 2.

### COMBINING JUMP DRIVES

The standard jump drives (identified by letters A through Z) are the only practical sizes which can be constructed (just as there are limitations on the construction of internal combustion engines; a million-ton version is impossible). Jump drives can be ganged and their combined output harnessed using Nexi.

A **Nexus** (plural = **Nexi**) connects the output of two or more (up to 9) identical mechanisms, allowing the joined devices to produce greater overall output.

For example, an N2 or NN Jump consists of two N Jump Drives connected by a Nexus. The nexus itself is basically a connection; it adds no tonnage and no additional cost.

A Nexus can also be used to create other combinations up to nine drives: N3, K4, Z9. An A9 drive (consisting of nine Standard J-Drive-A and nexi) creates an output of 900 EP, is (9 \* 10)= 90 tons, and costs MCr90. Jump Drive-J is more efficient at 50 tons.

Combined drives can themselves be combined (and designated by a prefix digit): 4A4 indicates ( 4 x 4 = ) 16 J-Drive-A. The largest drive available under ACS is 9Z9 (= 9 x 9 = ) 81 J-Drive-Z.

The resulting ratings remain subject to TL limitations.

For example:

Plant		tons	EP
J-Drive	A	10	100
J-Drive	A9	90	900
J-Drive	9A9	810	8,100
J-Drive	Z	120	2,400
J-Drive	Z9	1,080	21,600
J-Drive	9Z9	8,100	194,400

Similar nexi (Drive Nexi, Grav Nexi, Maneuver Nexi) connect other drives to also create greater output.

Jump Drive-A installed in Hull-B produces Potential-1; the same Jump Drive-A in Hull-A produces Potential-2. Potential is detailed in Z1 Drive Potential in Ship Design.

**Potential Is Limited By Tech Level.** Regardless of the table-mandated Potential, a Jump Drive produced at a Tech level is limited by any stated Tech Level restrictions. For example, the maximum Jump available at Tech Level 11 is Jump-2. Regardless of other details, a Jump Drive produced at TL-11 cannot produce more than Jump-2.

**Potential Requires Equal Potential In Power.** A Jump Drive requires a Power Source with equal or greater Potential. A Jump Drive with Potential 4 requires a Power Plant (or Anti-Matter Plant, or Collector) with at least Potential-4.

### MANAGING JUMP DRIVES

Jump Drives are subject to a variety of special details.

#### Jump Governors

A Jump Drive produces a Jump approximately equal to its Jump number in parsecs, and no less than the next lower Jump number. A Jump-4 drive can achieve up to 4 parsecs, and more than Jump-3.

A Jump Governor modifies the operation of a Jump Drive allowing any jump performance equal to or less than the drive's rating. A Jump-4 drive by itself can only perform Jump-4; equipped with a Jump Governor, it can perform Jump-3, Jump-2, or even Jump-1.

A Jump Governor is integral to a Standard or higher tech level Jump Drive. It follows that any Experimental, Prototype, or Early Jump Drive does not have a Jump Governor.

The same applies to Higher Order Jump Drives: a Hop-3 drive without a Governor can hop 30 parsecs; a Hop-3 drive with a Governor can Hop 10, 20, or 30 parsecs.

#### Fractional Jumps

Generally, jumps cover distances measured in parsecs, which correspond to the scale of star system and deep space hexes and common distances between stars. A jump of a specified size covers a range of distances from slightly more than the next smaller size to the specified size. For example, Jump-4 can reach from slightly more than 3 parsecs to 4 parsecs.

**Micro-Jump.** A micro-jump is the use of Jump Drive to travel a distance of less than one parsec. A jump within a star system is a micro-jump. The jump still lasts seven days, but the distance travelled is restricted to within the system. The jumpline may not intersect any 100D spheres.

A micro-jump is possible only with a Jump Drive.

In many instances, a micro-jump is impractical: traveling directly to the destination using maneuver drive would be faster. On the other hand, microjumps to the Remote System may be more efficient or faster than in-system drives.

**Minimum Distance:** For the Higher Order Jump Drives, each has minimum distance required (regardless of intervening masses).

For any potential of Hop, the value is approximately 10 parsecs, but see Astrogation to the 100D Sphere, and Overshoot as an exception. A Hop-1 drive can Astrogate to a nearby stellar hex intending to intersect its primary star's

## THE JUMP PROCESS

Event	Crew	Comment
1. Preparation For Jump		Planning
Determine Destination System	Captain	
Astrogation Task Resolution	Astrogator	Difficulty= Dice = Parsecs
Astrogation Task Verification	Astrogator	Difficulty= Dice = Parsecs+1
Move to Jump Point	Pilot	100D from all relevant gravity sources.
2. Initiate Jump		
Power Plant Consumes Fuel	Engineer. Power System.	
Jump Drive Engages	Engineer. Jump.	
Jump Entry Flash		Flash Size= Ship Size+4
Possible Drive Failure.		
Possible Jumpfield Interference.		
Transition To Jump Space		
3. Period in Jump Space		= 168 hours +/- Flux x 2 hours
Possible Vector Changes		Not possible with Gravitic-based drives.
4. End Jump		
Rumblings		Approximately one hour before Breakout.
Jump Exit Flash		Flash Size= Ship Size+ 2
Transition to Realspace		
Jump Drive Fail Effects		Time-in-Jump altered.
Astrogation Fail Effects		
Courseline Blockage	Astrogator	
Increased Scatter	Astrogator	
Normal Scatter	Astrogator	

100D sphere; if the Astrogation fails, the Hop overshoots to a full 10 parsec distance.

For any potential of Skip, that value is approximately 100 parsecs, but see Astrogation to the 100D Sphere, and Overshoot.

### The Jump Drive Balance

A jump drive must be strong enough to enclose the ship's volume with its jumpspace connection, but if it is too strong, initiation stalls. Even the smallest jump drives stall with any ship smaller than 100 tons, creating an effective lower limit to practical starships.

A 50-ton ship with a minimal size Jump Drive stalls. Jump cannot be initiated.

That same ship with two added 25-ton droptanks, provided that the tanks are not dropped when jumping, is capable of Jump.

### RENORMALIZATION

When the volume of a ship changes (by dropping drop tanks, changing the number of cargo pods, or adding or removing riders) the performance of the ship may change.

1. Note the jump drive code.
2. Determine the new tonnage.
3. Create new Drive Potential from Drive Potential-1

### Opportunities

Some opportunities involving renormalization include:

**Drop Tanks.** The ship carries a substantial quantity of fuel (jump fuel) in tanks which can be jettisoned. When jettisoned, the ship no longer counts its fuel drop tanks against its tonnage for Jump purposes. For example, a 400-ton Close Escort has Jump Drive-H (potential=4), Maneuver Drive-H

(potential= 4), and two 50-ton drop tanks and a 76-ton internal tank. In normal operations, it can do Jump-4 and 4G.

If it jettisons the drop tanks, it becomes a 300-ton ship (Jump potential-5 and 5G).

**Cargo Pods.** If ship cargo structure is modularized; actual tonnage (for Jump Purposes) calculations may vary.

**Riders.** The ship carries one or more ships (riders) which can be detached for combat or other missions. Because Riders do not require jump drives and jump fuel tankage, they may be more efficient in combat.

## THE JUMP PROCESS

A starship using Jump follows a four-step process.

### 1 PREPARATION FOR JUMP

Planning is the foundation for a successful jump.

#### Selecting The Destination

While characters make the general decision of which star system is their destination, the specific details of the decision are left to the Astrogator. Once he knows which star system, an Astrogator can select a specific destination based on one of several different principles: central star, mainworld, some other world (or body), an orbit within a system, a range band from a world, or an arbitrary Point Alpha.

**Central Star.** The planned courseline extends to the

## BEYOND JUMP DRIVE

The fantastic drives beyond Jump are capable of order of magnitude greater: they carry names like Hop, Skip, Leap, Vault, Bound, and then less imaginatively Six, Seven, Eight, and Nine. For reference, they are collectively called **Higher Order Jump Drives.**

ASTROGATION TASK	ASTROGATION TASK CONFIRM	STELLAR DENSITY	
To calculate an interstellar jump (in parsecs) ND < Int + Astrogator + [ Math ] ND < Int + Astrogator Wafer ND < Computer TL Uncertain (1D)	To confirm jump calculations (24 hrs) N+1D < Edu + Astrogator + [ Math ] N+1D < Edu + Astrogator Wafer Uncertain (1D)  (Jump Only; confirmation beyond 9 parsecs is not possible)	-70,000D -600D -5D -4D -3D -2D -1D 0D +1D	Extra Galactic <1% Rift 3% Sparse 17% Scattered 33% Standard 50% Dense 66% Cluster 83% Core 91% Dense Core 96%
N = Parsecs modified by Stellar Density.	N =Parsecs modified by Stellar Density.		

### COURSELINE BLOCKAGE

The number of sixes rolled in the Astrogation Task is the number of parsecs short of the destination.

**Spectacular.** For Spectacular purposes in Astrogation tasks, ones and sixes cancel each other:  
a predominance of ones (at least three) is **Spectacular Success**, while a predominance of sixes (at least three) is **Spectacular Failure**.

central star in the destination system. The ship will exit jump at a point on the 100D sphere surrounding the star.

**Mainworld.** The planned courseline extends to the mainworld of the destination system. The ship will exit jump at a point on the 100D sphere surrounding the mainworld. In some cases, the mainworld is within the 100D sphere of the system's star and the exit point is on the 100D sphere of the star instead.

**Some Other World.** The planned courseline extends to some other world in the destination system and the exit point will be on the 100D limit of that world (or satellite, or other body, including a non-primary star).

**An Orbit within the System.** The courseline extends to a specific orbit O= in the system; the equivalent to a Range Band from a Star. It is possible to designate a decimal Orbit.

**A Range Band from a World.** The courseline extends to a selected point in a Range Band from a world.

**Point Alpha.** A pre-determined location in a star system based on the specific intentions: a specific World Orbit or Satellite Orbit in a system, a specific point along an orbit (ahead or behind the world in the Orbit), or a specific distance from the star or from world.

Different destination points have specific utilities. Arrival at the 100D sphere of the Mainworld minimizes travel time to the local starport; arrival in an orbit in the Outer System is less likely to be detected from the Mainworld; moving directly to a gas giant in the system allows for cheap refuelling.

Precise astrogation planning depends on available information. Astrogation to the central star is relatively easy; Astrogation to a Mainworld or some other World requires precise information (available in most nearby starport data banks), and is generally not possible for unexplored systems.

### Resolving The Astrogation Task

Astrogation sets the courseline and the destination. Success in the task produces a proper course for the ship. Failure directs the ship to some other place.

Once the Astrogator knows the destination system and the specific destination within, he can create and resolve the Astrogation Task.

Astrogation task calculations are based on distance in parsecs; the number of parsecs is the number of dice required for the task (and thus defines its Difficulty). A three

parsec jump has an Astrogation task requiring 3D.

**Stellar Density.** Local stellar density modifies the number of dice required (but dice required is never less than 1D).

**Math Talent.** The non-human Talent Math can be used in addition to Astrogator skill.

**Skill Wafer.** An Astrogator may use a skill wafer (assuming availability) to increase (replace) his available skill.

**Using The Computer.** Even an unskilled Astrogator can simply sit at the ship's computer, enter the destination details, and allow the computer to create the course. The computer resolves the task using TL as C+S.

**Higher Order Jump Drives.** The Difficulty Dice for Hop-1 is 10D; for Hop-2 20D; for Skip-1 100D; for Bound-3 it is 30,000D.

Without making any criticism of the Astrogator, most higher order jump Astrogation tasks fail.

**Spectacular Success and Spectacular Failure.** In Astrogation tasks, consider only the net ones more than sixes or sixes more than ones for Spectacular purposes.

If net ones is three or more, the Astrogation task succeeds (which is Spectacular in itself).

If the number of sixes is greater than the Astrogation task target number, and is three or more, the Astrogation task is a Spectacular failure.

### Verifying The Astrogation Task

The Astrogation Task is Uncertain.

A prudent Astrogator confirms or verifies the results of the task before proceeding. The difficulty of manually confirming the jump calculation is one level higher than the automated calculation difficulty.

The Astrogation Confirmation Task is also Uncertain.

For example, Ank Dinsha 888888 Astrogator-3 is plotting out a jump to the next system two parsecs away. Jump-2 makes it an Average 2D task with 1D Uncertainty. Ank must roll (8+3 = ) 11 or less on 2D. He rolls 1D (=6) and the Referee secretly rolls the Uncertain die (=6). Assuming the Uncertain roll is 3, the Referee says: you have your final Jump input. Arv thinks the situation through (Hmm, if the Uncertain die is 6, the calculations will be wrong) and decides to manually confirm the figures.

Confirmation will take 24 hours and is a Difficult 3D task with 1D Uncertainty. He needs to roll (8+3 =11) on 3D. He

rolls 2D (=5) and the Referee rolls the Uncertain die. In this case, even if the Uncertain die is 6, Arv succeeds in confirming the figures. If they were correct, the Referee would tell him they are confirmed. In this case, the Referee tells him that he found an error; the original calculations are not confirmed. Arv needs to start over.

**Movement To The Jump Point**

The ship moves to the selected point for the initiation of jump. The location at which a ship will enter jump space is a Jump Point. A Jump Point must be at least 100 Diameters from every body (star, planet, gas giant, planetoid, or other object) larger than the ship.

**Note Movement Vector.** The astrogator should note (and perhaps adjust) the movement vector of the ship. For most purposes, the vector can be noted as a speed and a direction relative to the jumpline.

For example, 100 kps along the jumpline, or 100 kps reverse on the jumpline, or 100 kps perpendicular to the jumpline. It is also possible to have zero speed.

**2 INITIATING JUMP**

Initiation begins transition from Real Space to Jump Space.

**The Power System Supplies The Energy Required**

The ship's Power System consumes fuel in an extremely rapid (and inefficient) process, channelling the required energy to the Jump Drive which then "tears a hole in spacetime" and inserts the ship into Jump Space.

The actual energy required depends on the Jump Drive, the Power System, and their levels of performance.

**The Jump Drive Engages**

Almost immediately, the Jump Drive engages and the ship enters jumpspace.

**Jump Entry Flash**

A ship entering Jump Space emits an active flash of broad spectrum energy (detectable as Electronics and Photonics) equal to Ship Size plus Mod +4. The ship's gravitational signature (detectable as Gravitics) vanishes from any sensors.

Entry Flash is subject to lightspeed and lasts about a minute at peak strength. It then degrades -1 every minute until its becomes undetectable.

**3 IN JUMPSPACE**

A ship in Jump Space is totally isolated from Real Space.

**Undetectable.** A ship in Jump Space is undetectable. There is no known system available to detect the presence

of ships in Jump Space.

(Some psionics claim to be able to detect ships in jump, but test results are inconclusive.)

**Almost Unstoppable.** A ship in Jump Space is theoretically unstoppable. It remains in Jump Space until it exits at its planned destination. A ship cannot voluntarily terminate jump early.

If its drives are destroyed, it still exits Jump Space at the end of the Jump time period (rather than immediately).

If the Jump Field is breached, much of the matter is destroyed by Jump Space. What matter that remains exits Jump Space at the end of the time period.

**Movement Vector Can Be Changed**

A ship can change its speed and direction while in jump space. Vector change requires non-gravity-based drives or devices; gravity-based drives (due to their need to interact with gravity sources) are generally ineffective.

**4 THE END OF JUMP**

Exit (Breakout, Precipitation) is the transition from Jump Space back to Real Space. The field which sustains the Jump effect collapses and the ship transitions to Real Space.

**Interference** with Exit is virtually impossible. If the Exit Point is within a 100 Diameter sphere, the ship automatically exits where the straight line course intersects that sphere.

**Rumblings**

Exit from Jump occurs without any specific input or control activity from the ship. Just before Exit, the jump drive shows signs of the jump ending (through decreased energy levels, increased vibration levels, and other readings).

Rumblings occur about one hour before Exit; their absence is a sign that Breakout will be delayed; their early occurrence is a sign that Breakout will be premature.

**Jump Exit Flash**

A ship leaving Jump Space emits an active flash of broad spectrum energy (Electronics and Photonics) equal to Ship Size plus Mod +2 (which is slightly less intense than an Entry Flash). The ship's gravitational signature (detectable as Gravitics) appears on any sensors.

Exit Flash is subject to lightspeed and lasts about a minute at peak strength. It then degrades -1 every minute until its becomes undetectable.

**Transition To Real Space**

The ship fully returns to Real Space.

**Vectors Are Preserved.** Conservation of momentum applies to ships as they enter and exit jump space.

UNPLANNED OUTCOMES					
Type	Failed Jump			Misjump	
Cause	Drive Fail or Power Fail	Interference with Jumpfield	Astrogation Failure	Jump Drive Failure	
Time in Jump=	0 Days	0 Days	7 Days	7+ Flux Days	
Exit=	No Movement	No Movement	Blockage/Scatter	As Planned	
Mishap	in Jump Drive	in Jump Drive	No	In Jump Drive	

**Time In Jump.** Calculated secretly and revealed only when it occurs.

\*technically =Safe Jump Distance.

**Blockage and Scatter** are consequences of an Astrogation Fail, calculated at the time the ship exits Jump.



<b>S DAMAGE SEVERITY</b>		<b>D DIAGNOSIS SEVERITY</b>		<b>IA IMMEDIATE ACTION DAMAGE CONTROL</b>	<b>FA FIRST AID DAMAGE CONTROL</b>
1D	Difficulty	1D	Difficulty		
1	Easy 1D	1	Easy 1D	<b>Check Double Skill (2D)</b>	<b>Check Double Medical (2D)</b>
2	Average 2D	2	Average 2D		
3	Difficult 3D	3	Difficult 3D	Use any appropriate skill.	For an injury, the victim (if still conscious) or a comrade may devote one Round to Check Double Medical (2D).
4	Formidable 4D	4	Formidable 4D	Success converts the damage to Severity= Easy 1D	Success reduces an injury or wound by 1D.
5	Staggering 5D	5	Staggering 5D	and	
6	Hopeless 6D	6	Hopeless 6D	the component remains operable.	
7	Impossible 7D	7	Impossible 7D		
8	Beyond 8 D	8	Beyond 8 D		
9	Destroyed	9	Destroyed	Not Possible if Damage above 6D	Not Possible if Injury above 6D

### The Mishap

Drives (and other mechanisms) may be damaged by the energy of jump, or by exposure to jumpspace.

A Mishap occurs during a Failed Jump, when the Jump Drive fails during Jump., or when a hull fails during Jump.

**Inflicting Mishap Damage.** Mishap damage to a ship begins in the Jump Drive and cascades through the ship. Mishap damage for non-ships is inflicted randomly to the object's components.

Using the ShipSheet, inflict one event of Damage to the Jump Drive. Determine Damage and Diagnosis Severity.

Inflict Damage one level less severe (reroll for Diagnosis Severity) on each adjacent box.

Inflict Damage one level yet less severe (reroll for the Diagnosis Severity) on boxes adjacent to those.

Continue the process until the severity of damage is less than Easy.

Absent any changes made in jump space, a ship arrives at its destination with the same vector (speed and direction) it had when it left. Speed and direction are expressed within a constant frame of reference which encompasses both start and destination (probably relative to the Galactic core).

### Normal Scatter

The straight line course for any Jump extends from the Entry Point to a planned Exit Point. The actual exit point may naturally vary slightly from the planned exit point.

**100D Sphere.** If the planned Exit Point is the intersection of the Jump Line and the surface of the 100D Sphere of a World or Star, there is no Scatter. The ship emerges at the planned Exit Point.

**Range Band from a World.** The Astrogator may designate a Range Band from a World or Star, subject to the 100D limit. The actual Exit Point is the Range band S= plus Flux. If it is within the 100D limit, the Exit point is at the 100D limit.

For example, the Beowulf's Astrogator plans its Exit Point at S=12 from the star (the edge of the Inner System). The actual Exit Point is S= 12 + Flux, thus possibly as close as S=7 (as long as that is not within the star's 100D limit) or as far away as S=17.

**An Orbit within the System.** The Astrogator may designate an Orbit in the destination system. Convert the Orbit O= to Space Range S=. The actual Exit Point is the Range band S= plus Flux. If the result is within the 100D limit, the Exit point is at the 100D limit.

### UNPLANNED OUTCOMES

Jump activity may from time to time produce unplanned outcomes: the Failed Jump and the Misjump.

### The Failed Jump

A jump attempt may fail. The ship does not enter jump; it remains in its current location with jump fuel expended.

**Drive Failure.** The Jump Drive did not process sufficient

energy (or did not have sufficient capacity) to initiate Jump.

The Jump Drive receives Mishap damage.

Conceivably, a Power System may fail and that failure will in turn trigger a Jump Drive failure.

**Interference.** If, during initiation a Jump, objects larger than the ship are in (or partially in) the ship's jump field, the Jump fails. The Jump Drive receives Mishap damage.

A Jump Drive will fail if the total tonnage within the Jump Field is greater than can be transported by the Drive operating at its minimum value (Jump-1 for Standard and better Jump Drives).

Jump Drive-B in a 200-ton Hull-B produces Jump-2. Based on the Drive Potential-2 Table, it produces Jump-1 in 400-ton Hull-D. Attempting Jump-2 with less than 400 tons, but more than 200 tons reduces the effect to Jump-1 and triggers an Astrogation Failure. Attempting Jump with more than 400 tons produces Jump Drive Failure.

### The Misjump

A Jump may begin but produce imperfect results.

**Jump Drive Failure.** If the Jump Drive fails at any time after Jump has begun, time in Jump is altered and the Jump Drive receives Mishap damage (in addition to, and separate from, any damage that caused the failure).

Jump Drive failure can occur at any time during the Jump. Despite any time already spent in Jump, calculate the new total time in Jump. If it is greater than the time already elapsed, Jump ends immediately; otherwise, Jump continues until the total dictated time has elapsed.

For example, the Jump Drive is destroyed by a luddite bomb after one day in Jump. The time roll is 7+ Flux = 5. The ship emerges into RealSpace after 5 total days in Jump.

Or, the Jump Drive fails 6 days into the jump. The time roll is 7 +Flux= 2 days. Although 6 days have passed aboard ship, it emerges into Real Space where only 2 days have elapsed.

The ship emerges from Jump Space at its otherwise

planned location.

**Astrogation Failure.** If the Astrogation task fails, the ship travels toward the intended destination for a normal period of time, but Jump is subject to potential Blockage.

Actual exit point is determined when the ship exits Jump.

## **BLOCKAGE AND SCATTER**

**Blockage** terminates a courseline short of the destination. **Scatter** shifts the end of the courseline away from the intended destination.

### **Blockage**

A planned jumpline may be blocked (at any point along the course, at the moment jump begins) by an intervening gravity source (larger than the ship in jump). The ship exits from jump at 100 diameters from the gravity source. The effect mimics quantum mechanics wave function collapse.

As the length of the jumpline increases, the potential for blockage increases. For example, although a jump-6 (=6 parsecs = 20 light years) jumpline may appear to be a clear line of sight from start to end, the far end originated 20 years ago; some object (anything larger than the jumping ship: another ship, a comet, a stray planetoid; a rogue world) may occlude the jumpline but cannot be detected or foreseen from the start point.

Blockage is produced by an Astrogation failure; the longer the courseline, the greater the chance of a blockage. The courseline is blocked by a stray, random, unforeseen, intervening object which forces the ship out of JumpSpace.

The number of sixes in the Astrogation Task is the number of parsecs short of the destination (if the Astrogation Task succeeds, the number of sixes in the roll is inconsequential).

If exit point is in a system hex, place it at  $S=12 + \text{Flux}$ .

If the exit point is in a deep space hex, create the stray object and place the ship at 100D from the object.

### **Scatter**

Astrogation failure which does not produce Blockage nevertheless produces scatter. The ship arrives at  $S=12 + \text{Flux}$ , but at least one range band farther out from the star's 100D sphere.

### **Overshoot**

An astrogator may plan a jump to intersect the 100D sphere of a star or world at a distance less than the capability of the Jump Drive (using a Jump-3 drive without a Jump Governor to reach a system 1 parsec distant; using a ten-parsec Hop-1 drive to reach a system 4 parsecs distant). If the Astrogation task fails, the ship continues for the full distance of the jump.

Developmental Transport Tenacious TL-11, in the Regina system, is equipped with prototype jump-3. At this TL stage, the drive does not have a Jump Governor and can only perform Jump-3. The ship receives emergency orders to nearby Jenghe. Naval Lieutenant Nargle Agash 777777 Astrogator-5 must plan the 1-parsec jump. She plots 3-parsec jump courseline to Phlume that intersects the 100D sphere of Jenghe's star. The 3-parsec Astrogation task difficulty is 3D, which Nargle resolves with  $C+S=12$ .

The task is uncertain. Nargle rolls  $2D = 1+6=7$ . The Un-

certain die is secretly rolled by the referee (=6).

Confirming the Astrogation task will take at least a day; Nargle figures the Uncertain roll is 5 or less and that the Astrogation Task succeeded; she'll take the chance. She gives the order to proceed and the ship enters Jump. After a week in JumpSpace, the ship emerges.

The Astrogation roll failed: Tenacious misses the 100D sphere of Jenghe and proceeds toward Phlume. The Astrogation task included two sixes: there is a blockage two parsecs short of Phlume, about one parsec out, precisely at Jenghe.

The referee calls for a flux roll = - 5. The ship emerges in the Jenghe system at  $S=12 -5 = 7$  from the star. Nargle's captain chides her for arriving somewhat farther out than the desirable 100D limit ( $S=6$ ) but remains unaware of the astrogation failure.

**Controverting Higher Order Drive Minimums Is Almost Impossible.** Technically, an Astrogator may plot a courseline for higher order jump drives to intersect the intervening 100D sphere of nearer systems. The course is plotted based on the drive minimum range.

Naval Lieutenant Nargle Agash 777777 Astrogator-5 is now assigned to HopShip X4 at TL-17 with a 10-parsec Hop-1 drive (and its attendant minimum 10-parsec limitation). Located at Regina, the X4 is ordered to Jenghe (one parsec distant). Nargle plots a course to Quare (ten parsecs away) but to intersect Jenghe's star's 100D sphere.

The 10-parsec Astrogation task difficulty is 10D. Nargle  $C+S=12$ , but she elects to use the Computer T L-17. She must roll 17 or less on 10D with 1D Uncertain. Because Confirmation is not possible, Nargle proceeds to execute the Hop:  $9D = 6\ 6\ 1\ 1\ 1\ 1\ 1\ 3\ 3$  (and the Referee rolls the Uncertain die =5).  $23+X$  fails. But, the net ones over sixes produces three ones: Spectacular Success, and the ship emerges from HopSpace at  $S=13$  from the star.

Nargle has a reputation as a great astrogator.

## **DRIVE AVAILABILITY BY TECH LEVEL**

The availability of various drives and their capabilities is determined by Tech Level. The tables detail the specific types of drives for ready reference.

For example, Jump Drive-1 can be produced at TL9. Using Tech Level Stage Effects, it is possible to produce an Experimental Jump-Drive-1 at TL 6, but its efficiency is less than 1 and it will produce no useful results.

For example, the Nine Drive is impossible to produce because its TL 34 is beyond the TL spectrum. It is possible to build an experimental drive at TL-32 and a Prototype drive at TL-33.



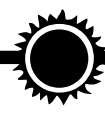
**THE MANY LEVELS OF JUMP TECHNOLOGY**

Drive	10^	Possible*	Drive Multiplier	Time**	Destination	Distance*	TL
Jump	^0	1-9 x 10^0	1	168 hours	Nearby Stars	0	9
Hop	^1	1-9 x 10^1	10	168 hours		10	17
Skip	^2	1-9 x 10^2	100	168 hours		100	20
Leap	^3	1-9 x 10^3	1,000	168 hours	Transgalactic	1,000	22
Bound	^4	1-9 x 10^4	10,000	168 hours	Pangalactic	10,000	26
Vault	^5	1-9 x 10^5	100,000	168 hours	Intergalactic	100,000	29
Six Drive	^6	1-9 x 10^6	1,000,000	168 hours	Local Group	1 million	31
Seven Drive	^7	1-9 x 10^7	10,000,000	168 hours		10 million	32
Eight Drive	^8	1-9 x 10^8	100,000,000	168 hours		100 million	33
Nine Drive	^9	1-9 x 10^9	1,000,000,000	168 hours		1 billion	34

\*In Parsecs. \*\*may vary Plus or Minus 10%.

Y DRIVE COSTS Drive EP	Jump	Higher Order Jump Drives							Exotic Drives				
	J	H	S	L	B	V	6	7	8	9	R	A	I
A 100	10	10	10	10	10	10	10						
B 200	15	15	15	15	15	15	15						
C 300	20	20	20	20	20	20	20						
D 400	25	25	25	25	25	25	25						
E 500	30	30	30	30	30	30	30						
F 600	35	35	35	35	35	35	35						
G 700	40	40	40	40	40	40	40						
H 800	45	45	45	45	45	45	45						
J 900	50	50	50	50	50	50	50						
K 1000	55	55	55	55	55	55	55						
L 1100	60	60	60	60	60	60	60						
M 1200	65	65	65	65	65	65	65						
N 1300	70	70	70	70	70	70	70						
P 1400	75	75	75	75	75	75	75						
Q 1500	80	80	80	80	80	80	80						
R 1600	85	85	85	85	85	85	85						
S 1700	90	90	90	90	90	90	90						
T 1800	95	95	95	95	95	95	95						
U 1900	100	100	100	100	100	100	100						
V 2000	105	105	105	105	105	105	105						
W 2100	110	110	110	110	110	110	110						
X 2200	115	115	115	115	115	115	115						
Y 2300	120	120	120	120	120	120	120						
Z 2400	125	125	125	125	125	125	125						
N2 2600	140	140	140	140	140	140	140						
P2 2800	150	150	150	150	150	150	150						
Q2 3000	160	160	160	160	160	160	160						
R2 3200	170	170	170	170	170	170	170						
S2 3400	180	180	180	180	180	180	180						
T2 3600	190	190	190	190	190	190	190						
U2 3800	200	200	200	200	200	200	200						
V2 4000	210	210	210	210	210	210	210						
W2 4200	220	220	220	220	220	220	220						
X2 4400	230	230	230	230	230	230	230						
Y2 4600	240	240	240	240	240	240	240						
Z2 4800	250	250	250	250	250	250	250						
MCr/ton=	1	1	1	1	1	1	1	1	1	1	1	1	1

Not Generally Available



### STELLAR DIAMETER LIMITS

Distance=	1 au	10 au	150 au	1230 au	9800 au	1 ly	4 pc	45 pc	450 pc	4500 pc	45000 pc		
O=	3	7	11	14	17	21							
S=	8	9	11	13	15	17	19						
(star) D=	1	10	100	1,000	10,000	100,000	1,000,000	10,000,000	100,000,000	1,000,000,000	10 billion		
Z Lifters	○												
G Gravitic		○											
M Maneuver			○										
N NAFAL					○								
J Jump				▶									
H Hop					▶								
S Skip						▶							
L Leap							▶						
B Bound								▶					
V Vault									▶				
6 Six										▶			
7 Seven											▶		
8 Eight												▶	
9 Nine													▶

○ Drive cannot operate outside this limit.  
▶ Drive cannot operate inside this limit.  
D= Assumes spectral G V star.

### COURSELINE BLOCKAGE

If the Astrogation Task fails, count sixes in the failed roll: The Blockage is at that count in parsecs, short of the destination.

**Spectacular:** pair ones and sixes and determine any excess: if at least three excess ones, the task is **Spectacular Success**, and the arrival is normal.

if at least three excess sixes, the task is **Spectacular Failure** and the ship emerges short of the destination.

### OUTSYSTEM SCATTER

	OutSystem Scatter	InSystem Scatter
Drive	No	In System S=12 + Flux
Jump	No	In System S=14 + Flux
Hop	Left/Right Flux (max +1/-1)	
Skip	Random Hex inSector	
Leap	Random Hex In Sector	
Bound	Empty Sector	
Vault	Empty Sector ex-Galaxy	
Six Drive	Empty Sector ex-Galaxy	
Seven Drive	Empty Sector ex-Galaxy	
Eight Drive	Empty Sector ex-Galaxy	
Nine Drive	Empty Sector ex-Galaxy	

### SCATTER (RANDOM SUBSECTOR HEX)

	2D											
	02	03	04	05	06	07	08	09	10	11	12	
02												
03			0101	0201	0301	0401	0501	0601	0701	0801		
04			0102	0202	0302	0402	0502	0602	0702	0802		
05			0103	0203	0303	0403	0503	0603	0703	0803		
06			0104	0204	0304	0404	0504	0604	0704	0804		
07			0105	0205	0305	0405	0505	0605	0705	0805		
08			0106	0206	0306	0406	0506	0606	0706	0806		
09			0107	0207	0307	0407	0507	0607	0707	0807		
10			0108	0208	0308	0408	0508	0608	0708	0808		
11			0109	0209	0309	0409	0509	0609	0709	0809		
12			0110	0210	0310	0410	0510	0610	0710	0810		

Re-Roll Blank Results.

### NEAR WORLD DIAMETER LIMITS

	S=	4	5	6	7	8	9
(world) D=	1	10	100				1,000
Z Lifters	○						
G Gravitic		○					
M Maneuver							○
N NAFAL							
J Jump					▶		

○ Drive cannot operate outside this limit  
▶ Drive cannot operate inside this limit.  
D= Assumes World Size=8.

### RANDOM SUBSECTOR WITHIN A SECTOR

1D	1	2	3	4	5	6
1	P	M	N	O	P	M
2	D	A	B	C	D	A
3	H	E	F	G	H	E
4	L	I	J	K	L	I
5	P	M	N	O	P	M
6	D	A	B	C	D	A

Roll 1D plus 1D for the specific Subsector letter in a Sector. A grey letter is in an adjacent sector.

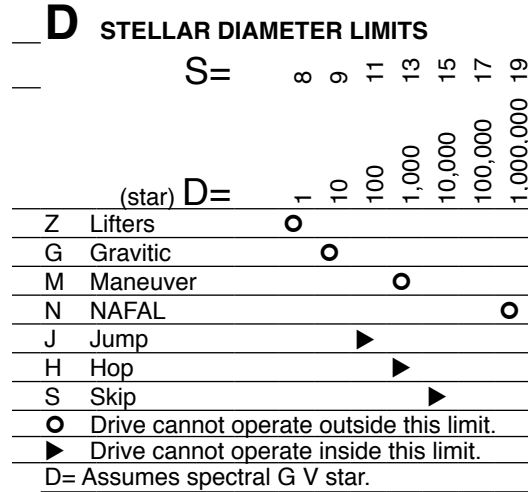
<b>INTERSTELLAR Performance</b>		<b>J</b> Jump 1-9 parsecs Jump-1= 1 parsec	<b>H</b> Hop 10-90 parsecs Hop-1= 10 parsecs 1,000D about 10 AU	<b>S</b> Skip 100-900 parsecs Skip-1= 100 parsecs 10,000D about 100 AU
Limit*	Diameters= 100D AU= about 1 AU Orbit O= 3 Space Range S= 11 lights= 500 light-seconds			
Fuel	Power Plant= AM= Collector=		10% of Hull times potential 1 slug per 100 tons x potential one charge	
Time	Hours=		168 hours about a week	
Astrogation Difficulty	Dice=	Jump Number (x 1)	Hop Number x 10	Skip Number x 100
Blockage	Blockage located at	Roll Difficulty Dice: Sixes times parsecs short of destination.	Roll Difficulty Dice: Sixes times parsecs short of destination.	Roll Difficulty Dice: Sixes times parsecs short of destination.
Scatter	OutSystem: no		Left/Right Flux (max +1 / - 1)	random hex in sector which is Skip Number x2 Sectors distant
	InSystem: S=12 + Flux (or one range band out from the star's 100D sphere)		S=14 + Flux (or one range band out from the star's 1,000D sphere).	S=16 + Flux (or one range band out from the star's 10,000D sphere).
Minimum	Jump-1= 0.1 to 1 parsecs. treated as 1 parsec.		Minimum 10 parsecs.	Minimum 100 parsecs

\*Assumes spectral-G star.

<b>J</b>	Eff=50%	80%	90%	100%
TL	Experimental	Prototype	Early	Standard
6	Jump-0 (0.5)			
7	Jump-0 (0.5)	Jump-0 (0.8)		
8	Jump-1 (1.0)	Jump-0 (0.8)	Jump-0 (0.9)	
9	Jump-1 (1.5)	Jump-1 (1.6)	Jump-0 (0.9)	Jump-1
10	Jump-2 (2.0)	Jump-2 (2.4)	Jump-1 (1.8)	Jump-1
11	Jump-2 (2.5)	Jump-3 (3.2)	Jump-2 (2.7)	Jump-2
12	Jump-3 (3.0)	Jump-4 (4.0)	Jump-3 (3.6)	Jump-3
13	Jump-3 (3.5)	Jump-4 (4.8)	Jump-4 (4.5)	Jump-4
14	Jump-4 (4.0)	Jump-5 (5.6)	Jump-5 (5.4)	Jump-5
15	Jump-4 (4.5)	Jump-6 (6.4)	Jump-6 (6.3)	Jump-6
16		Jump-7 (7.2)	Jump-7 (7.2)	Jump-7
17			Jump-8 (8.1)	Jump-8
18				Jump-9

<b>S</b>	Eff=50%	80%	90%	100%
TL	Experimental	Prototype	Early	Standard
17	Skip-0 (0.5)			
18	Skip-0 (0.5)	Skip-0 (0.8)		
19	Skip-1 (1.0)	Skip-0 (0.8)	Skip-0 (0.9)	
20	Skip-1 (1.5)	Skip-1 (1.6)	Skip-0 (0.9)	Skip-1
21	Skip-2 (2.0)	Skip-2 (2.4)	Skip-1 (1.8)	Skip-1
22	Skip-2 (2.5)	Skip-3 (3.2)	Skip-2 (2.7)	Skip-2
23	Skip-3 (3.0)	Skip-4 (4.0)	Skip-3 (3.6)	Skip-3
24	Skip-3 (3.5)	Skip-4 (4.8)	Skip-4 (4.5)	Skip-4
25	Skip-4 (4.0)	Skip-5 (5.6)	Skip-5 (5.4)	Skip-5
26	Skip-4 (4.5)	Skip-6 (6.4)	Skip-6 (6.3)	Skip-6
27		Skip-7 (7.2)	Skip-7 (7.2)	Skip-7
28			Skip-8 (8.1)	Skip-8
29				Skip-9

<b>H</b>	Eff=50%	80%	90%	100%
TL	Experimental	Prototype	Early	Standard
14	Hop-0 (0.5)			
15	Hop-0 (0.5)	Hop-0 (0.8)		
16	Hop-1 (1.0)	Hop-0 (0.8)	Hop-0 (0.9)	
17	Hop-1 (1.5)	Hop-1 (1.6)	Hop-0 (0.9)	Hop-1
18	Hop-2 (2.0)	Hop-2 (2.4)	Hop-1 (1.8)	Hop-1
19	Hop-2 (2.5)	Hop-3 (3.2)	Hop-2 (2.7)	Hop-2
20	Hop-3 (3.0)	Hop-4 (4.0)	Hop-3 (3.6)	Hop-3
21	Hop-3 (3.5)	Hop-4 (4.8)	Hop-4 (4.5)	Hop-4
22	Hop-4 (4.0)	Hop-5 (5.6)	Hop-5 (5.4)	Hop-5
23	Hop-4 (4.5)	Hop-6 (6.4)	Hop-6 (6.3)	Hop-6
24		Hop-7 (7.2)	Hop-7 (7.2)	Hop-7
25			Hop-8 (8.1)	Hop-8
26				Hop-9



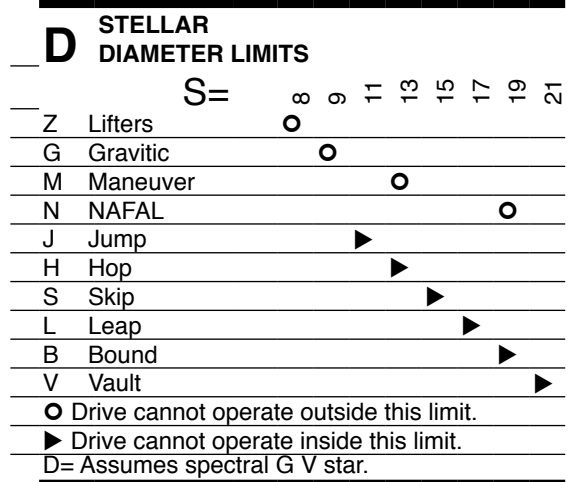
<b>INTERSTELLAR</b>		<b>L</b> Leap	<b>B</b> Bound	<b>V</b> Vault
Performance		1,000-9,000 parsecs	10,000-90,000 parsecs	100,000-900,000 parsecs
Limit*	Diameters=	Leap-1= 1,000 parsec 100,000D	Bound-1= 10,000 parsecs 1,000,000D	Vault-1= 100,000 parsecs 10,000,000D
	AU=	about 1,000 AU	about 10,000AU	about 100,000 AU
	Orbit O=	14	17	21
	Space Range S=	17	19	21
	lights=	1 light-week	8 light-weeks	82 light-weeks
Fuel	Power Plant=		10% of Hull times potential	
	AM=		1 slug per 100 tons x potential	
	Collector=		one charge	
Time	Hours=		168 hours about a week	
Astrogation Difficulty Dice=	Leap Number x 1,000	Bound Number x 10,000	Vault Number x 100,000	
Blockage	Blockage located at			
Scatter	OutSystem: random hex in sector	random empty hex/empty sector	random empty hex /empty sector	
	Leap Number x20 Sectors	Bound Number x200 Sectors	Vault Number x2,000 Sectors	
	distant	distant, outside Galaxy.	distant, outside Galaxy.	
Scatter	InSystem: at O=14	at O=17	at O=21	
Minimum	Minimum 1,000 parsecs	Minimum 10,000 parsecs	Minimum 100,000 parsecs	

\*Assumes spectral-G star.

<b>L</b>	Eff=50%	80%	90%	100%
TL	Experimental	Prototype	Early	Standard
20	Leap-0 (0.5)			
21	Leap-0 (0.5)	Leap-0 (0.8)		
22	Leap-1 (1.0)	Leap-0 (0.8)	Leap-0 (0.9)	
23	Leap-1 (1.5)	Leap-1 (1.6)	Leap-0 (0.9)	Leap-1
24	Leap-2 (2.0)	Leap-2 (2.4)	Leap-1 (1.8)	Leap-1
25	Leap-2 (2.5)	Leap-3 (3.2)	Leap-2 (2.7)	Leap-2
26	Leap-3 (3.0)	Leap-4 (4.0)	Leap-3 (3.6)	Leap-3
27	Leap-3 (3.5)	Leap-4 (4.8)	Leap-4 (4.5)	Leap-4
28	Leap-4 (4.0)	Leap-5 (5.6)	Leap-5 (5.4)	Leap-5
29	Leap-4 (4.5)	Leap-6 (6.4)	Leap-6 (6.3)	Leap-6
30		Leap-7 (7.2)	Leap-7 (7.2)	Leap-7
31			Leap-8 (8.1)	Leap-8
32				Leap-9





<b>B</b>	Eff=50%	80%	90%	100%
TL	Experimental	Prototype	Early	Standard
23	Jump-0 (0.5)			
24	Jump-0 (0.5)	Jump-0 (0.8)		
25	Jump-1 (1.0)	Jump-0 (0.8)	Jump-0 (0.9)	
26	Jump-1 (1.5)	Jump-1 (1.6)	Jump-0 (0.9)	Jump-1
27	Jump-2 (2.0)	Jump-2 (2.4)	Jump-1 (1.8)	Jump-1
28	Jump-2 (2.5)	Jump-3 (3.2)	Jump-2 (2.7)	Jump-2
29	Jump-3 (3.0)	Jump-4 (4.0)	Jump-3 (3.6)	Jump-3
30	Jump-3 (3.5)	Jump-4 (4.8)	Jump-4 (4.5)	Jump-4
31	Jump-4 (4.0)	Jump-5 (5.6)	Jump-5 (5.4)	Jump-5
32	Jump-4 (4.5)	Jump-6 (6.4)	Jump-6 (6.3)	Jump-6
33		Jump-7 (7.2)	Jump-7 (7.2)	Jump-7

<b>V</b>	Eff=50%	80%	90%	100%
TL	Experimental	Prototype	Early	Standard
26	Vault-0 (0.5)			
27	Vault-0 (0.5)	Vault-0 (0.8)		
28	Vault-1 (1.0)	Vault-0 (0.8)	Vault-0 (0.9)	
29	Vault-1 (1.5)	Vault-1 (1.6)	Vault-0 (0.9)	Vault-1
30	Vault-2 (2.0)	Vault-2 (2.4)	Vault-1 (1.8)	Vault-1
31	Vault-2 (2.5)	Vault-3 (3.2)	Vault-2 (2.7)	Vault-2
32	Vault-3 (3.0)	Vault-4 (4.0)	Vault-3 (3.6)	Vault-3
33	Vault-3 (3.5)	Vault-4 (4.8)	Vault-4 (4.5)	Vault-4



## POWER SYSTEM COMPARTMENT



Y DRIVE COSTS Drive	EP	Power Systems			
		 A	 C	 U	 P
A	100	31	20	15	4
B	200	32	30	20	7
C	300	33	40	25	10
D	400	34	50	30	13
E	500	35	60	35	16
F	600	36	70	40	19
G	700	37	80	45	22
H	800	38	90	50	25
J	900	39	100	55	28
K	1000	40	110	60	31
L	1100	41	120	65	34
M	1200	42	130	70	37
N	1300	44	140	75	40
P	1400	46	150	80	43
Q	1500	48	160	85	46
R	1600	50	170	90	49
S	1700	52	180	95	52
T	1800	54	190	100	55
U	1900	56	200	105	58
V	2000	68	210	110	61
W	2100	60	220	115	64
X	2200	62	230	120	67
Y	2300	64	240	125	70
Z	2400	66	250	130	73
N2	2600	88	280	150	80
P2	2800	92	300	160	86
Q2	3000	96	320	170	92
R2	3200	100	340	180	98
S2	3400	104	360	190	104
T2	3600	108	380	200	110
U2	3800	112	400	210	116
V2	4000	116	420	220	122
W2	4200	120	440	230	128
X2	4400	124	460	240	134
Y2	4600	128	480	250	140
Z2	4800	132	500	260	146
MCr/ton=		2	0.5	1.5	1

## COMBINING POWER PLANTS

The standard power systems (identified by letters A through Z) are the only practical sizes which can be constructed (just as there are limitations on the construction of internal combustion engines; a million-ton version is impossible). Power systems can be ganged and their combined output harnessed using Nexi.

A **Nexus** (plural = **Nexi**) connects the output of two or more (up to 9) identical mechanisms, allowing the joined devices to produce greater overall power output.

For example, an N2 or NN P-Plant consists of two N power plants connected by a Nexus. The nexus itself is basically a connection; it adds no tonnage and no additional cost.

A Nexus can also be used to create other combinations up to nine drives: N3, K4, Z9. An A9 drive (consisting of nine Standard P-Plant-A drives and nexi) creates an output of 900 EP, is (9 \* 4)= 36 tons, and costs MCr 36. P-Plant-J is more efficient at 28 tons.

Combined drives can themselves be combined (and designated by a prefix digit): 4A4 indicates ( 4 x 4 = ) 16 P-Plant Drive-A. The largest drive available under ACS is 9Z9 (= 9 x 9 = ) 81 P-Plant-Z.

The resulting ratings remain subject to TL limitations.

For example:

Plant		tons	EP	
P-Plant	A	4	100	smallest possible
P-Plant	A9	36	900	
P-Plant	9A9	324	8,100	
AM-Plant	K	40	1,000	
AM-Plant	K5	200	5,000	
AM-Plant	8K5	1,600	40,000	
U-Plant	Z	130	2,400	
U-Plant	Z9	1,170	21,600	
U-Plant	9Z9	10,530	194,400	largest possible

Similar nexi (Drive Nexi, Grav Nexi, Maneuver Nexi) connect other drives to also create greater output.

## DRIVE POTENTIAL

**The Power System Rule.** When installed in a starship, the Potential for an installed Power System must at least equal the greater Drive Potential of the interstellar and interplanetary drives.

Drive Potential is the EP (Energy Points) per Hull Ton; ignore fractions and round down. The Starship Drive Potential table pre-calculates values for most common combinations of drive and hull.

# How Power Systems Work

Spacecraft require a power system to support the operation of their various drives and internal mechanisms.

Starship energy needs are unique: in addition to routine power usage, the energy demands of jump drives are intense and immediate, far more than traditional power sources can supply. The starship power system has one overriding function: to meet this wide-ranging demand for energy.

For example, a 1,000-ton jump-2 starship requires 1000 EP Energy Points to initiate jump. A standard industrial 1000 EP fusion power plant is an installation sprawling over several hectares; even if reduced to a compact minimum, it would be about 3,000 tons: far larger than a ship's hull can contain.

A starship fusion power plant is a miniaturized version of the standard industrial power plant: a hundredth of the size and a hundredth of the output. The key is its OverClock capability: a starship power plant can output energy to the jump drive at 100 times normal for a period measured in seconds, but long enough to make jump happen.

Although the fusion Power Plant is the common standard, other power sources are also available.

## Power Systems for Starships

Of the available Power Systems, only four are practical for use as primary power on starships: P-Plants, AM Plants, Fission Plants, and Collectors.

Other systems can support compartment power needs including environment, computer systems, and life support: Power Cells, Fuel Cells, Ambient Cells, Generators, and FusionPlus.

**Power Plant.** Unless specifically stated, Power Plant or P-Plant refers to the standard and commonly available Fusion Power Plant.

**The Power System Rule.** When installed in a starship, the Drive Potential for an installed Power System must at least equal the greater of the Drive Potential for any of its installed interstellar and interplanetary drives.

**Redundant or Alternative Systems.** A ship may be equipped with more than one of any specific type of drive. For example, as ship may be equipped with a Power Plant and an Anti-Matter Plant.

## Skills and Knowledges

Power Systems are operated, maintained, and repaired by the ship's Engineers.

Skill: Engineer is sufficient for any task involving any of the power systems; Knowledge: Power System is applicable only to power systems.

## TYPES OF POWER SOURCES



**B**

A **Power Cell** is a rechargeable electric battery. It receives energy from an outside source and stores it until needed. When its charge is exhausted, it can be recharged.



**H**

A **Fuel Cell** generates electric current from fuel (typically hydrogen and oxygen). A Fuel Cell is more efficient than (for example) an engine-driven electric generator.



**A**

An **Ambient Cell** converts light (or heat, or radiation) into electricity; it is dependent on a continuing source of relatively strong local ambient energy.



**G**

An engine-driven **Generator** generates electric current from motion engine, a steam engines, moving water, wind, beasts of burden, even people turning cranks.



**F+**

**Fusion Plus** is a compact fusion system which converts hydrogen into electricity with minimal waste heat. FusionPlus is a small portable version of the Fusion Power Plant.



**U**

A **Fission Power Plant** accelerates the decay of heavy metals (uranium, plutonium, thorium) and uses the attendant heat to produce electricity.



**P**

A **Fusion Power Plant** joins (fuses) particles in a reaction with a net output of energy without the long-term radiation shielding requirements.



**A**

An **Anti-Matter Power System** brings together matter and anti-matter particles which annihilate each other to produce energy in a high-powered and efficient process.



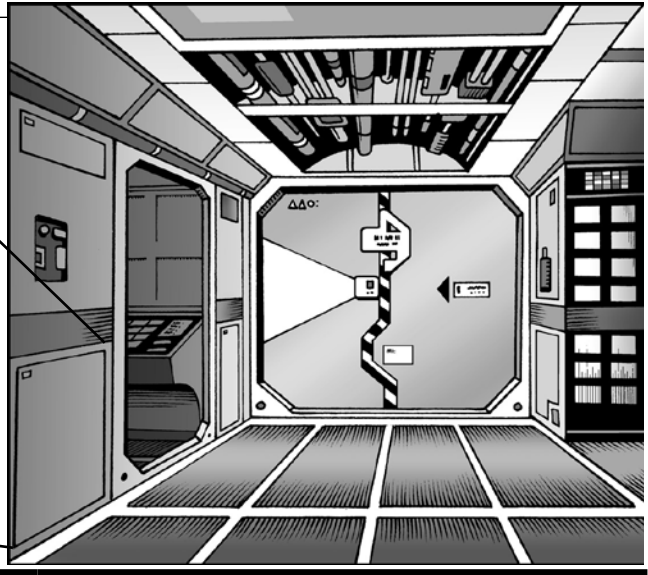
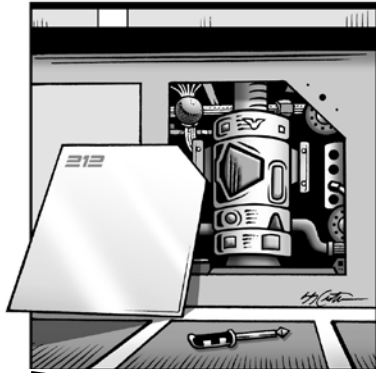
**C**

A **Collector** is an array of specialized materials that slowly absorb exotic particles and releases them in a burst of energy which can power interstellar drives.

Operation of Power Power systems is governed by Engineer: Power Systems.



## DISPERSED POWER SYSTEMS



### Centralized Or Dispersed

A ship power system may have a single source of energy, or the sources may be distributed throughout the ship.

**Dispersed.** The power system supports its interplanetary and interstellar drives. Individual mechanisms are self-powered (with FusionPlus or Power Cells) and independent of a central power source.

- **Fusion Plus.** Ships may use Fusion Plus (compact cold fusion modules) as the independent power source. Individual components can continue to operate indefinitely (months) without a central power supply.

- **Power Cells.** Ships may use Power Cells (compact high capacity power storage cells; batteries) as the independent power source. Individual components can operate for (1D) days after disconnection from the central power supply.

**Centralized.** A power system which supplies all power to the operating mechanisms of the ship. Individual mechanisms or areas have short-term emergency power backups (1D hours).

## FUSION POWER PLANT

The power plant is a variant of the standard fusion power plant redesigned to meet the needs of starship operations.

**Fuel.** Starship fusion plants fuse molecular hydrogen.

Raw or unrefined hydrogen fuel (contaminated with hydrogen compounds such as methane CH<sub>4</sub>, ammonia NH<sub>3</sub>, water OH<sub>2</sub>, hydrogen sulfide SH<sub>2</sub>, and helium) is available directly from the atmospheres of gas giants. An alternative raw or unrefined fuel is water available from bodies of free-

standing liquid water or deposits of solid water ice on worlds with Hydrographics 1+.

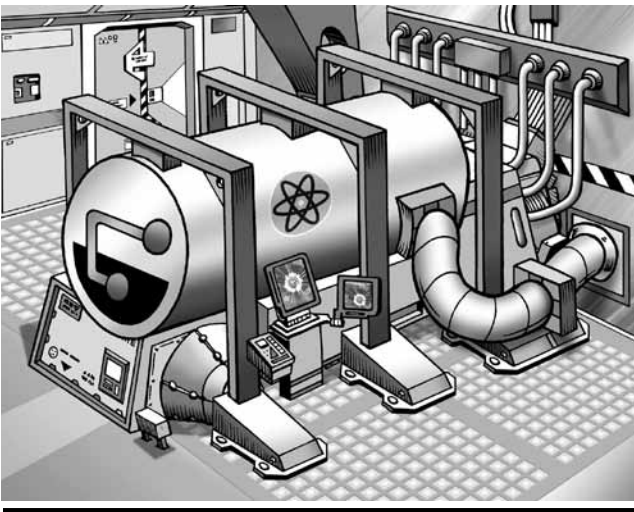
Unrefined fuel is often available at starports.

Refined Fuel is available at better quality starports.

**Overclock.** Starship Power Plants are "small" generators compared to the standard plants used on world surfaces. The key to their importance is called **Overclock**. The Power Plant can increase its output by several orders of magnitude for a period of seconds, with great inefficiency. This ability even makes normal operation relatively inefficient, with fuel usage measured in tons per week rather than tons per year. In addition, each use of Overclock increases the chance of failure (which is why starship Power Plants require annual maintenance).

These Overclock inefficiencies are reflected in the Drive Tech Level Stage Effects table (in Ship Design) which significantly reduces efficiency and increases tonnage for lower tech levels (and increases efficiency and reduces tonnage for higher techlevels).

## FUSION POWER PLANT



## FISSION POWER PLANTS

The power plant uses the fission of radioactive elements to produce usable energy. Its output is similar to Fusion Power Plants, but it is incapable of Overclock, and cannot support Interstellar Drive operations.

**Fuel.** Fission power plants are fueled by radioactives (typically Uranium, Plutonium, or Thorium). Raw radioactives are mined as available on worlds or asteroids.

Refined fuel rods are available at some starports (those which supply a significant number of ships powered by fission power plants). Refined fuel rods can be custom-manufactured from raw radioactives using a Radioactive Fuel Processing Unit, or at TL-5+ manufacturing facilities.

### ANTI-MATTER PLANTS

The Anti-Matter Plant is a sophisticated Power System producing energy from matter-anti-matter encounters.

**Fuel.** Anti-matter fuel slugs contain AM particles with magnetic or gravitic fields to isolate them from normal matter. The particles can be released slowly as a continuing source of energy, or in a burst as required to power starship drives.

AM Slugs is produced in slugs available at some starports (those which supply a significant number of ships powered by AM power plants).

AM slugs are stored in a 1-ton console near the AM Plant. The greatest vulnerability of AM Plants is the potential for catastrophic failure: an accidental, environmental, or combat hit to the AM fuel supply is sufficient to destroy the entire ship.

**AM Slug Production.** AM Plants are intrinsically capable of operating "in reverse" and producing AM Slugs. With power supplied from a Fusion Power Plant of equal potential, an AM Plant in production mode can produce 1 AM slug per 100 EP per day.

### COLLECTORS

The Collector is a specialized alternate Power Source. It slowly absorbs energy and releases it in a burst which can fuel interstellar drives.

The Collector uses a large external surface area to slowly absorb exotic particles; its unique structure releases energy in a powerful burst to support the high energy requirements of interstellar drives.

**Not For Routine Energy Use.** A Collector is unsuitable as a routine energy supply (the mechanisms of the ship are powered by other sources).

### POWER CELLS

The ship has an array of units which store usable energy. Power cells are dependent on an energy source to provide the energy that they store and release.

Power cells are batteries: they store energy; they do not produce it. An operating Power Plant can charge multiple Power Cells in about a day.

**Routine Energy Use.** A charged Power Cell can support the operation of its assigned device for two weeks.

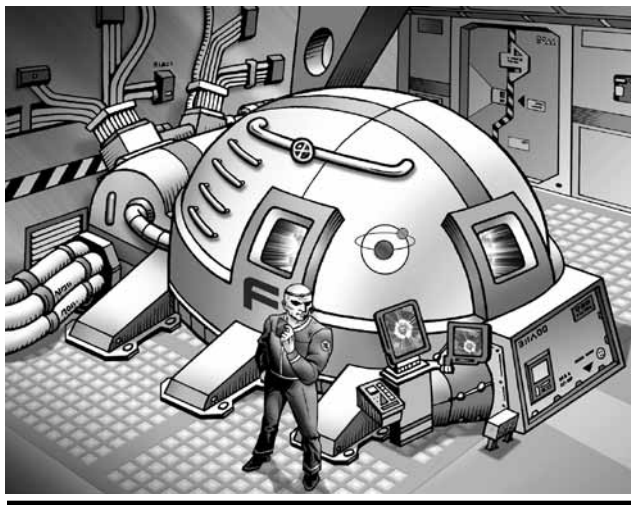
**Operations.** Power Cells are suitable for routine use of non-energy-intensive devices. In practice, they support Consoles, Computers, and Sensors. They are not suitable for Drives, Weapons, or Defenses.

### FUEL CELLS

The ship has an array of units which convert a source fuel into usable energy.

**Fuel.** Fuel cells consume hydrogen and oxygen to produce electric current. Hydrogen can be obtained from standard starship fuel, or skimmed from gas giants. Oxygen can

### FISSION POWER PLANT



be obtained from any world with Atmosphere 2-9. Refined or unrefined status is inconsequential for Fuel Cell fuel. A single fuel cell requires one ton of fuel to support 10 weeks of operations for a Compartment.

**Routine Energy Use.** A charged Fuel Cell can support the operation of its assigned device for ten weeks.

**Operations.** Fuel Cells, like Power Cells, are suitable for routine use of non-energy-intensive devices. In practice, they support Consoles, Computers, and Sensors. They are not suitable for Drives, Weapons, or Defenses.

### FUSION PLUS UNITS

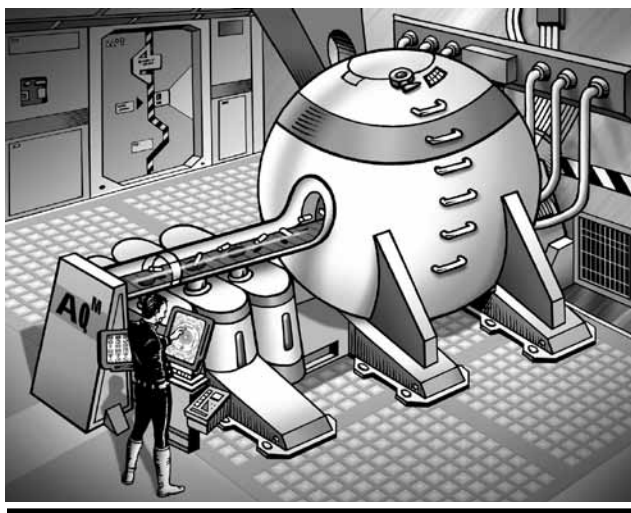
The power plant uses a cold fusion process to produce usable energy.

**Fuel.** Highly efficient Fusion Plus units electrolyze water to produce hydrogen and waste oxygen.

**Routine Energy Use.** A charged FusionPlus can support the operation of its assigned devices for about a year.

**Fuel Consumption.** A small (several liter) water tank is filled with potable water as necessary.

### ANTI-MATTER POWER PLANT



**POWER SYSTEMS**

Note the details of TL availability for available power systems.

**X DRIVE TECH LEVEL STAGE EFFECTS**

Stage	TL Cost	Eff	Fuel	Tons	Examples:	TL	Potential	Tons	MCr	Fuel%	Tons
Exp	Experimental-3 x10	50%	2.0	x3	Exp P-Plant-B	6	1 ( 50%=1.0)	21	210	2	4
Pro	Prototype -2 x5	80%	1.2	x2	Pro P-Plant-B	7	1 ( 80%=1.6)	14	70	1.2	3 (=2.4)
Ear	Early -1 x2	90%	1.1	x1	Ear P-Plant-B	8	1 ( 90%=1.8)	7	14	1.1	3 (=2.2)
Std	Standard 0 x1	100%	1.0	x1	Std P-Plant-B	9	2 (100%=2.0)	7	7	1	2
Bas	Basic 0 /2	90%	1.1	x1	Bas P-Plant-B	9	1 ( 90%=1.8)	7	3.5	1.1	3 (=2.2)
Alt	Alternate 0 x1	100%	1.0	x1	Alt P-Plant-B	9	2 (100%=2.0)	7	7	1	2
Imp	Improved +1 x1	110%	0.9	x1	Imp P-Plant-B	10	2 (110%=2.2)	7	7	.9	2 (=1.8)
Gen	Generic +1 /2	90%	1.1	x1	Gen P-Plant-B	10	1 ( 90%=1.8)	7	3.5	1.1	3 (=2.2)
Mod	Modified +2 /2	110%	0.9	/2	Mod P-Plant-B	11	2 (110%=2.2)	4 (=3.5)	1.7	.9	2 (=1.8)
Adv	Advanced +3 x2	120%	0.8	/3	Adv P-Plant-B	12	2 (120%=2.4)	3 (=2.3)	4.6	.8	2 (=1.6)
Ult	Ultimate +4 x3	130%	0.7	/4	Ult P-Plant-B	13	2 (130%=2.6)	2 (=1.7)	5.1	.7	2 (=1.4)

TL Stage Effects (Cost, QREBS) apply. Variations based on Standard P-Plant-B TL-9 in Hull-B 200 tons with Drive Potential=2. Round against advantage (up for tonnage; down for potential).  
 Efficiencies round down (thus Early Jump-1 at 90% becomes Jump-0).

\* Potential increases or decreases with Efficiency.  
 \*\* P-Plant Fuel formula is Hull Tons times Potential divided by 100.  
 \*\*\*Base cost of MCr1 per ton (using final tonnage and cost multiplier).

**P**

	Eff=50%	80%	90%	100%	110%	120%	130%	
	TL Experimental	Prototype	Early	Standard	Improved	Advanced	Advanced	
Fusion Power Plants	5 Power-0 (0.5)							
	6 Power-1 (1.0)	Power-0 (0.8)						
	7 Power-1 (1.5)	Power-1 (1.6)	Power-0 (0.9)					
	8 Power-2 (2.0)	Power-2 (2.4)	Power-1 (1.8)	Power-1				
	9 Power-2 (2.5)	Power-3 (3.2)	Power-2 (2.7)	Power-2	Power-1 (1.1)			
	10 Power-3 (3.0)	Power-4 (4.0)	Power-3 (3.6)	Power-3	Power-2 (2.2)			
	11 Power-3 (3.5)	Power-4 (4.8)	Power-4 (4.8)	Power-4	Power-3 (3.3)	Power-1 (1.2)		
	12 Power-4 (4.0)	Power-5 (5.6)	Power-6 (6.0)	Power-5	Power-4 (4.4)	Power-2 (2.4)	P-1 (1.3)	
	13 Power-4 (4.5)	Power-6 (6.4)	Power-7 (7.2)	Power-6	Power-5 (5.5)	Power-3 (3.6)	P-2 (2.6)	
	14	Power-7 (7.2)	Power-8 (8.4)	Power-7	Power-6 (6.6)	Power-4 (4.8)	P-3 (3.9)	
	15		Power-9 (9.6)	Power-8	Power-7 (7.7)	Power-6 (6.0)	P-5 (5.2)	
	16			Power-9	Power-8 (8.8)	Power-7 (7.2)	P-6 (6.5)	
	17					Power-9 (9.9)	Power-8 (8.4)	P-7 (7.8)
	18						Power-9 (9.6)	P-9 (9.1)

Shows Power Plant Potential based on TL Stage Effects. Numerical is Drive Potential (P-1 has Drive Potential-1).

**U**

	Eff=50%	80%	90%	100%	110%	120%	130%	
	TL Experimental	Prototype	Early	Standard	Improved	Advanced	Ultimate	
Fission Power Plants	4 Fission-0 (0.5)							
	5 Fission-1 (1.0)	Fission-0 (0.8)						
	6 Fission-1 (1.5)	Fission-1 (1.6)	Fission-0 (0.9)					
	7 Fission-2 (2.0)	Fission-2 (2.4)	Fission-1 (1.8)	Fission-1				
	8 Fission-2 (2.5)	Fission-3 (3.2)	Fission-2 (2.7)	Fission-2	Fission-1 (1.1)			
	9 Fission-3 (3.0)	Fission-4 (4.0)	Fission-3 (3.6)	Fission-3	Fission-2 (2.2)			
	10 Fission-3 (3.5)	Fission-4 (4.8)	Fission-4 (4.8)	Fission-4	Fission-3 (3.3)	Fission-1 (1.2)		
	11 Fission-4 (4.0)	Fission-5 (5.6)	Fission-6 (6.0)	Fission-5	Fission-4 (4.4)	Fission-2 (2.4)	F-1 (1.3)	
	12 Fission-4 (4.5)	Fission-6 (6.4)	Fission-7 (7.2)	Fission-6	Fission-5 (5.5)	Fission-3 (3.6)	F-2 (2.6)	
	13	Fission-7 (7.2)	Fission-8 (8.4)	Fission-7	Fission-6 (6.6)	Fission-4 (4.8)	F-3 (3.9)	
	14		Fission-9 (9.6)	Fission-8	Fission-7 (7.7)	Fission-6 (6.0)	F-5 (5.2)	
	15			Fission-9	Fission-8 (8.8)	Fission-7 (7.2)	F-6 (6.5)	
	16					Fission-9 (9.9)	Fission-8 (8.4)	F-7 (7.8)
	17						Fission-9 (9.6)	F-9 (9.1)

Shows Power Plant Potential based on TL Stage Effects. Numerical is Drive Potential (U-1 has Drive Potential-1).

































Base TL equals Shipyard TL

 Sensor Generic

 TL Sensor Blank

# SENSORS

Comm/ Visual	 <b>C</b> Communicator 8	 <b>T</b> Scope 9	 <b>V</b> Visor 14	 <b>W</b> CommPlus 15	 <b>H</b> Holovisor 18			
	Space Sensors	 <b>R</b> Radar 9	 <b>N</b> Neutrino Detector 10	 <b>E</b> EMS 12	 <b>G</b> Grav Sensor 13	 <b>S</b> Scanner 19		
		World Sensors	 <b>M</b> Mass Sensor 8	 <b>B</b> Deep Radar 9	 <b>D</b> Densitometer 10	 <b>L</b> Life Detector 10	 <b>A</b> Activity Sensor 11	
			Specialized	 <b>U</b> Radiation Sensor 8	 <b>K</b> Sniffer 9	 <b>Y</b> Sound Sensor 10	 <b>P</b> Proximeter 10	 <b>F</b> Field Sensor 12
				Deception	 <b>J</b> Jammer 8	 <b>Q</b> Stealth Mask 12		 <b>X</b> Reserved

Mounts	 Surface	 Turret	 Barbette	 Antenna	 Big Antenna	 Deployable	 Extendable
--------	---	--	--	---	--	--	--

# How Sensors Work

Sensors are the technological eyes and ears (and other senses) of starships (and of many star system installations). Technology magnifies the capabilities of personal senses and translates the information that sensors gather into understandable formats.

The **Traveller** sensor system and its mix of devices allows the crew of a starship (or spacecraft, or vehicle, or base, or starport, or installation) to acquire knowledge about objects and phenomena around them in a series of information-gathering steps. Rather than knowing everything about a star system or planet or region all at once, the information becomes available in a series of readings.

## UNDERSTANDING THE TRAVELLER SENSOR SYSTEM

The sensor system is based on two principles:

### The Referee Has Perfect Knowledge

He knows if an enemy starship is lurking in the planetoid belt, or behind a gas giant. Or,

He knows that the present star system is totally vacant, with no threats or dangers other than natural ones.

### The Players Have No Knowledge.

They know nothing. They depend on the readings from their sensors to develop an understanding of the situation.

Dare they risk moving directly to the barren mainworld, not knowing what ships might lie in ambush?

Dare they move closer, risking being detected by possible enemies as they do?

The Sensor system is the process by which the players learn about potential threats, challenges, and rewards.

### The Process

The Sensor Process becomes part of the excitement as players investigate each new star system, planet, and even planetary location, moving ever closer as they use their sensors, and risking disaster if they guess wrong.

**SOARN Sense Only As Really Necessary.** The Sensor Process is a sequence of steps dealing with the unknown. If the system is totally unknown to the characters, then using the Sensor Process is entirely appropriate. If the system is familiar, then Sensors come into play only when problems or unusual readings occur.

## UNDERSTANDING SENSORS

Sensors are technological devices which provide information about the environment. Sensors are identified by a LongName (with enough detail to define its usage) which includes Stage, Range, Type, and Tech Level.

Each specific type of Sensor is also identified by a single Letter Code (for example, C = Communicator).

**Types of Sensors.** Sensors are available in a variety of generalized types. Space Sensors are used over the vast distances of space. World Sensors are used over smaller distances associated with a world (and are more closely tailored to the information that examination of a world can provide).

## USING SENSORS

Sensor output is provided in three distinct stages, each revealing more information.

### Alert

When there is something of possible interest, the Referee conveys to the players an Alert:

“Your [sensor] sees something about here [location].”

### Detection

Using the Sensor Task, the characters try to resolve what gave the alert (or they can ignore it). Success in the Sensor Task provides information about the alert.

### Tracking

Once a sensor detects an object, it can track that object until some event causes the signal to be lost (it moves out of range; it is hidden by a world; it deliberately jams or hides its signal).

A Sensor cannot operate beyond its stated Range.

The Sensor Task determines the success of the effort.

Because the range of possible readings is unknown, the Referee administers the task in increments based on the dice used:

**The Uncertain Die (see Uncertain Tasks).** The referee rolls the Uncertain Die secretly and notes its result. Players

## SENSORS



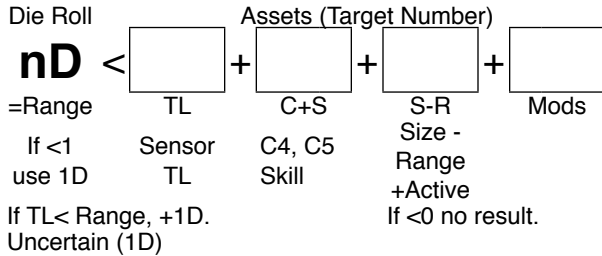
Sensop Crew Member



Sensors Compartment

Sensors are the eyes and ears of a ship.

## THE SENSOR TASK



Target Number equals TL + C+S + S-R + Mods.

**TL.** The Tech Level of the Sensor.

**C+S.** The Characteristic plus Skill of the Sensop operating the Sensor. If C+S is less than Sensor TL, the operator may depend on the device and its console and use Sensor/Weapon TL instead. A Sensop with C+S greater than device TL has greater chance of success using C+S instead of TL.

**S-R.** The Size of the Target minus Range S= to the Target + Active Sensor Mod. If this value is less than zero, Task automatically fails.

### Mods:

**Active Sensor Mod.** The Sensor Task assumes Passive Mode. If the Sensor is Active, add Mod = Sensor Range S= (task is more likely to succeed).

**Target Active Mod.** If the Target is firing weapons, operating defenses, operating drives, or operating an Active Sensor of the same principle, add Mod = Sensor Range S= (task is more likely to succeed).

**Stealth Mask Mod.** If Target has Stealth Mask, subtract Mod = Sensor Range S= (task more likely to fail).

**Lying Doggo.** If a ship has all systems powered down, subtract Mod = Sensor Range S= (task is more likely to fail).

**Sensor Mount Mod.** The Mount provides a Mod on the Sensor Task. The default Surface Mount is Mod+0. The 50-ton Bay Mount is Mod+5 (task is more likely to succeed).

**Space Range Effects.** It is possible to construct a Sensor with less Range (and because S= decreases, its Mod decreases), or greater Range (and because S+ increases, its Mod increases).

**TL Stage Effect Mod.** Building a Sensor at an earlier TL imposes a negative Mod equal to the difference from Standard TL (an Early version operates at one Lower TL and experiences Mod minus 1). Building a Sensor at a later TL (except Generic) imposes a positive Mod equal to the difference from Standard TL (an Advanced version operates at three TLs higher and experiences Mod +3).

can assume the result is 3 (although it may be between 1 and 6). If this assumed 3 is less than T+C+S+M, he reveals anything detected at S=1 (for Space Sensors) or R=1 for (World Sensors).

**The Second Die.** The referee rolls the second Die and if the total (of the assumed 3 for the Uncertain Die and the second Die) is less than T+C+S+M, he reveals anything detected at S=2 (for Space Sensors) or R=2 for (World Sensors).

**Additional Dice.** Continue rolling additional dice until they equal the stated range for the sensor.

## IDENTIFYING SENSORS

Sensors are identified by a LongName which provides enough detail to define its usage. A Sensor LongName includes Stage, Range, Type, Tech Level, and C+S.

**Stage** is the sensor's position in the TL spectrum.

**Range** is the sensor's distance ability. Space Sensors use Space Ranges. World Sensors use World Ranges.

**Mount.** Sensors are contained in a Mount (which is then contained within the identification of the installed sensor).

**Sensor Name** details the precise nature of the mechanism and provides insights into how it operates.

**Tech Level** identifies the Technological Level at which the Sensor is commonly manufactured. TL is required.

**C+S.** Characteristic Plus Skill shows the expected or presumed C+S used to operate the sensor and equals the base TL for the device.

For example, Standard AR Surf Radar-9 (9) is designed to detect a benchmark Size-8 BCS Ship at Attack Range S=7. To resolve the task, the player rolls 7D for Sensor TL=9 plus C+S=9 Plus Size Mod (for the Benchmark=) 0.

The chance of success rolling 18 or less on 7D is about 9%. A Sensop with C+S less than 9 spends hours at his console as it does the majority of the work, occasionally presenting a stray signal as a possible contact. A well-qualified Sensop (perhaps C+S= 12) needs to roll 9+12 = 21 or less on 7D, with a chance of success of about 26%.

## CREATING SENSORS

Sensors are defined primarily by Type and Tech Level.

Available Sensors are determined by the Tech Level of the constructing shipyard (although character may upgrade their ship's sensors as better ones become available).

Space Sensors detect a variety of inputs and process them to provide specific details of location, environment, and friends and enemies.

## IDENTIFYING SPACE SENSORS

Stage	Range	Mount	Type	-TL	(C+S)	Additional
Std	AR	Surf	Radar-9	(9)	(9)	Mod +0 0 tons MCr 1 S=7
Ear	AR	Surf	Radar-8	(8)	(8)	Mod - 1 0 tons MCr 2 S=7
Imp	AR	Surf	Radar-10	(10)	(10)	Mod +1 0 tons MCr 1 S=7
Imp	AR	Surf	Radar-1	(10)	(10)	Mod +1 0 tons MCr 1 S=7
Mod	AR	Bay	Radar-11	(11)	(11)	Mod +7 50 tons MCr 5.5 S=7
Ear	DS	BAnt	Radar-10,	(10)	(10)	Mod +4 30 tons MCr 12 S=12

The Standard Radar is available at TL-9.

The Early version (more costly; Mod-1) is available at TL-8.

The Improved version (Mod+1) is a one TL later.

## The Process

For each desired Sensor:

A. Select a **Sensor**. Note its Model Letter and TL.

Base tonnage for a Sensor is zero tons.

Base cost for World Sensor is MCr0.1;

Base cost for a Space Sensor is MCr1.0.

B. Select a **Mount** for the Sensor. Mount is TL-independent. Note any Mods to the Sensor based on Mount.

Surface Mounts (with the exception of Surface and Antenna) are installed in Hardpoints (or Firmpoints)..

C. Apply **TL Stage Effects** consistent with ship TL.

D. For Space Sensors, apply **Space Range Effects**..

E. For World Sensors, apply **World Range Effects**.

F. Allocate a **Control Panel** each Sensor.

G. Note the final cost and tonnage.

Surface and Antenna sensor installations do not require hardpoints. Added required tons may be located anywhere on the ship (not necessarily on the Bridge).

**Console Substitution.** A Sensor Console operates with an assumed C+S= TL. If the assigned operator has a C+S greater than the Console, then the operator may resolve the Sensor Task with his own C+S.

**TL Stage Effects** apply to the Sensor but not the Mount. It affects cost of the Sensor, but not tonnage.

**Range Effects** apply to the Mount but not the Sensor.. A Surface Mount (with no tonnage) can be increased from the standard AR S=7 to LR or even DS at no increase in tonnage and, uniquely for Surface Mounts, at no increase in cost (since the cost multiplier times 0 produces 0).

**Multiple Sensors.** A ship may install any number of sensors, subject only to tonnage restrictions. More than one of a specific sensor (multiples of the same model, or several different models) may be installed for redundancy.

---

## HARDPOINTS AND FIRMPPOINTS

Minimum tonnage for any Mount is 1 ton (a turret cannot be less than 1 ton; a FR Barbette can conceivably be 1 ton; a FR Bay can conceivably be 16 or 17 tons).

A ship may have one Hardpoint per 100 tons of hull, or instead **three** Firmpoints per 100 tons.

A ship may have one installation per Hardpoint, or a ship may have one World Range installation per Firm Point.

But, Surface and Antenna mounts do not require Hard Points or Firm Points.

---

## DEPLOYABLE SENSORS

Sensors may be installed in Deployable Hardpoints; which may be moved and operated at a distance from the ship. Deployables are launched from a ship and operate from a remote location. The primary advantage is, if targeted by an enemy, they do not disclose the precise location of their parent ship.

Deployable Sensors are installed under Weapons.

---

## EXTENDABLE SENSORS

SSensors may be mounted on Extendable Stalks. Extendable Sensors can change the location of the sensor, typically to move an emitting (and detectable) sensor away from the main hull of a ship.

---

## SENSOR CREATION EXAMPLE

For example, several Neutrino Detectors are possible.

### [Std] AR Surf ] N-10 Neutrino Detector-10

The standard device at standard tech level; mounted in a hull Surface Mount.

S=7 (per Space Sensors).

Cost= Standard= MCr1 (per Space Sensors).

The Sensor is assigned to a Console with tonnage.

Mount = Surface Mount requires no additional tonnage.

The N-10 can detect Fusion Power Plants equal to or larger than the benchmark shown on the Sensor Data Chart, but not farther than Maximum Range S=7.

The Neutrino Detector resolves the Sensor Task using TL= 10 and no Mods. Assuming the Sensor Operator has C4=7 and Sensor-3, the Sensor Task calls for him to roll 7D for (10 + 7 + 3 = 20) or less = about a 20% chance of detecting the target.

### ExSRN-6 Experimental SR Bay Neutrino Detector-6

An experimental device with a shorter range at an earlier Tech Level (TL=10 -3 -1) mounted in a Bay.

S= 5 Short Range (Space Sensors).

Sensor Cost= MCr1 x 10 = MCr10.

Mount Cost= MCr5.0 /2 = MCr2.5.

Mount Tonnage= 50 / 2 = 25 tons.

The ExSRN-10 can (attempt to) detect FusionPlus modules at S=5 It has Mod +2 (based on -3 +5) to detect.

Assuming the Sensor Operator has C4= 7 and Sensor-3 and Mod + 2 (Experimental = -3; Bay = +5), the Sensor Task calls 5D for (6 + 7 + 3 +2 = 18) or less = about a 50% chance of detecting the target.

### AdvDS B1 Neutrino Detector-15

An advanced device with very great detection range, a high tech level, mounted in a Barbette.

S=12 Deep Space (Space Sensors)

Sensor Cost= MCr1 x2= MCr2.

Mount Cost= MCr3.0 x5 = MCr15.

Mount Tonnage= 3 x 3 = 9 tons.

The AdvDS N-15 can attempt to detect fusion power plant neutrino emissions at extreme ranges (S=12). It has Mod +5 to detect. Assuming the Sensor Operator has C4= 7 and Sensor-3 and Mod + 5 (Adv = +3; Barbette= +2 = +5), the Sensor Task calls for him to roll 12D for (15 + 7 + 3 +4 = 29) or less = about a 10% chance of detecting a standard Fusion Power Plant at S=12.

---

## HARDPOINTS AND FIRMPPOINTS

Minimum tonnage for any Mount is 1 ton (a turret cannot be less than 1 ton; a FR Barbette can conceivably be 1 ton; a FR Bay can conceivably be 16 or 17 tons).

A ship may have one Hardpoint per 100 tons of hull, or instead **three** Firmpoints per 100 tons.

A ship may have one installation per Hardpoint, or a ship may have one World Range installation per Firm Point.

But, Surface and Antenna mounts do not require Hard Points or Firm Points.



### WHAT SENSORS SHOULD A SHIP CARRY?

By default, any ship has automatically installed (at no specific cost):

**Comms.** One R=7 C Communicator-8.

**Radar.** One R=7 R Radar-9.

**Vision.** Several R=6 Portholes. In practice, the portholes facilitate the use of Vision by characters in the ship, including with technological means such as Binox or telescopes.

By extension, characters capable of Perception or Awareness can sense outside of the ship (using the portholes or not as appropriate).

The default installed Sensors cannot be modified. They can be replaced or supplemented with new Sensors.

### WORLD RANGE R= SENSORS

World-ranged sensors are typically for survey purposes, or specialized missions. Scout ships probably have them.

### SPACE RANGE S= SENSORS

Space-ranged sensors may be: general purpose and specialized.

**General Purpose** sensors are used in all starships and fall into three families: Every ship probably has one of each of these

**Comms.** Communicator TL8-16 or CommPlus TL17+.

**Detectors.** Radar TL9-11, EMS TL12-18, and Scanner TL19+.

**Viewers.** Portholes TL5, Scope TL9-13, Visor TL14-17) and HoloVisor TL18+.

### SPECIALIZED SPACE-RANGE SENSORS

Specialized sensors are used for survey, covert ops, or overt military use. They include Grav Sensor, Jammer, Neutrino Detector, and Stealth Mask.

The larger the ship, the more likely it has improved sensor mounts. Large naval ships may install Specialized sensors in Bays: to increase the sensor task mod. Large ships probably install sensors with greater than standard Space range S=.

### USING THE SENSOR CHARTS

The Sensor Charts show the various sensors and their capabilities at a wide selection of ranges.

**Maximum Range.** Each Sensor has a Maximum Range; it cannot attempt detection beyond Maximum Range.

## 1 THE COMM AND VISION SENSORS

	Sensor	TL	Mount	S=	R=	MCr
Com/Vision	<b>C</b> Communicator	8	Surf	7		1.0
	<b>H</b> Holovisor	18	Surf	7		1.0
	<b>T</b> Scope	9	Surf	7		1.0
	<b>V</b> Visor	14	Surf	7		1.0
	<b>W</b> CommPlus	15	Surf	7		1.0

## C COMMUNICATOR 8 SURF

Communicator (essentially radio) receives and transmits modulated energy to carry information. They carry voice (or any language of any type including tactile and pvoice) and may carry images. Communicators are line-of-sight; they cannot transmit through objects (worlds, planets, stars). Receiving is Passive; transmitting messages is Active.

**Broadcast Mode.** Communicators normally operate in Broadcast mode. The broadcast can be intercepted by any Communicator.

**Beamcast Mode.** Communicators operating in Beamcast mode must first detect their intended receiver. Range is Maximum Range minus 2. The Beamcast cannot be intercepted (unless the interceptor is in the Beamcast beam).

**Burst Mode.** Communicators operating in Burst Mode compress their message into a very short burst. Interception of a Burst requires resolution of the Sensor Task with double the required dice.

**Communicator Operations.** A Communicator or CommPlus can receive a Broadcast if it is within the transmitting Communicator's Range.

Communicators function using the electromagnetic spectrum (radio waves). Operating (active) Communicators may be detected (by location) by EMS, Scanner, and Radar. CommPlus communicates using exotic particles. CommPlus use different and unique processes, and each cannot interact with the other.

**Related Sensors:** The Communicator is the basic electromagnetic broad spectrum information transmitter/receiver. Common synonyms include comm, or radio. The equivalent sensor based on neutrinos is CommPlus.

## H HOLOVISOR 18 SURF

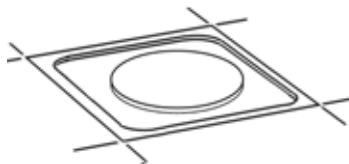
HoloVisor is the ultimate vision screen system, using external light detectors and displaying them in 3D projection (computer enhancements fill in gaps, extrapolate unseen sides of objects, and maintain a complete image in memory).

Projections are rotatable: it is possible to view an object and rotate the image to see the other side (but, unless the

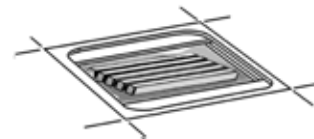
### TYPICAL SENSOR SURFACE MOUNTS



Hardpoint (or Firmpoint) Mount



Surface Mount



Antenna Mount

system has seen that other side, the image will only be an extrapolation or computer-enhanced guess).

**Related Sensors:** Predecessors to the Holovisor include the Visor and the Scope.

## T SCOPE 9 SURF

Scope is vision screen with distance and enhancement capabilities. It acquires images and magnifies them for interaction, navigation, and analysis.

Scope operates in the visible light spectrum RGB usable by Humans. Specific sophonts produce similar Scopes adapted to their vision spectra.

**Related Sensors:** The successor to the Scope is the Visor and ultimately the Holovisor.

## V VISOR 14 SURF

Visor is the basic visual sensor. It uses external cameras with telescopic enhancements to produce viewable images.

Visor is tunable to specific light wavelengths for false color imagery, or to mimic specific sophont vision systems.

**Related Sensors:** The Visor supplants the Scope and is ultimately succeeded by the Holovisor.

## W COMMPPLUS 15 SURF

CommPlus is an advanced version of Communicator which uses particles (primarily mesons and neutrinos) to carry information. CommPlus can transmit through objects (worlds, planets, stars).

CommPlus is incompatible with Communicators. Neither can receive and transmit to the other system. CommPlus operate otherwise in the same manner as Communications (Broadcast, Beamcast, Burst).

## P PORTHOLES

Most ships have TL=5 Portholes; they range from simple observation ports to transparent pilot windscreens.

Portholes are transparent and oriented to Vision. Various versions include closable armored shutters, hardened or strengthened material, and insulation

**Synonyms:** Portholes are also called Viewports, Vision Ports, Observation Ports, Windscreens, Windshields.

### Perception Ports, Awareness Ports, and Psi Ports.

Sections of hull can be crafted of homogeneous material to allow a sophont to use a specific sense with a minimum of (or no) interference with the sense.

STANDARD SENSOR PACKAGES					
TL	Components	Mod	Tons	MCr	Range
7	Ear AR Surf Comm-7	-1	0	1	S= 7
	Ear SR Surf Radar-7	-1	0	2	S= 5
	Ear SR Surf Scope-7	-1	0	2	S= 5
8	Std AR Surf Comm-8	0	0	1	S= 7
	Ear AR Surf Radar-8	-1	0	2	S= 7
	Ear AR Surf Scope-8	-1	0	2	S= 7
9	Imp AR Surf Comm-9	+1	0	1	S= 7
	Std AR Surf Radar-9	0	0	1	S= 7
	Std AR Surf Scope-9	0	0	1	S= 7
10	Mod AR Surf Comm-10	+2	0	0.5	S= 7
	Imp AR Surf Radar-10	+1	0	1	S= 7
	Imp AR Surf Scope-10	+1	0	1	S= 7
11	Adv AR Surf Comm-11	+3	0	2	S= 7
	Mod AR Surf Radar-11	+2	0	0.5	S= 7
	Imp LR Surf Scope-11	+1	0	1	S= 9
12	Adv LR Surf Comm-12	+3	0	2	S= 9
	Adv AR Surf Radar-12	+3	0	2	S= 7
	Mod LR Surf Scope-12	+2	0	0.5	S= 9
13	Adv DS Surf Comm-13	+3	0	2	S=12
	Adv LR Surf Radar-13	+3	0	2	S= 9
	Adv LR Surf Scope-13	+3	0	2	S= 9
14	Ult DS Surf Comm-14	+4	0	3	S=12
	Adv DS Surf Radar-14	+3	0	2	S=12
	Std AR Surf Visor-14	0	0	1	S= 7
15	Ult DS Surf Comm-14	+4	0	3	S=12
	Mod LR Surf EMS-15	+2	0	0.5	S= 9
	Std LR Surf Visor-15	0	0	1	S= 9
16	Ult DS Surf Comm-14	+4	0	3	S=12
	Adv LR Surf EMS-16	+3	0	2	S= 9
	Std LR Surf Visor-15	0	0	1	S= 9
17	Ult DS Surf Comm-14	+4	0	3	S=12
	Adv DS Surf EMS-17	+3	0	2	S=12
	LR Surf Visor-17	+2	0	0.5	S= 9
18	Ult DS Surf Comm-14	+4	0	3	S=12
	Ult DS Surf EMS-18	+4	0	3	S=12
	Std AR Surf HoloVisor-18	0	0	1	S= 7

Each Sensor package requires at least one Console (+1 ton, MCr0.2 not included above).

## REMOTE SENSORS

Sensors may be installed in Missiles and operated remotely.

Any zero-ton (Surface Mount) Sensor can be installed in a Missile where Sensor Range S= is equal to Missile Size.

Two distinct zero-ton Sensors can be installed in a Missile where Range S= Missile Size minus 1.

**Reusable.** Standard cost Sensors are reusable; the missile can return to the ship and be redeployed time after time.

**Disposable.** A disposable version of the Sensor suitable for one-time use is one-ten standard cost.

**Return-To-Ship Mode.** Sensor Missiles can be programmed to return to their launching ship and their gathered information is downloaded.

**Relay Mode.** Sensor Missiles can transmit their gathered information to a DataCaster or a CommCaster installation.

**The Remote Sensor Task** is resolved normally using C+S= TL..

Vargr ships favor a remote sensor strategy: they mount an array of firmpoint-based missile turrets launching Reusable Size-3 missiles, each carrying two different Range S=2 sensors, all tied to a DataCaster turret.

## 2 THE SPACE SENSORS

	Sensor	TL	Mount	S=	R=	MCr
Space	<b>E</b> EMS	12	Surf	7		1.0
	<b>G</b> Grav Sensor	13	Surf	7		1.0
	<b>N</b> Neutrino Detector	10	Surf	7		1.0
	<b>R</b> Radar	9	Surf	7		1.0
	<b>S</b> Scanner	19	Surf	7		1.0

### **E** EMS 12 SURF

EMS ElectroMagnetic Sensor is a sophisticated form of Radar; its signals are aggressively computer-analyzed for detailed information. Passive EMS senses existing EM radiation (including emissions by the target, reflected local energy, and occluded background energy). Active EMS projects radio pulses in sweeping scans of an area and interprets the returned signals (echoes) for information about an objects size, distance, and speed.

**Related Sensors.** Radar is the basic location, size, and speed sensor based on electromagnetic spectrum. EMS ElectroMagnetic Sensor is a more sophisticated version of Radar. The Scanner is the most advanced of the systems.

### **G** GRAV SENSOR 13 SURF

Grav Sensor detects gravity sources (large masses) but is not effective at mapping internal structure of large bodies. It detects operation of various M-Drives, G-Drives, NA-FAL, Lifters, and inertial compensators, even behind larger worlds, ships, or objects.

**Related Sensors.** The Grav Sensor is an advanced version and longer range version of the Mass Sensor.

### **N** NEUTRINO DETECTOR 10 SURF

Neutrino Detectors sense neutrinos, primarily as the byproduct of fusion reactions: positive readings reflect the presence of stars, starship or world fusion reactors, or nuclear activity.

Because neutrinos are almost impossible to shield, Neutrino Detectors are effective in sensing ships through their Power Plants (although not A-Plants or Collectors). The can also detect Fusion+ modules.

Ships frustrate Neutrino Detectors by turning the Power Plant off, or by approaching with the local star directly astern.

### **R** RADAR 9 SURF

Radar projects radio pulses in sweeping scans of an area and interprets the returned signals (echoes) for information about an object's size, distance, and speed.

**Related Sensors.** Radar is the elementary location, size, and speed sensor based on electromagnetic spectrum. EMS ElectroMagnetic Sensor is a more sophisticated version of Radar. Scanner is the most advanced of the systems.

### **S** SCANNER 19 SURF

Scanner is an advanced form of EMS.

**Related Sensors.** Radar is the elementary location, size, and speed sensor based on electromagnetic spectrum. EMS ElectroMagnetic Sensor is a more sophisticated version of Radar. Scanner is the most advanced of the systems.

## 3 THE WORLD SENSORS

	Sensor	TL	Mount	S=	R=	MCr
World	<b>A</b> Activity Sensor	11	Surf		7	0.1
	<b>B</b> Deep Radar	9	Surf		7	0.1
	<b>D</b> Densitometer	10	Surf		7	0.1
	<b>L</b> Life Detector	10	Surf		7	0.1
	<b>M</b> Mass Sensor	8	Surf		7	0.1

### **A** ACTIVITY SENSOR 11 SURF

The Activity Sensor is a technological equivalent of the perception sense: multi-spectrum detectors sensitive to thought activity and living processes.

Activity Sensor is equivalent to the Perception sense.

**Related Sensors:** Activity Sensor detects mental activity: thoughts and emotions. Life Detector detects the presence of living organisms.

### **B** DEEP RADAR 9 SURF

Deep Radar can map underground density structures using active energy emissions. Deep Radar detects objects below surface, underground, or under water. The objects it can detect are identified by the depth (R=) below the surface and by their pixel size.

**Related Sensors.** Deep Radar maps interior structures of solid objects by actively using the electromagnetic spectrum. Densitometers perform the same function passively using gravity waves.

### **D** DENSITOMETER 10 SURF

A Densitometer can map underground or below surface structures by passively analyzing gravity waves. The Densitometer detects objects below surface, underground, or under water. The objects it can detect are identified by the depth (R=) below the surface and by their pixel size.

Readings are in Depth R= with a resolution of pixels based on Size.

**Related Sensors:** Densitometers detect the gravity of objects. Mass Sensor are similar but can only detect presence (not interior structure). Deep Radar can actively detect interior structures using energy transmissions.

### **L** LIFE DETECTOR 10 SURF

A Life Detector senses the presence of living organisms, and is a partial equivalent to the Perception sense.

**Related Sensors:** Life Detector detects the presence of living organisms. Activity Sensor detects mental activity: thoughts and emotions.

### **M** MASS SENSOR 8 SURF

Mass Sensor detects the gravity profile of large objects, but cannot detect variations in mass, or objects concealed within other oobjects.

Mass Sensor detects operating Gravitics devices as large masses (and confuses them with large masses).

**Related Sensors.** The Mass Sensor is a rudimentary version of the Grav Sensor. Mass Sensor is similar to Deep Radar and Densitometer, but can only detect presence (not interior structure).

## 4 THE SPECIALIZED SENSORS

	Sensor	TL	Mount	S=	R=	MCr
Specialized	<b>U</b> Radiation Sensor	8	Surf		7	0.1
	<b>F</b> Field Sensor	12	Surf		7	0.1
	<b>K</b> Analyzer/ Sniffer	9	Surf		7	0.1
	<b>P</b> Proximeter	10	Surf		7	0.1
	<b>Y</b> Sound Sensor	7	Surf		7	0.1

### **U RADIATION SENSOR 8 SURF**

Radiation Sensor detects a broad spectrum of fission, fusion, and anti-matter interaction by-products.

The Radiation Sensor measures levels of radiation at specific locations within range, and can determine source (local contamination, operating fission processes) and level of hazard.

**Environmental Hazards.** The Radiation Sensor can detect radiation hazards in the environment.

### **F FIELD SENSOR 12 SURF**

Field Sensor is a technological equivalent of the awareness sense: multi-spectrum detectors sensitive to electric and magnetic fields.

Field Sensor is the equivalent of the Awareness sense.

**Related Sensors.** The Field Sensor approximates Awareness. Life Detector and Activity Sensor approximate Perception.

### **K ANALYZER/ SNIFFER 9 SURF**

The Analyzer detects volatiles in space and (more usually) in atmosphere. Like the sense of smell, the Analyzer relies on physically acquiring samples and processing them.

**The Encounter Process.** In routine operation, external sensors on a ship or craft hull intake gas and particle samples from surrounding atmosphere (or space). Automated processes analyze the samples and provide basic information about chemical composition.

**The Sample Process.** Any ship with an Analyzer/Sniffer probably equips its small craft and vehicles with a Sampler which gathers atmospheric and soil samples appropriately date, time, and location samples for later analysis.

**Environmental Hazards.** The Analyzer/Sniffer can detect chemical and biological hazards in the environment.

### **P PROXIMETER 10 SURF**

Proximeter senses objects close to the hull of a starship. It serves as an accurate close-up altimeter, and as an alert device when objects (people) approach.

### **Y SOUND SENSOR 7 SURF**

Sound Sensor is an external audio pickup capable of sensing a wide variety of sounds. It operates only in atmosphere (or under water).

A natural corollary is an external announcement system capable of projecting voice and a variety of alert and alarm sounds.

## 5 THE JAMMERS

	Sensor	TL	Mount	S=	R=	MCr
Jam	<b>J</b> Jammer	8	Surf		7	1.0
	<b>Q</b> Stealth Mask	12	Surf		7	1.0

### **J JAMMER 8 SURF**

Jammer is an anti-sensor. The device scrambles or distorts the transmissions and readings of other sensors.

The value or effectiveness of Jammer is the sum of (TL + Char + Skill + Mod – Space Range). Jammer is a negative Mod on the attempting Active or Passive Radar, EMS, or Scanner Sensor Task, or operation of DataCaster.

**Related Sensors:** The Jammer is an active anti-detection sensor; the Stealth Mask is its passive equivalent.

### **Q STEALTH MASK 12 SURF**

Stealth Mask is a signal absorber; it (actually an external hull coating) absorbs or diverts Active sensor signals. Stealth Mask (although Passive) can be switched On and Off.

Stealth Mask is a Mod on an opponent's **Active** Sensor Task equal to Range S=. The Standard Attack Range S=7 Stealth Mask is Mod+7 on an opponent Active Sensor Task.

**Related Sensors:** Jammer is an active anti-detection sensor; Stealth Mask is its passive equivalent.

## TWO SHIPS USE THEIR SENSORS

Ship Alpha and Ship Omega (otherwise identical Size-7 ships differing only in sensor arrays) arrive simultaneously in the Egareva system in Deep Space S=11 from the Primary star and on opposite sides of the gas giant in Orbit O=3. They are S=8 from the Gas Giant and S=9 from each other.

Ship Alpha TL-10 has Imp AR Surf Radar-10 (Mod +1; S=7) currently in Passive mode. It hears nothing. It moves toward the gas giant and reaches S=8 from Omega.

Ship Omega TL-12 has Adv AR Surf Radar-12 (MOD +3; S=7) in Active mode; its Radar actively sweeps space looking for ships.

Passive Alpha has apparent Size-7 minus Range S=8. If Size<Range, the Sensor Task returns no result. Omega sees nothing.

Active Omega has Size-7 minus Range S=8 plus Active Mod S=7 for Apparent Size=6. Alpha attempts the Sensor Task: Range S=8. Sensor TL=10. C+S=10. Size-Range+Active= 7-8+7=+6. The Radar has Mod+1. Alpha needs to roll 10+10+6+1 =27 on 8D to detect Omega (one D is Uncertain). Alpha rolls 1 2 3 4 5 6 7 X = 28+X; even without the Uncertain die, it is clear that there is nothing out there (or nothing has been detected).

Alpha moves to S=7 and retries rolling 7D (one Die Uncertain). He rolls 6D= 4 5 5 3 5 4 X= 26+X which is inconclusive. They retry: 6D= 1 6 5 6 5 6 X = 29 and three sixes indicates Spectacular Failure. The Referee says: Check Double Skill. But this Sensop has been coasting along depending on TL to provide the Sensor's C+S=10; his own skill is 2. He checks 2D for 4 or less and rolls 9. The lights flicker and the data feed from the Radar stops. "Something's wrong!"

Sensors

# 03 World Range Sensors



			VI	D	Vd	Or	Fo	G		
			5	6	7	8	9	10		
Mode			1000 m	5 km	50 km	500 km	5000 km	50,000 km		
Mass	M	<b>8</b> Mass Detector	Passive.	5 Missile	6 Small Craft	7 ACS Ship	8 BCS Ship	9 Rock	10 Large Rock	
	B	<b>9</b> Deep Radar	Active.	Depth R=4 Px Size=3	Depth R=3 Px Size=4	Depth R=2 Px Size=5	Depth R=1 Px Size=6			
	D	<b>10</b> Densitometer	Passive.	Depth R=8 Px Size=6	Depth R=7 Px Size=6	Depth R=6 Px Size=6	Depth R=5 Px Size=6	Depth R=4 Px Size=6	Depth R=3 Px Size=6	
Life	L	<b>10</b> Life Detector	Passive.	4 Animals	5 People	6 Crowds	7 Herds	8 Forest	Vague Readings	
	A	<b>11</b> Activity Sensor	Passive.	5 Thoughts	6 Agonies	7 Deaths	8 Many Deaths			
Specialized	K	<b>9</b> Analyzer/Sniffer	Passive.	Operates on Samples						
	S	<b>10</b> Sound Sensor	Passive.	3 Distress	4 Distress!!	5 Gunshots	6 Thunder	7 Explosion		
	P	<b>10</b> Proximeter	Active	5 Missile	6 Small Craft	7 ACS Ship				
	F	<b>12</b> Field Sensor	Passive		2 Electronics			5 Generators	6 Power Lines	
	U	<b>8</b> Radiation Sensor	Passive	Rad-1 Mild	Rad-2 Radioactive	Rad-3 High	Rad-4			
Anti-Sensor	J	<b>8</b> Jammer	Active Only	User appears as fuzzy Size-8 BCS ship object to all sensors.						
	Q	<b>12</b> Stealth Mask	Passive							

**Object Size.** Size shown is the minimum detectable at range shown. Smaller objects cannot be detected.

**Passive Mode.** Information shown assumes a Passive sensor.

**Active Mode.** Apply Mod (+ S=) to the Sensor Task. Sensor is automatically detected by all operating passive sensors of the same type in range.



# A SENSORS

		Type	TL	Mount	S=	R=	MCR	Passive or Active (Principle)	Principle. Skills.		
Space Range Sensors	Com/Visual	<b>C</b> Communicator	8	Surf	7		1.0	Passive Active (Electronics)	Electronics. Comms.	<b>C</b> <b>H</b> <b>T</b> <b>V</b> <b>W</b>	Com/Visual Space Range Sensors
		<b>H</b> Holovisor	18	Surf	7		1.0	Passive	Photonics		
		<b>T</b> Scope	9	Surf	7		1.0	Passive	Photonics		
		<b>V</b> Visor	14	Surf	7		1.0	Passive	Photonics		
		<b>W</b> CommPlus	15	Surf	7		1.0	Passive Active (Gravitics)	Gravitics		
Space Range Sensors	Space	<b>E</b> EMS	12	Surf	7		1.0	Passive Active (Electronics)	Electronics	<b>E</b> <b>G</b> <b>N</b> <b>R</b> <b>S</b>	Space Space Range Sensors
		<b>G</b> Grav Sensor	13	Surf	7		1.0	Passive	Gravitics		
		<b>N</b> Neutrino Detector	10	Surf	7		1.0	Passive	Gravitics		
		<b>R</b> Radar	9	Surf	7		1.0	Active (Electronics)	Electronics		
		<b>S</b> Scanner	19	Surf	7		1.0	Active (Electronics)	Electronics		
World Range Sensors	World	<b>A</b> Activity Sensor	11	Surf		7	0.1	Passive	Electronics	<b>A</b> <b>B</b> <b>D</b> <b>L</b> <b>M</b>	World World Range Sensors
		<b>B</b> Deep Radar	9	Surf		7	0.1	Active (Electronics)	Electronics		
		<b>D</b> Densitometer	10	Surf		7	0.1	Passive	Gravitics		
		<b>L</b> Life Detector	10	Surf		7	0.1	Passive	Magnetics		
		<b>M</b> Mass Sensor	8	Surf		7	0.1	Passive	Gravitics		
World Range Sensors	Specialized	<b>U</b> Radiation Sensor	8	Surf		7	0.1	Passive	Electronics	<b>U</b> <b>F</b> <b>K</b> <b>P</b> <b>Y</b>	Specialized World Range Sensors
		<b>F</b> Field Sensor	12	Surf		7	0.1	Passive	Electronics (Magnetics)		
		<b>K</b> Analyzer/ Sniffer	9	Surf		7	0.1	Passive	Electronics (Biologics)		
		<b>P</b> Proximeter	10	Surf		7	0.1	Active (Electronics)	Electronics		
		<b>Y</b> Sound Sensor	7	Surf		7	0.1	Passive	Electronics		
Jam	Jam	<b>J</b> Jammer	8	Surf		7	1.0	Active (Electronics)	Electronics (Gravitics)	<b>J</b> <b>Q</b>	Jam
		<b>Q</b> Stealth Mask	12	Surf		7	1.0	Passive	Polymers		

An Active Sensor can detect any Active Sensor which uses the same Principle (Sensor Task uses Target Active Mod = S=).

# C SENSOR MOUNTS

Mount	Type	Tons	Mod	Skill	MCR
T1	Single Turret	1	+1	Sensor	0.2
B1	Barbette	3	+2	Sensor	3.0
Bay	Bay	50	+5	Sensor	5.0
LBay	Large Bay	100	+8	Sensor	10.0
M	Main	200	+10	Sensor	20.0
Surf	Surface	0	0	Sensor	0.0
Ant	Antenna	1	+1	Sensor	0.5
BAnt	Big Antenna	10	+5	Sensor	2.0
Ext	Extendable	+2	+3	Sensor	1.0
De	Deployable	+2		Sensor	3.0

**Deployable.** In addition to Turret or Barbette costs.

# TL TECH LEVEL STAGE EFFECTS

TL	Stage	TL	Cost	Mod
Exp	Experimental	-3	x10	-3
Pro	Prototype	-2	x5	-2
Ear	Early	-1	x2	-1
Std	Standard	0	x1	0
Bas	Basic	0	/2	0
Alt	Alternate	0	x1	0
Imp	Improved	+1	x1	+1
Gen	Generic	+1	/2	0
Mod	Modified	+2	/2	+2
Adv	Advanced	+3	x2	+3
Ult	Ultimate	+4	x3	+4

Applies to Sensor.

# D SPACE RANGE EFFECTS

S=	Range	TL	Tons	Cost
2	<b>FR</b> Fighter Range	-2	/3	/3
5	<b>SR</b> Short Range	-1	/2	/2
7	<b>AR</b> Attack Range	0	x1	x1
9	<b>LR</b> Long Range	+1	x2	x3
12	<b>DS</b> Deep Space	+2	x3	x5

For Sensors using S= Space Range. Convert S=R-5. Applies to Mount.

# E WORLD RANGE EFFECTS

S=	R=	Range	TL	Tons	Cost
5	<b>VL</b> Vlong 1000 m	-2	/3	/3	
1	<b>D</b> Distant 5 km	-1	/2	/2	
2	<b>Vd</b> Vdistant 50 km	0	x1	x1	
8	<b>Or</b> Orbit 500 km	+1	x2	x3	
9	<b>Fo</b> Far 5,000 km	+2	x3	x5	
5	10 <b>G</b> Geo 50,000 km	+3	x4	x6	

For Sensors using R= World Range. Convert R=S+5. Applies to Mount

# F CONTROLS

Install Control Panels.



One per Sensor.

Sensors

# 03 Space Range Sensors



			Boarding	1	FR	3	4	SR	
			B	5 km	2	500 km	5000 km	5	
			1000 m	5 km	50 km	500 km	5000 km	50,000 km	
			Mode						
Comms	C	<b>8</b> Communicator Electronic	Passive. Active.					Operates using lightspeed radio waves.	
	W	<b>15</b> CommPlus Gravitic	Passive. Active.					Operates using lightspeed exotic particles.	
Visuals	T	<b>9</b> Scope Photonic	Passive.	3 Book	4 Fusion+	5 Missile	6 Small Craft	7 ACS Ship	8 BCS Ship
	V	<b>14</b> Visor Photonic	Passive.		3 Book	4 Fusion+	5 Missile	6 Small Craft	7 ACS Ship
	H	<b>18</b> Holovisor Photonic	Passive.						
Radars	R	<b>9</b> Radar Electronic	Passive. Active.			3 Book	4 Fusion+	5 Missile	6 Small Craft
	E	<b>12</b> EMS Electronic	Passive. Active.						5 Missile
	S	<b>19</b> Scanner Electronic	Passive. Active.					3 Book	4 Fusion+
Specialized	G	<b>13</b> Grav Sensor Gravitic	Passive Only.						5 Missile
	K	<b>10</b> N- Detector Gravitic	Passive Only.					4 Fusion+	
Anti-Sensor	J	<b>8</b> Jammer Electronic	Active Only.						User appears as fuzzy Size-8 BCS ship object to all sensors.
	Q	<b>12</b> Stealth Mask Polymer	Passive.						

**Object Size.** Size shown is the minimum detectable at range shown. Smaller objects cannot be detected.

**Passive Mode.** Information shown assumes a Passive sensor.

**Active Mode.** Allows Mod+3. Sensor is automatically detected by all operating passive sensors of the same type in range.



6	AR 7	8	LR 9	10	11	DS 12	
1 ls	2 ls	8 ls	16 ls	3 lm	1 au = 8 lm	30 lm	
							Receive only. <b>8</b> C Communicator
							Receive only. <b>15</b> W CommPlus
9 Local Hex	10 Terrain Hex	11 Asteroid	12 World Hex				<b>9</b> T Scope
8 BCS Ship	9 Local Hex	10 Terrain Hex	11 Asteroid	12 World Hex			<b>14</b> V Visor
5 Person	6 Truck	7 ACS Ship	8 BCS Ship	9 Local Hex	10 Terrain Hex	11 Asteroid	<b>18</b> H Holovisor
7 ACS Ship	8 BCS Ship	9 Rock	10 Large Rock	11 Asteroid			<b>9</b> R Radar
6 Small Craft	7 ACS Ship	8 BCS Ship	9 Local hex	10 Terrain Hex	11 Asteroid	12 World Hex	<b>12</b> E EMS
5 Missile	6 Small Craft	7 ACS Ship	8 BCS Ship	9 Rock	10 Large Rock	11 Asteroid	<b>19</b> S Scanner
6 Small Craft	7 ACS Ship	8 BCS Ship	9 Rock	10 Large Rock	11 Asteroid	12 Moon	<b>13</b> G Grav Sensor
					9 Power Plant		<b>10</b> K N- Detector
							<b>8</b> J Jammer
							<b>12</b> Q Stealth Mask
							<b>THE SENSOR TASK</b> Die Roll $nD < \boxed{\phantom{00}} + \boxed{\phantom{00}} + \boxed{\phantom{00}} + \boxed{\phantom{00}}$ =Range TL C+S S-R Mods If <1 Sensor TL C4, C5 Skill Size - Range +Active If TL < Range, +1D. Uncertain (1D) If <0 no result.

Limit of Active Senses



# How Weapons Work

Space weapons are produced in many different forms and at many different tech levels, but all have the same goal: to defeat other ships in battles, and to attack targets on worlds.

The broad array of space weapons reflects the many different ways weapon technology can operate. The interplay between weapons and defenses allows for many different weapon use strategies.

## UNDERSTANDING SPACE WEAPONS

Space weapons have a focused purpose: to damage or destroy enemy spacecraft, or to damage targets on worlds. Space Weapons fall into four distinct categories or operating principles.

**Missiles** launch a physical object at the target. Missile Launchers, Slug Throwers, Kinetic Kill Missiles, Ortilery, and Rail Guns. The use of Small Craft as rams fall into this category.

**Beams** project concentrated energy at the target. Particle Accelerators, Plasma and Fusion Guns, Meson Guns, Lasers, Tractors and Pressors, and Disruptors.

**Fields** project an area of effect on the target. Stasis, Inducers and Dampers.

**Data Broadcasts** or **Beamcasts** send data at the target. CommCaster and DataCasters.

### Identifying Space Weapons

Space Weapons are identified by a LongName with enough detail to define its usage. The LongName includes:

Stage - Range - Mount - Type - Tech Level (C+S)

LongName Elements may be omitted if not applicable.

**Stage** is the weapon's position in the spectrum of sophistication in the developmental life cycle. It is possible for Stage to be blank. For example, Prototype, or Advanced.

**Range** is the weapon's distance factor in attacking tar-

gets. Weapons may use Space Ranges or World Ranges. Range in either case translates to a range band.

**Mount** states the type of weapon mount.

**Weapon Name** details the precise nature of the mechanism and provides insights into how it operates.

**Tech Level** identifies the Technological Level at which the Weapon is commonly manufactured. TL is required.

**C+S.** A weapon identifier may have an additional element indicating the Controlling Characteristic and Skill level of the operator. If the weapon is controlled by a Gunner, Brain or Computer, the applicable C+S is used. C+S is shown as a plus and a number inside parentheses. For example, the operator assigned to a specific weapons installation is C4=7 and Bay Weapons-3; the weapon LongName includes (+10) for the C+S value. Until an operator for a weapon is assigned, (+C+S) is omitted).

### Identifying Missiles

Missiles are a special case and are identified separate from their Launcher. A Missile LongName consists of

Missile - Size - Warhead - Guidance.

When a missile is used, it takes its TL and (C+S) from its Launcher.

**Missile** is the weapon identifier: always: Missile.

**Size** is the Missile's Object Size from 1 to 7. For example, Missile-1 is a Bullet.

Type describes the warhead or attack capability. For example, N is Nuclear.

**Guidance** is the system which controls the missile and directs it to its target. For example, OG is Operator Guided: the Gunner in the Launcher guides the missile to its target. Such a system may include radar guidance, direct joystick control, or some other means.

## WEAPONS CREW



Gunner



Loader



Sensop

Mounts



Turret



Barbette



Bay



Bolt-In



MainWeapon



Deployable



Extendable

## IDENTIFYING SPACE WEAPONS

R= or S=

Stage	Range	Mount	Type	-TL (C+S)	Additional				
Std	Vd (FR)	T1	Beam Laser-10 (10)	Mod -2	1 ton	MCr0.7	S=2	Hits=1D	
Ear	Vd (FR)	T1	Beam Laser-9 (9)	Mod -3	1 ton	MCr1.2	S=2	Hits=1D	
Imp	Vd (FR)	T1	Beam Laser-11 (8)	Mod -1	1 ton	MCr0.7	S=2	Hits=1D	
Ult	Vd (FR)	T1	Beam Laser-14 (14)	Mod +2	1 ton	MCr1.7	S=2	Hits=1D	

The Standard Beam Laser Single Turret is available at TL-10. The Early version (more costly; worse Mod) is available at TL-9. The Improved version (better Mod) is a one TL later. The Ultimate version is substantially better.

## IDENTIFYING MISSILES

Stage	Type	Missile-Size	Guidance	Damage
Std	Slug	Missile-Size-1	UG (=0)	Pen=0
Std	Explosive	Missile-Size-2	UG (=0)	Pen=2

The Standard Slug Missile-1 is relatively ineffective.

The larger Explosive Missile-2 inflicts greater damage.

Missiles have same TL as their launching Mount. Missile Guidance is restricted by TL of construction.

### The Concept of Missile Includes

Traditional missiles, Bullets, various projectiles, Bombs, Deadfall Ordnance, Metal Slabs launched from Rail Guns, and other systems.

### WEAPONS MOUNTS

The effectiveness of Space Weapons depends greatly on the size of the Weapon Mount. Space Weapon Mounts are the physical structures in which weapons are installed.

Mounts determine the skill required to operate the weapon, the Mod on the Space Weapon Task, and (in most cases) the Hits the weapon inflicts.

### Allocating Mounts

Each Type of Weapon has a minimum size for its Mount (Minimum Mount as noted in the Space Weapon Types Table). Any Mount equal to or greater than the Minimum can be selected.

**Limits On The Number of Mounts.** Every hull has one Hardpoint per 100 tons. One Mount may be installed at each Hardpoint. In some cases (Main), the Mount will occupy more than the 100 tons associated with that Hard Point. In some cases (Bay or Large Bay), the Mount will occupy much of the 100 tons associated with the Hard Point.

**FirmPoints.** A hull may allocate, instead of HardPoints, three FirmPoints per 100 tons. A Firmpoint will accept any mount which is less than one ton.

**Mount Power.** Mounts are self-contained for battle survivability purposes. They carry their own life support (1 week) and their own power modules. They carry their own operating computer (which is networked to the ship's main computer).

### Deployable Mounts

A Deployable Mount is a Mount capable of being launched from (and recovered by) a ship.

Only Turrets and Barbettes can be made Deployable.

**Uses.** For a Deployable targetted and hit by enemy fire, damage is restricted to the Deployable. Deployables detected by Sensors do not betray the location of the ship itself. Deployables can serve as Life Pods.

**Operations.** It can maneuver under its own power (it

has G-Drive= 1-G which restricts it to about 5 km from its ship, or within 10 D of a nearby planet S=5 R=10). It may be launched from the ship and may maneuver under its own power.

**Endurance.** Deployables carry life support and power for about two weeks.

**Armor.** A Deployable is armored equal to the ship's hull.

### USING SPACE WEAPONS

Weapons may attack targets which their ship has detected. In some cases, weapons (usually missiles) may be launched without a specific target detected or identified.

Space Weapons attack using the Space Weapon Task. Range determines the number of Dice to hit.

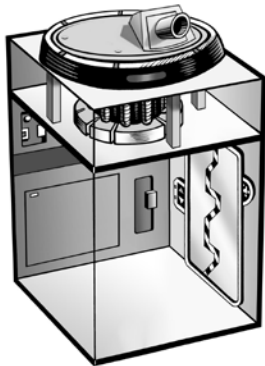
Technology, Characteristic and Skill, and applicable Mods determines the Target Number. The size of the Space Weapon (based on its weapons mount) is a major element of the Space Weapons Task and is applied as a Mod.

The Type of weapon determines which defenses and armors it can ignore and which it must overcome.

If the Weapon Hits the target and successfully overcomes any armor and protections, it inflicts damage based the Weapon Mount Size.

Weapon Type determines the type of damage inflicted.

Typical Mods are Weapons Mount and Target Size minus Range.



**Sandcaster  
in Single Turret Mount**



**Beam Laser  
in Single Turret Mount**

### CREATING WEAPONS

The abilities and effectiveness of Weapons is determined primarily by Type and Tech Level.

The Weapons available to a ship are determined by the Tech Level of the constructing shipyard (although characters may upgrade their ship's weapons as better ones become available).

Similarly, the Space Weapons available to worlds or bases as determined by its governing tech level.

### WEAPONS AND WEAPONS EFFECTS

The array of available Space Weapons ranges from the simple to the complex. The following descriptions provide a basic understanding of the principles and realities of the weapons.

## A PARTICLE ACCELERATOR BARBETTE

Particle Accelerators project subatomic particles in electronically or magnetically focused beams. Interaction with the target produces physical and radiation damage.

Particle Accelerators operate in two distinct modes: in space and in atmosphere.

**In Space.** PA Particle Accelerators in space use Space

### The Space Weapon Creation Process

Space Weapons are selected from the Space Weapons List and modified by Stage and Range. Tonnage is rounded to the nearest Ton with a minimum of 1 ton for Ships (exception: FirmPoints). Costs are not rounded.

For each desired Weapon:

- A. Select a Weapon.
- B. Select a Mount. Mount is TL-independent.
- C. Apply TL Stage Effects to the Weapon (as desired, and consistent with the ship TL) to modify cost, performance, and QREBS.
- D. If the Weapon has S=, it is possible to apply Space Range Effects to increase or decrease Space Range.
- E. If the Weapon has R=, it is possible to apply World Range Effects to increase or decrease World Range R=.
- F. Allocate a Control Panel for each Weapon.
- G. Note the cost and tonnage.

Ranges S=. They have an effective range limit of about S=7, beyond which the particle beam becomes too dissipated.

**In Atmosphere.** PAs operating in atmosphere (attacking a target which is in atmosphere) use World Ranges R=, and shed 1D of damage for each layer (Range Band) of atmosphere the beam penetrates.

Theoretically, a Particle Accelerator at S=7 (its maximum possible range) could attack a target on a world surface. It would use R= 12 because the target is in atmosphere, and its particle beam would shed 1D for each Range Band of atmosphere it penetrates, typically Bands 1 to 7. A PA Barbette would lose effectiveness before the beam hit the target; a Main Mount could potentially hit and damage the target.

## B SLUG THROWER TURRET

Slug Throwers are heavy duty Guns or Gatlings firing Missile-2 slugs. Although Size-2 Slugs are technically Missiles, Slug Throwers (Code = B) do not appear on the Defenses: AB AM Mode Table under Attacker; they are not subject to Anti-Missile Defenses.

## CD COMMCASTER DATACASTER TURRET

CommCasters are communications channels that share information and communications. DataCasters are offensive weapons against enemy sensors and communicators.

### CommCasters

CommCasters share data between ships which are in range and each ship have a CommCaster installed.

**Sensor Data.** Grouped ships, each with CommCasters, can share Sensor Data, and each may attack targets sensed by the other.

**Virtual Battery Fire.** Grouped Ships each equipped with CommCaster can attack the same target with weapons of the same Type (but not necessarily the same TL or Mount).

### DataCasters

DataCasters broadcast or beamcast petabytes of information at or against enemy sensors and communicators. They pursue three strategies:

**Sensor Overload.** Attacks on Sensors or Comms inflict Damage on Sensors or Comms.

**Virus.** Attacks on non-Sensors, Non-Comms attempt to infect equipment with a virus.

**Psychological Attacks.** Attacks provide a shifting series of morale attacks, false messages, and appeals to a variety of cultural and social fears. Psychological attacks challenge the Sanity of crew, passengers, staff, and troops. A successful Datacaster attack requires each individual in the affected area to Check San.

## E STASIS TURRET

A Stasis Projector imposes a series of Stasis Fields (varying in size from 1 cm to 1.5 m) along a line extending from its projector. The fields tend to form around objects; all molecular activity within the field is suspended; time stands still within an active field. The field remains in effect until released. When the field is released, its contents continue unaffected.

However, their connections with the rest of the ship have been severed. The result is a crippling effect on the component Hit Location.

The litter of stasis project or attacks lingers long after the battle. Stasis bubbles filled with battlefield debris can be destabilized with a hand-held Mag Scrambler to reveal their contents: personnel, artifact, ruined equipment, even captured explosions.

## **PF** PLASMA / FUSION GUN **BARBETTE**

Plasma and Fusion Guns fire beams of super-heated plasma against targets and cause damage by their intense heat and kinetic energy.

**Plasma Gun** fire imposes extreme heat, but it falls short of fusion temperatures.

**Fusion Gun** fire imposes extreme heat which actually reaches fusion/ thermonuclear temperatures.

## **G** MESON GUN **MAIN**

Meson Guns create specialized particles and project them in focused beams at near light-speed toward a target. Specific speed is tailored to promote energetic particle decay beyond any armor and inside the target. The ultimate decay products (electrons and photons) inflict internal damage.

## **H** INDUCER **TURRET**

The Jump Inducer channels the energies of a ship's Jump Drive into disastrous jump-like effect on a target.

The name Jump Inducer is misleading: the weapon induces a misjump of components of a ship. The misjump essentially disintegrates the components.

Jump Inducer requires an installed Jump Drive.

## **JKL** MINING PULSE BEAM LASER **TURRET**

Laser weapons fire concentrated beams of energy at their targets and cause damage through intense heat.

**Mining Laser** is an industrial-strength Laser system created for asteroid mining. Its primary use is slicing nickel iron asteroids at relatively close ranges.

**Pulse Laser** is a weaponized Mining Laser with improved power and range. It fires in intermittent pulses rather than continuous beams.

**Beam Laser** is the standard starship Laser weapon. It fires in continuous beams to inflict greater damage.

## **M** MISSILE **TURRET**

Missile systems launch Size-4 or Size-5 Missiles at targets. The Missile itself (independently described) travels to the target and inflicts damage.

## **N** KK MISSILE **BAY**

KK Missile Launcher is a dedicated Launcher for Size-7 (roughly 100 tons; the size of a small ship) Missiles intended for high-velocity impact. The Missile itself (independently described) travels to the target and inflicts damage.

## **Q** ORTILLERY **BAY**

Ortillery (Orbital Artillery) systems launch a variety of Deadfall Ordnance (unpowered Size 4-5-6 Missiles) from or-

---

## **DATACASTER VIRUS**

DataCaster attacks against non-Sensor, non-Comm locations attempt to infect the target with a virus.

A successful attack inserts the Virus.

**The Virus.** The inserted Virus has a value equal to the DataCaster TL. Assign it a name based on the Attacker as in Virus <Attacker>.

**Initial Infection.** The inserted Virus attacks its first location (SubCompartment) with

Check (2D) Virus -Target TL +Flux

Target may substitute Console Operator's C+S.

Failure stops the attack.

Success disables the SubCompartment.

**Continued Infection.** Each successful Initial Infection attempts to infect two neighboring SubCompartments.

If all Subcompartments are infected, the Virus attempts to infect two neighboring Compartments.

**Immediate Action.** A specific Virus attack may be frustrated by voluntarily shutting down an entire Compartment.

For example, Vargr Raider Vengeance TL-15 pounces on Free Trader Achilles TL-12 using its DataCaster. The attack succeeds and Virus <Vengeance1> attempts infection on the Maneuver Drive Compartment.

Check Virus must roll 2D less than TL-15 minus TL-12 plus Flux = 3+0 =3. He rolls 3+4=7 and fails.

Vengeance tries again. This turn, Flux=+5, and he must roll 3+5=8 or less. He rolls 3+4=7 and succeeds. The target Maneuver Drive SubCompartment is disabled.

Virus Vengeance now attempts to infect two neighboring SubCompartments:

15-12+Flux = 3 -2=1. Vengeance rolls 2+6=8 and fails.

15-12+Flux = 3+4=7. Vengeance rolls 3+3=6 and infects a second subcompartment. In the next turn, each infected subcompartment can attempt to infect two subcompartments.

---

bit against world surface targets.

## **R** RAIL GUN **BAY**

Rail Guns launch a variety of Size-6 Missiles at strategic world surface and orbital targets. Rail Guns operate in remote regions of a system (planetoids, small moons) where they fabricate their Missiles bodies on-site (hardly more than slabs or billets of nickel-iron) and add guidance systems.

## **S** SANDCASTER **TURRET**

Sandcasters project clouds of sand (small crystalline particles) which obstruct incoming beam weapons.

A Sandcaster is not technically a weapon; it is a defense.

## **T** JUMP DAMPER **BARBETTE**

A Jump Damper inflates the Diameter effect of a ship; ships within this enlarged field are prevented from initiating jump. Its effect is spherical centered on the ship.

## **U** TRACTOR/PRESSOR **BARBETTE**

Tractors and Pressors (reversed polarity versions of the

same principle) are grav-based remote manipulators. Each is capable of applying pressure (tractors pull an object toward it; pressors push an object away from it; each is capable of applying some lateral pressure).

**V SALVO RACK** **BAY**  
Salvo Rack launches groups of Size-3 missiles.

**W DISINTEGRATOR/ DISRUPTOR** **BARBETTE**  
Disruptor suppresses the charge on the electron. Chemical bonds break; compounds disintegrate. Atomic nuclei exhibit a positive charge, repel their neighbors, and create an expanding cloud of particles.

The Disruptor is a relatively slow weapon. Focused on a target, it boils away armor layers over the course of minutes.

Disruptors boil off armor in layers.

Disintegrators require two identical Weapons in identical mounts in order to make one Attack.

**X AM MISSILE** **BARBETTE**  
Hybrid-X is a triple turret equipped with a Pulse Laser, a SandCaster, and a Missile Launcher.

In any turn, the turret may use any one of its weapons; the other two are not available

**Y HYBRID S-L-M** **TURRET**

Hybrid-Y is a triple turret equipped with a Beam Laser, a SandCaster, and a Missile Launcher.

In any turn, the turret may use any one of its weapons; the other two are not available.

THE TECHNOLOGY OF GUIDANCE SYSTEMS		
TL	Guidance	Computers
Low Tech	<b>5</b>	UnGuided
	<b>6</b>	
Mid Tech	<b>7</b>	Model /2.
	<b>8</b>	HardWired
	<b>9</b>	Operator Model /3.
High Tech	<b>10</b>	Model /4.
	<b>11</b>	Self-Aware Semi-Organic Brain. Model /5.
	<b>12</b>	Positronic Brain. Model /6.
Vhigh Tech	<b>13</b>	Wafer Technology. Model /7.
	<b>14</b>	Self Aware Model /8.
	<b>15</b>	Model /9.
Xhi	<b>16</b>	True Artificial Intelligence.

## Z RESERVED

Non-standard, special, previously undisclosed, previously unencountered, unusual, or strange weapons maybe presented as Weapon Type Z. This types includes weapons otherwise described here but unusual enough that they are not immediately recognizable.

### MISSILE BRAINS

Missiles can be equipped with a variety of guidance and control systems.

**Unguided (C+S)= 0** Minimum Missile Size = **1**

The Missile is unguided: it is launched at a target with no further intervention from an operator.

**Hardwired (C+S)= 5** Minimum Missile Size = **3**

The Missile is hardwired with a rudimentary decision-making systems. It operates independently once launched.

**Guided (C+S)= Operator** Minimum Missile Size = **4**

The Missile is guided by a Gunner in the launching Mount and uses his C+S (or his Console's TL).

**Distance Effects.** Guidance by an Operator at a distance ultimately declines in quality. (C+S) is modified by minus World Range (R=). If (C+S)-R becomes less than 5, the Missile reverts to Hardwired (C+S)=5.

**Attention Effects.** The Operator must be participating in the Guidance process when the missile attacks. If not, the Missile reverts to Hard-Wired (C+S)=5.

**Self-Aware (C+S)= varies** Minimum Missile Size = **5**

Self-Aware missiles are equipped with a Brain (Electronic, Positronic, Semi-Organic, usually not Organic) which operates the missile and guides it to its target.

**DataCasters.** One purpose of DataCasters is to communicate with enemy Self-Aware Missile Brains. Success shocks the Brain into inaction or turning on its launchers.

**Self-Aware (C+S).** C+S is determined at the time of Launch: C= 6 + 1D. S= 1D. Plus Flux.

**DownLoad (C+S)= operator** Minimum Missile Size = **5**

A Missile Gunner can DownLoad his Personality into a Missile (or several missiles) and send them on their way.

Each missile is guided by the personality of the Operator (which would dissipate anyway after several days).



### IDENTIFYING MISSILES

Stage	Type	Missile-Size	Guidance	Damage
Std	Slug	Missile-Size-1	UG (=0)	Pen=0
Std	Explosive	Missile-Size-2	UG (=0)	Pen=2

The Standard Slug Missile-1 is relatively ineffective.  
The larger Explosive Missile-2 inflicts greater damage.

### MISSILES

Sz	Min Mount	Type	Guidance System					Missile Types										
			UG	OG	HW	SA	DL	S	D	X	E	N	A	K	Y	Z	Size	
1	MachineGun	Turret	Bullet	UG														
2	SlugLauncher	Turret	Slug	UG														
3	SalvoRack	Bay	Vsmall Missile	UG		HW												about 1-liter 3000 / ton
4	Missile	Turret	Small Missile		OG	HW												about 10-liters 400 / ton
	AM Missile	Barbette	Small Missile		OG	HW												
5	Missile	Turret	Missile		OG	HW	SA	DL										
	Ortillery	Bay	Missile	UG	OG	HW												1.5 m long 50 per ton
6	Missile	Bay	Small Craft		OG	HW	SA	DL										
	Rail Gun	Bay	Small Craft	UG	OG	HW	SA	DL										Small Craft 5 tons
7	KK Missile		Ship	UG	OG	HW	SA	DL										Ship Size 100 tons

**UG. UnGuided.** No guidance system.

**HW. Hardwired (=5).** Circuits direct missile to target.

**OG. Operator Guided (=C+S).** Gunner directs to the target (must be launched from S=2 or less). Min Missile Size=4

**SA. Self-Aware (=C+S).** Missile is controlled by an on-board self-aware Brain. Minimum Missile Size=5

**DL. Down Loaded (C+S).** Missile is controlled by the downloaded personality of the Gunner. Minimum Missile Size=5

### MISSILE TYPES AND EFFECTS

Sz	Missile	Type	Effects (in D)											Sensor			
			S	D	X	E	N	A	K	Y	Z						
1	Missile-1	Bullet	S														
2	Missile-2	Slug	S	X		Z											
3	Missile-3	Vsmall Msl	S	X		Z											
4	Missile-4	Small Msl		X	E	A	Y	Z									
5	Missile-5	Missile		D	X	E	N	Y	Z								
6	Missile-6	Small Craft		D	X												
7	Missile-7	Ship		D	X	E											

Hits inflicted are in D. For example, Pen-1 inflicts 1D Hits Kinetic = Sp = Speed = Space Range of Attack.

ME= Massive Explosion. Missile-6K is a G-Drive powered Small Craft. Missile-7K is an M-Drive powered Ship.

Sensor: Carries one Sensor with R= Size, or two Sensors with R=Size minus-1, or three Sensors with R=Size-2.

Deadfall: Target must be on World Surface.

Kinetic: Speed= S= from Launch point.

### MASSIVE EXPLOSION (Missile Warhead)

Sz+1D	R=	Proximity	Blast	BFE*	Rad	Burn
5-	0	Direct Hit				Vaporized= 100D
6	1	Hit	90 D	20 D	10 D	30 D
7	2	Hit	40 D	15 D	10 D	20 D
8	3	Vnear Miss	30 D	10 D	10 D	10 D
9	4	Near Miss	10 D	5 D	5 D	5 D
10	5	Far Miss	5 D	1 D	1 D	1 D
11	6	Miss				

\* BFE= Bang, Flash, EMP (EMP only with Nukes)

Bang=0 if in space.

Non-Nuke ignore EMP and Rad.

ME Possible with Siz= 4-5-6-7

### MISSILE TYPES

Missiles are available in the following types based on the available launcher.

**S Slug.** Solid metal projectile.

**D Deadfall.** Gravity-driven projectile against world surface.

**X Explosive.** High explosive charge explodes on impact.

**E EMP.** ElectroMagnetic Pulse to disable electronics.

**N Nuke.** Nuclear fission or fusion weapon.

**A Anti-Matter.** AM-based explosive effect.

**K Kinetic.** Inflicts damage through high velocity impact.

**Y Decoy.** Appears as SDXENAZ (but not KY)

**Z Sensor Package.** World Range (single-use or reusable).



Weapons Defenses Sensors			S=	0	B	1	2	3	4	5	Active Sensor Range Limit
TL	Description		Contact	Boarding	Fighter1	Fighter2	SR Short Range				
Comm/Vis	C	8 Communicator									
	H	18 Holovisor									
	AR	T	9 Scope								
	V	14 Visor									
	W	15 CommPlus									
Space	E	12 EMS									
	AR	G	13 Grav Sensor								
	N	10 Neutrino Detector									
	R	9 Radar									
Jam	S	19 Scanner									
	A	Q	12 Stealth Mask								
	F	J	8 Jammer								
World	A	11 Activity Sensor									
	FR	B	9 Deep Radar								
	D	10 Densitometer									
	L	10 Life Detector									
Specialized	M	8 Mass Sensor									
	FR	U	8 Radiation Sensor								
	F	12 Field Sensor									
	K	9 Analyzer/ Sniffer									
Exotic	P	10 Proximeter									
	FR	Y	7 Sound Sensor								
	T	14 Jump Damper									
	FR	U	16 Tractor/Pressor								
Missiles	H	17 Inducer									
	FR	W	18 Disintegrator								
	E	21 Stasis									
Specialized	FR	B	9 Slug Thrower	AM	AM	AM					
	V	10 Salvo Rack	AM	AM	AM						
	AR	M	7 Missile								
	N	10 KK Missile									
Beams	X	20 AM Missile									
	AR	C	8 CommCaster								
	Y	10 Hybrid S-L-M	AM AB	AM AB	AM AB						
	LR	G	13 Meson Gun								
	A	11 Particle Accel									
Screens	R	12 Rail Gun									
	FR	D	10 DataCaster								
	S	9 SandCaster	AM AB	AM AB	AM AB						
Globe	FR	Q	12 Ortilery					RINT	RINT	RINT	
	J	8 Mining Laser	AM	AM	AM						
	FR	K	9 Pulse Laser	AM	AM	AM					
	L	10 Beam Laser	AM	AM	AM						
Sensors	P	11 Plasma Gun	AM	AM	AM						
	FR	F	12 Fusion Gun	AM	AM	AM					
	G	13 Meson Screen									
	FR	N	12 Nuclear Damper								
	R	19 ProtonScreen									
Globe	FR	Q	17 Grav Scramb								
	J	19 Mag Scramb									
	FR	E	12 Elec Scramb								
	T	16 Black Globe									
Globe	FR	U	20 White Globe								
	V	22 Silver Globe									
	W	24 Stasis Globe									



6	7	8	9	10	11	12	13	Weapons Defenses Sensors			
AR Attack Range		LR Long Range		DS Deep Space				Description			
								Communicator	C		
								Holovisor	H		
								Scope	T	AR	Comm/Vis
								Visor	V		
								CommPlus	W		
								EMS	E		
								Grav Sensor	G		
								Neutrino Detector	N	AR	Space
								Radar	R		
								Scanner	S		
								Stealth Mask	Q	A	Jam

6	7	8	9	10	11	12	13				
AR6	AR7	LR8	LR9	DS10	DS11	DS12	DS13				FR
RINT	RINT	Delay	Delay	Delay	Delay	1 day	no	Missile	M		
RINT	RINT	Delay	Delay	Delay	Delay	1 day		KK Missile	N	AR	Missiles
RINT	RINT	Delay	Delay	Delay	Delay	1 day		AM Missile	X		
					RINT	RINT	no	CommCaster	C	AR	
RINT	RINT	Delay	Delay	Delay	Delay	1 day	no	Hybrid S-L-M	Y	AR	Special
					RINT	RINT	no	Meson Gun	G		
					RINT	RINT	no	Particle Accel	A	LR	
Delay	Delay	Delay	no	no	no	no	no	Rail Gun	R		

**LASOB. Launched at start of Battle.** Assumes the combatant has pre-planned attacks. Resolved in Turn number equal to S.

**RINT. Resolve In Next Turn.** If fired in the current Turn, the Attack is resolved in the Next Turn.

**Delay.** If fired in the current Turn, the Attack is resolved in S turns later.

**1 Day.** Attacks must be launched 1 day prior to start of battle.

**No.** No Attack is possible.

**AB. Anti-Beam.** May be used in defense against beam weapons JKLPF.

**AM. Anti-Missile.** May be used in defense against missile weapons BVMNX.





# DEFENSE GENERATOR MOUNTS

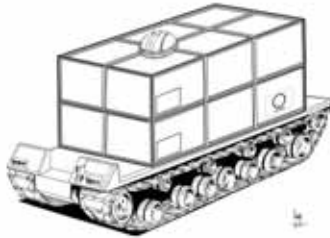
Triple Mount R=7



Double Mount R=6



Standard Mount R=5



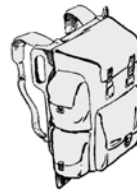
Half Mount R=4



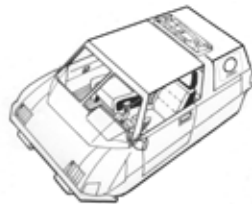
Quarter Mount R=3/21



Small Devices R=T



Starship Mount



Suitable for a personal device

Additional tonnage nearby as required.

Defense device mounts are produced in standard sizes: Standard, Double, Half, and Quarter, which may be further modified by Tech Level Stage Effects. While the interiors of the enclosures may differ, the uniform exterior dimensions allow transport on standard vehicles. Starship Hardpoint mount shown for comparison.

DEFENSE RANGE EFFECTS			Mount (Bolt-In)				Typical Military Mount
S=	R=	Range	TL	Cost	Tons	Tons	
	T	T Talking	+6	x5	/100	0.01	=Size-3.6 (cubic)
	1	Vs Vshort 5 meters	+5	x4	/20	0.05	=Size-4.2 (cubic)
	2	S Short 50 meters	+2	x2	/10	0.10	=Size-4.5 (cubic)
	3	M Medium 150 m	-1	x1	/4	0.25	Quarter-Mount
	4	L Long 500 m	-	/2	/2	0.50	Half-Mount
0	BR	5 VL Vlong 1000 m	+0	x1	x1	1	Standard Mount
1	FR1	6 D Distant 5 km	+1	x2	x2	2	Double Mount
2	FR2	7 Vd VDistant 50 km	+2	x3	x3	3	Triple Mount

# How Screens Work

High technology force fields can produce barriers to matter and energy and protecting ships and installations. Advanced force fields can be transformed into offensive weapons.

The foundation of the various force field generators is the ability to create a barrier around a volume, and to tune that barrier to produce specific effects. Different types of force field are created by distinct scientific principles, which in turn produce specific effects. Force fields are produced in three general categories:

**The Damper Series** manipulates the strong and weak nuclear forces with an effect that can suppress or enhance particle decay. The Damper Series gives rise to Meson Screens, Nuclear Dampers, Tractor/ Pressors, and Disintegrators. Note that Tractor/Pressors (although derived from the damper principle, are weapons).

**The Globe Series** projects an impenetrable barrier to matter with an associated absorption of energy. The Globe Series creates the Black Globe and its variant White Globe, Silver Globe, and Stasis Globe.

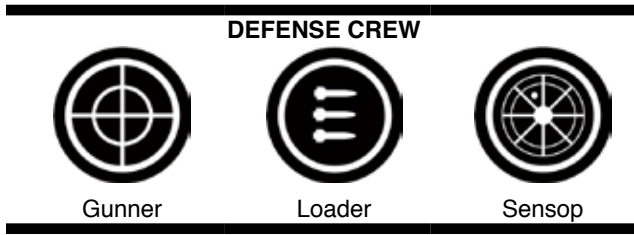
**The Scrambler Series** disrupts the expression of fundamental magnetic, gravitic, and electronic forces. The Scrambler Series produces the Mag, Grav, and Electronic Scramblers.

## STANDARD MOUNTS

The various force field devices are contained in Mounts: enclosures providing power, basic protection against weather and environment, and access security.

**Battlefield Mounts** contain a device for transport and installation on world surfaces; they are produced in a range of sizes. The Standard Mount is one ton: approximately 3 meters by 3 meters by 1.5 meters. Other Mounts are variants: Triple, Double, Half, or Quarter. The actual size of a specific device depends on its performance and on Tech Level Stage Effects. A device is fitted into the smallest possible Mount. For example, the Standard Nuclear Damper-12 R=5 is one ton. It is fitted into a Standard 1-ton Mount. A Standard Nuclear Damper-12 R=4 (based on the Range Effects table) requires half normal tonnage. It fits into a Half Mount at one-half ton.

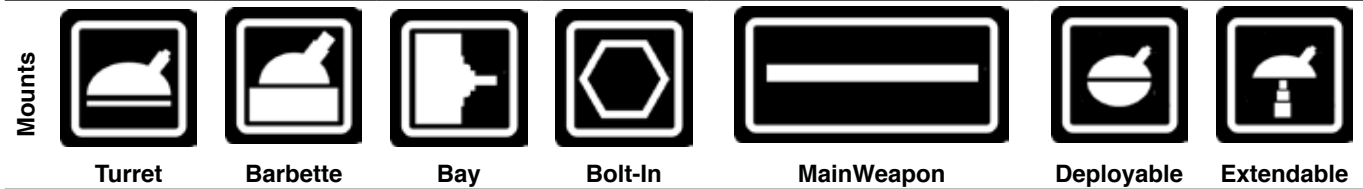
**Starship Mounts** are standard fittings on ships; they are produced in an array of sizes. The actual size of a specific device depends on its performance and on Tech Level Stage Effects. A device is fitted into the smallest possible Mount. For example, a Standard Nuclear Damper-12 R=5 is one-ton. It is fitted into an Internal one-ton Mount.








## IDENTIFYING DEFENSES

Stage	Range	Mount	Type	-TL (C+S)	Additional				
Exp	VI (BR)	Bo	Nuclear Damper-9	(9)	Mod -3	1 ton	MCr11.0	S=0	
Ear	Vd (FR2)	B1	Nuclear Damper-13	(13)	Mod +1	9 tons	MCr11.0	S=2	
Std	VI (BR)	Bo	Nuclear Damper-12	(12)	Mod 0	1 ton	MCr2.0	S=0	
Imp	VI (BR)	Bo	Nuclear Damper-13	(13)	Mod +1	1 ton	MCr2.0	S=0	
Std	D (FR1)	Bo	Nuclear Damper-13	(13)	Mod 0	2 tons	MCr3.0	S=1	
Std	Vd (FR2)	Bay	Nuclear Damper-13	(13)	Mod +5	50 tons	MCr6.0	S=2	
Ult	Vd (FR2)	Main	Nuclear Damper-21	(21)	Mod+14	600 tons	MCr123.0	S=2	

The Standard Nuclear Damper is available at TL-12..



# The Damper Series

	 12	 13	 19		
	<b>N</b>	<b>G</b>	<b>R</b>	<b>W*</b>	<b>U*</b>
	<b>Nuclear Damper</b>	<b>Meson Screen</b>	<b>ProtonScreen</b>	<b>Disintegrator</b>	<b>Tractor/Pressor</b>
<b>Options</b>	Centered (Default) Directed	Centered (Default) Directed Meson	Centered (Default) Directed Proton Conversion	Centered (Default) Directed Suppression	Directed Kinetic
<b>Affects</b>	Fission. Fusion. Nuclear warheads. Anti-Matter.	MesonGun. CommPlus.	Anti-Matter Warheads Anti-Matter Power. Environmental AM.	Anti-Matter Warheads Anti-Matter Power. Environmental AM. *weaponized	Matter. Objects. *weaponized

**Option Centered (Default).** The device creates a field centered on the device. It has a standard field with radius  $S=0$ .

**Option Directed.** Two separate Dampers can produce a remote effect on a specific target within range. A computer-, sensor-, or operator-controlled pair of nuclear dampers can focus their effect on specific targets.

**Option Proton Conversion** has a very specific effect: anti-protons within anti-matter become protons and interact with other anti-matter particles to self-destruct in a flash of energy. Anti-matter entering the Proton Screen field self-destructs. An Anti-Matter warhead entering the field is automatically destroyed.

**Option Kinetic** to Nuclear Damper becomes a Tractor Pressor. It allows addition of kinetic energy (Speed) to the Nuclear Damper field. The added Speed applies to all matter within the field (including the Nuclear Damper itself) and everything in the field moves as a group.

**Option Suppression** enables the device to suppress the strong nuclear force, producing a disintegration effect. Atomic nuclei degrade into their component particles.

**Option Meson.** The device volume prohibits meson decay within it. Energetic mesons do not release their energy and cannot affect equipment or devices within the volume.

The Damper principle allows the suppression of energetic particle interactions. Variants of the principle allow enhancement of these same interactions. Various damper devices make battlefields nuclear free and protect against meson guns. The term damper is a misnomer, the process in some mechanisms enhances particle decay.

There are four basic mechanisms within the Damper Series: Nuclear Damper, Meson Screen, and Proton Screen. Weaponized versions of the principle produce the Tractor/Pressor and the Disintegrator./Disruptor.

## **N** NUCLEAR DAMPER **BOLT-IN**

The Damper Principle creates a volume within which particle decay is suppressed.

**Fission Is Suppressed.** The ND field makes nuclear fission not possible. Fission explosives cannot function. Fission reactors cease activity while the field is active. Radioactive decay stops.

**Hot Fusion is Suppressed.** The ND field makes hot fusion not possible. Fusion power plants cease activity while the field is active. Fusion stops.

Fusion Plus and Cold Fusion are unaffected.

**Matter-Anti-Matter Annihilation is Suppressed.** The Nuclear Damper field prohibits the mutual destruction of anti-matter and matter when they contact. Anti-Matter power plants cease activity while the field is active. Anti-Matter Missile warheads fail to detonate (but, they may activate if the field is released).

## **Effect**

A nuclear damper prevents or stops a fission reaction. Nuclear warheads cannot detonate.

Unstable nuclear isotopes do not decay; they are suspended unchanged until the nuclear damper field is removed.

Fission warheads fail to explode. Triggering explosives may scatter the nuclear material, but it is relatively harmless (and not radioactive) while it remains within the ND field.

Fusion gun output does not produce fusion reactions (the weapons are reduced to a poor level of plasma gun performance; hits inflicted are halved).

Fission power plants cease generating new power, although they may continue to generate power based on latent heat for several hours. The fission plant interior is relatively harmless (and not radioactive) with the ND field.

Radioactive areas inflict no radiation effects while within the ND field. Radioactivity resumes when the field is removed. Matter-Anti-Matter annihilation resumes when the field is removed.

**Overlapping Fields** for Dampers ignore each other.

## **Appearance**

A single operating Nuclear Damper an invisible spherical field with a standard radius equal to Range  $S=0$ .

The surface of a Nuclear Damper field is invisible and unremarkable. The interior of the Nuclear Damper field is unremarkable other than its known effects on particle decay.

**Detection of Damper Fields.** A Nuclear Damper field is

not remotely detectable. A Radiation Detector is used to infer that a Nuclear Damper field is in place.

**Base Size and Dimensions.** The standard Nuclear Damper device is one ton (four 1.5 meter cubes) and designed to be installed in a Mount with a volume of one ton.

Starship installations may be turrets, barbets, or larger bays; static locations place the device in a dedicated compartment; mobile installations are fitted into a transportable one-ton cargo container.

### Receiving Damage

The standard Nuclear Damper is damaged when an attack penetrates its protective layers and inflicts at least one Hit on the device. The hit process produces damage severity and diagnosis severity.

### Baseline Device and Options

The baseline Nuclear Damper is a one-ton TL-12 device with Range S=0. The governing operational Knowledge is Gunner +Screens. The governing maintenance, diagnosis, and repair skill is Electronic. It implements the default Option Centered: the effect is centered on the device, and extends to its standard range band.

## G MESON SCREEN BOLT-IN

Meson Screens apply a variant of the damper principle to create a volume in which energetic mesons cannot decay.

Meson Guns direct a variety of particles toward a target. Mesons specifically can pass through ordinary matter (specifically through armor and exterior hull structures) with very little interaction: precise control of the specific particles and their speeds forces them to decay (into a burst of radiation) inside the target. Meson Screens prohibit this decay and the particles pass through the entire volume without effect.

Meson Screens inhibit the operation of Communicator-Plus (Meson Communicators) including both transmission and reception. Meson Screens inhibit the operation of Meson Guns. The screen must be deactivated for a Meson Gun to fire or CommPlus to function.

## R PROTON SCREEN BOLT-IN

**Proton Screen** contaminates anti-matter and forces its rapid (near instant) self-destruction.

Proton Conversion enables the device to promote conversion of anti-protons to protons. Within the affected volume, anti-protons spontaneously (the field itself adds the required energy) transmute into protons.

Because Anti-Matter within a Proton Screen field self-destructs, many weapons use Option Directed. A ship free of Anti-Matter can elect Option Centered, which affects all Anti-Matter coming within range.

## U TRACTOR/PRESSOR BARBETTE

**Tractor/Pressor** allows remote manipulation of matter.

Tractor/Pressor uses **Option Kinetic**. Coupled with a (required) Option Directed (with two identical devices), Option Kinetic can add Speed away from the device creating a Pressor effect, or Speed toward the device creating a Tractor effect. Option Kinetic can insert Speed equal to any value

from 0 to TL minus 14.

A Tractor/Pressor-15 (a Kinetic ND-15) can move an object in its grip at up to Speed= 1 (about 5 kph) which is reasonable for ship handling effects. A Tractor/Pressor-20 can move an object at up to Speed= 6 (about 100 kph).

Tractor /Pressor is a weapon (rather than a Defense) shown here because of its use of the damper principle. In its weaponized form, it imposes damage through a controlled shaking effect.

## W DISINTEGRATOR/DISRUPTOR BARBETTE

**Disintegrator** (often called Disruptor) suppresses particle attractive bonds, turning matter into a particle dust.

Disintegrator uses **Option Suppression**. Coupled with a (required) Option Directed (with two identical devices), the device produces a gradual disintegration effect: hits equal to device tech level per turn. The Disruptor is a relatively slow weapon. Focused on a target, it boils away armor layers over the course of minutes.

Disruptors boil off armor in layers. Disintegrators without the Directed option are self-destructive.

Disintegrator is a weapon (rather than a Defense) shown here because of its relationship to the damper principle.

## EJQ ELEC GRAV MAG SCRAMBLER BOLT-IN

The Scrambler principle disrupts the expression of fundamental magnetic, gravitic, and electronic forces. Devices create a volume within which the affected force is "undefined." Devices which depend on the specific force produce nonsense output or are inoperative.

The Scrambler Series produces three distinct mechanisms: the Magnetic Scrambler, the Gravitic Scrambler, and the Electronic Scrambler.

The Scrambler may have optional settings: Option Directed, Option Strong, and Option Anti.

## E ELECTRONIC SCRAMBLER

An Electronic Scrambler disrupts electronic activity. Devices which are based on electronic principles are disrupted or non-functional. The electronic effects of materials within the Scrambler field become chaotic and allow no reasonable conclusions to be inferred.

When the field is removed, the mechanisms return to normal operation.

### For example, within a Electronic Scrambler volume

Electronic activity fluctuates chaotically. Devices identified as Electronic in nature (requiring Skill= Electronics) are rendered non-functional.




Devices based on electronic effects (specifically communicators, computers, consoles, control panels, and others).

However, the flow of electric current continues unaffected: simple electric devices (motors, lights, heaters) operate normally.

### Appearance and Operation

Electronic Scrambler creates a spherical field centered on the device; it has no readily apparent characteristics.

## The Scrambler Series

	 14	 17	 12
	<b>Q</b>	<b>J</b>	<b>E</b>
	<b>Mag Scrambler</b>	<b>Grav Scrambler</b>	<b>Elec Scrambler</b>
<b>Options</b>	Standard	Standard	Standard
	Directed		Directed
	Strong		Strong
	Anti	Anti	Anti
<b>Affects</b>	Magnetic	Gravitic	Electronic

**Option Directed** allows projection of the Scrambler field to a remote point. The Scrambler effect is restricted to the surface of the spherical field. Rather than affecting the entire volume of the field, only the Range Band equal to the radius of the field is scrambled.

For a Scrambler R=4, only effects in Range Band R=4 from the device are imposed.

**Option Strong** greatly increases the power of the Scrambler effect and makes the Scramble effect continue after the device is powered off. Affected devices can be diagnosed and repaired. Devices are rendered inoperative until diagnosed and repaired.

**Option Anti** suppresses or counteracts the effects of a Scrambler field. Any portion of a Scrambler field volume which is overlapped by an Anti- field is immune to the Scrambler effect.

**EMS ElectroMagnetic Sensors** detect wildly fluctuating electronic values within the field volume (generally rendered as static).

**Awareness.** Electronic activity creates a Lek glow observable by Awareness. A sophont with Awareness may notice the absence of a Lek glow in the region.

**Size and Dimensions.** The standard Electronic Scrambler approximately one ton and capable of fitting into a one-ton turret or mount.

**Damage.** The standard Electronic Scrambler is damaged when an attack penetrates its protective layers and inflicts at least one starship Hit on the device (= 10 personal combat Hits) per ton.

**Governing Skill.** The Electronic Scrambler is an Electronic device. The Electronic Scrambler mechanism is shielded from the effects of itself and other Electronic Scramblers.

### Baseline Device

The baseline Electronic Scrambler is a one-ton TL-12 device with Range S=0. The governing operational Knowledge is Gunner +Screens. The governing maintenance, diagnosis, and repair skill is Electronic.

Options available for the Electronic Scrambler include: Directed, Strong Field, and Anti-Field.

## J GRAVITIC SCRAMBLER

A Grav Scrambler disrupts gravity. Devices which are based on gravitic principles are disrupted or non-functional. The gravitic effects of materials within the Scrambler field become chaotic and allow no reasonable conclusions to be inferred. When the field is removed, the mechanisms return to normal operation.

### For example, within a Grav Scrambler volume

Gravitational fields fluctuate chaotically (= flux times 10% changing every turn/ minute).

Devices identified as Gravitic in nature (requiring Skill=Gravitics) are rendered non-functional.

Devices based on gravitic effects (specifically Lifters, G-Drive and M-Drive) are non-functional.

Grav sensors detect wildly fluctuating grav values within the volume of the field. Mass detectors return wildly fluctuating mass values within the volume of the field.

Anti-matter containment vessels which depend on gravitic effects suffer a catastrophic failure within the Grav Scrambler field.

### Appearance and Operation

A Grav Scrambler creates a spherical field centered on the device. The field has no readily apparent characteristics.

**Grav and Mass Sensors** detect wildly fluctuating magnetic values within the field volume.

**Size and Dimensions.** The standard Grav Scrambler approximately one ton and capable of fitting into a one-ton turret or mount.

**Damage.** The standard Grav Scrambler is damaged when an attack penetrates its protective layers and inflicts at least one starship Hit on the device (= 10 personal combat Hits) per ton.

**Governing Skill.** The Grav Scrambler is a Gravitic device. The Grav Scrambler mechanism is shielded from the effects of itself and other Grav Scramblers.

### Baseline Device

The baseline Gravitic Scrambler is a one-ton TL-12 device with Range S=0. The governing operational Knowledge is Gunner +Screens. The governing maintenance, diagnosis, and repair skill is Gravitic.

Options available for the Grav Scrambler include: Anti-Field. Directed and Strong are not available options.

## MAGNETIC SCRAMBLER

A Magnetic Scrambler disrupts magnetism.

Devices based on magnetic principles are disrupted or non-functional. The magnetic effects of materials within the Scrambler field become chaotic and allow no reasonable conclusions to be inferred. When the field is removed, the mechanisms return to normal operation.

### For example, within a Mag Scrambler volume

Devices identified as Magnetic in nature (requiring Skill=Magnetic) are rendered non-functional.

Magnetic closures, magnets, and electromagnets fail to operate.

Magnetic-based computer memory is non-functional. Existing data is not preserved when the Scrambler effect is removed.

Anti-matter containment vessels which depend on magnetic effects suffer a catastrophic failure.

Magnetic sensors detect wildly fluctuating magnetic values within the volume of the field.

Gauss weapons fail.

### Appearance and Operation

A Mag Scrambler creates a spherical field centered on the device. The field has no readily apparent characteristics.

**EMS ElectroMagnetic Sensors** detect wildly fluctuating magnetic values within the field volume.

**Awareness.** Magnetic fields create a Mag glow observable by Awareness. A sophont with Awareness may notice the absence of a Mag glow in the region.

**Size and Dimensions.** The standard Mag Scrambler approximately one ton and capable of fitting into a one-ton turret or mount.

**Damage.** The standard Mag Scrambler is damaged when an attack penetrates its protective layers and inflicts at least one starship Hit on the device (= 10 personal combat Hits) per ton.

**Governing Skill.** The Mag Scrambler is a Magnetic device. The Mag Scrambler mechanism is shielded from the effects of itself and other Mag Scramblers.

### Baseline Device

The baseline Magnetic Scrambler is a one-ton TL-12 device with Range S=0. The governing operational Knowledge is Gunner +Screens. The governing maintenance, diagnosis, and repair skill is Magnetic.

Options available for the Mag Scrambler include: Directed, Strong Field, and Anti-Field.

## TUVW GLOBES BOLT-IN

The Globe principle establishes a barrier which prohibits the entry of matter and absorbs (or in some cases reflects) incoming energy. It derives its name from the characteristic globe-shaped field it establishes centered on the device.

The fundamental concepts give rise to a series of implementations: The Black Globe, the White Globe, the Silver Globe, and the Stasis Globe.

## T BLACK GLOBE

The Black Globe blocks the entry of matter and absorbs all incoming energy (light, heat, radiation, impact). Absorbed energy becomes heat which raises the overall interior temperature. The globe is black because no energy is re-emitted or reflected. Because a black globe does not emit or reflect energy, it is undetectable by many sensors.

**Volume of the Globe and its Protected Space.** A standard Globe Generator produces a spherical protected space centered on the generator with a radius of Range S=0.

### Appearance

When activated, a Black Globe Generator produces a spherical field with a standard radius equal to Range R =5

or S=0.

The globe appears black (deep matte black; it reflects nothing). Sensors reflect a total absence of signal.

The Black Globe Barrier stops all electronic, magnetic, gravitic, mechanical, and inertial effects. It does not stop Psi.

The interior of a Black Globe is weightless and unaffected by exterior gravity. Typically, hulls within the field use local grav plates to produce gravity for occupants.

The interior of a Black Globe is independent of exterior inertial frames of reference. Impacts are absorbed as energy but have no direct effect on the interior.

Because the barrier absorbs energy, any variation in the absorption process can become a signal; outside forces can send signals into the Black Globe; the interior cannot send signals out.

**Size and Dimensions.** The standard globe is installed in a Mount, typically with a volume of one ton.

Starship installations may be turrets, barbettes, or larger; static locations place the device in a dedicated compartment; mobile installations are fitted into a transportable one-ton cargo container.

### Damage

Events, attacks, and environment can inflict damage on a globe.

Matter is stopped dead at the globe perimeter (larger, more energetic objects may squash as they impact). The collision is inelastic; objects do not rebound.

The energy of matter impact is absorbed (in hits; based on impact collision).

Environmental energy is absorbed by the globe as well (also in hits; based on various environmental effects).

**Damage Saturation.** Damage applied to a globe expresses itself as an increase in temperature within the globe. Total hits are averaged over the tonnage of the ship.

For example, a 100-ton ship receives 100 hits and is protected by its Black Globe. The internal temperature of the ship is raised +1 in each ton of the ship, increasing from Temperate to Hot. In the next attack, the ship receives 300 hits absorbed by the Black Globe. Internal temperature is raised by +3 to +4 and the internal spaces become Very Hot.

For example, a 1000-ton ship receives 100 hits and is protected by its Black Globe. The internal temperature of the ship is barely affected. In the next attack, the ship receives 300 more absorbed by the Black Globe. A total of 400 hits averaged over 1000 tons is 0.4 hits per ton. The internal temperature is again barely affected. Finally, the ship receives 2000 hits from a barrage of attacks. Having received 2400 total hits, the ship's internal temperature is determined by 2.4 hits per ton: somewhere between Hot and Very Hot.





### Operation

Globes are activated and absorb energy that would ordinarily inflict damage on a ship or object.

**Activation.** When a globe is activated, its field appears (virtually instantly) at a designated distance from the device.

If the field intersects an object (a world surface, a nearby ship hull, an individual) that object is cleanly sliced with part falling within the globe field and part outside.

## The Globe Series

	 16	 20	 22	 24
	<b>T</b>	<b>U</b>	<b>V</b>	<b>W</b>
	<b>Black Globe</b>	<b>White Globe</b>	<b>Silver Globe</b>	<b>Stasis Globe</b>
Options	Damage Capture Heat	Damage Capture Heat		
	Damage Capture Power	Damage Capture Power		
	Selective	Selective	Selective	
	Flicker	Flicker		
	Conforming Field	Conforming Field	Conforming Field	Conforming Field
	Foam			
	Remote	Remote	Remote	Remote

**Option Damage Capture Heat.** Fitted with a mechanism concentrating heat into a heat sink.

**Option Damage Capture Power.** Fitted with a mechanism concentrating the energy as power in Jump Drive Capacitors.

**Option Selective.** Adjustable to absorb selected energy levels or wavelengths.

**Option Flicker.** Adjustable to flicker (on and off) at a selected rate, or in response to specific threats or conditions.

**Option Conforming Field.** For a hull, pod, or chassis fitted with a Jump Grid, produces a field which conforms to the grid (and thus the shape of the hull).

**Option Canceller.** Allows part of the globe to be turned off or on, producing partial or half globes, and portals in globes.

**Option Foam.** Structures the volume of the globe as a foam of microscopic Black Globe bubbles which immediately absorb energy and collapse. Matter within the volume is sliced into very small (molecular-level) pieces.

**Option Remote.** Allows creation of a globe field at some distance from, and separate from the device. Absorbed energy accumulates within the globe; with nothing to absorb it; the energy is distributed as heat across the entire enclosed object.

**Energy Absorption.** A globe absorbs energy which touches it, including heat, radiation, light, gravity, magnetism, and impact.

Energy is absorbed as damage or hits and recorded as EP Energy Points. One damage = 1 EP.

Black globe fields feel Cold to the touch (the surface is always at least one reading lower in temperature (on Hot and Cold Benchmarks) than the surrounding environment (and never greater than Cold = 275 K).

**Time.** Time passes normally within most Globes (but not Stasis).

**Gravity.** Gravity is stopped by the globe barrier. The interior of the globe is unaffected by gravity. Most hulls have artificial gravity in the floor plates that counteract the effect.

**Momentum. Inertia.** The effects of inertia remain. Acceleration produces felt effects. Most hulls have inertial compensators which counteract the effect.

On the other hand, a collision of an outside object with a Black Globe is inelastic: the Globe converts that impact energy to heat; the interior of a globe does not feel impact.

When Black Globes collide, each absorbs a proportional level of energy. The collision is inelastic and both globes stop in contact with each other.

**Penetration of Globes.** Almost nothing penetrates a Globe. All incoming matter is stopped by the Globe surface.

All incoming energy is converted to heat and absorbed by the appropriate reservoir. The interior is in zero gravity. The interior does not feel turbulence, vibration, or impact.

Nuclear Damper fields and Meson Screen fields do not penetrate a Black Globe.

However, the interior can sense the rate of energy absorption; thus it can sense intermittent or coded pulses applied to the globe (modulated laser, gravity, electromagnetic, or even mechanical).

The Star Marine Guards defending the Imperial Embassy on Arden during the Fifth Frontier War retreated to a Black Globe Safe Room when locals stormed and burned the compound. The 100-meter diameter globe neatly sliced through walls (and a few attackers) to envelope about a quarter of the installation. Over the course of a month, it resisted fire, bombs, and other attacks.

When forces from the Imperial Fleet arrived, they used a coded laser to signal the interior that all was finally safe, but to confirm the signal, an outside Marine tapped the rhythm to the Marine song: tap-tap-tap, tap-tap-tap, tap-tap-tap-tap-tap.

The interior Marines deactivated the barrier, happy at the prospect of eating something other than stored rations.

### Psi And Black Globe Effects

In addition, the Psi is unaffected by a Black Globe Barrier, (although this requires some clarification). Psi activity outside the barrier which manipulates objects or energy finds that energy or objects stopped by the barrier. Psi can penetrate the barrier with Psi senses. Psi can manipulate matter or energy inside the Black Globe from outside (or energy and objects outside the Black Globe from inside).

**Jump.** A Jump Drive mechanism can propel a hull into jump while inside a Black Globe.

A Black Globe mechanism operating in Jump Space is the equivalent of a Jump Field, but because it absorbs energy, it is rapidly overwhelmed by the alien physics of Jump Space, and overloads within an hour or so.

A Black Globe operating while in a Jump Field functions normally.

**Globes Within Globes.** A smaller globe may be established within a larger globe. Although their barriers may intersect, neither produces an effect within the other.

**On Worlds.** A Black Globe activated on a world surface or in atmosphere receives damage at a rate equal to world size plus atmosphere per turn as it absorbs ambient energy from the environment.

**Options**

Globe Generators can be enhanced by a variety of options: Damage Capture Power, Damage Capture Heat, Selective, Flicker, Conforming Field, Cancellor, Foam, Remote Projection.

**Option Damage Capture Heat.** A Black Globe can be fitted with a Damage Capture mechanism concentrating heat into a heat sink.

If the Globe generator has Damage Capture Heat, all hits are concentrated into a one-ton Heat Sink. The temperature of the Heat Sink Core is determined by the total hits.

For example, a ship receives 1000 hits which are channeled to a 1-ton Heat Sink. The temperature of the Heat Sink is raised to 3000 Hits/ 1 ton = 6000 K.

Based on Hot and Cold Benchmarks, a 1-ton Heat Sink-10 can absorb 700 hits before it is saturated.

A Heat Sink may use Ejection Cooling. When a Heat Sink reaches its thermal limit, its core may be ejected; a new core inserted to begin the process of absorbing hits.

A Heat Sink may use radiative cooling. Fins and coolant shed heat to reduce temperature. Radiative cooling reduces the hits in a Heat Sink by one-third of total capacity per cycle.

If the Heat Sink Core exceeds its limit, it self-destructs, destroying the Heat Sink and the Globe Generator.

The Damage Capture Heat process is inefficient; only 90 percent of absorbed heat is channeled to the Heat Sink; the remainder is expressed as a temperature rise in the interior of the globe (averaged across the tonnage of the hull).

**Option Damage Capture Power.** A Black Globe can be fitted with a Damage Capture mechanism concentrating the energy as power in Jump Drive Capacitors.

If the Globe generator has Damage Capture Power, all hits are channeled as EP into the power storage capacitors of the ship's Jump Drive. The capacitors may store hits as EP equal to Hull Tons times Jump Drive Potential.

For example, a 1000-ton Jump-4 ship receives 1000 hits which are channeled to its Jump Drive Capacitors, which can absorb a total of 4,000 hits. The stored power in the capacitors is 1000.

The power in the Jump Drive Capacitors may be used to support a Jump by the ship.

If the power stored in Jump Drive Capacitors exceed capacity, the Jump Drive self destructs, destroying the Jump

Drive and the Globe Generator.

A 1000-ton ship with a Jump-4 drive requires 400 tons of fuel through its power plant to produce the 4000 EP necessary to power a Jump-4,

It follows that any event against a Black Globe which sends hits to the Jump Drive Capacitors is the equivalent of fuel and can also drive a jump, such as:

Impact by a 21-ton object at Speed-14 = 4116 hits

Two direct hits by strategic nuclear weapons= 4200 hits

Two direct hits by Missile-5 Massive Explosion = 4200 hits (100D each of Blast, BFE, Burn, and Rad at average=3.5).

The Damage Capture Power process is inefficient; only 50 percent of absorbed power is channeled to the Capacitors; the remainder is expressed as a temperature rise in the interior of the globe (averaged across the tonnage of the hull).

**Option Selective.** The Globe can be adjusted to absorb selected energy levels or wavelengths.

The option selectively filters incoming EM frequencies and power levels, allowing non-weaponized frequencies and non-threat power levels to pass through the barrier (in either direction). The globe is white because it re-emits some of the incoming energy across a broad spectrum (which appears as white to all visual sensors).

The interior of the globe can use sensors and energy weapons adapted to specific power levels and frequencies.

**Option Flicker.** The Globe can be adjusted to flicker (on and off) at a selected rate, or in response to specific threats or conditions.

Flicker can produce a shredding effect against matter. The front of a projectile may penetrate the region of a globe when it is off; when the globe turns on, it is sheared cleanly and the object is stopped (its energy absorbed). The back of the projectile continues to press the object forward (although slowly) until the globe flickers off, at which point the object presses into the globe's volume. Flicker on again shears the projectile.

**GLOBE DAMAGE CAPTURE**

TL	Max Temp	Hits	Capacitor Limit
7	400	16	
8	500	64	
9	600	144	
10	700	350	
11	800	400	
12	900	450	
13	1000	500	Based On Jump Drive =Hull Tons times Jump Drive Potential
14	2000	1000	
15	3000	1500	
16	4000	2000	
17	5000	2500	
18	6000	3000	
19	7000	3500	
20	8000	4000	
21	9000	4500	



A Flickering Black Globe modifies the standard Black Globe to activate and deactivate the field in a recurring cycle. During the on-phase, the interior of the globe is protected; during the off-phase, the interior can use sensors and weapons, but is vulnerable to outside effects.

A Black Globe may flicker regularly (for example, 60 cycles per second) during which it is "on" half the time and "off" half the time. It may flicker in pulses (expressed as a percentage) during which it is "on" 90% of the time, and "off" 10% of the time.

A Black Globe may flicker reactively. Sensors turn to globe "on" when an incoming threat is detected, perceived, or predicted. The Black Globe is "off" most of the time, and turns "on" when incoming energy greater than a specific level, or incoming matter (missiles, meteors, collision situations) is detected.

**Option Conforming Field.** If a hull, pod, or chassis is fitted with a Jump Grid, a Globe Generator will produce a field which conforms to the grid (and thus the shape of the hull).

A Conforming Globe adapts the surface of the field projected by the globe generator to conform to the material configuration of the object being enveloped.

**Option Cancellor.** A Cancellor option on any Globe Generator allows a portion of the globe to be turned off or on, allowing the generation of partial globes, half globes, and portals in globes.

An independent Cancellor can produce effects on existing Globes (opening portals in Globes, turning off Stasis Globes).

A globe cancel feature allows the creation of interlocking fields which allow (in air lock fashion) a Globe to eject a heat sink while preventing damage from entering.

A Partial Globe Generator uses a complex interplay of generator and canceller to project a partial globe surface (typically a half sphere). A major advantage of the partial globe is the energy it absorbs may be dissipated more easily.

**Option Foam.** The area affected by the Globe Generator is filled with a foam of minimal size Black Globe bubbles (which immediately absorb energy and collapse). Matter within the volume is sliced into (molecular-level) pieces.

Foam Option Plus remote Projector is a disintegrator.

Foam option alone is a Bomb that disintegrates (cleanly) within its radius of effect.

**Option Remote.** Remote Globe Projectors create a globe field at some distance from the device; the field is totally separate from the device. Absorbed energy accumulates within the globe; with nothing to absorb it; the energy is distributed as heat across the entire enclosed object.

## **U WHITE GLOBE**

Advances in globe technology produce a barrier which re-emits absorbed energy evenly over the surface and across all wavelengths. At low energy absorption levels, the globe is dark grey, shading to light grey, white, and ultimately blinding glowing white.

White globes are glowing beacons to many sensors; sustained energy re-emission significantly increases their detectability.

## **V SILVER GLOBE**

Polarity Reversal Option produces the Silver Globe uses reversed polarity circuits to reflect all incoming energy. The globe is silver because of its reflective mirror surface effect. There is no energy absorbed.

A Silver Globe (and/or a Stasis Globe) rebounds in a perfect elastic collision.

## **W STASIS GLOBE**

Stasis option establishes a barrier which cannot be penetrated by any force from the outside universe. Activity within the Globe is stopped until the globe is deactivated. Theoretically, a Stasis Globe can withstand anything, even the end of time. When the field is collapsed, activity resumes.

A Stasis Globe is silver and externally indistinguishable from a Silver Globe.

A Stasis Globe can be created with a duration: it automatically deactivates after a specific elapsed period of time. A Stasis Globe can also be created with a deactivation trigger: a sensitivity to a coded gravitic, magnetic, electromagnetic, or even mechanical pulses which cause its deactivation.

## A1 DEFENSES

	Type	TL	Mount	S=	R=	MCR
Dampers BR	N Nuclear Damper	12	Bo	0		1.0
	G Meson Screen	13	Bo	0		2.0
	R Proton Screen	19	Bo	0		2.0
	W Disruptor*	18	Barbette		7	15.0
	U Tractor/Pressor*	16	Barbette		7	5.0
Scramb BR	Q Mag Scrambler	14	Bo		5	1.0
	J Grav Scrambler	17	Bo		5	1.0
	E Elec Scrambler	12	Bo		5	1.0
Globes BR	T Black Globe	16	Bo		5	3.0
	U White Globe	20	Bo		5	3.0
	V Silver Globe	22	Bo		5	3.0
	W Stasis Globe	24	Bo		5	3.0
	S SandCaster	9	Turret		7	0.1
Beams FR	J Mining Laser	8	Turret		7	0.5
	K Pulse Laser	9	Turret		7	0.3
	L Beam Laser	10	Turret		7	0.5
	P Plasma Gun	11	Barbette		7	1.0
	F Fusion Gun	12	Barbette		7	1.5
	Y Hybrid S-L-M	10	Turret	7*	7*	1.0

\*Range varies by usage.

## C DEFENSE MOUNTS

Mount	Type	Tons	Mod	Skill	MCR
Bo	Bolt-In	1	0	Screens	1.0
T1	Single Turret	1	-2	Screens	0.2
T2	Dual Turret	1	-1	Screens	0.5
T3	Triple Turret	1	0	Screens	1.0
T4	Quad Turret	1	+1	Screens	1.5
B1	Barbette	3	+2	Screens	3.0
B2	Dual Barbette	5	+3	Screens	4.0
Bay	Bay	50	+5	Screens	5.0
LBay	Large Bay	100	+8	Screens	10.0
M	Main	200	+10	Spine	20.0
Sp	Spine			Spine	
Ext	Extendable	+2	+3	Screens	1.0
De	Deployable	+2		Screens	3.0

**Deployable.** In addition to Turret or Barbette costs.

**Hardpoints.** Each Mount occupies one Hardpoint.

**Skills.** Screens substitute for Turret, Bay, or Spine.

## DE DEFENSE RANGE EFFECTS

S=	R=	Range	TL	Cost	Mount
	T	T Talking	+6	x5	/100
1	Vs	Vshort 5 meters	+5	x4	/20
2	S	Short 50 meters	+2	x2	/10
3	M	Medium 150 m	-1	x1	/4
4	L	Long 500 m	-	/2	/2
0	BR	5 VL Vlong 1000 m	+0	x1	x1
1	FR1	6 D Distant 5 km	+1	x2	x2
2	FR2	7 Vd VDistant 50 km	+2	x3	x3

## ARTIFACT BLACK GLOBES

Black Globe Generators occur in two forms: the traditional technologically-developed device, and the artifact.

### Traditional Technology Black Globes

The technological BGG device is base TL-16, with its attendant stage effects for the device and for its options. Any reasonable technological society can probably discover and produce this range of devices.

### Artifact Black Globes

There is a second type of BGG. Found in the destroyed cities of the Ancients, the artifact BGG is a puzzle and a contradiction to those who study the exploits of the Ancients.

Ancient BG Generators appears in nearly all known Droyne cultures from the Ancient War period. There are three varieties: Alpha, Beta, and Gamma.

**Black Globe Alpha** is the most common device: a many-faceted Size-5.5 (about one volume ton) lump of laminated carbon embedded with titanium and tungsten wires and a variety of overlapping holes. With external power, Alpha produces a standard Black Globe S=0 R=5.

**Black Globe Beta** (discovered at the rate of about one in 100) is two interlocking hollow cubes about Size-4.5 (about 100 kilograms) composed of laminated carbon embedded with the familiar titanium and tungsten wires and pierced by many overlapping holes. With external power, Beta produces a Range R=5 radius Black Globe.

**Gamma** (fewer than one in a thousand) is a smooth flat Size-3.5 disk: a solid slab of laminated carbon infiltrated with networks of wires and circuits. With external power, Gamma produces a Range R=4 radius Black Globe.

**Reproducible Technology.** Incredibly, the artifacts are reproducible with available technology. Careful matching of molecular composition, swaging of titanium and tungsten wires, and precision hole boring can produce imitations of the true artifacts at QREBS = 50000.

Alpha is reproducible at TL-15.

Beta is reproducible at TL-17.

Gamma is reproducible at TL-22.

## TL TECH LEVEL STAGE EFFECTS

TL	Stage	TL	Cost	Mod	Q	R	E	B	S
Exp	Experimental	-3	x10	-3	Q	-2	-3	+3	-3
Pro	Prototype	-2	x5	-2	Q	-2	-2	+2	-2
Ear	Early	-1	x2	-1	Q		-1	+1	-1
Std	Standard	0	x1	0	Q				
Bas	Basic	0	/2	0	Q		-1	+1	
Alt	Alternate	0	x1	0	Q	F	F	F	F
Imp	Improved	+1	x1	+1	Q	+1	+1	-1	+1
Gen	Generic	+1	/2	0	5	0	0	0	0
Mod	Modified	+2	/2	+2	Q	+2	+2	-2	+2
Adv	Advanced	+3	x2	+3	Q	+3	+3	-3	+3
Ult	Ultimate	+4	x3	+4	Q	+4	+4	-4	+4

F= Flux (value may vary depending on the manufacturer).

Q= Quality = 2D-2 Affects Defense.

# How Fuel Works

Spacecraft consume fuel in the course of their operations.

The different types of power plants for starships and spacecraft depend on distinct types of fuel, each with its own benefits and complications. The common types of fuel are: Hydrogen, Radioactives, Anti-Matter, and Exotic Particles.

## HYDROGEN

The standard fuel for starships with Fusion Power Plants is Hydrogen, usually stored as Liquid Hydrogen.

**Units.** Liquid Hydrogen is tallied in tons, a unit of volume of about 13.5 cubic meters, and not coincidentally, about one thousand kilograms or one metric ton.

**Characteristics.** Liquid Hydrogen is a colorless liquid with Temperature -11 (about 20 Kelvin) and a viscosity (resistance to flow) about one percent that of water.

**Availability.** Hydrogen is easily acquired. Naturally-occurring gaseous hydrogen (contaminated by various compounds) is "raw" and, while usable as fuel, benefits from purification to ideal standards. Liquid water (pumped from lakes or rivers), and water ice (harvested from ice caps, planetoids, and comets) can be electrolyzed to produce gaseous hydrogen (and useful life support oxygen). Then cooled and liquified, it is stored in a ships tanks until required.

Raw Liquid Hydrogen is available at most starports ABCD at Cr100 per ton. Refined Liquid Hydrogen is available at Starports AB at Cr500 per ton.

**Benchmark Performance.** One ton of liquid hydrogen supports a Potential-1 Fusion Power Plant in 100 tons of Hull for about one year of ordinary operations.

Ten tons of liquid hydrogen provides the energy for Jump-1 in a 100-ton Hull.

## Operations

A Fusion Power Plant requires tons of fuel equal to Power Plant Potential times Hull tonnage divided by 100 to support one year (12 months) of normal operations. If the ship is on centralized power (no local Fusion Plus modules) this requirement is doubled.

**Jump.** The Fusion Power Plant consumes vast quantities of liquid hydrogen in very short time span in an inefficient (or wasteful process). The drive requires tons equal to Jump Drive Potential times Hull tonnage divided by 10.

**Unrefined Fuel.** The low (or zero) cost of unrefined Liquid Hydrogen fuel is offset by its gradual contamination of the Power Plant process. After 25 uses of unrefined fuel, a Power Plant runs the

risk of failure for each additional week of use: Check (2D) TL (Mod minus weeks of use). Failure of the Check produces failure of the Power Plant.

**FusionPlus** modules (alternatively called **Fusion+**, **Fusion Plus**, **Cold Fusion**) are small, sealed, self-contained cold fusion power sources. Virtually maintenance free, they are sited throughout many ships as independent power sources. Powered by water, they are inspected and cleaned annually, at which time their small water tank is refilled.

**Rocket Fuel.** Rockets (including HEPlAR) are fueled by Liquid Hydrogen and Liquid Oxygen which burn to produce thrust. Any electrolysis process which produces Liquid Hydrogen also produces Liquid Oxygen for about the same price. Where Rockets or HEPlAR are in general use, Starports probably have them available at about CR500 per ton.

## RADIOACTIVES

The standard fuel for starships with Fission Power Plants is radioactives manufactured into Rods.

**Units.** Radioactives are tallied in standard (fuel) Rods; about 200 rods can be stored in a ton.

**Characteristics.** Rods are solid metal fuel cylinders (about 1 cm in diameter; 3 meters long) encased in a protective shroud for shielding and structural strength. They are tolerably safe to the touch: a bare unused Rod is Rad-1 at contact. Used rods are Rad-5 at Contact R=0, diminishing -1 per Range Band to Rad-4 at R=1; Rad-0 at R=4.

**Availability.** Radioactives are mined, processed, and manufactured into rods by local industry at TL-8.

## Operations

A Fission Power Plant requires rods equal to Power Plant potential times Hull tonnage divided by 100 to support ten years (120 months) of ordinary operations. If the ship is on centralized power (no local Fusion Plus modules) this requirement is doubled.

**Jump.** Fission Power Plants cannot produce energy with sufficient intensity to support Jump.

## FUEL AT STARPORTS AND SPACEPORTS

Starport	H Hydrogen	U Radioactives	A Anti-Matter	C Collector
<b>A</b>	Both*	TL 8+	TL 18+	TL 14+
<b>B</b>	Both*	TL 8+	TL 18+	TL 14+
<b>C</b>	Raw	no	no	no
<b>D</b>	Raw	no	no	no
<b>E</b>	no**	no	no	no
<b>X</b>	no**	no	no	no
<b>F</b>	Raw	no	no	no
<b>G</b>	Raw	no	no	no
<b>H</b>	no**	no	no	no
<b>Y</b>	no**	no	no	no

\*Both includes Refined and Unrefined (Raw) hydrogen fuel.

\*\*May be available in the local environment.

Raw Fuel (Water) from oceans.  
Raw Fuel (Ice) from Ice Caps or Snowpack, Ice Asteroids or Comets.  
Raw Fuel (Gas) from Gas Giants.

## ANTI-MATTER

The standard (but only available at higher technology levels) fuel for starship anti-matter plants.

**Units.** Anti-Matter is counted in slugs. The slug is a small amount of anti-matter encased in a fail-safe protective envelope that prevents interaction with ordinary matter until energy is necessary. It measures approximately 5 cm in diameter by 10 cm in length.

Anti-matter slugs are carried in fuel consoles: 1,000 slugs per ton; they are consumed in the energy process.

**Availability.** Slugs are specifically produced for individual ships or anti-matter plants. Starports A and B usually have AM slugs suited to specific ship traffic in their region.

**Self-Production.** AM-powered ships may carry with them the ability to produce additional slugs.

**Benchmark Performance.** One set of slugs will provide energy for one year (12 months). Anti-Matter power plants can support Jump.

## Operations

An Anti-Matter Plant requires slugs equal to AM Plant Potential times Hull tonnage divided by 100. This fuel supports one year (12 months) of operations. If the ship is on centralized power (no local Fusion Plus modules) this requirement is doubled.

**Jump.** The AM Power Plant processes fuel for the Jump Drive. The drive requires slugs equal to Jump Drive Potential times Hull tonnage divided by 100.

## COLLECTORS

The Collector is a specialized Power Source: half internal mechanism and half external extendable Canopy. The Collector accumulates potential energy from exotic particles in the Canopy and releases it to the Jump Drive at the instant it is activated.

**Routine Energy Use.** A Collector is unsuitable as a routine energy supply; it only powers the Jump Drive.

**Powering Jump Drive.** One full charge supports any Jump Drive of equal Drive Potential or less.

**Charging.** A Collector can only accumulate a charge while its canopy is deployed.

## Canopy Operation

The canopy is an extendable framework covered with particle attractive media. Too fragile to withstand accelera-

---

## THREE DIFFERENT POWER PLANTS

For example, 2000-ton cargo carrier *Ishtar* with Plant-V has Potential-2.

If equipped with a **Fission Plant**, it requires (2 x2000 / 100=) 40 rods, which will support the ship for ten years. The rods cost Cr40,000 each, or MCr1.6. Amortized over ten years, the rod cost is Cr13,333 per month.

If equipped with a **Fusion Plant**, it requires (2 x2000 /100=) 40 tons of fuel per month. At Cr500 per ton, Fusion costs about Cr20,000 per month.

If equipped with an **Anti-Matter Plant**, it requires (2 x2000 /100=) 40 slugs per year. At Cr6,000 each, Anti-Matter costs about Cr20,000 per month.

---

---

## POWER PLANT OPERATIONAL MODES

Power Plants may operate in four specific Modes.

**Normal Mode.** Ships usually operate in Normal Mode. Power sources consume fuel at the normal rate, and the ship's mechanisms function at full capacity.

**Quiet Mode.** Ship operates at a reduced level sufficient for life support and little else. Sensors are passive only. Ship does not maneuver. Fuel consumption is 10% of standard level. Life support is available for ten times the normal period. Quiet can be elevated to Normal in one combat round.

Power Plant Neutrino Detector Size =4. Fusion Plus=2.

**Long-Term Mode.** The ship operates at a reduced level sufficient to avoid environmental effects. The ship is incapable of most activities, although its mechanisms can be activated by users and elevated to Quiet. Fuel consumption is generally at 1% of standard level. Life support is not available. Long-Term includes the ability to temporarily and automatically increase to Quiet while mechanisms refuel. Long-Term can be raised to Quiet in about a day.

Power Plant Neutrino Detector Size =3. Fusion Plus=1

**Hibernation Mode.** Power Plants can support a ship at extremely low levels of operation. The ship operates at the absolute minimum level possible, shutting down every possible activity, and awakening at fixed intervals to diagnose and repair faults. A ship in Hibernation effectively uses no fuel; extremely long-lived power cells awaken the ship at about 100-year intervals for self-diagnosis and repair. Hibernation can be raised to Long-Term in 10 days.

Power Plant Neutrino Detector Size =2. Fusion Plus=1

**Power Plant** draws from the ship's common fuel resource and will continue to operate until they are empty. If an external fuel source is available, the ship can be directed to shift to Normal Mode, refuel the tons, rods, slugs, and return to the previous Mode. **Collectors** are unaffected by power saving modes. **Decentralized Power** locations within a ship supported by decentralized power may independently operate in Quiet or Long-Term Mode.

Computers, consoles, and brains operate normally in Normal and Quiet Modes. Organic and Semi-Organic Brains cannot survive Long-Term Mode or Hibernation. Fluidic Brains cannot survive Hibernation.

The 600-ton recon frigate *Liberty*, Power Plant-F and Jump Drive-F Potential-4; total fuel tankage is 264 tons, operated during the First Frontier War.

In **Normal Mode**, the ship consumes 24 tons of fuel per month for operations. It can operate for 11 months using its available fuel (but would need to refuel before it could jump out of the system).

In **Quiet Mode**, it consumes 2.4 tons per month and can remain on station up to 110 months (about 9 years).

In **Long-Term Mode**, it consumes 0.24 tons per month and can do so for 1,100 months or about 91 years. As part of the reserve fleet, it is tethered to an ice planetoid. Every 90 years or so, each ship's computer brings the ship to Quiet, then Normal, refills its tanks, and reverts to Long-Term Mode.

In **Hibernation Mode**, the ship is basically turned off and can remain in place without limit. Standby circuits bring the ship awake at 100-year intervals for a brief status check, diagnosis of issues, and repair as needed,

---

## W DRIVE TECH LEVEL AVAILABILITY

Drive	TL=	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
M	Maneuver	-	-	1	3	5	7	9	-	-	-	-	-	-	-	-
G	Gravitic	-	1	4	7	9	-	-	-	-	-	-	-	-	-	-
R	Rocket	1	4	7	9	-	-	-	-	-	-	-	-	-	-	-
H	HEPlAR	-	1	3	5	7	9	-	-	-	-	-	-	-	-	-
N	NAFAL	-	-	1	4	7	9	-	-	-	-	-	-	-	-	-
J	Jump	-	-	1	-	2	3	4	5	6	7	8	9	-	-	-
H	Hop	-	-	-	-	-	-	-	-	-	-	1	2	3	4	5
P	P- Plant	-	1	2	3	4	5	6	7	8	9	-	-	-	-	-
A	Anti-Matter	-	-	-	-	-	-	-	-	-	-	-	-	1	2	3
U	Fission	-	1	2	3	4	5	6	7	8	9	-	-	-	-	-
C	Collector	-	-	-	-	-	-	-	1	2	3	4	5	6	7	8
O	Orion	-	O1	-	-	-	O2	-	-	-	-	-	-	-	-	O3
T	Thruster	-	-	-	1	-	-	-	2	-	-	3	-	4	5	6

Tech Level Availability shows the Drive Potential available for a Standard drive at its Base Tech Level. For example, G-Drive Potential-1 is available at TL-8, and G-Drive Potential 2-3-4 is available at TL-9.

tion, it must be stowed before the ship accelerates.

Easily contaminated by atmosphere; it can be effectively deployed only in vacuum.

**Deploying The Canopy.** A stowed canopy can be deployed in about an hour.

**Collecting.** A deployed canopy charges in about a week. Once charged, it remains so while deployed, and for about a day after being stowed. A canopy accumulates about one tenth charge for each day of deployment.

**Stowing The Canopy.** A deployed canopy must be stowed (takes 10 + Flux hours) before the ship accelerates.

**Canopy Degradation.** A canopy degrades with use and rapidly degrades when abused. A canopy functions normally until it has cycled through 100 charges. Thereafter each charge cycle after 100 lasts an additional day. The 150th charge cycle lasts (7+ (150 -100) =) 57 days.

A deployed canopy subject to acceleration receives the equivalent effect of ten charges. A canopy is capable of charging without regard to proximity of stars or worlds.

## F FUEL STORAGE

Fuel	System	one ton tank
Liquid Hydrogen	Fusion	holds one ton
Anti-Matter	AM	holds 1,000 Slugs
Radioactives	Fission	holds 200 Rods
Particles	Collector	stored in Collector Canopy.
Detonators	Orion	holds 7,000 detonators
Rocket Fuel	Rocket	holds one ton

There is no cost associated with Fuel Storage systems.

## O1 O2 O3 ORION DETONATORS

	TL		each	per ton
Orion 1	O1	8	Fission	Cr 8 Cr56,000
Orion 2	O2	12	Fusion	Cr 1 Cr 7,000
Orion 3	O3	21	AM	Cr12 Cr84,000

Orion has in three stages: Fission, Fusion, and AM.

Feed mechanism stores 7,000 detonators per ton.

One Rod at double cost makes 1,000 Fission detonators.

One Slug at double cost makes 1,000 AM detonators.

## X DRIVE TECH LEVEL STAGE EFFECTS

Stage	TL	Cost	Eff	Fuel	Tons
Exp	Experimental	-3 x10	50%	2.0	x3
Pro	Prototype	-2 x5	80%	1.2	x2
Ear	Early	-1 x2	90%	1.1	x1
Std	Standard	0 x1	100%	1.0	x1
Bas	Basic	0 /2	90%	1.1	x1
Alt	Alternate	0 x1	100%	1.0	x1
Imp	Improved	+1 x1	110%	0.9	x1
Gen	Generic	+1 /2	90%	1.1	x1
Mod	Modified	+2 /2	110%	0.9	/2
Adv	Advanced	+3 x2	120%	0.8	/3
Ult	Ultimate	+4 x3	130%	0.7	/4

TL Stage Effects (Cost, QREBS) apply.

Efficiencies round down (thus Early Jump-1 at 90% becomes Jump-0).

## ORION DETONATORS

Regardless of technology (fusion, fission, or AM), Orion detonators are self-contained exploders with a programmable yield based on the needs of the system (typically 0.2 kilotons; dialable from 0.01 to 1.0). Each is a cylinder 8 cm in diameter and 20 cm long (about 1 liter), and designed for use with an automated feed system. The devices typically have a variety of fail-safe interlocks and codes, remote tracking and identifications, and other non-public protections.

The fuel feed mechanisms for Orion hold about 7,000 detonators per ton (whether fission, fusion, or AM).

**Fission Orion** detonators are small fission bombs activated by a remote signal.

**Fusion Orion** detonators are fusible elements which are externally activated by nuclear damper technology. They are fail-safe outside of the Orion system. A ship may manufacture its own Fusion Detonators in its workshops using available materials; they may be purchased for Cr1 each.

**AM Orion** detonators are a small amount of magnetically-held anti-matter activated by a remote signal.

## FOUR DIFFERENT POWER PLANTS SUPPORT JUMP

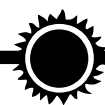
For example, 2000-ton cargo carrier *Ishtar* with Plant-V has Potential-2 and Jump-V capable of Jump-2.

If equipped with a **Fission Plant**, the ship cannot Jump: Fission cannot provide the power required fast enough.

If equipped with a **Fusion Plant**, it requires (2 x2000 /10=) 400 tons of fuel per Jump-2. At Cr500 per ton, Fusion costs about Cr200,000 per Jump-2.

If equipped with an **Anti-Matter Plant**, it requires (2 x2000 /100=) 40 slugs per Jump-2. At Cr6,000 each, Anti-Matter costs about Cr240,000 per Jump-2.

If equipped with a **Collector**, it requires one full Charge. After about 150 Charges (perhaps six years of travelling), the Canopy needs to be replaced at a cost of MCr52.5, which is about Cr350,000 per Jump-2.



**G** Gravitic  
(Near World Drive)  
internally self-fuelled;  
no fuel required)

		<b>Power Plant</b>	<b>Fission Plant</b>	<b>Anti-Matter</b>	<b>Collector</b>		
	<b>Fuel</b>	<b>in Tons</b>	<b>in Rods</b>	<b>in Slugs</b>	<b>in Charges</b>		
<b>M</b>	Maneuver	included in Operations	not possible	included in Operations	not possible	gravity-based interplanetary drive.	<b>M</b>
<b>R</b>	Rocket	uses Rocket Fuel	uses Rocket Fuel	not possible	not possible	thrust-based interplanetary drive.	<b>R</b>
<b>H</b>	HEPlaR	1 Burn= P x H / 100	1 Burn= P x H / 100	not possible	not possible	improved thrust-based interplanetary drive.	<b>H</b>
<b>J</b>	Jump					interstellar drive. fuel in addition to Operations.	<b>J</b>
<b>H</b>	Hop	Tons= P x H / 10	not possible	Slugs= P x H / 100	one full charge	interstellar drive. fuel in addition to Operations.	<b>H</b>
<b>S</b>	Skip					interstellar drive. fuel in addition to Operations.	<b>S</b>
<b>N</b>	NAFAL	Tons= P x H / 100 for 1 month	included in Operations*	included in Operations*	not possible	sublight interstellar drive. *If NAFAL in use, fuel use x2.	<b>N</b>
<b>Y</b>	Operations	Tons= P x H / 100 for 1 month**	Rods= P x H / 100 for 10 years**	Slugs= P x H / 100 for 1 year**	not possible	general energy requirements for life support and activity.	<b>Y</b>

\*\* Decentralized power; if centralized, fuel use x2. P= Drive Potential. H= Hull Tonnage.

### F FUEL COSTS AND FITTINGS

Item	Cost	TL	Comment	
Raw Fuel (Gas)	*	0	Gas= Skimmed from gas giants.	Hydrogen
Raw Fuel (Water)	*	0	Water= Pumped from oceans or lakes.	
Raw Fuel (Ice)	*	0	Ice= Gathered from ice caps, asteroids.	
Raw Fuel (Gas) Cr100/ ton		2	at Starport ABCD (also usable as Rocket Fuel- Liquid Hydrogen/ Oxygen).	
Refined Fuel (Gas)Cr500/ ton		3	at Starport AB (also usable as Rocket Fuel- Liquid Hydrogen/ Oxygen)	Power Plant
O2 Fusion Detonator Cr1		12	at Starport ABCD. Approximately Cr7,000 per ton. Store 7,000 per ton.	
S Fuel Scoop KCr100 1 ton		8	Intakes 100 tons of gas / hour. Intakes gas into fuel tanks.	
N Fuel Intake KCr100 1 ton		8	Intakes 40 tons of water/ hour. Sucks liquid (hull ports / hoses).	U
B Fuel Bin KCr100 1 ton		8	Intakes 20 tons of ice/ hour. Accepts ice solids.	
P +Fuel Purifier MCr1 1 ton		8	Converts raw fuel to refined fuel at the rate of the intake.	
X Transfer Pump MCr1 1 ton		10	Transfers 100 tons of Drop Tank fuel to P-Plant in seconds.	
U Fuel Rod KCr400 /set		8	at Starports AB TL 8+. Set= 10 Rods. Store up to 200 Rods per ton.	C
O1 Fission Detonator KCr80 /set		8	at Starports AB TL 8+. Set= 1,000 Detonators. Store up to 7,000 per ton.	
C Canopy =half Collector cost		14	at Starports AB TL 14+. Replaces old Collector Canopy.	AM
A AM Fuel Slugs KCr60/ set		18	at Starports AB TL 18+. Set= 10 Slugs. Store up to 1,000 Slugs per ton.	
O3 AM Detonator KCr12/ set		18	at Starports AB TL 18+. Set= 1,000 Detonators. Store up to 7,000 per ton.	

### AM SLUG PRODUCTION

AM Plants are intrinsically capable of operation "in reverse" to produce AM Slugs.

Supported by energy from a Fusion Power Plant of equal potential, an AM Plant in Production Mode can produce 1 AM slug per 100 EP per day.



Hydrogen Radioactives Anti-Matter

### HIGHER ORDER JUMP FUEL

The higher order jump drives (Hop, Skip, Leap, Vault, Bound, Six, Seven, Eight, and Nine) consume fuel at the same rate as Jump.



**TARGETTING**

Description	Compartment
Center Of Ship	Hit Location Zero.
Hot Spot	a Power System or Drive.
Active Sensor	an Active Sensor.
Specific Sensor	a Specific Type Active Sensor
Active Weapon	a Firing Weapon.
Specific Weapon	a Specific Type Firing Weapon
Bridge	the Bridge.

**COMPARTMENTS**

Hit Location  
Compartment

+4	
1	
2	
3	
4	
5	
6	

Sub  
Compartment  
(1 of 6)

An attack against a non-existent Compartment has no effect and is ignored.

**S SCALE**

Space Combat is based on variable distances in Space Range Bands, variable time in Rounds, and approximate Size for Ships.

**Distance Scale**

Ranges in Space are tracked using Space Range Bands. Each Band is numbered and corresponds to a specific physical distance.

The battle can range across an entire star system, but most combat is restricted to S=9 or less, or a total distance of about 5 million km (

**Time Scale**

Combat is in Rounds approximately 20 minutes long.

**Unit Scale**

The participants in the battle are individual starships and spacecraft (with a maximum about 2400 tons), plus small craft between 10 and 100 tons, and missiles between a fraction of a ton and more than 100 tons.

Most ships are classified as Size-7; most small craft are Size-6, and missiles range

7.50 (8.00)

SMALL SHIP COMBAT CARD						QSP:		Mission	Hull	Config	Gs	Jump	for small craft and ships to 700 tons
Ship Name and Data													
LOC	Coating	1	2	3	Tons	+4	+3	+2	+1	HP Wpn			
-6						1	1	1	1	0	12		
-5						2	2	2	2		10		
-4						3	3	3	3		8		
-3						4	4	4	4		6		
-2						5	5	5	5		4		
-1						6	6	6	6		2		
0										1			
+1						-4	-3	-2	-1	3			
+2						1	1	1	1	5			
+3						2	2	2	2	7			
+4						3	3	3	3	9			
+5						4	4	4	4	11			
						5	5	5	5				
						6	6	6	6				

Small Ship Combat Card

T5-018

# How Space Combat Works

Conflicts in space, between starships and spacecraft, is resolved using the Traveller Space Combat System.

Space Combat resolves conflict between the full range of spacecraft, starships, and small craft based on the weapons and defenses used, the decisions of the commanders involved, and some measure of chance. Combat is based on variable scales which give the feel of authenticity without slavish adherence to exact formulas. Distance is a coarse set of approximate ranges. Time is a coarse measure of passing time. Size is an approximation of the relative size of objects and targets.

Finally, the Space Combat assumes that many attacks and many shots are taking place, but a significant portion of them go wild and come to nothing: the misses are unimportant; the hits are what count. The system also assumes that there are lulls in the action which characters wait or think or catch their breath. Space combat accomplishes all of these realistic elements without burdening the players with arbitrary or constraining rules.

The Traveller Space Combat System resolves conflict between Adventure Class Ships: starships created using the ACS Design System.

**Adventure Class Ships ACS** range in size from 100 tons to 2400 tons and operate singly or in small units (squadrons) of several ships each. The mix of available ships includes both starships and spacecraft, and both ships and small craft.

**Battle Class Ships BCS** are larger than 2400 tons and are created using the BCS Design System. BCS ships operate in fleets and squadrons and include some small ships only where necessary.

## THE ELEMENTS OF A FIGHT

Space Combat includes the following elements:

### The Situation

The situation is an encounter. Both sides have goals and the situation already dictates that violence will be used to resolve the conflict; the time for negotiation is past. The encounter is defined by:

**The Participants.** Participants are players and non-player characters. Players are the crew of ships; their opposition consists of non-player characters controlled by the referee.

**The Ships Themselves.** The specific ships are pre-defined starships or spacecraft created using the ACS Adventure Class Ship design system. Each ship requires a ShipSheet with the data required for resolving combat.

---

## HOW SPACE COMBAT WORKS

An Attack has four steps: Hit, Defenses, Penetration, and Damage.

---

### TO HIT

The Attacker attempts the Space Combat Task using a specific Weapon against a Target which may have Armor and Defenses. Failure of the task stops the attack.

Success produces a Hit.

To Hit

---

### DEFENSES

An Attack may be deflected by specific defenses: AB, AM, or Tailored.

**AB Anti-Beam.** A Beam Attack may be deflected by AB Anti-Beam Defenses. For each AB Defense not committed to an Attack, Defender rolls AB Defense; success stops the Attack.

**AM Anti-Missile.** A Missile Attack may be deflected by AM Anti-Missile Defenses. For each AM Defense not committed to an Attack, Defender rolls AM Defense; success stops the Attack.

**Tailored.** Specific Attacks may be stopped by tailored Defenses on a case-by-case basis.

Defenses

---

### PENETRATION

For each Hit, Attacker selects a Target Compartment and applies Flux to determine actual Hit Compartment (if empty, the Attack ends).

Attacker applies the Weapon Hits in D against the Hit Compartment's Armor and Protection.

**Against Armor,** Hits reduce the AV Armor Value and, if AV is reduced to zero, they Penetrate.

**Against Protections,** Hits are compared to AV Armor Value and (if AV is exceeded, they Penetrate).

Failure to Penetrate stops the Attack.

Penetration

---

### DAMAGE

Successful Attack and Penetration damages (at least temporarily) one Subcompartment within a Compartment. Roll 1D to determine which is affected; mark that Subcompartment as Damaged.

**Injuries.** If the Subcompartment contains personnel, they are potentially killed.

Immediate Action may eliminate the Damage.

Medical Attention may save lives of personnel.

Damage

---

**After The Battle:** When the battle is over, ships recover through damage control and repairs. A Compartment with any remaining undamaged SubCompartments may be repaired.

---



**The Location.** The situation defines the place where the battle will occur: usually a star system and its worlds as they apply to the encounter. Location also defines local bases and local forces which may participate or interfere in the battle.

### **The Search**

Starships are constantly searching with their sensors for possible threats of dangers. This search is routine and always in process. When the search sensors register unknown ships (or known hostile ships) the search converts to a potential battle.

### **The Battle**

The ships attack, defend, move, and otherwise act to resolve the encounter in a series of Rounds.

In a Round, every ship has the opportunity to attack other ships, to defend against their attacks, and to move.

The Rounds continue until one side is defeated or has fled the battlefield.

### **The Aftermath**

Once the fight is over, participants resolve the consequences of their actions: gathering the dead, helping the wounded, occupying the territory they have won, or fleeing

### **MOVEMENT**

Ships may change Range at the end of each Combat Round using the Range Change table. Movement includes Range Changes, Ramming, Boarding, Lurching, and Docking.

### **A VEHICLE FOR ROLE-PLAYING**

The ACS Space Combat System is intended as a detailed process in support of role-playing. Individual characters can, and should, be assigned specific responsibilities aboard a ship and participate in making decisions and taking the actions necessary to implement them.

---

## **B BATTERIES**

Any group or set of the same Weapon may be formed into a Battery: all mounts fire together in one attack (or Defense).

**TL:** The attack uses the lowest TL of the group.

**Mods:** The group totals its Mods.

**Hits:** The group totals its Hits.

---

### **Virtual Batteries**

Ships each with CommCasters within Range of each other and with a common Range to a Target can create temporary Virtual Batteries with their Weapons subject to a one-Round delay: designation in the current Round for execution in the next Round.

---

# TO HIT

The Attacker attempts the Space Combat Task using a specific Weapon against a Target which may have Armor and Defenses. Failure of the task stops the attack.

Success produces a Hit.

## THE SPACE WEAPON TASK

Die Roll  $nD < \boxed{\text{TL}} + \boxed{\text{C+S}} + \boxed{\text{S-R}} + \boxed{\text{Mods}}$

=Range TL C+S S-R Mods

If <1 Wpn TL C4, C5 Skill Size - Range +Active

If TL < Range, +1D. If <0 no result.

Target Number equals TL + C+S + S-R + Mods.

**TL.** The Tech Level of the Weapon.

**C+S.** The Characteristic plus Skill of the Weapon operator. If C+S is less than Weapon TL, the operator may depend on the device and its console and use Console TL instead. A Gunner with C+S greater than device TL has greater chance of success by applying C+S instead of TL.

**S-R.** The Size of the Target minus Range S= to the Target + Active Sensor Mod. If this value is less than zero, Task automatically fails.

### Mods:

**Active Sensor Mod.** The Sensor Task assumes Passive Mode. If the Attacker is supporting the weapon with sn Active Sensor add Mod = Sensor Range S= (task is more likely to succeed).

**Target Active Mod.** If the Target is firing weapons, operating defenses, operating drives, or operating an Active Sensor of the same principle, add Mod = Sensor Range S= (task is more likely to succeed).

**Stealth Mask Mod.** Stealth Mask is a Mod on an opponent's Active Sensor Task equal to Range S=. The Standard Attack Range S=7 Stealth Mask is Mod+7 on an opponent Active Sensor Task.

**Lying Doggo.** If a target ship is in Quiet Mode (systems powered down), subtract Mod = Attacker Sensor Range S= (task is more likely to fail).

**Weapon Mount Mod.** The Mount provides a Mod on the Weapon Task. The default Surface Mount is Mod+0. The 50-ton Bay Mount is Mod+5 (task is more likely to succeed).

**Space Range Effects.** It is possible to construct a Weapon with less Range (and because S= decreases, its Mod decreases), or greater Range (and because as S= increases, its Mod increases).

**TL Stage Effect Mod.** Building a Weapon at an earlier TL imposes a negative Mod equal to the difference from Standard TL (an Early version operates at one Lower TL and experiences Mod minus 1). Building a Weapon at a later TL (except Generic) imposes a positive Mod equal to the difference from Standard TL (an Advanced version operates at three TLs higher and experiences Mod +3).

# DEFENSES

An Attack may be deflected by specific defenses: AB, AM, or Tailored.

**AB Anti-Beam.** A Beam Attack may be deflected by AB Anti-Beam Defenses. For each AB Defense not committed to an Attack, Defender rolls AB Defense; success stops the Attack.

**AM Anti-Missile.** A Missile Attack may be deflected by AM Anti-Missile Defenses. For each AM Defense not committed to an Attack, Defender rolls AM Defense; success stops the Attack.

**Tailored.** Specific Attacks may be stopped by tailored Defenses on a case-by-case basis.

An Anti-Beam or Anti-Missile Weapon committed to Defense cannot fire in Attack, but may fire once at each independent Attack.

## Anti-Beam Weapons (Sandcasters)

If a Beam Weapon succeeds at the Space Weapon Task, anti-Beam weapons (Sandcasters) may fire in an attempt to deflect it.

## Anti-Missile Weapons (Beams)

If a Missile Weapon succeeds at the Space Weapon Task, anti-Missile weapons (Beams) may fire in an attempt to deflect it.

Note the total Mods for a specific weapon and add Attacker Weapon TL minus Defender Anti-TL.

Check Mods (1D)

Roll that value or less (1D) to stop the attack

An Anti-weapon cannot be used in an attack during the Combat Round. It may fire to deflect every eligible attack that is made during the Round.

## Tailored and Absolute Defenses

There are tailored Defenses which are effective against can be used against specific attacks as shown in the Weapons Vs. Defenses table.

There are absolute Defenses which, when operating, prohibit a successful attack.

An operating **Meson Screen** prohibits a Meson Gun attack within its volume.

An operating **Nuclear Damper** prohibits a Nuclear explosion within its volume.

An operating **Proton Screen** detonates an Anti-Matter missile at the edge of its volume.

# AB AM ANTI-FIRE AB AM CHECK

## Check Anti Defense Mod (1D)

Note the total Mods for a specific weapon and add Attacker Weapon TL minus Defender Anti-Beam TL. Success deflects the attack A mount which fires Anti-Fire cannot attack in the Combat Round. A mount may fire individually at all incoming attacks of the proper type.

---

## PENETRATION

For each Hit, Attacker selects a Target Compartment and applies Flux to determine actual Hit Compartment (if empty, the Attack ends).

Attacker applies the Weapon Hits in D against the Hit Compartment's Armor and Protection.

**Against Armor**, Hits reduce the AV Armor Value and, if AV is reduced to zero, they Penetrate.

**Against Protections**, Hits are compared to AV Armor Value and (if AV is exceeded, they Penetrate).

Failure to Penetrate stops the Attack.

---

A Successful Attack must still penetrate Armor before it may inflict damage.

Note the applicable weapon capabilities, armor, and protections and resolve the necessary interactions.

Various Armor Values are increased against specific Attacks. After the various calculations, round the result down to the nearest whole number. AV-11 is x100 against Heat (which includes Beams, Lasers). A Laser attack inflicting 5D= 30 Hits reduces AV-11 from 1100 to 1070; round down

Armor Values reduced by a Hit are reduced permanently until repaired.

Protections which are overcome remain in force in future Rounds.

---

## DAMAGE

Successful Attack and Penetration damages (at least temporarily) one Subcompartment within a Compartment. Roll 1D to determine which is affected; mark that Subcompartment as Damaged.

**Injuries**. If the Subcompartment contains personnel, they are potentially killed.

Immediate Action may eliminate the Damage.

Medical Attention may save lives of personnel.

---

**Anti-Matter**. Damage to an Anti-Matter Power Plant or Weapon is resolved instantly as a Massive Explosion..

**Massive Explosions** inflict a large quantity of damage in one process.

Massive Explosions may occur without actually contacting the target (and thus reducing their potential damage).

When a Massive Explosion is called for, determine the range at which it occurs, and roll Flux for the Hit Location.

---

## AFTER THE BATTLE

When the battle is over, ships recover through damage control and repairs. A Compartment with any remaining undamaged SubCompartments may be repaired (a Compartment in which all SubCompartments are damaged cannot be repaired)..

---

After the Battle ends, determine the actual damage that a ship receives:

For each Subcompartment, roll and note Damage Severity and Diagnosis Severity; apply DM+1 for each time the SubCompartment was hit.

Ignore damage analysis if it is unimportant to the course of play.

---

### S DAMAGE SEVERITY

1D	Difficulty
1	Easy 1D
2	Average 2D
3	Difficult 3D
4	Formidable 4D
5	Staggering 5D
6	Hopeless 6D
7	Impossible 7D
8	Beyond 8 D
9	Destroyed

---

### D DIAGNOSIS SEVERITY

1D	Difficulty
1	Easy 1D
2	Average 2D
3	Difficult 3D
4	Formidable 4D
5	Staggering 5D
6	Hopeless 6D
7	Impossible 7D
8	Beyond 8 D
9	Destroyed

---

### IA IMMEDIATE ACTION DAMAGE CONTROL

#### Check Double Skill (2D)

Use any appropriate skill. Success converts the damage to Severity= Easy 1D and the component remains operable.

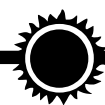
---

### FA FIRST AID DAMAGE CONTROL

#### Check Double Medical (2D)

For an injury, the victim (if still conscious) or a comrade may devote one Round to Check Double Medical (2D).

Success reduces an injury or wound to 1D and returns the individual to service.



Weapons vs Defenses			FI	AB	AM	Defense		Armor		
	TL	Description				Globe	Scr	Coat	Anti	Armor
Exotic	FR	T 14	Jump Damper	Y		TUVW	QE			
		U 16	Tractor/Pressor	Y		TUVW	QE	Q		
		H 17	Inducer	Y		TUVW				
		Z								
		W 18	Disintegrator	Y		TUVW				
E 21	Stasis	Y		TUVW	J					
Missiles	FR	B 9	Slug Thrower	Y	JKLPF	TUVW				
		V 10	Salvo Rack	Y	JKLPF	TUVW				
		Q 12	Ortillery	Y	JKLPF	TUVW				
	AR	M 7	Missile	Y	JKLPF	TUVW				
		N 10	KK Missile		JKLPF	TUVW				
X 20	AM Missile	Y	JKLPF	TUVW	X					
L	R 12	Rail Gun	Y	JKLPF	TUVW					
Specialized	FR	S	Slug	Y					K	ASPOFC
		D	Deadfall	Y					B	ASPOFC
		X	Explosive	Y					BF	ASPOFC
		E	EMP						E	
		N	Nuclear	Y					BER	ASPOFC
		A	Anti-Matter	Y						ASPOFC
		K	Kinetic						K	ASPOFC
		Y	Decoy	Y						
		Z	Sensor	Y						
Specialized	AR	C 8	CommCaster							
		Y 10	Hybrid S-L-M		JKLPF	TUVW				
	FR	G 13	Meson Gun				TUVW	G		
		A 11	Particle Accel	Y			TUVW		R	
		D 10	DataCaster				TUVW			
S 9	SandCaster				TUVW					
Beams	FR	J 8	Mining Laser		S	TUVW		NP		ASPOFC
		K 9	Pulse Laser		S	TUVW		NP		ASPOFC
		L 10	Beam Laser		S	TUVW		NP		ASPOFC
		P 11	Plasma Gun		S	TUVW		NP		ASPOFC
		F 12	Fusion Gun		S	TUVW		NP		ASPOFC

When there's a chance for confusion between weapon codes and defense codes, differentiate the components by name. Thus, Railgun Slug is distinct from Sandcaster and Armor Shell, even though they all share the code "S".

For any attacking weapon, it must successfully pass through (as applicable) AB, AM, Defenses, Coatings, Armor, and Anti-Layers before it can inflict damage,

**FI. Fighter Interference.**  
A Fighter (or any Small Craft) clustered with a Ship may interfere with an attack (marked Y in the FI column).

Armor	Armor						Coat			Anti-Layer			
	A	S	P		F	C	N	P	Q	B	E	K	R
	Plate	Shell	Poly	Orgn	FeN	Charg	Ablat	Reflec	Slick	Blast	EMP	Kinetic	Rad
AV	=TL	/ 2	/ 2	/ 2	= 20	x 2	=0	=0	=0	=TL	=TL	=TL	=TL
BF	x 10	x 5	x 5	x 5	= 200	x20				x10			
Pen	x 10	x 5	x 5	x 5	= 200	x20						x100	
EMP	x 10	x 5	x 5	x 5	= 200	x20			x100		x10		
Rad	x 10	x 5	x 5	x 5	= 200	x20			v Trac				x100
Heat	x100	x50	/ 2	/ 2	= 2000	x20			x100				
Pres	x 10	x 5	x 5	/ 2	= 200	x20			x100				

Multiply or divide versus base TL (not necessarily AV). Heat includes Beam Weapons.

**ME MASSIVE EXPLOSION (Missile Warhead)**

R=	Proximity	Blast	BFE*	Rad	Burn	* BFE= Bang, Flash, EMP (EMP only with Nukes). Bang=0 if in space. Non-Nuke ignore EMP and Rad. ME Possible with Siz= 4-5-6-7
5-	0	Direct Hit	Vaporized=	100D		
6	1	Hit	90 D	20 D	10 D	30 D
7	2	Hit	40 D	15 D	10 D	20 D
8	3	Vnear Miss	30 D	10 D	10 D	10 D
9	4	Near Miss	10 D	5 D	5 D	5 D
10	5	Far Miss	5 D	1D	1D	1D
11	6	Miss				

**AB AM ANTI-FIRE AB AM CHECK**

**Check Anti Defense Mod (1D)**

Note the total Mods for a specific weapon and add Attacker Weapon TL minus Defender Anti-Beam TL. Success deflects the attack A mount which fires Anti-Fire cannot attack in the Combat Round. A mount may fire individually at all incoming attacks of the proper type.

MISSILE TYPES AND EFFECTS			Effects (in D)									
Sz	Missile	Type	SDXENAKYZ	Slug	Deadfall	Explosive	EMP	Nuke	AM	Kinetic	Decoy	Sensor
1	Missile-1	Bullet	S	Pen= 0								
2	Missile-2	Slug	S X	Z Pen= 1		Pen= 2						
3	Missile-3	Vsmall Msl	S X	Z Pen= 2		Pen= 3	EMP= 3					
4	Missile-4	Small Msl	XE A YZ			Pen= 4	EMP= 4		ME x3			
5	Missile-5	Missile	DXEN	YZ	ME /10	Pen= 5	EMP= 5	ME				
6	Missile-6	Small Craft	DX	KYZ	ME /5	ME /5				Pen= 6xSp^2		
7	Missile-7	Ship	DXE	YZ	ME /3	ME /3				Pen= 7xSp^2		

Hits inflicted are in D. For example, Pen-1 inflicts 1D Hits Kinetic = Sp = Speed = Space Range of Attack.  
ME= Massive Explosion. Missile-6K is a G-Drive powered Small Craft. Missile-7K is an M-Drive powered Ship.  
**Sensor:** Carries one Sensor with R= Size, or two Sensors with R=Size minus-1, or three Sensors with R=Size-2.  
**Deadfall:** Target must be on World Surface.  
**Kinetic:** Speed= S= from Launch point.

### BRIEF COMBAT SYNOPSIS

An Attack is based on **Weapon TL**, C+S and Target Size. Range S= Dice Rolled.  
A Missile Attack is based on Missile capabilities SDXENAKYZ and is resolved in the Round it Hits (not necessarily the Round of Launch).  
Defensive Fire (AB AM) is based on **Mount Mods**. Check 1D.  
Penetration is Based on **Mount Hits**. Roll Dice= Hits and apply against Armor and Protection.  
Damage is automatic after Penetration and Disables one SubCompartment and Incapacitates all personnel in the SubCompartment.  
Immediate Action (assuming Damage Control Personnel) can un-Disable a Disabled SubCompartment. Roll per Combat Round. First Aid can un-Incapacitate a crew member. Roll per Combat Round.  
Massive Explosions from Missiles occurs outside of Armor and must Penetrate Armor and Protection.  
Massive Explosion from Anti-Matter on-board a ship occurs inside Armor and Protections: it completely destroys a full Compartment.  
EMP which Penetrates disables all Computers and Consoles for one Combat Round.

Adv Vd (FR) T1 Pulse Laser-12 (12) Mod +1 1 ton MCr0.8 S=2 Hits=1D  
**Attack.** This weapon will Attack a target at S=2 with 2D < (TL 12 +C+S=12 +Size-7 -2=5) = 27 which is automatic.

Std Fo (SR-) T4 SandCaster-11 (11) Mod +1 12 ton MCr7.6 S=4  
**Defenses.** The Target has a SandCaster which it could fire in defense: Check (1D) (Mod+1 + TL11 - TL-12= -1)= 0 but it would have no effect.

**Penetration.** The Target has a standard Plate Armor Hull at TL-11. The Attacker rolls Flux for the Hit Location: =0 which is the center of the Ship. Armor Value AV= TL=11. The Pulse Laser inflicts Hits= Mount Hits= 1D=6. Armor at that location is reduced to 5.

Bas FR T3 Missile-5 (5) Mod +0 0.99 ton MCr1.33 S=2  
Std Explosive Missile-Size-4 UG (=0) Pen=4

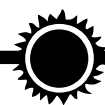
Attacker now fires his Missiles from S=2. They launch and because it will attempt to Hit this Round, the Space Weapon Task is resolved: Launched from S=2 so the task uses 2D< (TL-5+ C+S=12 +Size-7 -2=5)= 24 which is automatic.

Std Fo (SR-) B1 Pulse Laser-11 (11) Mod +2 15 ton MCr15.3 S=4 Hits=5D

**Defenses.** The Target has a Pulse Laser which it could fire in defense. Check (1D) (Mod-0 + TL-11 - TL-12= -1)= 0, but it would have no effect.

**Penetration.** The Target has a standard Plate Armor Hull at TL-11. The Attacker rolls Flux for the Hit Location = +1 near the center of the ship. Armor Value AV=11 (as yet undamaged at this location). The Missile explodes at the Armor surface. A Size-4 Missile with Explosive inflicts Pen-4 (=4D= 3-4-5-6) = 17 Hits. Plate Armor is x10 versus Pen (=110) and is reduced to 93 (record as 9, round down).

In response, the Target now turns the tables and attacks with its Pulse Laser: At range S=2, the Space Weapons Task is automatic, and the Target has no defenses. The new Target has Plate Armor at TL-12. The new Attacker rolls Flux for hit Location = -1 near the ship center. Armor AV=12 (x100 against Burn, Beam, and Laser). The Pulse Laser inflicts Hits= Mount Hits= 5D=1 2 3 4 5= 15. Armor at that location is reduced to 1200 -15= 1185 (reduced to 11, round down).



Ships can change Range Bands in the course of combat. Minor changes for advantage take place at the end of the Combat Round.

**Jump.** A ship can escape a battle by Jumping (assuming it has Fuel and is beyond the 100 D Limit) in the Movement Phase..

**Agility** is Power Plant Potential minus Current used Gs, or Maximum Gs minus Current used Gs. In the event of Conflict, a ship with greater Agility moves last.

RANGE CHANGE	
No DS Range Band changes.	
LR to DS = (30 - G) Rounds	
AR to LR or LR to AR = (20 - G) Rounds	
SR to AR or AR to SR = (10 - G) Rounds	
G= Current Acceleration in G's.	

**Movement Sequence**

Ships move in a decending sequence based on tonnage (larger ships move before smaller ships). Ships which are Clustered may move together.

**Ramming.** After all Range Changes, a ship or craft at Boarding Range may Ram. A ship at Boarding Range with an enemy ship may declare Ramming. The target may Check Double Skill Pilot to avoid the collision. Each receives Hits equal to opponent's Compartments Squared at Location=Flux

**Boarding.** After all Range Changes, a ship or craft at Boarding Range may declare Boarding.

**Launching and Docking.** After all Range Changes, Ramming, and Boarding, any ship or craft which is Docked may Launch. Any ship or craft at Boarding Range may Dock. Ships and Craft may not Dock and Launch in the same Round.

## 2 Space Ranges

Distance	S=	Descriptor	Name	Stellar**	World***	Band	Light-	O=	R=		
1,500 mn km	13	Outer System		1000 D			83 lm	7	18		
500 mn km	12	Siege	Deep Space	100 D		DS	No Range Band changes.	30 lm	5	17	
150 mn km	11							8 lm	3	16	
50 mn km	10							3 lm	0	15	
5 mn km	9	Long Range	Long Range	10 D 1 D	1000 D	LR	= (30 - G) Rounds	16 ls	14	14	
2.5 mn km	8							8 ls	13	13	
500,000 km	7	Missile	Attack Range		100 D	AR	= (20 - G) Rounds	2 ls	12	12	
250,000 km	6							SR to AR / AR to SR = (10 - G) Rounds	1 ls	11	11
50,000 km	5								10 D	10	10
5,000 km	4	Far Orbit	Short Range		1D	SR			9	9	
500 km	3							Orbit		8	8
50 km	2	Fighter	Fighter Range			FR	B-1-2-3-4-5 = one Range Band per Combat Round.		7	7	
5 km	1							Close Fighter		6	6
1000 m	B	Boarding	Boarding			B		5	5	5	
0	0	Surface	Contact					0	0	0	

\*\* Assumes Spectral G star. \*\*\* Assumes typical World Size= 3 +. \* G= Current Acceleration in G's. Jump not possible within 100D. Maneuver M-Drive not possible outside 1000D. Gravitic G-Drive not possible outside 10D.

**CLUSTERING**

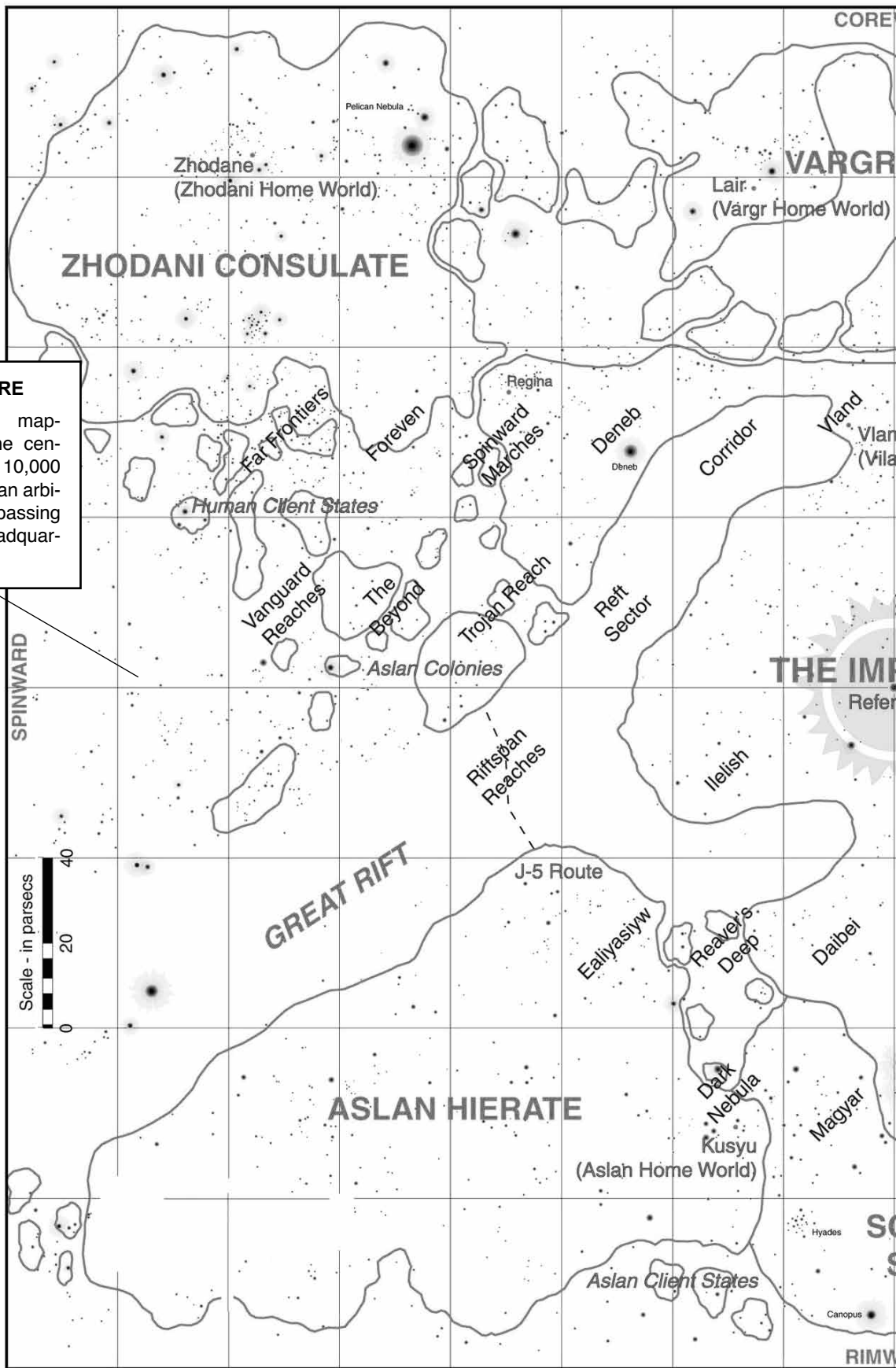
S=2	S=1	Ship S=0	S=1	S=2
One Ship Small Craft	One Ship Small Craft	Itself One Ship Small Craft	One Ship Small Craft	One Ship Small Craft

Ships may Cluster for protection. A Ship may use its Defenses to shelter other nearby ships and small craft from Attacks. All small craft within Range of a Defense can be sheltered. Depending on the Range of a Defense, one additional ship at S=0, and two Ships each at S=1 and S=2 can be sheltered.

There is no safe space for more than two ships to be within Boarding Range of Each Other.

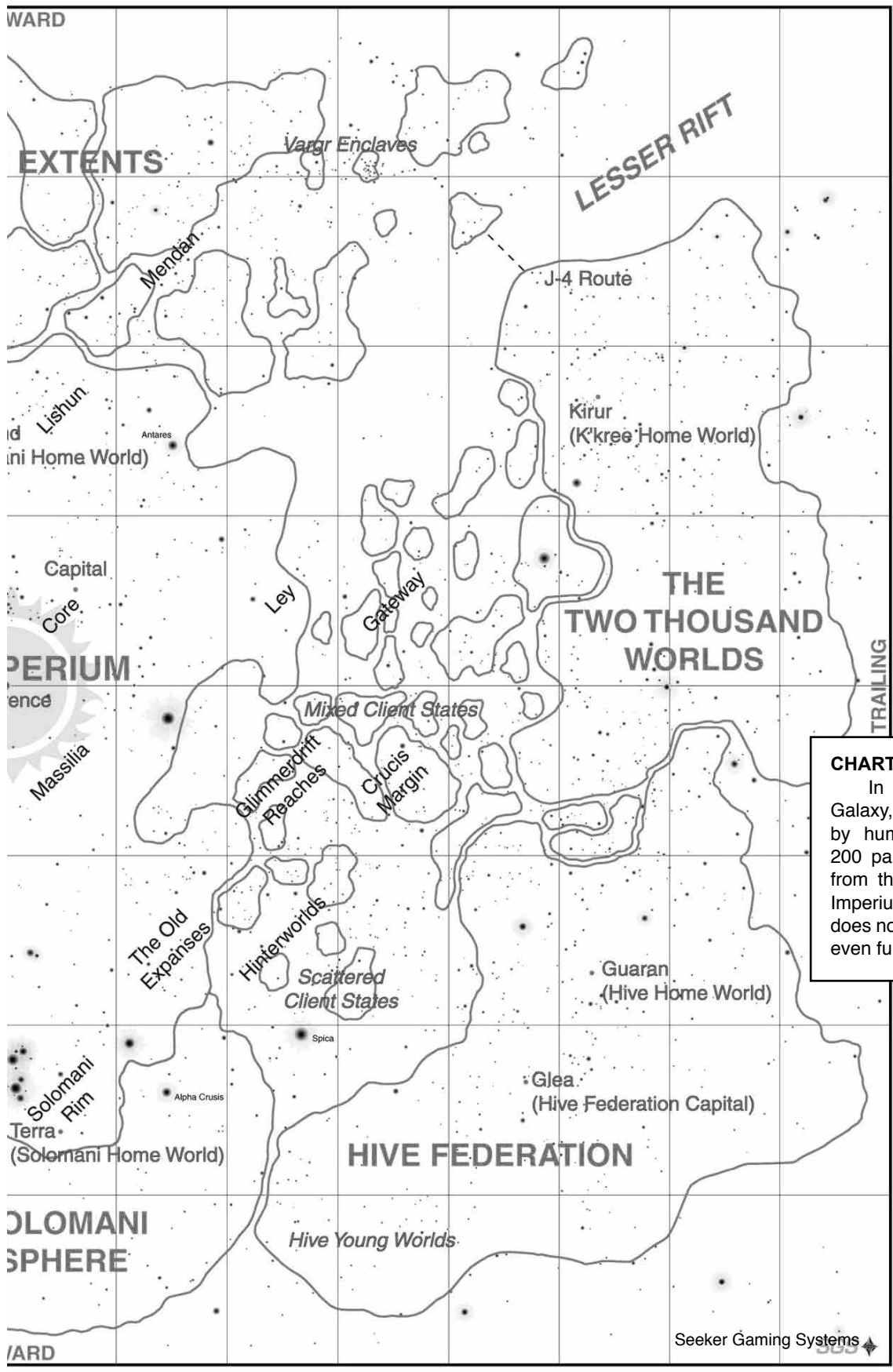
**Fighter Interference.** Any Small Craft Clustered with a Ship may elect to Interfere with an Attack (as marked for Fighter Interference on the Weapons vs Defenses table) by using its installed Defense in AM AB Anti-Fire. Against non-Missile, non-Beam weapons (marked Y on the table; it may juxtapose itself in the line of fire (and is potentially destroyed). Fighter interference is limited to one small craft per Attack.

**Ship Interference.** Any Ship Clustered with a Ship may interfere with the attack. It substitutes itself for the Target .



**THE GALACTIC CORE**

Under Imperial mapping conventions, the center of the Galaxy is 10,000 parsecs coreward of an arbitrary circumference passing through the IISS Headquarters on Reference.



**CHARTED SPACE**  
 In the vastness of the Galaxy, the region explored by humanity extends some 200 parsecs in all directions from the center of the Third Imperium. Explored, however, does not mean understood, or even fully mapped.



# Charting The Stars

The vastness of Charted Space (and beyond) is mapped in a series of Sectors, Subsectors, and Star Systems.

Interstellar mapping charts the locations of stars and their systems on planes of hexagons called sectors and subsectors. Each hex represents a parsec and may be a stellar hex containing a star system, or an empty deep space hex.

## SECTORS

The standard large-scale interstellar mapping convention is the Sector: a flat map divided into 1280 locations. These locations are structured as 32 columns of 40 hexes; alternating columns are slightly depressed as required by the hexagon structure.

**Location Numbering.** The coordinate system for hexes on maps refers to columns and rows. The first two digits of the Hex Location is the column number (on sector maps = 01 through 32). The second two digits is the row number (on sector maps = 01 through 40). Blanks to the left are padded with zeros.

The hex in the upper left corner of a sector is location 0101 (column 01, row 01); the hex in the lower right corner is 3240 (column 32; row 40).

Each hex is approximately one parsec in diameter, and may contain a star system (even a complex system of several stars). Other hexes contain only a few (often unidentified) dim rogue stars or worlds, or nothing at all.

## SUBSECTORS

A Sector is divided into sixteen smaller Subsectors, each containing 80 locations: 8 columns of 10 rows of hexes. Subsector location numbers are identical to sector location numbers (the upper left hex of Subsector A is 0101; the lower right hex of subsector A is 0810).

Subsectors are useful because they easily fit on one page, and provide information about many worlds within a reasonable distance.

**The Blank Maps.** Blank Sector and Subsector Maps are provided for the mapping of existing territories, or for the exploration of new territories.

## THE STELLAR HEX

The basic unit of interstellar mapping is the **Stellar Hex**: a mapping hexagon about one parsec in diameter. Hexagons are used because they regularize and simplify movement. They allow simple counting of distance in six directions (as opposed to four with square grids).

### Basic Stellar Hex Information

Each Stellar Hex provides some measure of information about its contents (although the total information available varies). For unexplored regions, the hex may provide no information, even though the actual location may have a star system. For well-mapped areas, the Stellar Hex may provide a wealth of information.

**Hex Location.** The location coordinates are provided.

**World.** A World Symbol shows that a world (otherwise undefined or undescribed) is present. This symbol may be an Asteroid symbol, showing that the single most important world in the system is Size=0.

**Gas Giant.** A Gas Giant symbol shows the presence or absence of a giant world with hydrogen atmosphere suitable for wilderness refueling.

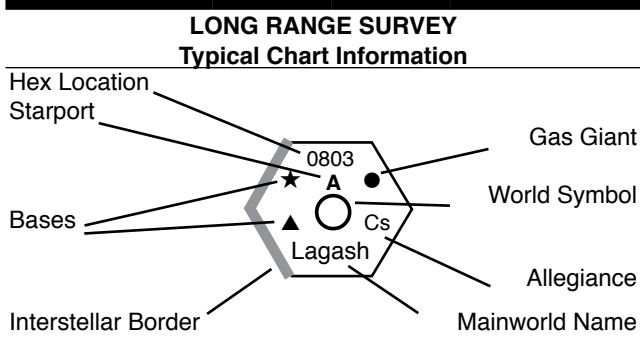
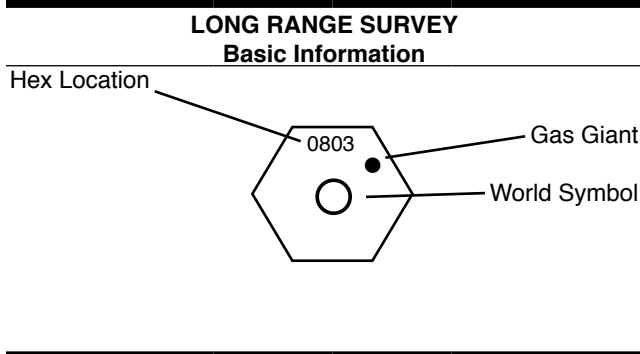
**Starport Type** shows expected system facilities.

**Bases** shows military, naval, or scout bases.

**World Name** provides the name of the Mainworld.

## THE CLASSIC SYSTEM CONTENTS TABLE

When creating a subsector or sector map, stellar hexes can be randomly generated. The presence or, and contents of, stellar hexes is controlled by the System Contents Table: which provides the probability that a hex contains a system, gas giants, and asteroids.



### Variant Stellar Densities

System Presence is based on Stellar Density. The density of star systems may be different in other regions of space. The following (on the Extended System Contents Table) are generally accepted stellar densities.

**Extra Galactic (less than 1%).** The region is beyond the rim of the Galaxy. Star systems are rare and widely separated. There is the potential for entire sectors to be starless.

**Rift (3%).** The region is a gap or void of stars within the boundaries of the Galaxy. Systems are rare enough that the Rift is a barrier to even Jump-5 or Jump-6 Travel.

**Sparse (17%).** The region has fewer star systems than most locations within the Galaxy.

**Scattered (33%).** The region has fewer star systems than many regions of the Galaxy.

**Standard (50%).** The region has a typical or average density of star systems within the Galaxy.

**Dense (66%).** The region has a greater population of star systems than most regions within the Galaxy.

**Cluster (83%).** The region is densely packed with star systems (corresponding to a stellar cluster).

**Core (91%).** The region is densely packed with star systems, and most are multiple systems within a single Stellar Hex. This density is expected at the Galactic core.

### POPULATING SECTOR MAPS (Version 1)

Using the standard System Presence table, examine each hex on a sector map. Roll 3 or less (on 1D) for a system to be present. If a system is present, roll 9 or less (2D) for a gas Giant to be present in the system. Finally, roll 2 or less (2D) for the system to be marked an Asteroid Belt.

### POPULATING SECTOR MAPS (Version 2)

The task of placing Stellar Hexes on a sector or subsector map is driven by the System Presence Table. To make this task less tedious, the Referee may choose any statistically equivalent approach.

**Spreadsheet.** A simple spreadsheet function can determine the presence of systems for each of the 1280 hexes on the Sector Map. For example,

```
=IF (((RAND()*6)-1)+
((RAND()*6)-1)+
((RAND()*6)-1)<=3,"yes","no")
```

determines system presence for ExtraGalactic hexes.

**Countoff.** For vast areas of vacant hexes, the Referee

### CLASSIC SYSTEM CONTENTS TABLE

System Presence=	3 or less	( on 1D )	50%
Gas Giant Presence	8 or less	( on 2D )	72%
Asteroid=	2	( on 2D )	3%

If Asteroid, then World Size = 0 in World Generation.

### EXTENDED SYSTEM CONTENTS TABLE

Extra Galactic=	3 or less	( on 3D )	1%
Rift=	2 or less	( on 2D )	3%
Sparse=	1 or less	( on 1D )	17%
Scattered=	2 or less	( on 1D )	33%
Standard=	3 or less	( on 1D )	50%
Dense=	4 or less	( on 1D )	66%
Cluster=	5 or less	( on 1D )	83%
Core=	11 or less	( on 2D )	91%

can count off a predetermined number of hexes between stellar hexes. For example, on an Extra Galactic Sector Map, the Referee begins at hex 0101, counts 213 hexes, and places a system in hex 0613. He then counts another 213 hexes and placed another system in hex 1126.

To avoid exactness, vary the number by Flux (plus or minus 5).

Conversely, in the Galactic core, count off 35 hexes as populated, and then mark the 36th empty.

### Asteroids

Asteroids may also be placed based on a statistically equivalent method. One system in 36 will have an Asteroid Belt as its mainworld.

**Method One.** Roll 2D for each system. A roll of 2 = Asteroid Belt.

**Method Two.** Count off every 36th system and mark it as Asteroid Belt.

### Gas Giants

Gas Giants may be placed based on a statistically equivalent method.

**Method One.** Roll 2D for each system. A roll of 8 or less indicates a Gas Giant.

**Method Two.** Count off systems in the following order: NGGNGGGNGG. Mark G= Gas Giant and N= No Gas Giant.

This method slightly underproduces Gas Giants: for every 10 systems checked, go back and replace five of the Ns with Gs.

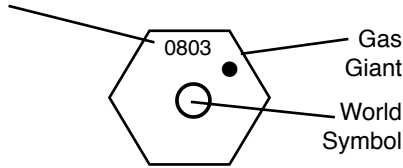


# THE SECTOR MAP

Star Systems are mapped on Sector grids to allow long range analysis and for astrogation by travellers.

## LONG RANGE SURVEY Star Map Symbols

Hex Location



A sector map shows the general presence of star systems and main-worlds across a large region of space.

**Mapping A Large Region:** Populate a blank sector map with system hexes (which contain star systems) and deep space hexes (which are purportedly, or generally known to be, empty).

The Sector Map is an overview: as a minimum enough data to support long range astrogation (maps of charted territories show more, often far more).

The Sector Map shows at least:

- Presence or absence of systems.
- Presence or absence of gas giants (to support refueling).

## POPULATING THE MAP

Determine (select) the overall map density and note any regions of greater or lesser density. For each hex, roll on the table and mark the symbols.

**Per Sector.** Expected number of Stellar Hexes for the Density.

**Density.** percentage density of Stellar Hexes.

**Countoff.** Expected empty hexes between Stellar Hexes; if [ brackets ], expected Stellar Hexes between empty hexes.

A	B	C	D
E	F	G	H
I	J	K	L
M	N	O	P

SUBSECTORS WITHIN A SECTOR

A	
B	
C	
D	
E	
F	
G	
H	
I	
J	
K	
L	
M	
N	
O	
P	

MAP LEGEND

World Symbol: ● No Water Present, ● Water Present, ⊙ Asteroid Belt

BASES

- Naval Base
- ▲ Scout Base
- Military Base
- Outpost
- F Research Station
- △ Scout Way Station
- ☉ Neutral Depot

TRAVEL ZONES

- Amber Zone
- Red Zone

POPULATION

- under one billion
- Secondary — billion
- over one billion
- PRIMUS — billion

World names in red are subsector capitals.

	Extra Galactic	Rift	Sparse	Scattered	Standard	Dense	Cluster	Core	Asteroids
<b>1D</b>			1 -	2 -	3 -	4 -	5 -		
<b>2D</b>		2 -						11 -	2
<b>3D</b>	3 -								
Per Sector	6	38	216	420	640	840	1060	1170	
Density	<1%	3%	17%	33%	50%	66%	83%	91%	
Count-Off	213	33	6	3	2	[3]	[6]	[12]	36



Star Systems are mapped on Subsector grids to provide greater detail on fewer worlds.

# THE SUBSECTOR MAP

## THE SUBSECTOR MAP

A subsector map shows a portion of the sector map with greater detail. Where the sector provides an overview, the subsector allows greater astrogation detail.

If a Sector Map has been created, transfer the data to the Subsector Map.

### SUBSECTORS WITHIN A SECTOR

<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>
<b>E</b>	<b>F</b>	<b>G</b>	<b>H</b>
<b>I</b>	<b>J</b>	<b>K</b>	<b>L</b>
<b>M</b>	<b>N</b>	<b>O</b>	<b>P</b>

Subsector Map creation uses the same procedures as creating a Sector Map:

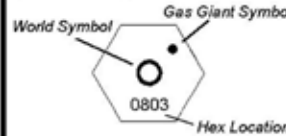
Populate a blank subsector map with system hexes (which contain star systems) and deep space hexes (purportedly or generally known to be empty).



**Subsector Name**

### STAR MAP SYMBOLS

#### Basic System Data



#### Additional (if Known)



#### World Types

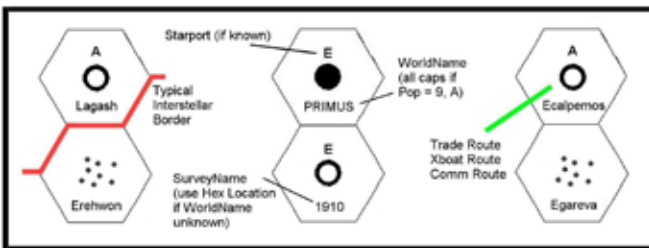
- No Water Present
- Water Present
- ⋄ Asteroid Belt

#### Starports

- A - Excellent
- B - Good
- C - Routine
- D - Poor
- E - Frontier
- X - None
- (Blank) - Unknown

#### Bases

- ★ Naval Base
- ▲ Scout Base
- Military Base
- Outpost
- Γ Research Station
- △ Way Station
- ☆ Naval Depot



	Extra Galactic	Rift	Sparse	Scattered	Standard	Dense	Cluster	Core	Asteroids
<b>1D</b>			1 -	2 -	3 -	4 -	5 -		
<b>2D</b>		2 -						11 -	2
<b>3D</b>	3 -								
Per Sector	6	38	216	420	640	840	1060	1170	
Density	<1%	3%	17%	33%	50%	66%	83%	91%	
Count-Off	213	33	6	3	2	[3]	[6]	[12]	36

# A1 ORBITAL DISTANCES

	S=	O=	AU=	Million km	Light-	Example	Sub-Orbits	Stellar Surface		
								Ia	Ib	II
Inner System	10	0	0.2	30	100 ls		no		A0-F5	A0-K0
		1	0.4	60	200 ls	Mercury	no	A0	G0-G5	K5
		2	0.7	105	350 ls	Venus	0	A5-G0	K0	M0
Inner System	11	3	1.0	150	8 lm	Terra	0			
		4	1.6	240	13 lm	Mars	0-1	A0-F5	G5	K5
Outer System	12	5	2.8	420	30 lm	Asteroid Belt	0-2	G0	K0	M0
		6	5.2	780	43 lm	Jupiter	0-3	G5-K0	K5	M5
	13	7	10	1,500	83 lm	Saturn	0-4	K5	M0	M9
		8	20	3,000	3 lh	Uranus	0-5	M0	M5-M9	
		9	40	6,000	5 lh	Neptune	0-6	M5-M9		
Outer System	15	10	77	11,550	10 lh	Kuiper Belt	0-7			
		11	154	23,100	21 lh	Kuiper Belt	0-8			
Remote System	16	12	308	46,200	42 lh		0-9			
		13	615	92,250	3 ld		0-10			
	17	14	1,230	184,500	7 ld		0-11			
		15	2,500	368,700	14 ld		0-12			
	18	16	4,900	737,400	4 lw		0-13			
		17	9,800	1,474,500	8 lw		0-14			
	18	19,500	2,925,000	16 lw		0-15				
	20	19	39,500	5,925,000	32 lw	Oort Cloud	0-16			
	20	78,700	11,805,000		1 ly	Oort Cloud				

O=  
Orbit No.

ls= light-second  
lh= light-minute  
lw= light-hour

ld= light-day  
lw= light-week

Stars of Spectral and Size shown have a surface at the Orbit shown. The first (innermost) orbit for the star is the next greater orbit number.

## HZ HABITABLE ZONE ORBITS

	Ia	Ib	II	III	IV	V	VI	D
O	15	15	14	13	12	11	-	1
B	13	13	12	11	10	9	-	0
A	12	11	9	7	7	7	-	0
F	11	10	9	6	6	5	3	0
G	12	10	9	7	5	3	2	0
K	12	10	9	8	5	2	1	0
M	12	11	10	9		0	0	0

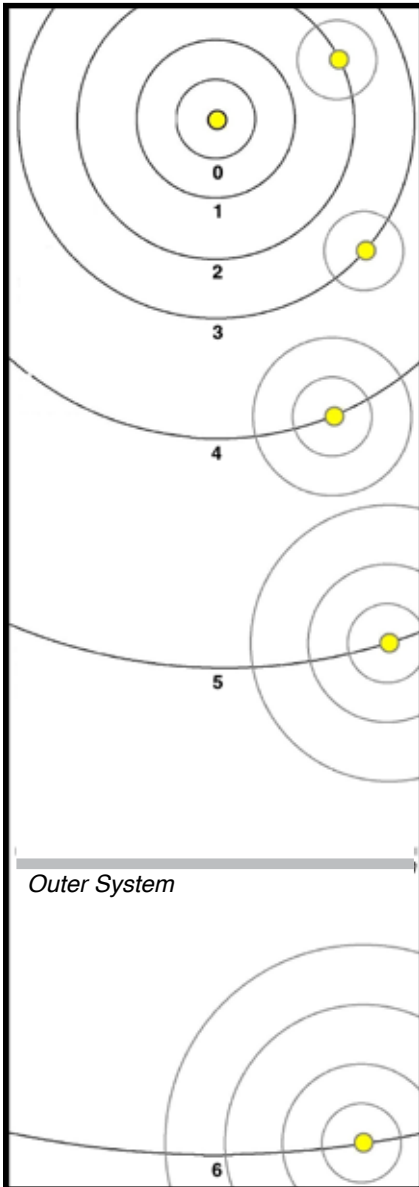
Habitable Zone (HZ) orbit number indicates a world surface environment hospitable to humans and similar. Orbit 0 or 1 is a Tz Twilight Zone World.

## MOARN

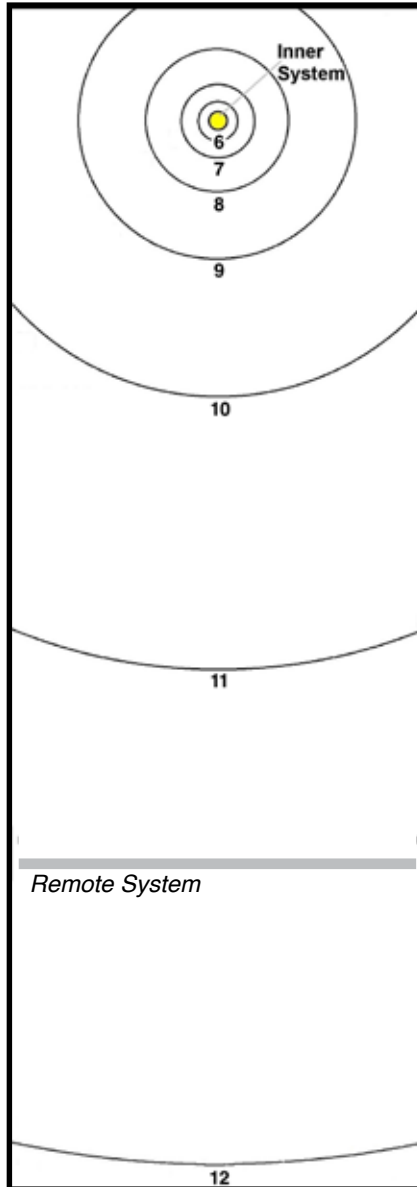
### MOARN Map Only As Really Necessary

Some journeys stop only momentarily in star systems; the information required about that is little more than the type of world present and perhaps the location of a gas giant for starship refueling. Other systems create a need for extensive information: details of several worlds, the location of companion stars, and even information about worlds in the remote or outer system.

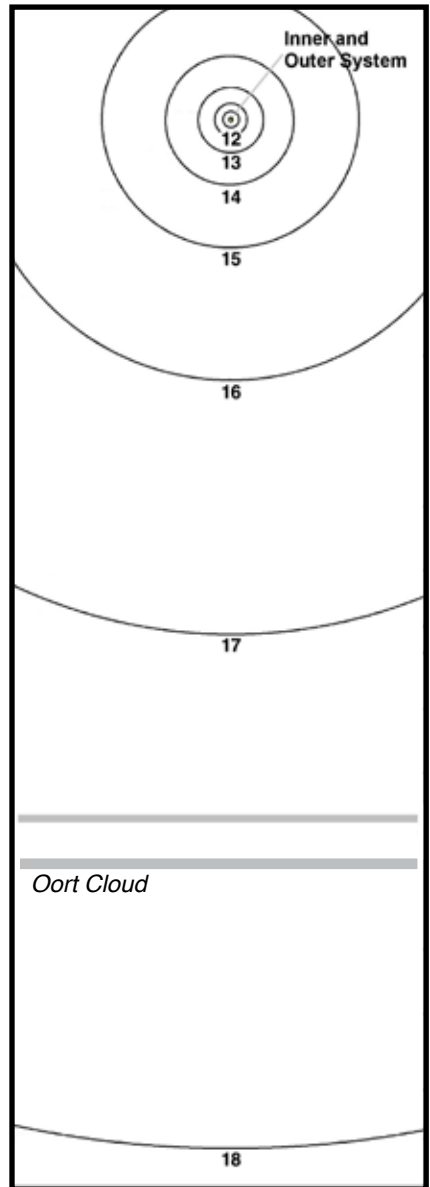
The Inner System (Orbits 0-5)



The Outer System (Orbits 6-11)



The Remote System (Orbits 12-17)



# Star Systems And Their Worlds

Star systems contain accumulations of stars, gas giants, and worlds.

**Traveller Star System Generation** provides increasing levels of detail and complexity as a Star System is explored.

**MOARN Map Only As Really Necessary.** Some journeys stop only momentarily in star systems; the information required about that is little more than the type of world present and perhaps the location of a gas giant for starship refueling. Other systems create a need for extensive information: details of several worlds, the location of companion stars, and even information about worlds in the remote or outer system.

**Traveller Star System Generation** is a hierarchical process which can be started and stopped as the situation requires. The referee need create only as much information as the players need; as more is required, more can be generated.

## UNDERSTANDING STAR SYSTEMS

A star system consists of a central star and its family: of planets and their satellites, companion stars, and other components.

**Multiple Stars.** Some systems have more than one star. The central star is the Primary, plus other stars which are Close (in the Inner System Orbits 0-1-2-3-4-5), Near (in the Outer System Orbits 6-7-8-9-10-11), or Far (in the Remote System Orbits 12-13-14-15-16-17). Each of these stars itself may have a Companion which is extremely Close (well inside Orbit 0).

**Orbits.** Each star is encircled by a series of Orbits numbered beginning with 0 and extending as far as Orbit-19. Orbits are numbered to correspond to these in the Solar System (that is, 1= Mercury, 2= Venus, 3= Earth). An additional Orbit-0 is allowed inside the orbit of Mercury.

**Worlds.** Each system may have many different worlds: planets, gas giants, asteroid or planetoid belts, satellites, and various small worldlets.

## The Mainworld

The focus of each system is its Mainworld: the single most important world in the system. If the Mainworld has a high population, other worlds in the system are probably explored and even settled. If the Mainworld has a low population, the other worlds in the system are likely barren. The Mainworld is the world referenced in data bases and is the destination of most travelers entering the system (just as Terra is the likely destination of those visiting the Sol system).

## DESCRIBING SYSTEMS

Star systems are recorded and described on FillForms H, J, and K. Most systems can be described on the Inner System FillForm H for the central star and orbits 0 through 6.



Where necessary, additional Fillforms J and K can be used for the Outer System and the Remote System.

## CREATING STAR SYSTEMS AND THEIR WORLDS

The process of creating starsystems is governed by the Star System Generation Checklist and Charts A through G, and recorded on Charts H through K.

## A SYSTEM CHECKLIST

The System Checklist details the steps to be taken in creating star systems.

## The Second Survey Format

When large data bases of system information are called for, they can be presented in the Second Survey Format: one line per star system showing the Mainworld of the system and other data appropriate for astrogation.

**Sector Name.** The Sector Name is known before the information is created, as is the hex location of the system.

While Sector Name may be of any length, it is often abbreviated to its four initial letters.

## B MAINWORLD

The Mainworld is the most important world in the system. The first step in system creation is generation of information about the Mainworld.

Over time, the MainWorld in a system may change. At some point in history, the MainWorld may be a Size 8 world with its associated atmosphere, hydrographics, and population. At some later point, there may be a shift to a different world with different Size, and associated information.

**Starport.** The starport is on the Mainworld. Other spaceports (for other worlds) can be created later in the process.

**Mainworld Type.** The Mainworld may be a Planet occupying an Orbit, or it may be a Satellite orbiting a Gas Giant (or a larger planet). It is possible for a Planet Mainworld to be an Asteroid Belt (determined when World Size is generated).

If Mainworld is a Satellite, Flux determines the Orbit name (letters Ay to Zee) and if Close or Far from its world.

## The Habitable Zone

The Habitable Zone is that region in a star system which is hospitable to humans (and many similar sophonts).

Inner System Reference Chart H and Outer System

Reference Chart J show the orbits which are in the Habitable Zone for various star types.

**HZ** is the abbreviation for Habitable Zone. An orbit is the HZ allows the world to have liquid water and climate hospitable to humans and similar sophonts.

**HZ+1** is one orbit farther from the star; the resulting climate is Cold (at the lower edge of human endurance). By extension, HZ+2 is two orbits farther from the Habitable Zone.

**HZ- 1** is one orbit closer to the star; the resulting climate is Hot (near the upper limits of human endurance). By extension, HZ- 2 is two orbits closer in from from the Habitable Zone.

**Twilight Zone.** A Planet in Orbit 0 or Orbit 1 is tidally locked to its star. Although the world may be in the HZ, hospitable conditions are present only in a narrow Twilight Zone.

**Locked.** A Satellite in Close Orbit to its planet is Locked to it; Satellites do not have Twilight Zones.

For example, in the Sol System, Terra is in the Habitable Zone. Venus occupies HZ-1; Mercury occupies HZ- 2 (and because it is in Orbit-1, it has a narrow Twilight Zone). Mars occupies HZ+1; Ceres (along with the other asteroids) is in HZ+2.

### Gas Giants and Belts

The number of Gas Giants in the system and the number of Planetoid Belts can be generated.

Gas Giants in a system =  $2D / 2 - 2$  (ignore fractions and treat less-than-zero as zero) which produces a range from 0 to 4 with some chance of none at all. This value is for the entire stellar hex regardless of the number of subsystems.

Planetoid Belts in a system =  $1D - 3$  (ignore fractions and treat less-than-zero as zero) which produces a range from 0 to 3 with a fair chance of zero. This value does not include the Mainworld if it is an Asteroid Belt. For terminology purposes, an Asteroid Belt is a Mainworld; an Planetoid belt is not a Mainworld.

### Using Chart B

Chart B provides basic information about the Mainworld. Ship crews can look up this information in data bases and can make decisions before setting course for the system. The presence of Gas Giants allows wilderness refueling.

## C STSAHPGL-T

The basic information contained in the Universal World Profile can be created with the instructions on the Chart A Checklist.

### Using Chart C

Chart C allows the information in the UWP to be decoded and understood.

The instructions for creating the elements of the UWP are appended to each table.

## D TRADE CLASSIFICATIONS

The Trade Classifications reflect specific types of information about the Mainworld (and to a lesser extent, other locations in the system).

Trade Classifications apply labels to worlds (both the

Mainworld and other system worlds in the system) which are used in the Trade and Commerce system. They identify basic conditions relating to population, climate, political, and economic status.

## E THE EXTENSIONS

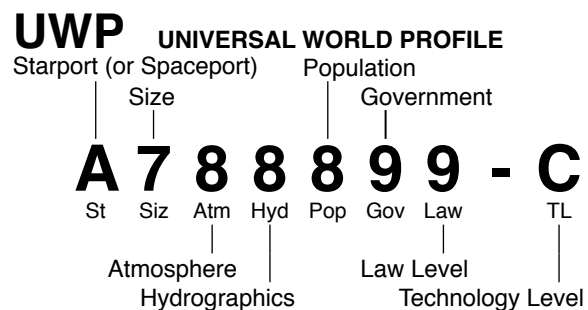
Extensions provide additional MainWorld information.

### The Importance Extension {Ix}

The Importance Extension {Ix} ranks worlds within a region. It can generally range from +5 to -3. A world with +4 or +5 is Important; a world with 0 or less is Unimportant.

**Trade Routes.** Trade Routes within a sector connect Important Worlds by various Jump lengths (typically Jump-4 or less). If such a route is not possible, intermediate connections with less Important worlds are possible.

**Capitals.** The most Important world in a subsector is the Subsector Capital; the most important world in a Sector is the Sector Capital. When more than one world is of the highest Importance, the one with the most Trade Classifications is considered most Important.



	St	Siz	Atm	Hyd	Pop	Gov	Law	TL
0		0	0	0	0	0	0	- 0
1		1	1	1	1	1	1	- 1
2		2	2	2	2	2	2	- 2
3		3	3	3	3	3	3	- 3
4		4	4	4	4	4	4	- 4
5		5	5	5	5	5	5	- 5
6		6	6	6	6	6	6	- 6
7		7	7	7	7	7	7	- 7
8		8	8	8	8	8	8	- 8
9		9	9	9	9	9	9	- 9
A	A	A	A	A	A	A	A	- A
B	B	B	B	B	B	B	B	- B
C	C	C	C	C	C	C	C	- C
D	D	D	D	D	D	D	D	- D
E	E	E	E	E	E	E	E	- E
F	F	F	F	F	F	F	F	- F
G	G						G	- G
H	H						H	- H
J							J	- J
K								- K
L								- L
X	X							-
Y	Y							-



---

## RU

Resource Units =  $R * L * I * E$

If any value = 0, use 1 (to avoid multiplying by zero).

Resource units can be negative: a world can be a net drain for Resource Units.

**The Importance of Efficiencies.** All economies have efficiencies and barriers to efficiency. As used in the Economic Extension, Efficiencies range from -5 to +5, with higher values (because of the structure of the formula) being preferable.

In the RU formula, Efficiency at -1 or less turn the RUs available negative: the Inefficiencies are so destructive as to make the economy a net drain. Such barriers represent a welfare state; cultural influences which do not value wealth, even physical limitations.

On the other hand, some economies have positive efficiencies: positive multipliers increasing available RU.

Note Efficiency-0 uses 1 to avoid multiplying by zero; Efficiency-0 and Efficiency +1 are functionally equivalent.

**The Golden World.** A theoretical (and possibly apocryphal) world with maximum values under the Economic Extension would not only have an immense RU value, it would have virtually no barriers to production. Its citizens would value work, production, efficiency, and even customer satisfaction above all else.

**Comparative Budgets.** RU Resource Units are relative values: they are best understood in comparison to other worlds. Assuming World Alpha produces RU= 100 and World Beta produces RU= 50, one can assume Alpha has an economy twice the size of Beta.

Similarly, if Alpha has a naval budget for ship production, Beta probably has a budget equal to half of Alpha's.

---

Note that Capitals are established by Importance; the fact that a world is a Capital follows from its Importance, but does not itself grant Importance.

### The Economic Extension (Ex)

The Economic Extension (Ex) is a measure of the strength of a world economy and provides basic insights into the economy's structure and capabilities. The Economic Extension is useful in evaluating the budgets and outputs of a world, and for comparing the economics of different worlds.

By detailing the Resources (= 2D; if Mainworld TL= 8+, then plus GG and Belts), Labor (= Population minus 1), and Infrastructure (usually = 2D + Importance), a general picture of the economic strength of the World emerges.

Efficiencies (generated by Flux) address legal, cultural, and social norms which may increase or reduce overall economic strength. Negative Efficiencies (Inefficiencies) are bad; a positive value for Efficiencies is preferable.

**Resource Units.** The Economic Extension allows the calculation of Resource Units for a world (in effect creating a world budget).

### The Cultural Extension [Cx]

The Cultural Extension [Cx] is an insight into the social behaviors of the citizens of the world.

## F NABZ NIL

Chart F provides additional information about the world.

**Nobility.** The Imperium assigns a representative to each mainworld; this imperial Noble interacts with the local government and population, serves as an ambassador, and promotes trade and commerce. This noble may be a local appointed by the Emperor, or may be an offworlder assigned to the post.

When a world has a significant non-human population, the Noble often has a local counterpart who deals with non-human locals.

Under normal circumstances, a world with Trade Classification Fo Forbidden does not have resident nobles: it is possible one or more nobles hold titles and fiefs associated with the world, but they probably reside elsewhere.

It is possible that other nobles reside on the world (especially on higher population worlds): the data records those nobles with fiefs on the world and titles associated with the world.

**Allegiance.** Worlds within the Imperium owe their loyalty to the empire; worlds just beyond the Imperial borders may be Non-Aligned (carefully maintaining its neutrality), or Client-State (independent, but interacting with the empire at various levels).

Worlds may be members of interstellar groups and owe their allegiance to them.

**Bases.** Worlds may have bases for military, scout, or naval purposes.

### Travel Zones

Some worlds pose a variety of dangers to travelers. The Travel Zone classification system assigns to worlds a basic warning level based on experience.

Most worlds are Travel Zone Green: safe (relatively safe) to visit. Green status is assumed within the Imperium unless otherwise posted.

Some worlds are Travel Zone Red: dangerous to visitors. The level of danger is severe enough that the world is Interdicted and travel to the world is prohibited (with Trade Classification Forbidden). The level of enforcement of Red Zones varies: some systems are patrolled by Quarantine fleets; others have merely a warning beacon.

Some worlds are Travel Zone Amber: visitors are advised to use caution. Travel Zone Amber has two levels: Dangerous and Puzzling, each reflected in a Trade Classification.

Amber worlds with low population (Pop= 6 or less) have the label if local conditions may prove dangerous (as reflected by the low population). Amber worlds with higher population (Pop= 7 or more) may require caution by visitors, but the fact that large numbers live on the world makes the classification less about danger and more about intriguing or exotic conditions.

### Native Status

Most worlds capable of supporting native intelligent life NIL have a (or had a now-extinct) population of sophonts. The chart identifies the status of such sophonts.

## System Stars

The precise number of stars in a system and their spectral types can be created using the charts. About half of all star systems will be single stars without companions.

A system to have up to eight stars: a Primary and a Companion, a Close star in the inner system and its Companion, a Near star in the Outer System and its companion, and a Far star in the Remote system and its Companion (but the chance of such a system is extremely small).

## Stellar Spectral Type

The precise spectral identity of the stars in the system are generated using the Spectral Type chart.

## The Size of Additional Star Systems

Available orbits for system stars is restricted.

The Primary Star may have orbits out to Orbit-19 (not all need be, or will be, filled).

Close, Near, and Far stars may fill orbits around them to their own Orbit minus 3 (noting that Orbit 0 is a possibility). For example, a Close Star in Orbit 3 around its Primary can have a Planet at Orbit=-0 (= 3 - 3) A Close Star in Orbit 2 can have no Planet Orbits. A Far star in Orbit 17 around its Primary can have planets in orbits around it out to Orbit 14 (= 17 - 3).

The Sub Orbit Column of the Orbital Distance Chart 5a (in the Ranges Chapter) shows available orbits.

## G PLACING WORLDS

Chart G places the Mainworld in a specific Orbit and creates and places other worlds in the system. If the supply of worlds exceeds the available orbits, ignore excess worlds.

### Placing Worlds

Worlds in a system must be placed in orbits.

The Placing Worlds Chart provides priorities and deals with several exceptions.

The Mainworld is placed first. If it is a Satellite, then a Gas Giant must be placed in that orbit to accommodate it. If there is no Gas Giant in the system, then create a BigWorld (Size= -2D +7) and place it in that orbit.

If the Mainworld is an Asteroid Belt, it is placed using the Belt Column of the Basic Placement Chart without regard to Habitable Zone.

**Rotate Placement.** The Placing Worlds Chart calls for Rotating Placement of various worlds in the system. If the system has more than one star (Close, Near, Far), place the first of the worlds concerned in orbit around the Primary, the second in orbit around the Close, the third in orbit around the Near, and the fourth in orbit around the Far (if possible). Repeat the process if necessary.

**Precluded Orbits.** Some stars are so large that they engulf some of the orbits in the system. The Surface of the Star Column of the Orbital Distance Chart 5a (in the Ranges Chapter) shows precluded orbits.

**Other Restrictions.** The maximum Population for any non-Mainworld is Mainworld Population minus 1. All worlds other than the Mainworld have Spaceports rather than Starports.

## WORLDS

**MainWorlds** are the primary, most important, world in a system (not necessarily in the Habitable Zone).

**Inner Worlds** are starward of the Habitable Zone.

**Hospitables** are potentially habitable or exploitable worlds located in the Habitable Zone.

**Outer Worlds** are beyond the Habitable Zone.

**Planetoids** are the worldlets of a Belt. Population, Government, and Law Level show overall levels.

**Iceworlds** are frozen worlds beyond the HZ.

**RadWorlds** are worlds with extreme levels of radiation. Values are provided in Range Table 3b Strangeworlds.

**Infernos** are worlds with extremely high temperatures. Values are provided in Range Table 3b Strangeworlds.

**BigWorlds** are worlds with larger than expected Size. Occasionally, a satellite Mainworld in a system without Gas Giants requires a BigWorld as its primary. **Worldlets** are worlds with generally small Size.

**Inner Worlds** are starward of the Habitable Zone.

**Outer Worlds** are beyond the Habitable Zone.

**Stormworlds** are worlds wracked by atmospheric turbulence. Values are provided in Range Table 3b Strangeworlds.

**Satellites** for worlds or gas giants may be created as necessary, and include the range of all possible worlds.

### Other Worlds

The creation of additional worlds in a system uses a simplified procedure:

Inner Worlds are in orbits HZ minus 2 or more.

Hospitable Worlds are in orbits HZ - 1 to HZ +1.

Outer Worlds are in orbits HZ +2 or greater.

Consult the charts to determine the specific type of world and then create it using the information from the Other Worlds column.

Similar tables direct Satellite creation as necessary.

### Satellites

When necessary, satellites for worlds and for gas giants can be generated.

**Ring.** The table may create one or more Rings.

### More Worlds: Many, Even Most, Of Them Uncharted

This system does not create the many small chunks of rock and ice throughout most systems.

TL	Determine world Tech Level with																
1D+	the following Mods																
	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	X
St											+6	+4	+2			+1	-4
Siz	+2	+2	+1	+1	+1												
Atm	+1	+1	+1	+1							+1	+1	+1	+1	+1	+1	
Hyd										+1	+2						
Pop		+1	+1	+1	+1	+1				+2	+4	+4	+4	+4	+4	+4	
Gov	+1					+1											-2

# THE REGINA SYSTEM

Hex 1910 of the Spinward Marches sector is here created as an example using charts.

## A

Sector Name is known: The Spinward Marches.  
The Hex Location is already known: 1910.  
The Mainworld Name is Regina.

## B

Starport =  $2D=4$  = Type A. Excellent Quality.  
Mainworld Type = Flux = - 4 = Far Satellite.  
Satellite Orbit = Flux = -2 = Orbit Arr.  
Habitable Zone Variance = Flux = 0 = no variance.  
(HZ Orbit waits until Star Type is determined)  
Climate (based on HZ=0) = Temperate.  
Gas Giants =  $2D / 2 - 2 = 10 / 2 - 2 = 3$ .  
Planetoid Belts =  $1D - 3 = 2 - 3 = 0$ .

## C

Mainworld Size =  $2D - 2 = 7 = 7,000$  miles diameter.  
Atmosphere = Flux + Size = +1 + 7 = 8 = Dense.  
Hydrographics = Flux + Size = 0 + 8 = 8 =  
80% of the world surface is covered by seas.  
Population =  $2D - 2 = 8$ . Hundreds of millions.  
Government = Flux + Pop = +1 + 8 = 9 =  
Impersonal Bureaucracy.  
Law Level = Flux + Gov = +0 + 9 = 9 = High Law.  
Tech Level =  $1D + \text{Mods (Starport A = +6)} = 6 + 6 = 12$ .  
TL-12.

## D

Trade Classifications =  
Rich (Atm=8, Pop=8).  
Pre-Agricultural (Atm=8, Hyd=8, Pop=8).  
Pre-High (Pop= 8).

## E

Importance Extension = { +4 } = Important.  
Starport A = +1, TL A = +1, Rich = +1, Pre-Ag = +1.  
Economic Extension = ( D7E+4 )  
Resources =  $2D + GG + \text{Belts} = 10 + 3 + 0 = 13 = D$ .  
Labor = Pop - 1 = 7.  
Infrastructure =  $2D + \text{Importance} = 10 + 4 = 14 = E$ .  
Efficiencies = Flux = +4  
Cultural Extension = [ 9C6D ]  
Homogeneity = Pop + Flux = 8 + 1 = 9.  
Acceptance = Pop + Importance = 8 + 4 = 12 = C.  
Strangeness =  $2D - 2 = 6$ .  
Symbols = TL + Flux = 12 + 1 = 13 = D.

## F

Nobility = BcCeF = Knight, Baronet, Baron, Viscount, Duke.  
Based on Any, Rich, Pre-Ag, Pre-High, and subsector Capital.  
Allegiance = Im = a member world of the Imperium.  
Bases = NS  
Naval Base from the table.  $2D = 5 = \text{Yes}$ .  
Scout Base from the table.  $2D = 3 = \text{Yes}$ .  
Travel Zones. Imposed by the Referee. = None.  
Native Status. Based on Pop 7 or greater and Atm 2 or greater, the world has a Native population.

### System Stars

The system automatically has a Primary.  
Primary Companion = Flux = +4 = Yes.  
Close Star = Flux = 0 = No. Near Star = Flux = -2 = No.  
Far Star = Flux = +4 = Yes.  
Far Star Companion = Flux = +1 = No.  
The Regina system has a Primary and a Companion, and a Far star in the remote system, and without a companion.

### Stellar Data

Primary = F7 V. Primary Spectral Type = Flux = -1 = F. Primary Spectral Decimal = use Even Distribution Table from Dice = 7.  
Primary Size = Flux = 0 and consult the Spectral F column = V.  
Primary Companion = DM. Companion Spectral Type = -1 + 1D-1 = 4 = M.  
Companion Decimal = 4. Companion Size = Flux + 1D -1 +3 = +7 = D. Spectral decimal is ignored for Size= D.  
Far Star = M3 V. Spectral Type = Flux + 1D -1 = 0 + 3 = M. Spectral Decimal = 3. Stellar Size = Flux + 1D -1 = 0 + 2 = 2 = V.  
Place the Stars in orbits. Primary is the central star; its Companion orbits inside Orbit 0. Far star in orbit 11 +1D = 11 +5 = Orbit 16.

## G

Total Worlds In The System =  $1 + 3 + 0 + 2D = 1 + 3 + 0 + 10 = 14$ .  
Mainworld. Regina is in HZ. Inner System Reference shows HZ for Primary F7 V =Orbit 4. Because Regina is a Satellite, place a Gas Giant in Orbit 4. Regina orbits the GG (at Orbit Arr).  
Gas Giants. The system has three Gas Giants.  
First Gas Giant is in Orbit 4. GG Table =  $2D = 7 = \text{Siz S}$  (80,000 miles diameter = about equal to Jupiter). It is a LGG.  
Place the second Gas Giant. HZ= 4. GG Table = 2 = Siz M (30,000 miles diameter). It is a Small Gas Giant SGG. Basic Placement Chart for SGG =  $2D = 2 = \text{HZ}-2 = \text{Orbit } 4 - 2 = \text{Orbit } 2$ . Rotate placement of Gas Giants through the systems.  
Place the third Gas Giant orbiting the M6 V Far star (begin a new Inner System Fillform for the star). HZ for M6 V is Orbit 0. GG Table shows= 5 = Siz Q (60,000 miles diameter). It is a SGG. Convert it to an ice Giant. Basic Placement Chart for IG location =  $2D = 2 = \text{HZ}+2$ . Place the IG in Orbit 0 + 2 = Orbit 2.  
The system has no Planetoid Belts.  
Create world 5 of the system's 12. On World1 Column,  $2D = 5 = \text{Orbit } 4 = \text{a Satellite of the Gas Giant in Orbit } 4$ . As a Satellite in Orbit 4, HZ Hospitables Satellite table =  $1D = 4 = \text{Hospitable}$ .

Use the procedures in this Checklist to create star systems and their component worlds.



**The Second Survey Format**

		UWP													
Hex	Name	StSAHPGL-T	TC and Rem				{Ix}	(Ex)	[Cx]	N	B	Z	PBGW	A	Stellar
1910	Regina	A788899-C	Ri	Pa	Ph	An	Cp	{+4}	(D7E+4)	[9C6D]	Bc	Ce	F	NS	- 703 8 Im F7 V DM M3 V

The Second Survey Format shows tabular information about a star system (and especially its Mainworld) for ready reference in astrogration, merchant trade, and general inquiries. It consists of the following details.

**THE ELEMENTS OF SYSTEM DATA**

**Sector.** The Sector Name and general identity is created and known before this process begins. Generally not shown; specified for the collection of data.

**Hex.** The hex location identifier for the location of the system within the sector.

**Mainworld Name.** The generally accepted name of the Mainworld of the system. Generated by the referee.

**UWP.** The standard Universal World Profile (in the format StSAHPGL-T) for the Mainworld in the system. At Referee's discretion, Starport X (Forbidden) may be some other value.

**TC Trade Classifications.** The Trade Classifications (and Remarks) for the mainworld.

**Ex Extensions.** Guides to the character of the Mainworld: Importance, Economic, and Cultural.

**N Nobility.** Within the Imperium, the noble rank of the individual assigned by the Empire as representative to the MainWorld. More than one is possible.

**B Bases.** The nature of Military, Naval, and Scout bases on the world.

**Z Travel Zone.** Guidance about potential dangers on the World.

**PBG Population Belts Giants.** Three digits 0-9 representing the significant digit for the population of the Mainworld, the number of Planetoid Belts in the System, and the number of Gas Giants in the system.

**W Worlds.** The number of worlds in the system = MainWorld + Belts + Gas Giants +2D. This number does not include Worldlets and Satellites (other than the Mainworld if it is a Satellite).

**A Allegiance.** The larger government to which the system owes allegiance (if any).

**Stellar.** Spectral identification of the stars of the system.

**MOARN Map Only As Really Necessary.**

The charts allow the star system creation process to be started and stopped as necessary. There is no need to create complete or comprehensive maps before they are needed.

**MASTER SYSTEM GENERATION CHECKLIST**

<b>A</b>	Sector Name and Hex Location. Mainworld Name.
1	Starport. =2D for Starport Type.
1	(optional) Bases.
2	MainWorld Type =Flux (Planet or Satellite).
2	If Satellite, =Flux for Satellite Orbit Name.
<b>B</b>	2 Habitable Zone Variance. =Flux
3	Climate. Note based on HZ.
4	Population Digit. P= 2D-2 (reroll 0 if Pop not 0)
4	Gas Giants. =2D /2 -2.
4	Planetoid Belts. =1D -3.
	<b>StSAHPGL-T</b>
S	World Size. = 2D-2.
A	Atmosphere: =Flux + Size. If Siz =0, Atm =0.
<b>C</b>	H Hydrographics. =Flux+ Atm + Mods. Max= A.
P	Population. =2D-2. Digit= Random 1-9.
G	Government. =Flux +Pop.
L	Law. =Flux + Gov.
T	Tech Level. =1D + Mods.
<b>D</b>	TC Trade Classifications. Note all required. Defer Secondary, Political, Special TC.
	<b>Extensions.</b>
<b>E</b>	Ix Importance Extension.
Ex	Economic Extension.
Cx	Cultural Extension.
	<b>Additional Data.</b>
N	Nobility. Based on Trade Classifications.
A	Allegiance. Imposed by referee.
B	Bases. Naval. Scout. Depot. Way Station.
<b>F</b>	Z Travel Zones. Imposed by referee.
Nil	Native Intelligent Life and Status.
1	System Stars
2	Star Spectral Types
3	Place Stars In Orbits
<b>W</b>	Total Worlds In System= MW+GG+Belts+2D
P	Mainworld Placement.
<b>G</b>	P Gas Giant Placement
P	Planetoid Belt Placement
P	Create other Worlds
<b>H1</b>	Actual Habitable Zones for Inner System
<b>J1</b>	Actual Habitable Zones for Outer System
<b>K1</b>	Actual Habitable Zones for Remote System

# B

## WORLDGEN BASICS

Create the essential details for the Mainworld using the tables on this page. The Mainworld is the most important world in the system (although the world may well be not very important). This page allows the creation of basic information about a Mainworld appropriate for astrogation planning.

### CHECKLIST

- 1a. **Starport.** Note bases.
- 1b. **Spaceports** (for reference).
- 2a. **HomeStar.**
- 2b. **Mainworld Orbit** (note HZ).
- 2c. **If Satellite**, note details.
3. **Climate.** Based on HZ.
- 4p. **Population Digit.** Random 1-9 if Pop greater than 0.
- 4b. **Planetoid Belts.** Roll 1D -3.
- 4g. **Gas Giants.** Roll 2D /2 -2.

### FUEL AT

#### STARPORTS AND SPACEPORTS

Starport	Hydrogen	Radioactives	Anti-Matter	Collector
<b>H</b>	<b>U</b>	<b>A</b>	<b>C</b>	
<b>A</b> Both*	TL 8+	TL 18+	TL 14+	
<b>B</b> Both*	TL 8+	TL 18+	TL 14+	
<b>C</b> Raw	no	no	no	
<b>D</b> Raw	no	no	no	
<b>E</b> no**	no	no	no	
<b>X</b> no**	no	no	no	
<b>F</b> Raw	no	no	no	
<b>G</b> Raw	no	no	no	
<b>H</b> no**	no	no	no	
<b>Y</b> no**	no	no	no	

\*Both includes Refined and Unrefined (Raw) hydrogen fuel.

\*\*Unrefined may be available as local environmental water or ice:

- Raw Fuel (Water) from oceans.
- Raw Fuel (Ice) from Ice Caps or Snowpack, Ice Asteroids or Comets.
- Raw Fuel (Gas) from Gas Giants.

### 1a STARPORTS ON THE MAINWORLD

2D	Type	Quality	Yards	Repairs	Downport	Highport	Bases
2							Naval if 2D= 6-
3	<b>A</b>	Excellent	Star-ships	Overhaul	Yes	Pop =7+	Scout if 2D= 4-
4							Depot or Way Stn
5	<b>B</b>	Good	Space-craft	Overhaul	Yes	Pop =8+	Naval if 2D= 5-
6							Scout if 2D= 5-
7	<b>C</b>	Routine	No	Major	Yes	Pop =9+	Scout if 2D= 6-
8							Scout if 2D= 7-
9	<b>D</b>	Poor		Minor	Yes		
10	<b>E</b>	Frontier		No	Beacon		No Bases
11							
12	<b>X</b>	None		No	No		No Bases

### 1b SPACEPORTS ON NON-MAINWORLDS

Roll= Pop (Non-MW) -1D

1D	Type	Quality	Yards	Repairs	Downport	Highport	Possible Bases
4+	<b>F</b>	Good	No	Minor	Yes	No	Fa Farming.
3	<b>G</b>	Poor	No	Slight	Yes	No	Mi Mining.
2	<b>H</b>	Basic	No	No	Beacon	No	Cy Colony.
1							Pe Penal Colony.
0	<b>Y</b>	None	No	No	No	No	Re Reserve.

### 4 GAS GIANTS AND BELTS

**P** Population Digit = Random 1-9  
If Pop = 0, then use 0.

**B** Planetoid Belts = 1D - 3

**G** Gas Giants = 2D /2 - 2

### 2a HOMESTAR

Flux	Sp	O	B	A	F	G	K	M
-6	O	Ia	Ia	Ia	II	II	II	II
-5	OB	Ia	Ia	Ia	II	II	II	II
-4	A	Ib	Ib	Ib	III	III	III	II
-3	A	II	II	II	IV	IV	IV	II
-2	F	III	III	III	V	V	V	III
-1	F	III	III	IV	V	V	V	V
0	G	III	III	V	V	V	V	V
+1	K	V	III	V	V	V	V	V
+2	K	V	V	V	V	V	V	V
+3	M	V	V	V	V	V	V	V
+4	M	IV	IV	V	VI	VI	VI	VI
+5	M	D	D	D	D	D	D	D
+6	M	D	D	D	D	D	D	D

Size IV not possible for K5-K9, M0-M9.  
Size VI not possible for A0-A9, F0-F4  
If Size= D, ignore Spectral Decimal.  
Flux= -6 or +6 with Referee imposed DM.

### 2b MAINWORLD ORBIT

Flux	HZ	Var	Climate	TC
-6	-2			
-5	-1		Hot. Tropic.	Tr
-4	-1		Hot. Tropic.	Tr
-3	-1		Hot. Tropic.	Tr
-2	0		Temperate	
-1	0		Temperate.	
0	0		Temperate.	
+1	0		Temperate.	
+2	0		Temperate.	
+3	+1		Cold. Tundra.	Tu
+4	+1		Cold. Tundra.	Tu
+5	+1		Cold. Tundra.	Tu
+6	+2		Frozen.	Fr

Place Mainworld in Habitable Zone Orbit Number plus or minus HZ Var From Table B, Chart G.

- DM+2 if Spectral M.
- DM -2 if Spectral O or B.

### 2c SATELLITE?

Flux	Satellite?	GG?	=Lk	=Sa
-6		GG	Ay	En
-5	Far Satellite	GG	Bee	Oh
-4	Far Satellite	GG	Cee	Pee
-3	Close Satellite	GG	Dee	Que
-2	Planet	GG	Ee	Arr
-1	Planet	GG	Eff	Ess
0	Planet	GG	Gee	Tee
+1	Planet	no	Aitch	Yu
+2	Planet	no	Eye	Vee
+3	Planet	no	Jay	Dub
+4	Planet	no	Kay	Ex
+5	Planet	no	Ell	Wye
+6		no	Em	Zee

Is Mainworld Planet or Close or Far Satellite? If Satellite, is parent world Gas Giant or Planet. Close=

- Note Satellite Orbit Letter.
- DM +2 if MW is Planet.
- DM - 2 if Mainworld is Gas Giant.

Create and understand the elements of the Universal World Profile using these tables.



### S SIZE

Digit	Diameter
0	Asteroid Belt
1	1,000 miles 1,600 km
2	2,000 miles 3,200 km
3	3,000 miles 4,800 km
4	4,000 miles 6,400 km
5	5,000 miles 8,000 km
6	6,000 miles 9,600 km
7	7,000 miles 11,200 km
8	8,000 miles 12,800 km
9	9,000 miles 14,400 km
A	10,000 miles 16,000 km
B	11,000 miles 17,600 km
C	12,000 miles 19,200 km
D	13,000 miles 20,800 km
E	14,000 miles 22,400 km
F	15,000 miles 24,000 km

Siz= 2D -2.  
If =10, reroll 1D + 9.

### A ATMOSPHERE

Digit	Description
0	Vacuum S3
1	Trace S3
2	VThin Tainted P1 S2
3	VThin S2
4	Thin Tainted P1 S1
5	Thin S1
6	Standard
7	Standard Tainted P1
8	Dense
9	Dense Tainted P1
A	Exotic P1
B	Corrosive C1 P1
C	Insidious C2 P1
D	Dense High varies
E	Thin Low varies
F	Unusual varies

Atm= Flux +Siz  
If Atm<0 or Siz=0, Atm=0.  
If Atm>F, Atm=F

### H HYDROGRAPHICS

Digit	Description
0	Desert World
1	10% Water.
2	10% Water.
3	10% Water.
4	10% Water.
5	10% Water.
6	10% Water.
7	10% Water.
8	10% Water.
9	10% Water.
A	Water World

Hyd= Flux + Atm + Mods.  
Max= A.  
If Siz <2, Hyd =0  
If Atm <2 or Atm >9, DM - 4.  
If Hyd<0, Hyd=0.  
If Hyd>A, Hyd=A.

### P POPULATION

Digit	Description	Value
0	Unpopulated	0
1	Tens	10^1
2	Hundreds	10^2
3	Thousands	10^3
4	Ten Thousands	10^4
5	Hundred Thousands	
6	Millions	10^6
7	Ten Millions	10^7
8	Hundred Millions	10^8
9	Billions	10^9
A	Ten Billions	10^10
B	Hundred Billions	10^11
C	Trillions	10^12
D	Ten Trillions	10^13
E	Hundred Trillions	10^14
F	Quadrillions	10^15

Pop= 2D-2.  
If result=10, reroll as 2D+3.  
**Pop Digit.** If Pop>0, Digit= Even distribution 1-9.

### G GOVERNMENT

Digit	Description
0	<b>No Government Structure.</b> Family bonds predominate.
1	<b>Company/ Corporation.</b> Rule by a managerial elite.
2	<b>Participating Democracy.</b> Rule by popular vote.
3	<b>Self-Perpetuating Oligarchy.</b> Rule by a isolated minority..
4	<b>Representative Democracy.</b> Government by proxy.
5	<b>Feudal Technocracy.</b> Governmental relationships based on mutually beneficial technical activities.
6	<b>Captive Government / Colony.</b> Rule by an externally imposed leadership.
7	<b>Balkanization.</b> Rival governments compete for control.
8	<b>Civil Service Bureaucracy.</b> Rule by agencies employing individuals selected by merit.
9	<b>Impersonal Bureaucracy.</b> Rule by impersonal agencies isolated from the governed populations..
A	<b>Charismatic Dictatorship.</b> Government by a single leader enjoying the confidence of the citizens.
B	<b>Non-Charismatic Dictatorship.</b> Government by the successor to a charismatic dictator.
C	<b>Charismatic Oligarchy.</b> Government by a select religious, mystic, or psionic group, organization, or class enjoying the overwhelming confidence of the citizenry.
D	<b>Religious Dictatorship.</b> Rule by prophets.
E	<b>Religious Autocracy.</b> Government by a single religious, mystic, or psionic leader wielding absolute power.
F	<b>Totalitarian Oligarchy.</b> Rule by an all-powerful minority maintaining absolute control through coercion and oppression.

Gov= Flux + Pop. If Gov >F, Gov= F

### L LAW LEVEL

Digit	Description
0	<b>No Law.</b> No prohibitions.
1	<b>Low Law.</b> Prohibition of WMD, Psi weapons.
2	<b>Low Law.</b> Prohibition of "Portable" Weapons.
3	<b>Low Law.</b> Prohibition of Acid, Fire, Gas..
4	<b>Moderate Law.</b> Prohibition of Laser, Beam.
5	<b>Moderate Law.</b> No Shock,EMP, Rad,Mag, Grav.
6	<b>Moderate Law.</b> Prohibition of MachineGuns
7	<b>Moderate Law.</b> Prohibition of Pistols.
8	<b>High Law.</b> Open display of weapons prohibited.
9	<b>High Law.</b> No weapons outside the home.
A	<b>Extreme Law.</b> All weapons prohibited.
B	<b>Extreme Law.</b> Continental passports required.
C	<b>Extreme Law.</b> Unrestricted invasion of privacy.
D	<b>Extreme Law.</b> Paramilitary law enforcement.
E	<b>Extreme Law.</b> Full-fledged police state.
F	<b>Extreme Law.</b> Daily life rigidly controlled.
G	<b>Extreme Law.</b> Disproportionate punishment.
H	<b>Extreme Law.</b> Legalized oppressive practices.
J	<b>Extreme Law.</b> Routine oppression.

Law= Flux + Gov. If Law > J, Law= J

### TL = 1D+

Starport A= +6. B= +4. C= +2. X= -4. Spaceport F=+1  
Siz 0 1= +2. Siz 2 3 4= +1  
Atm 0 1 2 3 = +1. Atm A B C D E F = +1  
Hyd 9 = +1. Hyd A= +2  
Pop 1 2 3 4 5 = +1. Pop 9 = +2. Pop A+= +4.  
Gov 0 5 = +1. Gov D = -2.

# D

## WORLDGEN TRADE CLASSES

Create the applicable Trade Classifications for the Mainworld and apply Trade Classifications for other worlds in the system. Ba requires Starport E, X. Cp, Cs, Cx require Starport A (alternates are possible at the Referee's discretion). Politicals and Specials assigned by Referee (not generated). Lk, Tz, Ho, and Co refer to climate but are not properly TCs.

	Code	Siz	Atm	Hyd	Pop	Gov	Law	Definition	Comment
Planetary	As	0	0	0	--	--	--	Asteroid Belt	
	De	--	23456789	0	--	--	--	Desert	
	Fl	--	ABC	123456789A	--	--	--	Fluid	
	Ga	678	568	567	--	--	--	Garden World	
	He	3456789ABC	2479ABC	012	--	--	--	Hellworld	
	Ic	--	01	123456789A	--	--	--	Ice-Capped	
	Oc	ABCDEF	3456789ABC	A	--	--	--	Ocean World	
	Va	--	0	--	--	--	--	Vacuum	
	Wa	3456789A	3456789ABC	A	--	--	--	Water World	
Population	Di	--	--	--	0	0	0	Dieback (000-T)	
	Ba	--	--	--	0	0	0	Barren	
	Lo	--	--	--	123	--	--	Low Population	
	Ni	--	--	--	456	--	--	Non-Industrial	
	Ph	--	--	--	8	--	--	Pre-High	
	Hi	--	--	--	9ABCDEF	--	--	High Population	
Economic	Pa	--	456789	45678	48	--	--	Pre-Agricultural	
	Ag	--	456789	45678	567	--	--	Agricultural	
	Na	--	0123	0123	6789ABCDEF	--	--	Non-Agricultural	
	Px	--	23AB	12345	3456	--	6789	Prison or Exile Camp	MW
	Pi	--	012479	--	78	--	--	Pre-Industrial	
	In	--	012479ABC	--	9ABCDEF	--	--	Industrial	
	Po	--	2345	0123	--	--	--	Poor	
	Pr	--	68	--	59	--	--	Pre-Rich	
	Ri	--	68	--	678	--	--	Rich	
Climate	Fr	23456789	--	123456789A	--	--	--	Frozen	HZ +2 or outer
	Ho	--	--	--	--	--	--	Hot	HZ- 1
	Co	--	--	--	--	--	--	Cold	HZ+1
	Lk	--	--	--	--	--	--	Locked	Close Satellite
	Tr	6789	456789	34567	--	--	--	Tropic	HZ - 1
	Tu	6789	456789	34567	--	--	--	Tundra	HZ +1
	Tz	--	--	--	--	--	--	Twilight Zone	Orbit 0-1
Secondary	Fa	--	456789	45678	23456	--	--	Farming	HZ but not MW
	Mi	--	--	--	23456	--	--	Mining	Not MW. MW=In
	Mr	--	--	--	--	--	--	Military Rule	
	Pe	--	23AB	12345	3456	6	6789	Penal Colony.	Not MW
	Re	--	--	--	1234	6	45	Reserve	
Political	Cp	--	--	--	--	--	--	Subsector Capital	(Starport=A) Imperial
	Cs	--	--	--	--	--	--	Sector Capital	(Starport=A) Imperial
	Cx	--	--	--	--	--	--	Capital	(Starport=A) Imperial
	Cy	--	--	--	56789A	6	0123	Colony	--
Special	Sa	--	--	--	--	--	--	Satellite	Far Satellite
	Fo	--	--	--	--	--	--	Forbidden	(Red Zone)
	Pz	--	--	--	789ABCDEF	--	--	Puzzle	(Amber Zone)
	Da	--	--	--	0123456	--	--	Dangerous	(Amber Zone)
	Ab	--	--	--	--	--	--	Data Repository	
	An	--	--	--	--	--	--	Ancient Site	--

**Cp, Cs, Cx:** Capitals may have other starport types at discretion of the Referee. **Non-MW:** Not on system MainWorld.

**Cy:** A colony is Owned by another world. Note the owning world with O:nnnn (=hex of owning world). The Owner is the Most Important, Highest Population, Highest TL world within 6 hexes. **Mr:** Military Rule by the regional Allegiance power.

Create the Importance Extension, Economic Extension, and Cultural Extension.  
**Importance Extension** and the **Economic Extension** apply to the entire system;  
**Cultural Extension** applies usually to the entire system, although individual worlds may have their own Cultural Extensions.

## Ix IMPORTANCE EXTENSION

{+4}

The **Importance Extension** is contained between {braces}.

The **Importance Extension (Ix)** ranks worlds within a region. It governs the locations of capitals and trade routes.

### IMPORTANCE EXTENSION=

Characteristic	Value
Starport Type A or B	+1
Starport D or worse	- 1
Tech Level G or more	+1
Tech Level A or more	+1
Tech Level 8 or less	- 1
Per Ag Hi In Ri	+1
If Pop 6 or less	- 1
If Naval AND Scout Base	+1
If Way Station	+1

Important= +4 or greater.

Unimportant= 0 or less.

**Trade Routes.** Important Worlds are linked by established Trade Routes of J-4 or less.

**Capitals Cp Cs Cx.** Important worlds are more likely to be Capitals of subsectors and sectors.

### EXPECTED SHIP TRAFFIC

Ix Importance	Weekly	Daily
5 Very Important	1,000	100
4 Important	100	15-20
3 Ordinary	30	3-6
2 Ordinary	20	2-4
1 Ordinary	10	1-2
0 Unimportant	2	1
-1 Unimportant	1	1
-2 Very Unimportant	0	0
-3 Very Unimportant	0	0

Plus Flux

For a Busy Empire, next row higher.

For a Rural Empire, next row lower.

## Ex ECONOMIC EXTENSION

Resources Infrastructure  
**(RLI+E)**  
 or (RLI-E)  
 Labor Efficiencies

The **Economic Extension** is contained between (parentheses)].

The **Economic Extension (Ex)** is the strength of a world economy and provides basic insights into the economy's structure and capabilities.

### ECONOMIC EXTENSION=

Characteristic	Value
Resources=	2D If TL 8+ +GG + Belts
Labor=	Pop - 1
Infrastructure=	2D+ Ix If Ba, Di, Lo, then 0 If Lo, then 1 If Ni, then 1D + Ix
Efficiency=	Flux

The minimum value for Resources, Labor, and Infrastructure is 0.

Efficiency may be negative and can make RU negative.

**Resources** are any materials available for exploitation, including natural resources, minerals, ores, metals, energy resources, biological assets, and any other materials of limited availability.

**Labor** is the workforce available for the exploitation of Resources.

**Infrastructure** is the technical structure that supports Labor, including roads, power grid, and factories.

**Efficiency** reflects the current economic system, including legal procedures, tariffs, customs and ethics, rewards, and social structures. Positive is good and makes RU positive; negative is bad and makes RU negative.

## RU

**Resource Units = R \* L \* I \* E**

If any value = 0, use 1 instead (to avoid multiplying by zero).

## Cx CULTURAL EXTENSION

Homogeneity Strangeness  
**[HASS]**  
 Acceptance Symbols

The **Cultural Extension** is contained between [brackets].

The **Cultural Extension (Cx)** is a broad insight into the expected social norms and behaviors of the citizens of the world.

### CULTURAL EXTENSION=

Characteristic	Value
Homogeneity	Pop + Flux
Acceptance	Pop + Ix
Strangeness	Flux + 5
Symbols	Flux + TL

For all values, less than 1 = 1

**Homogeneity** is a measure of the degree to which members of society hold common beliefs. Members of very homogeneous cultures are in strong agreement on the fundamentals of society (usually basic rights, religion, and methods of interaction). Members of non-homogeneous cultures hold many different beliefs on the fundamentals of society.

**Acceptance** is the degree of xenophobia (or xenophilia) in the culture. High Acceptance is evidenced by friendliness to outsiders and offworlders; Low Acceptance is characterized by fear or rejection of outsiders.

**Strangeness** is the degree of difference from the norms of interstellar society. High Strangeness is evidenced by unusual or outwardly incomprehensible actions, statements, or responses in the course of daily activity. Low Strangeness reflects activities close to interstellar norms.

**Symbols** used by the culture may range from the concrete (idols; totems; statuary) to the abstract (symbolized belief systems; group affiliations). Expected



# F

WORLDGEN  
NABZ NIL

Note additional information for the system.

## N NOBILITY

Code	Description
B	Knight any
c	Baronet Pa or Pr
C	Baron Ag or Ri
D	Marquis Pi
e	Viscount Ph
E	Count In or Hi
f	Duke* Ix*=4+
F	Duke* Capital**
G	Archduke

\*but not a Capital.  
\*\*Subsector or Sector Capital.

## Z TRAVEL ZONES

Zone	TC	Condition
G	Green	
A	Amber	Da Dangerous
A	Amber	Pz Puzzling
R	Red	Fo Forbidden
Da if (pop 0-6 or Gov+LL).		
Pz if not (pop 0-6 or Gov+LL).		
Fo= Forbidden.		
<b>Government and Law Level</b>		
If Gov+LL is 20 or greater, impose Amber Zone (Da).		
If Gov+LL is 22 or greater, impose Red Zone.		

**Class X Starport**  
is almost always Red Zone.

## A ALLEGIANCE

Code	Description
Im	Imperial
Cs	Client State
Na	Non Aligned
Va	Vargr
As	Aslan
Zh	Zhodani
So	Solomani
Kk	K'kree
Hv	Hiver

Other abbreviations are possible.

## B BASES

Code	Description	Base Present If 2D=			
		D	C	B	A
N	Naval Base	-	-	5 -	6 -
Naval Base supports routine naval ship operations.					
S	Scout Base	7 -	6 -	5 -	4 -
Scout Base supports routine scout ship operations.					
D	Naval Depot	-	-	-	(*)
*1 per 1000 worlds					
Depot is a system-encompassing naval fleet base.					
W	Way Station	-	-	-	(**)
** 1 per 50 parsecs on trade route					
Way Station is scout communications relay station.					
Other bases may be established as exceptions: Military, Scientific, Diplomatic, and Cultural.					

## NIL NATIVE INTELLIGENT LIFE

Pop	Atm	TL	Inhabitants	
0	2-9	DEF	0	Extinct Natives
Intelligent Life evolved here, but now extinct.				
0		ABC	0	Extinct Exotic Natives
Intelligent Life evolved here, but now extinct.				
0	2-9	DEF	1+	Catastrophic XN
Evidence of Extinct Natives remains.				
0		ABC	1+	Catastrophic EXN
Evidence of Exotic Extinct Natives remains.				
1-2-3	(any)		1+	Transients
Temporary commercial or scientific activity.				
4-5-6	(any)		1+	Settlers
The initial steps of creating a colony.				
7+	0-1		1+	Transplants
Current locals evolved elsewhere.				
0	0-1		1+	Vanished Transplants
Evidence of Transplants, no longer present.				
7+	ABC		1+	Exotic Natives
Environment incompatible with humans				
			1+	Natives
Intelligent Life evolved on this world.				
				Corporate
Locals are employees from elsewhere.				
				Colonists
Locals are colonists from another world.				
Sophonts that evolved on the Homeworld are Natives, identified as "of" a homeworld.				
All other sophonts are identified as "from" a different (native) homeworld.				

## 1 GENERATE SYSTEM STARS

Flux	P	C	N	F	Companion
-4	P	--	--	--	--
-3	P	--	--	--	--
-2	P	--	--	--	--
-1	P	--	--	--	--
0	P	--	--	--	--
+1	P	--	--	--	--
+2	P	--	--	--	--
+3	P	C	N	F	Companion
+4	P	C	N	F	Companion
+5	P	C	N	F	Companion

Primary is always present.  
Flux for Close, Near, and Far stars in the system. Flux for Companions for each Star present.  
P=Primary. C=Close.  
N=Near. F=Far

## 2 SPECTRAL TYPE AND SIZE

Flux	Sp	O	B	A	F	G	K	M
-6	OB	Ia	Ia	Ia	II	II	II	II
-5	A	Ia	Ia	Ia	II	II	II	II
-4	A	Ib	Ib	Ib	III	III	III	II
-3	F	II	II	II	IV	IV	IV	II
-2	F	III	III	III	V	V	V	III
-1	G	III	III	IV	V	V	V	V
0	G	III	III	V	V	V	V	V
+1	K	V	III	V	V	V	V	V
+2	K	V	V	V	V	V	V	V
+3	M	V	V	V	V	V	V	V
+4	M	IV	IV	V	VI	VI	VI	VI
+5	M	D	D	D	D	D	D	D
+6	BD	IV	IV	V	VI	VI	VI	VI
+7	BD	IV	IV	V	VI	VI	VI	VI
+8	BD	IV	IV	V	VI	VI	VI	VI

HZ orbits by Star shown on H1 J1 K1.

Size IV not for K5-K9 and M0-M9.  
Size VI not for A0-A9 and F0-F4.

**OB.** Select further between O or B.

**Spectral Type:** Roll Flux for Primary.

For all others, Primary Flux + (1D-1).

**Spectral Decimal.** Roll decimal 0 to 9.

**Stellar Size.** Roll Flux for Primary.

For all others, use Primary Flux + (1D+2).

If Size= D, ignore Spectral Decimal.

If Spectral= BD ignore remaining rolls.

## 3 PLACE STARS IN ORBITS

Primary = at center of System.

Companion = Inside Orbit 0.

Close= 1D -1. Orbits=0-1-2-3-4-5

Near= 5 +1D. Orbits=6-7-8-9-10-11

Far= 11 +1D. Orbits=12-13-14-15-16-17

Create Gas Giants and place them in orbits on the System Fillform. Fill other orbits with Other Worlds.

## P1 PLACING WORLDS

Place Mainworld If Satellite, place GG in MW Orbit.  
If Satellite and No Giants, place a BigWorld in MW Orbit.  
If Asteroid Belt, place as Belt without regard to HZ.

Place Gas Giants Rotate Placement Per Star.

Place Planetoid Belts Rotate Placement Per Star.

Place Other Worlds Rotate Placement Per Star, place worlds using P2 World1 Column.  
Last World, place using P2 World2 Column.

### OTHER WORLDS

Subject to  
Max Pop = MW Pop - 1.  
St= Spaceport.

Hospitable= StSAHPGL-T  
Planetoids= St000PGL-T  
Iceworld= StSAHPGL-T  
Pop= DM - 6  
RadWorld= StSAH000-0  
Siz= 2D  
Inferno= YSB0000-0  
Siz= 6+ 1D  
BigWorld= StSAHPGL-T  
Siz= 2D +7  
any with Siz= B+ is BW.  
Worldlet= StSAHPGL-T  
Siz= 1D - 3  
Inner World StSAHPGL-T  
Pop= DM - 4  
Hyd= DM - 4  
Stormworld StSAHPGL-T  
Siz= 2D Atm= DM +4  
Hyd= DM - 4 Pop= DM - 6

## GG GAS GIANTS

	2D	Size	Diameter	Type	G
SGG	1	L	20,000		.2
	2	M	30,000	Neptune	.3
	3	N	40,000		.4
	4	P	50,000		.5
LGG	5	Q	60,000		.6
	6	R	70,000	Saturn	.7
	7	S	80,000		.8
	8	T	90,000	Jupiter	.9
	9	U	125,000	2 Mj	1.2
	10	V	180,000	4 Mj	1.8
	11	W	220,000	6 Mj	2.2
	12	X	250,000	8 Mj	2.5
	13	Y	250,000	>10 Mj	3.0

Mj= Jupiter Masses. Diameter= in miles  
All BD Brown Dwarfs are Siz=Y.  
Convert every second SGG Small Gas Giant to IG Ice Giant (same size).

## P2 BASIC PLACEMENT CHART

2D	LGG	SGG	IG	Belt	World1	World2
1	-4	-3	HZ	-2	11	18
2	-3	-2	+1	-1	10	17
3	-2	-1	+2	HZ	8	16
4	-1	HZ	+3	+1	6	15
5	HZ	+1	+4	+2	4	14
6	+1	+2	+5	+3	2	13
7	+2	+3	+6	+4	0	12
8	+3	+4	+7	+5	1	11
9	+4	+5	+8	+6	3	10
10	+5	+6	+9	+7	5	9
11	+6	+7	+10	+8	7	8
12	+7	+8	+11	+9	9	7

GG and Belt placement is based on HZ.

World placement is based on Orbit.  
If an orbit is duplicated or precluded, adjust to an adjacent or the closest possible orbit.

**Gas Giant Skimming:** Ship's G must exceed GG Size/100.

### Inner and Hospitable

=HZ-1, HZ, HZ+1

### =- HZ, HZ

1D Description
1 Worldlet
2 Inferno
3 Inner World
4 BigWorld
5 StormWorld
6 RadWorld

### Outer Worlds

=beyond HZ+1.

### +HZ

1D Description
1 Worldlet
2 Iceworld
3 Iceworld
4 BigWorld
5 Iceworld
6 Radworld

### HOSPITABLE SATELLITES

1D Description
1 Worldlet
2 Inferno
3 Inner World
4 BigWorld
5 StormWorld
6 RadWorld
7 Bigworld

### OUTER SATELLITES

1D Description
1 Worldlet
2 Worldlet
3 Iceworld
4 Iceworld
5 Stormworld
6 Radworld
7 Bigworld

## W WORLDS Total Worlds in the System=

MW = MainWorld  
GG = Gas Giants (includes Ice Giants)  
Belts = Planetoid Belts  
Does not include Worldlets and Satellites (except if MainWorld is a Satellite).

### MW + GG + Belts + 2D

## HZ HABITABLE ZONE ORBITS

	Ia	Ib	II	III	IV	V	VI	D
O	15	15	14	13	12	11	-	1
B	13	13	12	11	10	9	-	0
A	12	11	9	7	7	7	-	0
F	11	10	9	6	6	5	3	0
G	12	10	9	7	5	3	2	0
K	12	10	9	8	5	2	1	0
M	12	11	10	9		0	0	0

Habitable Zone (HZ) orbit number indicates a world surface environment hospitable to humans and similar. Orbit 0 or 1 is a Tz Twilight Zone World.

## S NUMBER OF SATELLITES

For Each World in the System=

Gas Giants=	1D-1
Inners =	1D-5
Hospitable=	1D-4
Outers=	1D-3

= total satellites for the world.  
Zero=Ring and reroll.  
Less than 0=none.

# H1

## WORLDGEN INNER SYSTEM

Quick reference  
to Inner System  
HZ and distances.

### 100D JUMP DRIVE LIMIT

	Ia	Ib	II	III	IV	V	VI	D
A0	10	9	7	6	5	5		*
A5	10	9	7	5	4	4		*
F0	11	9	7	5	4	3		*
F5	11	9	7	5	4	3	3	*
G0	11	10	8	6	4	2	2	*
G5	12	10	8	7	4	2	1	*
K0	12	11	9	7	5	2	0	*
K5	13	12	10	9		1	0	*
M0	14	13	11	9		1	0	*
M5	15	14	13	11		0	*	*
M9	15	15	13	12		*	*	*

Jump (Hop Skip Vault) Drives cannot operate within 100D of a gravity source.

### 10D GRAVITIC DRIVE LIMIT

	Ia	Ib	II	III	IV	V	VI	D
A0	7	5	4	1	1	0		*
A5	7	5	3	1	0	*		*
F0	7	6	3	1	0	*		*
F5	7	6	4	1	0	*	*	*
G0	8	6	4	1	0	*	*	*
G5	9	7	5	3	0	*	*	*
K0	10	7	6	3	0	*	*	*
K5	10	8	7	5		*	*	*
M0	11	10	8	6		*	*	*
M5	11	11	9	8		*	*	*
M9	12	11	10	8		*	*	*

Gravitic Drives cannot operate beyond 10D of a gravity source.

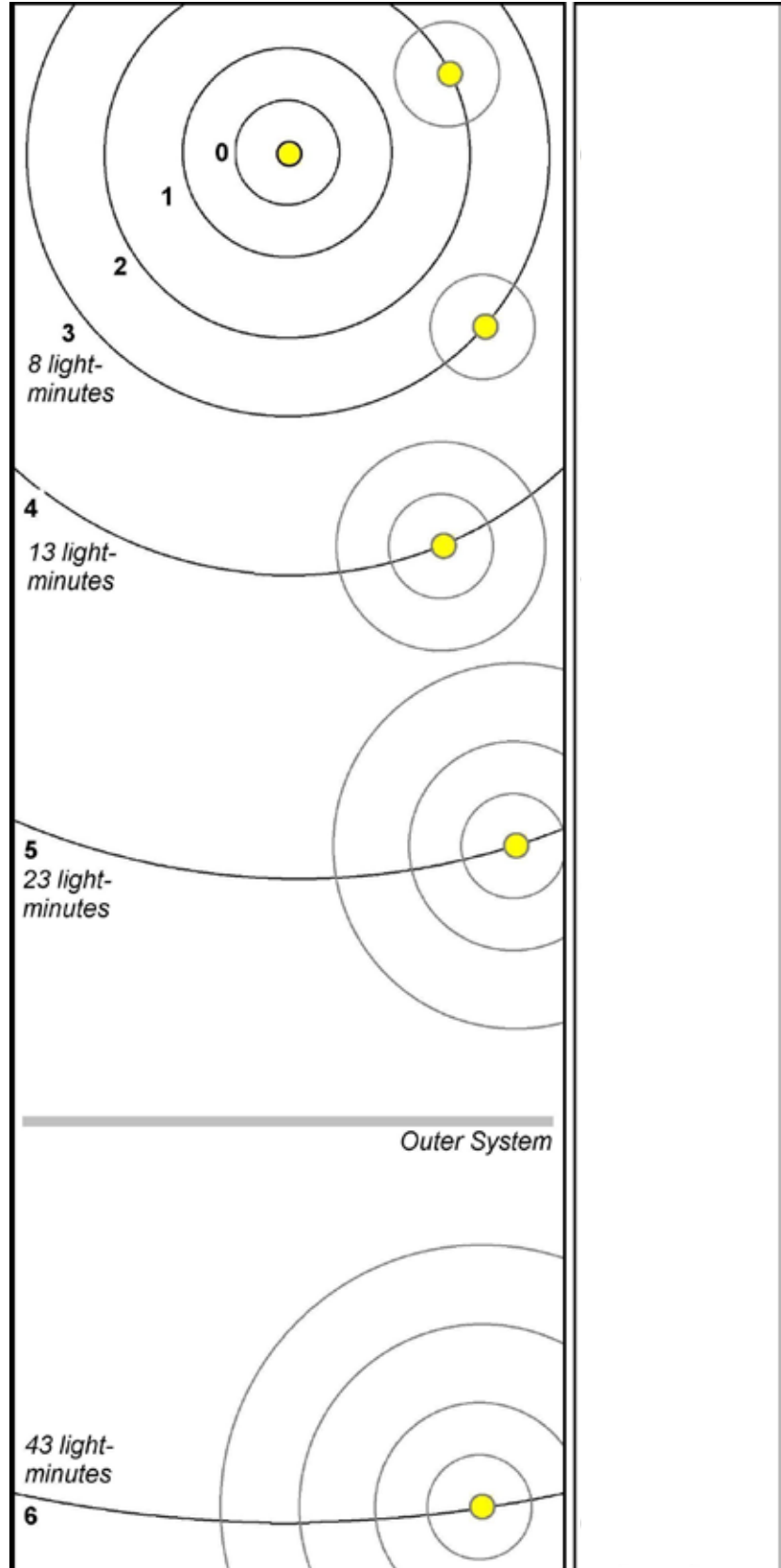
\* = inside Orbit 0.

Blank (K5-M9 IV, A0-F4 VI) Not possible.

### HZ HABITABLE ZONE ORBITS

	Ia	Ib	II	III	IV	V	VI	D
O	15	15	14	13	12	11	-	1
B	13	13	12	11	10	9	-	0
A	12	11	9	7	7	7	-	0
F	11	10	9	6	6	5	3	0
G	12	10	9	7	5	3	2	0
K	12	10	9	8	5	2	1	0
M	12	11	10	9		0	0	0

Habitable Zone (HZ) orbit number indicates a world surface environment hospitable to humans and similar. Orbit 0 or 1 is a Tz Twilight Zone World.





# J1

## WORLDGEN OUTER SYSTEM

Quick reference  
to Outer System  
HZ and distances.

### 100D JUMP DRIVE LIMIT

	Ia	Ib	II	III	IV	V	VI	D
A0	10	9	7	6	5	5		*
A5	10	9	7	5	4	4		*
F0	11	9	7	5	4	3		*
F5	11	9	7	5	4	3	3	*
G0	11	10	8	6	4	2	2	*
G5	12	10	8	7	4	2	1	*
K0	12	11	9	7	5	2	0	*
K5	13	12	10	9		1	0	*
M0	14	13	11	9		1	0	*
M5	15	14	13	11		0	*	*
M9	15	15	13	12		*	*	*

Jump (Hop Skip Vault) Drives cannot operate within 100D of a gravity source.

### 10D GRAVITIC DRIVE LIMIT

	Ia	Ib	II	III	IV	V	VI	D
A0	7	5	4	1	1	0		*
A5	7	5	3	1	0	*		*
F0	7	6	3	1	0	*		*
F5	7	6	4	1	0	*	*	*
G0	8	6	4	1	0	*	*	*
G5	9	7	5	3	0	*	*	*
K0	10	7	6	3	0	*	*	*
K5	10	8	7	5		*	*	*
M0	11	10	8	6		*	*	*
M5	11	11	9	8		*	*	*
M9	12	11	10	8		*	*	*

Gravitic Drives cannot operate beyond 10D of a gravity source.

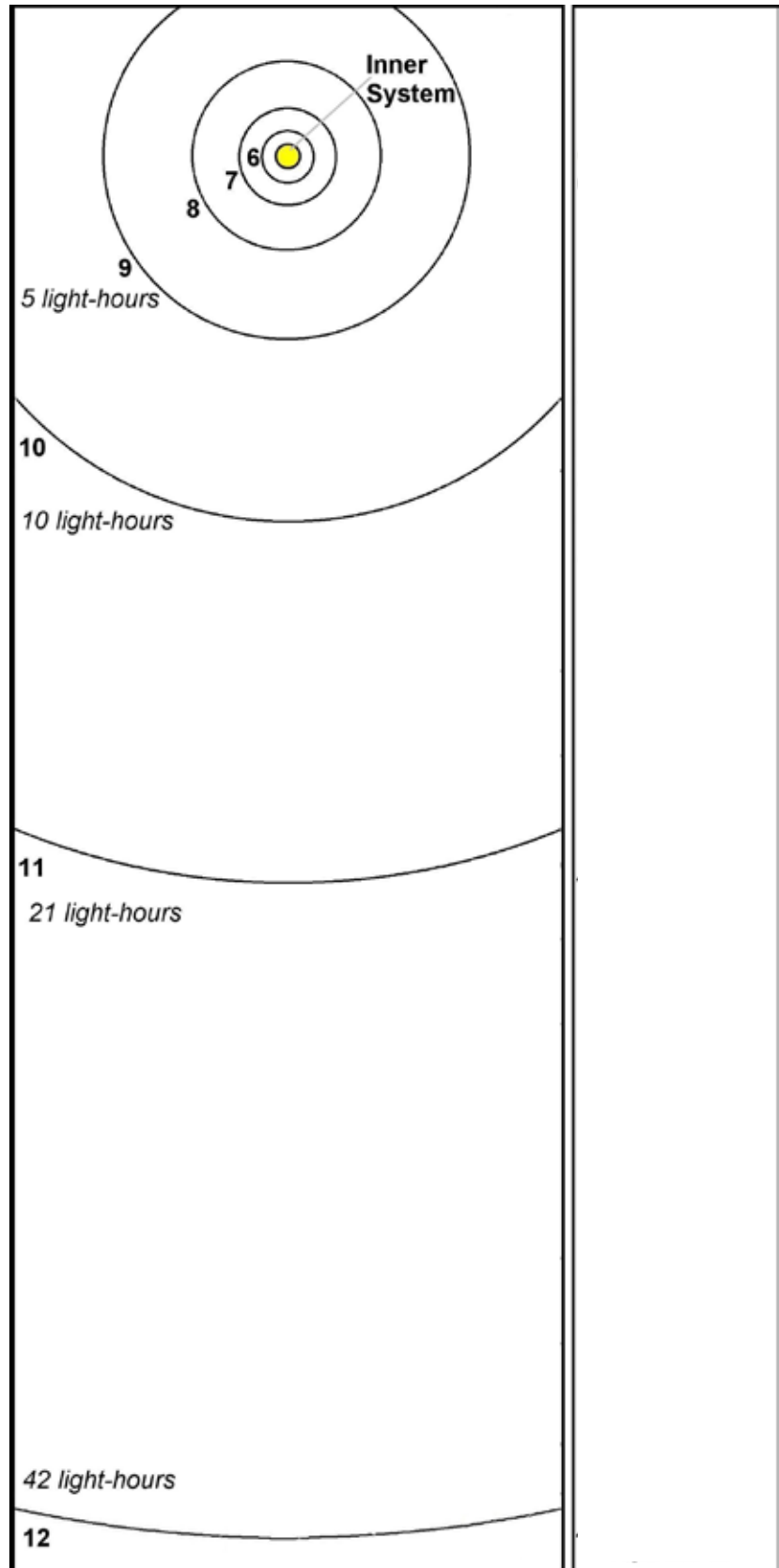
\* = inside Orbit 0.

Blank (K5-M9 IV, A0-F4 VI) Not possible.

### HZ HABITABLE ZONE ORBITS

	Ia	Ib	II	III	IV	V	VI	D
O	15	15	14	13	12	11	-	1
B	13	13	12	11	10	9	-	0
A	12	11	9	7	7	7	-	0
F	11	10	9	6	6	5	3	0
G	12	10	9	7	5	3	2	0
K	12	10	9	8	5	2	1	0
M	12	11	10	9		0	0	0

Habitable Zone (HZ) orbit number indicates a world surface environment hospitable to humans and similar. Orbit 0 or 1 is a Tz Twilight Zone World.





# K1

## WORLDGEN REMOTE SYSTEM

Quick reference  
to Remote System  
HZ and distances.

### 100D JUMP DRIVE LIMIT

	Ia	Ib	II	III	IV	V	VI	D
A0	10	9	7	6	5	5		*
A5	10	9	7	5	4	4		*
F0	11	9	7	5	4	3		*
F5	11	9	7	5	4	3	3	*
G0	11	10	8	6	4	2	2	*
G5	12	10	8	7	4	2	1	*
K0	12	11	9	7	5	2	0	*
K5	13	12	10	9		1	0	*
M0	14	13	11	9		1	0	*
M5	15	14	13	11		0	*	*
M9	15	15	13	12		*	*	*

Jump (Hop Skip Vault) Drives cannot operate within 100D of a gravity source.

### 10D GRAVITIC DRIVE LIMIT

	Ia	Ib	II	III	IV	V	VI	D
A0	7	5	4	1	1	0		*
A5	7	5	3	1	0	*		*
F0	7	6	3	1	0	*		*
F5	7	6	4	1	0	*	*	*
G0	8	6	4	1	0	*	*	*
G5	9	7	5	3	0	*	*	*
K0	10	7	6	3	0	*	*	*
K5	10	8	7	5		*	*	*
M0	11	10	8	6		*	*	*
M5	11	11	9	8		*	*	*
M9	12	11	10	8		*	*	*

Gravitic Drives cannot operate beyond 10D of a gravity source.

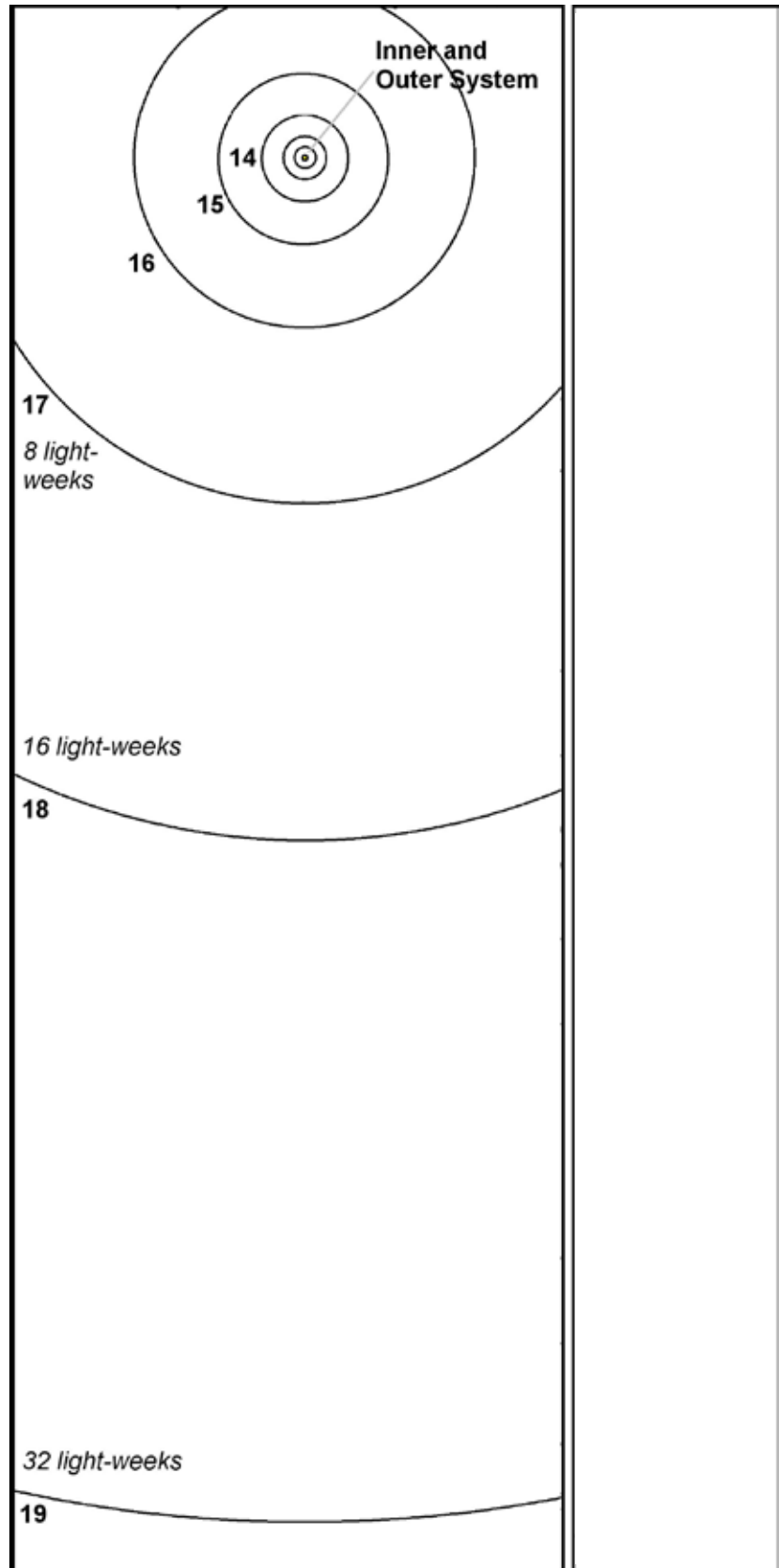
\* = inside Orbit 0.

Blank (K5-M9 IV, A0-F4 VI) Not possible.

### HZ HABITABLE ZONE ORBITS

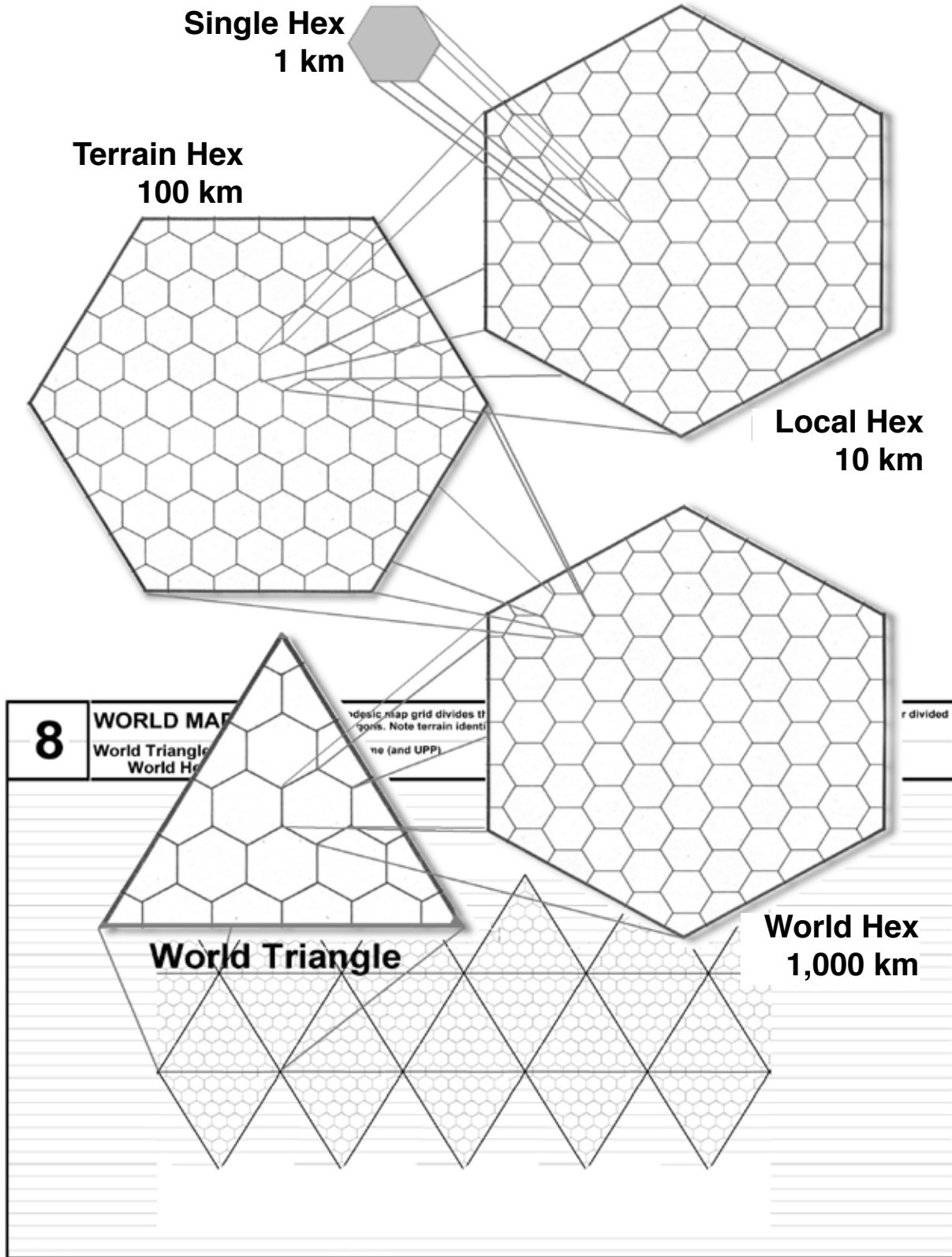
	Ia	Ib	II	III	IV	V	VI	D
O	15	15	14	13	12	11	-	1
B	13	13	12	11	10	9	-	0
A	12	11	9	7	7	7	-	0
F	11	10	9	6	6	5	3	0
G	12	10	9	7	5	3	2	0
K	12	10	9	8	5	2	1	0
M	12	11	10	9		0	0	0

Habitable Zone (HZ) orbit number indicates a world surface environment hospitable to humans and similar. Orbit 0 or 1 is a Tz Twilight Zone World.









# World Mapping

Surface features of worlds are key to travel, exploration, and exploitation. Worlds are mapped using as 20-sided polygons (approximating globes) further divided into hexagons in specific scales and containing informative terrain symbols.

World mapping divides the surface of a world into a series of hexagons (hexes) which define location and help in computing movement. Worlds are mapped with coarse scale World Hexes grouped into triangles to form a hexagon-based world map.

**Hex Size.** Hex size (or hex diameter) reflects the distance from the center of a hex to the center of an adjacent similarly sized hex. Hexes are universally even decimal multiples of meters (100 meters, 1,000 meters, 10 kilometers, and 1 km).

**The Poles.** Worlds are spinning spheres with their poles as their axes of rotation. The North Pole of a world is its axis of counter-clockwise rotation if viewed from above the pole; the South Pole is the axis of clockwise rotation.

## THE TRAVELLER MAPPING SYSTEM

Worlds (planets or satellites) are mapped with a hierarchy of hexes which record location, terrain, and other details.

**Mapped Using Hexagons.** Mapping is based on six-sided hexagons. Hexagon cells for mapping have long been a foundation of wargaming. They allow more flexibility than square based mapping: distance can be counted more easily and more accurately, and more directions of movement are possible.

**Mapped Using Terrain Symbols.** Each hex is a general geographic (or planetographic) location identified by one of more terrain symbols.

**Mapped In A Hierarchy Of Scales.** The basic and coarsest scale for world surface hexes is 1,000 km. Each such can be further detailed in successively smaller scale hexes: 100 km, 10 km, and even 1 km in diameter.

## The Scale Hierarchy

The **Traveller Mapping System (TMS)** is a hierarchy of hexagon-based maps created to describe and detail worlds as the information is needed in the course of adventures.

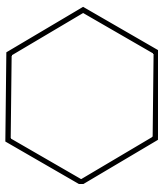
The TMS hierarchy consists of:

**The World Map.** The World Map is a flattened icosahedron (a twenty-sided regular polygon; the same shape as a 20-sided die) to represent the spherical world surface.

The twenty triangles of the icosahedron are flattened into a map for ease of printing and reading.

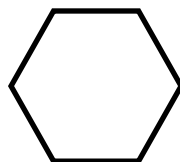
On this map, the top is the North Pole (the bottom is the South Pole) and the left (West) side wraps to touch the right

## HEXAGON TYPES



Horizontal

Mapping hexagons (hexes) may be horizontal (the flat edges are on the left and right) or vertical (the flat edges are on the bottom and the top).



Vertical

(East) side. The East and West edge triangles are divided to more easily fit on the page.

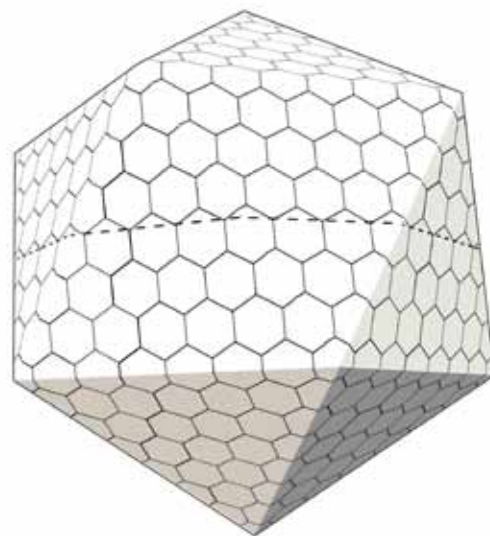
**The World Triangle.** Each of the triangles of the World Map is (roughly) a Continent or an Ocean.

**The World Hex (1000 km).** The surface of the world is divided into World Hexes of constant size: 1000 km in diameter. While all worlds have the same number of World Triangles (twenty), larger worlds have more World Hexes than smaller worlds.

**The Terrain Hex (100 km).** The World Hex is divided into 75 Terrain Hexes. Each is 100 km in diameter and allows recording or interacting with terrain in greater detail.

**The Local Hex (10 km).** The Terrain Hex is divided into 75 Local Hexes. Each is 10 km in diameter and allows very fine scale mapping of locations.

## THE WORLD MAP FOLDED UP



**The Single Hex (1 km).** The Local hex is divided into 75 Single Hexes, each 1 km in diameter. The Single Hex is the ultimate mapping hex.

**Pents.** Technically, the hexagons where five Triangles meet are pentagons (pents). They are treated in most respects like World Hexes.

There are twenty pents on a World Map.

**Movement Using The TMS Traveller Mapping System.**

TMS allows easy distance counting. All hex distances are multiples of 10 km. A route counted in World Hexes gives the distance in thousands of kilometers; a route counted in Terrain Hexes gives the distance in hundreds of kilometers.

**Tracing Routes.** Any number of routes can be traced from center-of-hex to center-of-hex.

**Crossing Gaps.** The gaps between World Triangles are zero-distance. A route can be traced across a gap to the other half of a hex with no additional distance cost.

**TERRAIN**

Terrain is basic nature of an individual hex, and it may be affected by other features. A road through a hex adds specificity to a hex, but does not change its basic nature.

Terrain governs, enhances, or obstructs movement; it identifies resources; it shows points of interest or danger.

**Terrain Types.** A selection of 36 Terrain types details most surface feature situations to be encountered.

**Terrain Symbols.** The Terrain Symbol chart provides

hand-drawing compatible map symbols for use with TMS.

**Terrain Numbers.** The 36 Terrain Types are also identified by numbers using only the digits 1 through 6. The available numbers 11 through 66 can be generated randomly (when needed) using two dice.

**Terrain Effects.** The specific effects of terrain are detailed in the Terrain chapter.

**MAPPING WORLDS**

Worlds are mapped using the principles and charts of the **Traveller Mapping System**.

**The Three Mapping Principles**

The **TMS** is based on three Principles.

**MOARN Map Only As Really Necessary.**

**Map At The Highest Possible Scale.**

**Involve The Players.**

**MOARN Map Only As Really Necessary.** The charts allow random selection of hexes with a few die rolls. Do not create comprehensive maps before they are needed.

Characters on a ship entering a system can consult a UWP and databases for a general concept of the local world. The UWP provides basic information for most purposes.

**Map At The Highest (or Coarsest) Scale Possible.**

Because terrain can be created as needed, reference maps for players can enough to provide them information without

**CREATING WORLD MAPS**

The Mapping Charts detail the mapping process.

- Chart 01. World Dimensions
- Chart 02. The World Map (Example)
- Chart 03. The World Triangles.
- Chart 04. The World Hex.
- Chart 05. The Terrain Hex.
- Chart 06. The Local hex.
- Chart 07. The Single Hex.
- Chart 08. Terrain Types.
- Chart 09. Terrain Symbols (by hand).
- Chart 10. Randomly Selecting Places.
- Chart 11. Creating World Maps.
- Chart 12a. Populating World Hexes-1.
- Chart 12b. Populating World Hexes-2.
- Chart 13a. Populating Terrain Hexes-1.
- Chart 13b. Populating Terrain Hexes-2.
- Chart 14a. Populating Local Hexes-1.
- Chart 14b. Populating Local Hexes-2.

The Maps include:

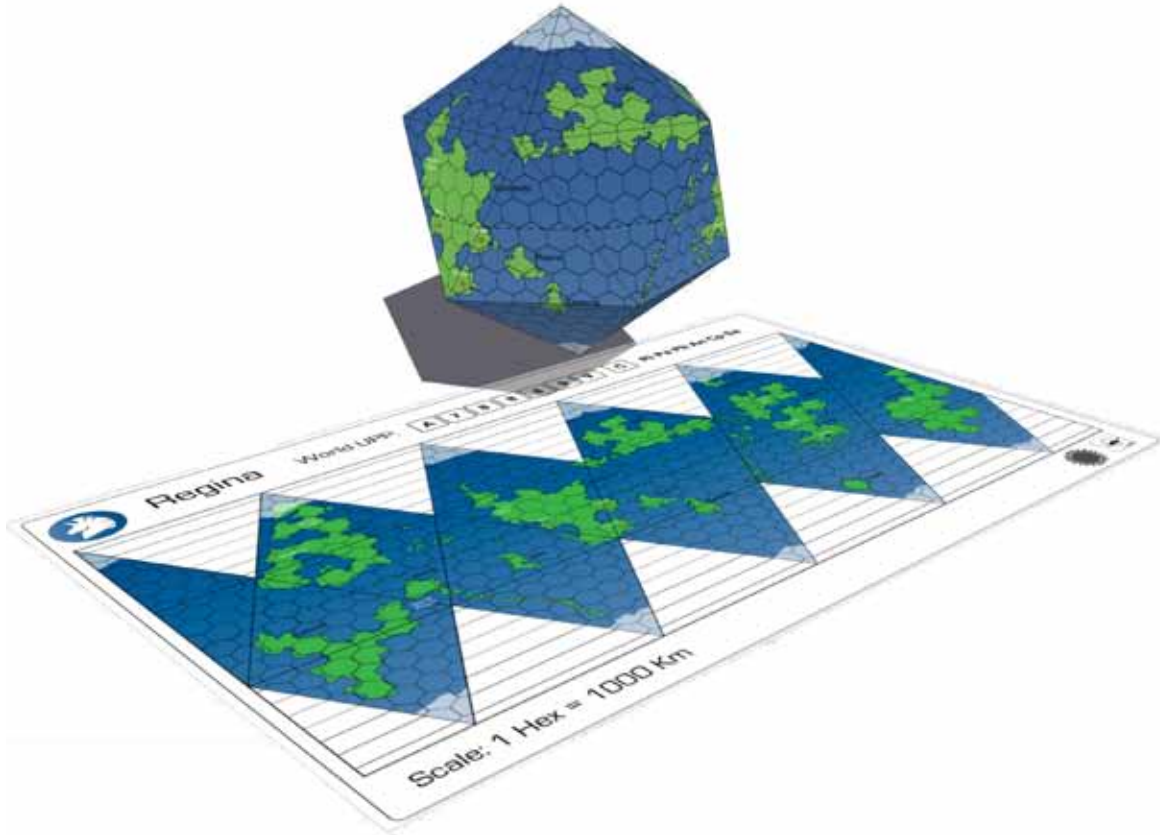
- Map 01 Map Size 01- 1,000 mile diameter
- Map 02 Map Size 01- 2,000 mile diameter
- Map 03 Map Size 01- 3,000 mile diameter
- Map 04 Map Size 01- 4,000 mile diameter
- Map 05 Map Size 01- 5,000 mile diameter
- Map 06 Map Size 01- 6,000 mile diameter
- Map 07 Map Size 01- 7,000 mile diameter
- Map 08 Map Size 01- 8,000 mile diameter
- Map 09 Map Size 01- 9,000 mile diameter
- Map 10 Map Size 01- 10,000 mile diameter
- Map 11 Map Size 01- 11,000 mile diameter
- Map 12 Map Size 01- 12,000 mile diameter
- Map 15 Map Size 01- 15,000 mile diameter
- Map 20 Map Size 01-20,000 mile diameter

**TERRAIN TYPES BY NUMBER**

TERRAIN TYPES BY NUMBER						Special Terrain Types		
1	2	3	4	5	6	7	8	9
1 Clear	Mountain	Ocean	Baked Land	City	Highway	Ocean Depth	Volcano	Airpad
2 Marsh	Desert	Islands	Twilight	Dome	Road	Abyss	Estate	Vlite Airstrip
3 Rough	Chasm	Shore	Frozen Land	Arcology	Trail	Caverns	Reserve	Lite Airstrip
4 Woods	Cropland	River	Ice Field	Suburbs	Air Corridor	Crater	Mine	Airport
5 Swamp	Rural	Lake	Precipice	Town	Grid	Wasteland	Resource	Hvy Airport
6 Rough Wood	Ruins	Icecap	Exotic	Starport	HighSpeed	Penal	Oil	Hvvy Airport

Randomly select a terrain type with dice using this table.

This table does not produce coherent terrain relationships: it produces a random terrain type.



needless detail.

The twenty triangles of a World Map can give a basic idea of continents and oceans. More detail and specific maps are called for only when the characters see a need.

**Involve The Players.** When map details are required, recruit the players to make die rolls which locate or identify terrain or details.

When a character says, "I want to see more near our destination," he becomes more involved in the process. Scanners, world maps in Library Data, or conversations with non-player characters can provide the needed information. Once that process has been resolved, the referee provides a blank World (or Terrain, or Local) Hex map and the player, with guidance from the referee, creates and enters the information on the map.

### **The Referee's Responsibility**

The referee can (and should) determine specific terrain details which are important to an adventure: the location and surrounds of strategic base the enemy will defend, or the details of the strange alien city at the edge of the remote system.

But, the other details: the other worlds in the system, the terrain near the starport, or strange mountain valleys along the way are all easily generated by involving the players as the information becomes necessary.

The Three Principles have benefits for the Referee. The burden of creating terrain is shared with the players, and

when used properly transforms from a burden to an element of the adventure. Each new element of terrain involves the players and their imaginations; it is often the players who then say, "Let's see what is past that hill." Or "Why is that valley so long?" and those questions provide more support for an interesting adventure.

### **Absolute Mapping**

It is possible to begin with a blank map and follow the process to completely define every hex and all terrain for a world. The charts make this process possible. Chart 10 governs creating the World Map, and Chart 11 governs filling in the Terrain Hexes of a World Hex.

### **Sensor Mapping**

Space Sensors can provide the information available to for the creation of maps as it becomes available.

At each distance, available sensors produce information (in an interactive process involving the referee, the player, the tables, and dice). The Space Sensors Charts shows the information that ordinary sensors can acquire in the course of observing and investigating a system.

### **HORIZONS**

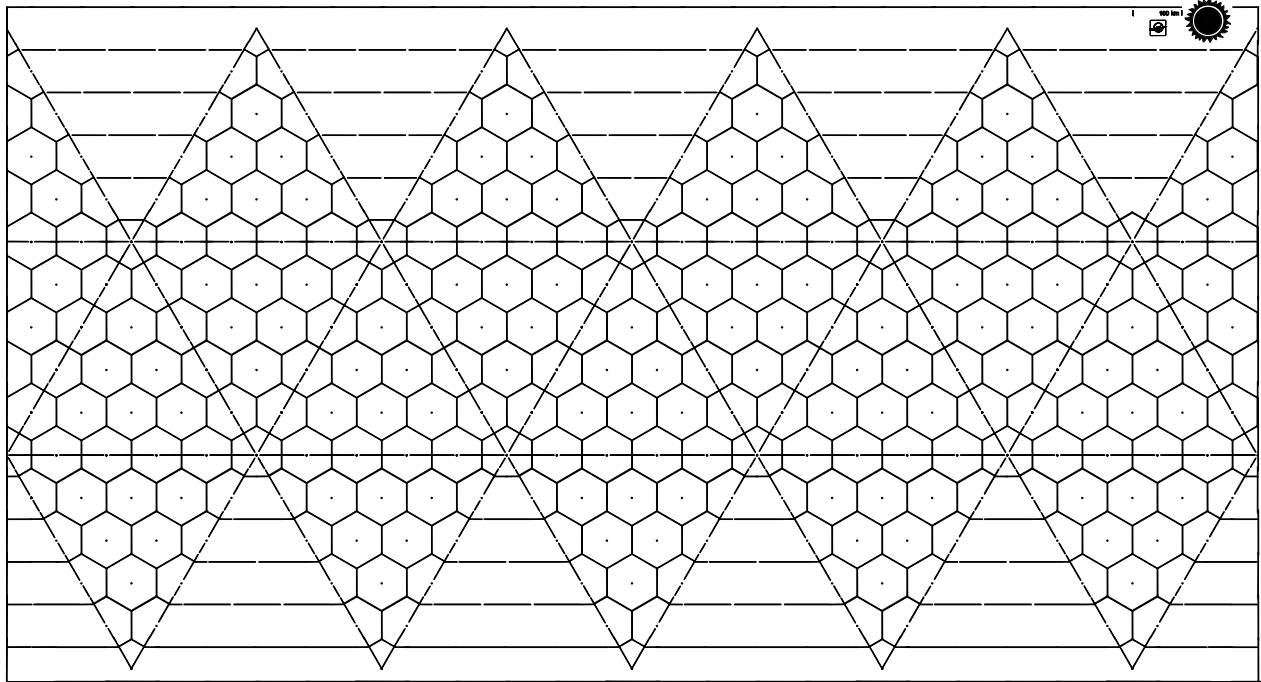
World and hex maps provide essential detail on what can be seen, sensed, or discovered from any specific location. The World, Terrain, and Local Hex charts each provide a Horizon Chart giving the distance to the Horizon.



# 02 The World Map

The Traveller Mapping System uses constant size world hexes to map worlds over a wide range of sizes. The World Map Appendix provides these individual blank maps.

## EXAMPLE: SIZE 5 WORLD MAP



### Example World Map-5

This world is Size=5 (a diameter of 5,000 miles).

Each World Hex is 1,000 km in Diameter.

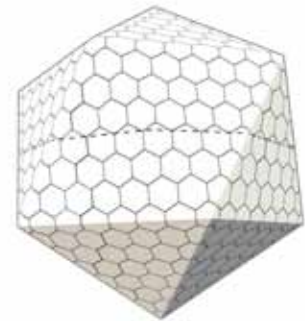
Each World Triangle edge is Size times 1000 km (=5,000 km long), or Size in World Hexes (= 5 World Hexes long).

Equatorial Circumference = World Size times 5 in World Hexes (= 5 x 5 ) = 25 World Hexes.

Equatorial Circumference = World Triangle Edge times 5 (= 5,000 km x 5 ) = 25,000 km.

There are no gaps between the Northern World Triangles; they are merely shown separated for convenience and to lay flat. The same holds for Southern World Triangles. The Northern and Southern World Triangle sets fold to create a sphere. Moving from one edge of a World Triangle to its lateral partner traverses no space and costs no time.

### THE WORLD MAP FOLDED UP





# World Triangle 03

The World Triangle is the basic mapping division of a world's surface.

## THE WORLD TRIANGLE

Worlds (planets, satellites) are mapped using a standard geodesic grid composed on constant size World Hexes.

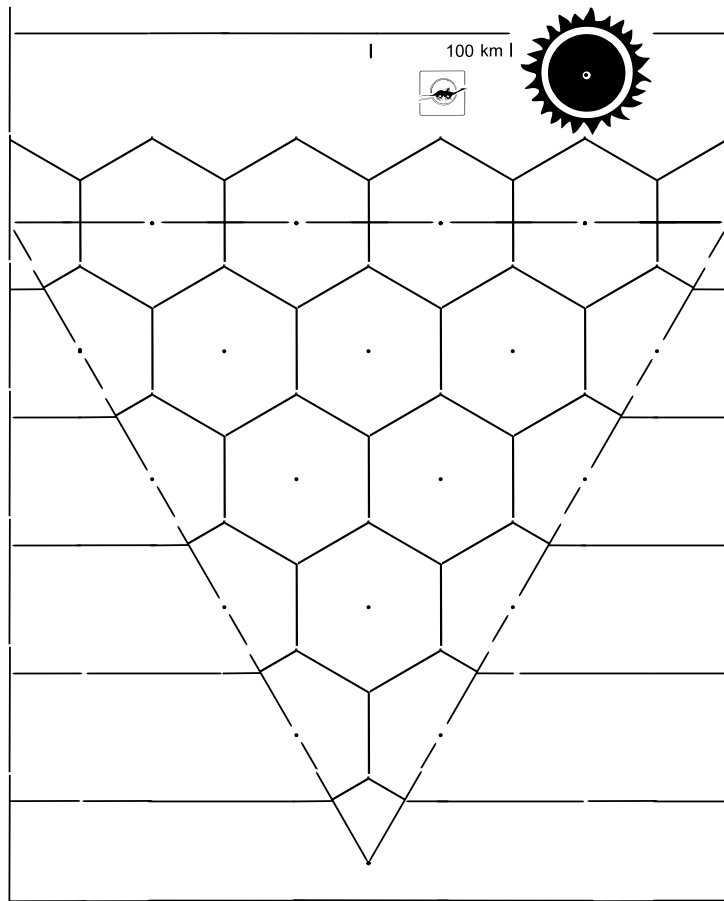
### The World Triangle

Each World is divided into 20 World Triangles, each of which has a number of World Hexes along each edge equal to World Size (ordinarily from 1 for a Size=1 world to 10 for a Size=10 world. Larger worlds possible with the creation system.

**Continental.** The World Triangle is described as Continental in size, a fact which makes the term variable from world to world. Continental can refer to an area as small as a single 1,000 km hex (on a Size-1 world) to the area of a triangle 10,000 km on each edge (on a Size-10 World) or larger.

**Terrain.** World Triangles are not described with Terrain (individual World Hexes are the largest identified by Terrain).

## EXAMPLE: SIZE 5 WORLD TRIANGLE





# 04 World Hex

The World Hex is 1000 km in diameter (count 10 hexes from any edge to any opposite edge).

## THE WORLD HEX

Worlds (planets, satellites) are mapped using a standard geodesic grid composed on constant size World Hexes.

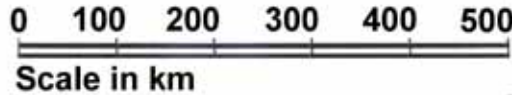
Each World Hex is 1000 km in diameter (from center of the World Hex to the center of an adjacent World Hex).

The World Hex contains 75 Terrain Hexes (61 complete hexes plus 24 half hexes and 6 third hexes).

A Terrain Hex is 100 km in diameter.

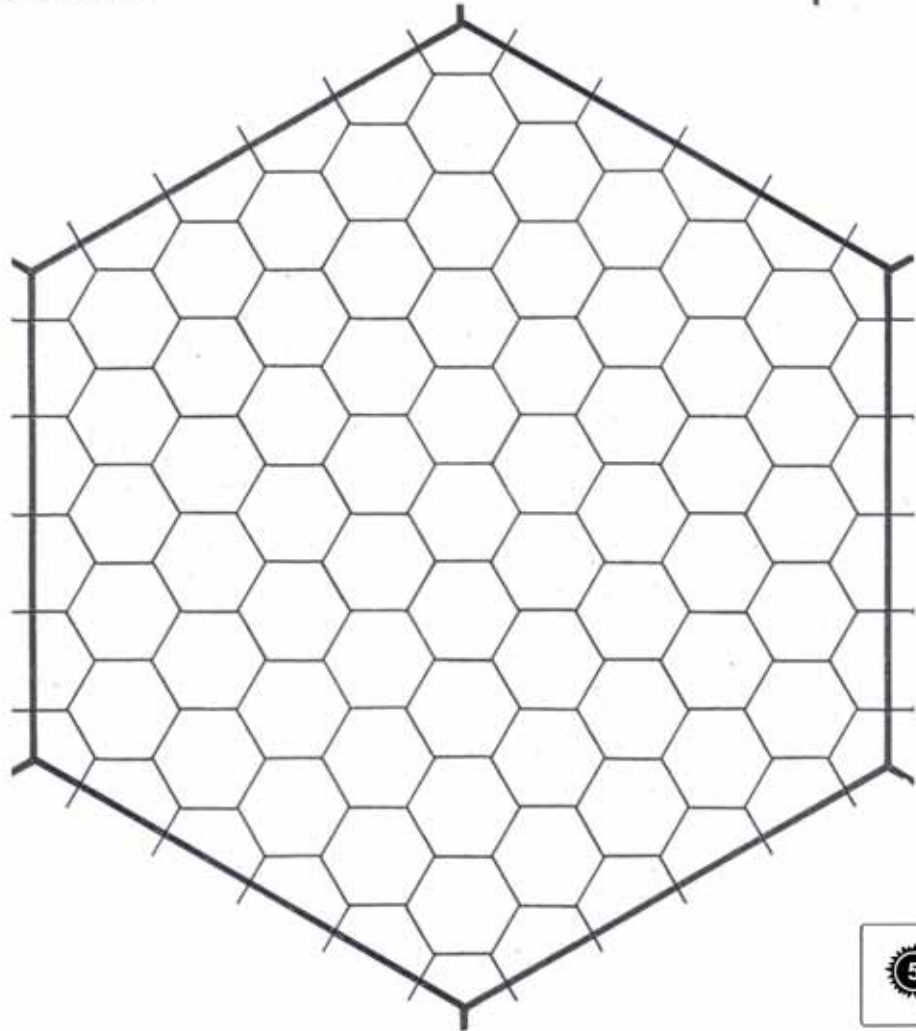
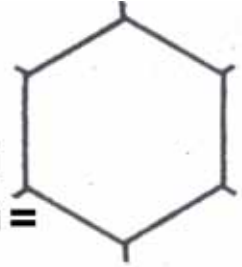
The Terrain within the World Hex is marked as Overall Terrain; terrain within the smaller hexes may vary.

## World Hex



Regional

Overall Terrain =



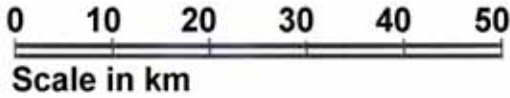




# Terrain Hex 05

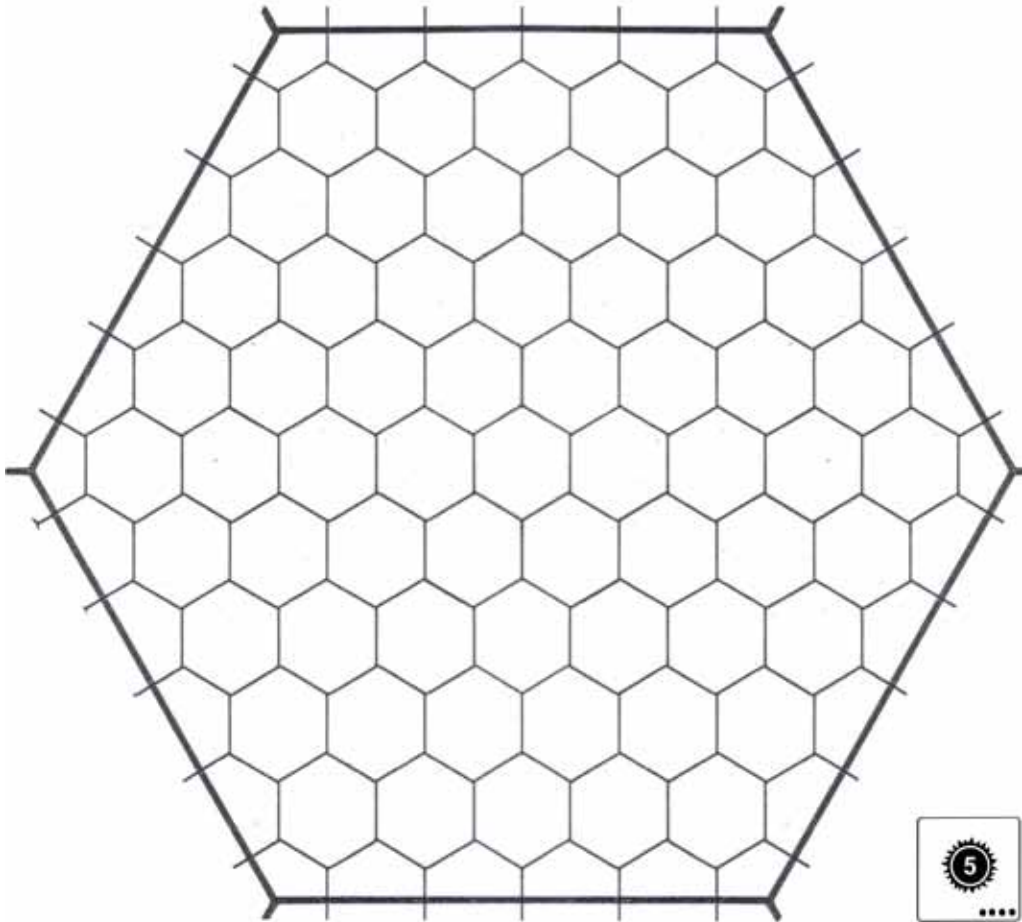
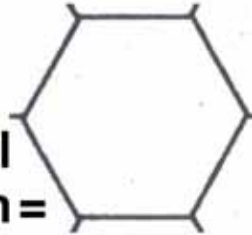
The Terrain Hex is 100 km in diameter (count 10 of 10 km each from any edge to any opposite edge).

## Terrain Hex



Volistant

Overall Terrain =



### THE TERRAIN HEX

World Hexes are divided into constant size Terrain Hexes.

Each Terrain Hex is 100 km in diameter (from the center of the Terrain Hex to the center of an adjacent Terrain Hex).

The Terrain Hex contains 75 Local Hexes (61 complete hexes plus 24 half hexes and 6 third hexes).

A Local Hex is 10 km in diameter.

The Terrain within the Terrain Hex is marked as Overall Terrain; terrain within the smaller hexes may vary.





# 06 Local Hex

The Local Hex is 10 km in diameter (count 10 hexes of 1 km each from any edge to any opposite edge).

### THE LOCAL HEX

Terrain Hexes are divided into constant size Local Hexes.

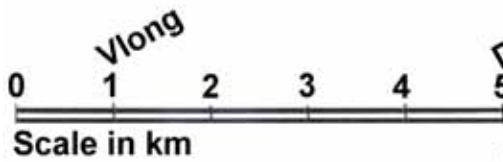
Each Local Hex is 10 km in diameter (from the center of the Local Hex to the center of an adjacent Local Hex).

The Local Hex contains 75 Single Hexes (61 complete hexes plus 24 half hexes and 6 third hexes).

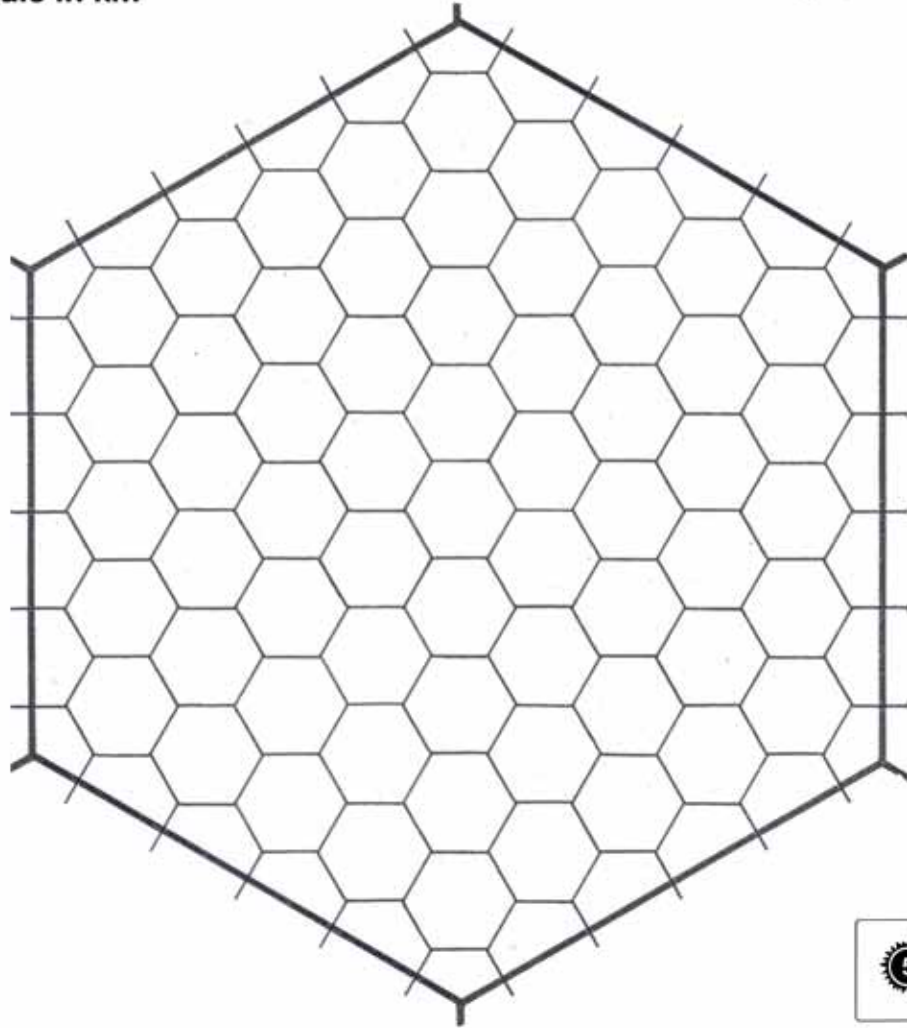
A Single Hex is 1 km in diameter.

The Terrain within the Local Hex is marked as Overall Terrain; terrain within the smaller hexes may vary.

## Local Hex



Overall Terrain =

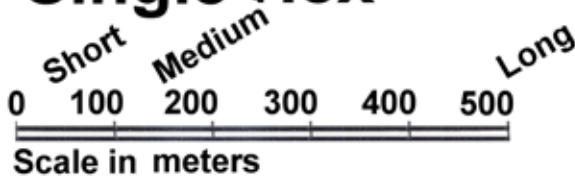




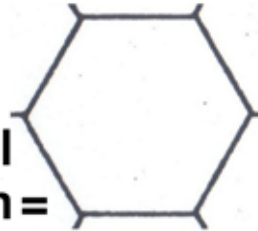
# Single Hex 07

The Single Hex is 1 km in diameter (count 10 hexes of 100 meters from any edge to any opposite edge).

## Single Hex



Overall Terrain =

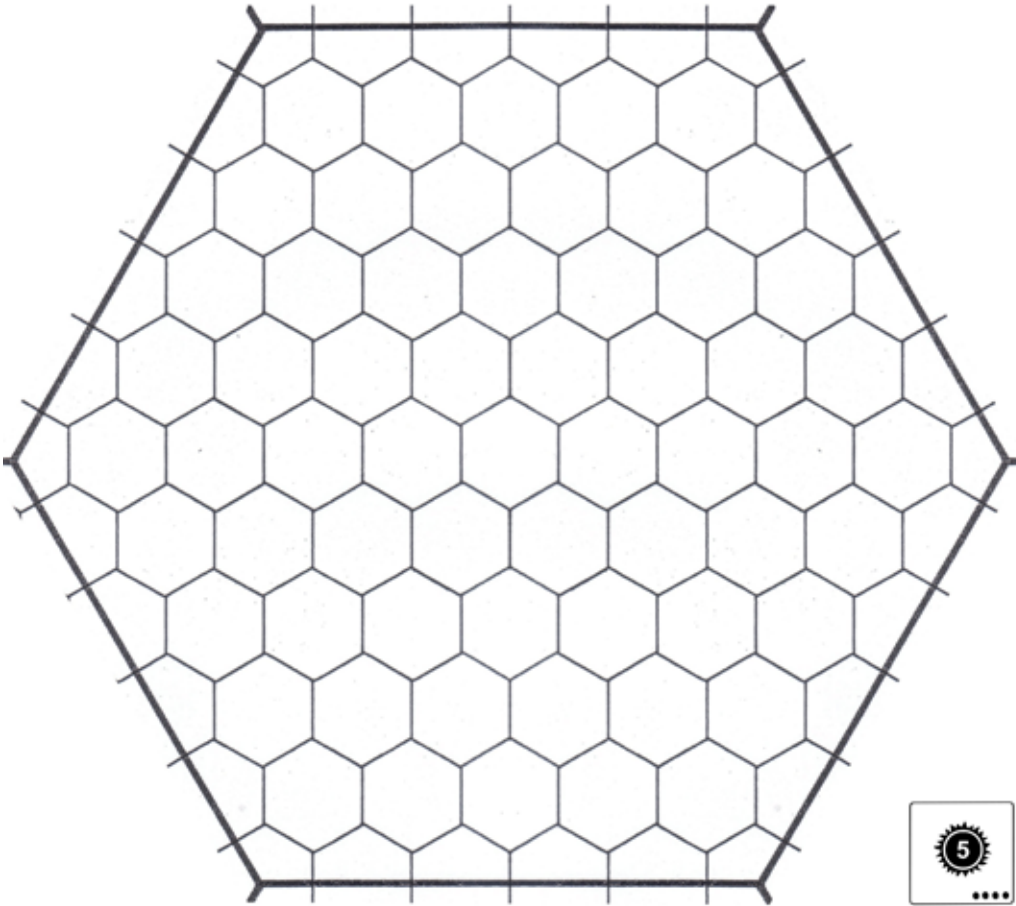


### THE SINGLE HEX

Local Hexes are divided into constant size Single Hexes.

Each Single Hex is 1 km in diameter (from the center of the Single Hex to the center of an adjacent Single Hex).

For position reference and for scale, the Single Hex is further divided into 100-meter hexes, which may contain structures or natural features.





# 08 Terrain Types





# Terrain Symbols By Hand 09

	 MARSH	 ROUGH	 WOODLANDS	 SWAMP	 ROUGH WOODS
11 Clear	12 Marsh	13 Rough	14 Woods	15 Swamp	16 Rough Wood
 MOUNTAINS	 DESERT	 CHASM	 CROPLAND	 RURAL	 RUINS
21 Mountain	22 Desert	23 Chasm	24 Cropland	25 Rural	26 Ruins
 OCEAN	 ISLANDS	 SHORE	 RIVER	 LAKE	 ICE CAP
31 Ocean	32 Islands	33 Shore	34 River	35 Lake	36 Icecap
 BAKED LANDS	 TWILIGHT	 FROZEN LANDS	 ICE FIELD	 PRECIPICE	 EXOTIC
41 Baked Lands	42 Twilight	43 Frozen Lands	44 Ice Field	45 Precipice	46 Exotic
 CITY	 DOME	 ARCOLOGY	 SUBURBS	 TOWN	 STARPORT
51 City	52 Dome	53 Arcology	54 Suburbs	55 Town	56 Starport
 HIGHWAY	 ROAD	 TRAIL	 AIR CORRIDOR	 GRID	 HIGH SPEED
61 Highway	62 Road	63 Trail	64 Air Corridor	65 Grid	66 High Speed
 OCEAN DEPTH	 OCEAN ABYSS	 CAVERNS	 CRATER	 WASTELAND	 PENAL
71 Ocean Depth	72 Abyss	73 Caverns	74 Crater	75 Wasteland	76 Penal
 VOLCANO	 ESTATE	 RESERVE	 MINE	 RESOURCES	 OIL
81 Volcano	82 Estate	83 Reserve	84 Mine	85 Resource	86 Oil
 AIRPAD	 VLITE AIRSTRIP	 LITE AIRSTRIP	 AIRPORT MED	 AIRPORT HEAVY	 AIRPORT VHEAVY
91 Airpad	92 Vlite Airstrip	93 Lite Airstrip	94 Airport	95 Heavy Airport	96 Vhvy Airport





# 10 Random Places

Locations for places (Triangles, World Hexes, Terrain Hexes, Local Hexes) and for the placement of terrain can be randomly selected.

### RANDOM PLACES

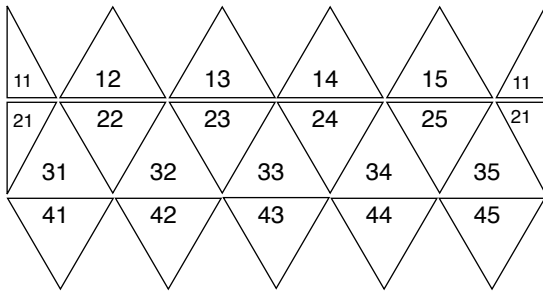
When the situation requires, a random location can be selected using die rolls.

**MOARN.** Remember MOARN Map Only As Really Necessary concept, locations for terrain, goals, destinations, or situations can be created randomly when they are required.

### Select A Triangle On The World Map

To randomly select a Triangle on the World Map, roll 1D for the row (if the roll is 5 or 6, reroll). Roll 1D for the Triangle (if the roll is 6, reroll).

### Select A Triangle On The World Map



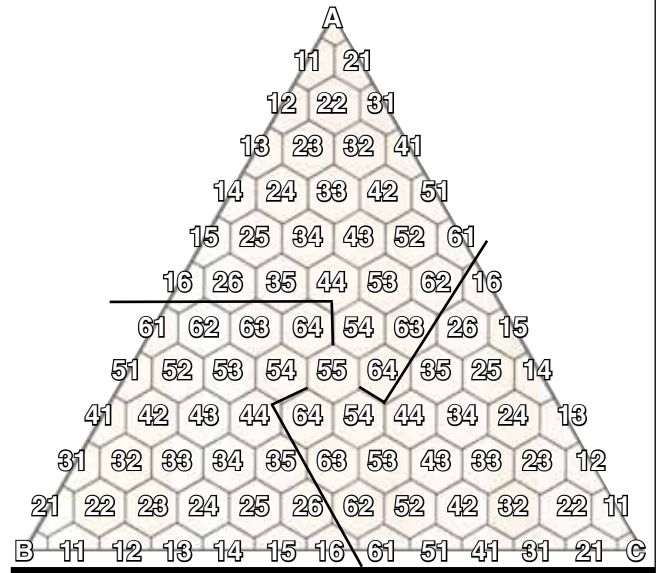
If the resulting Triangle is point down, invert the World Triangle selection diagram. Note that Triangles 11 and 21 are split across the edge of the geodesic map.

### Select A World Hex In A Triangle

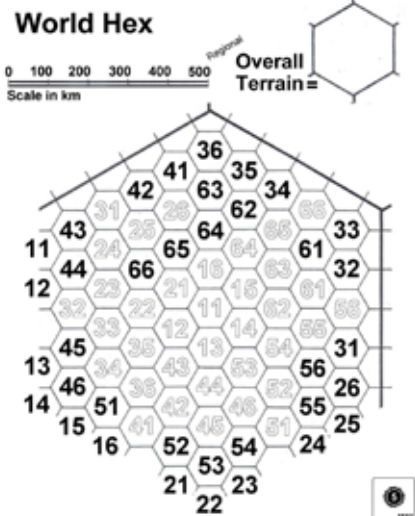
To randomly select a World Hex within a Triangle, roll 1D to select vertex A, B, or C. Then roll 2D for the hex location.

If the Triangle is smaller than the roll, re-roll. If the Triangle is larger break it into smaller Triangles and then randomly select. All three vertexes A B or C will select the same hex if the result is 55. This random selection will not locate a Pent.

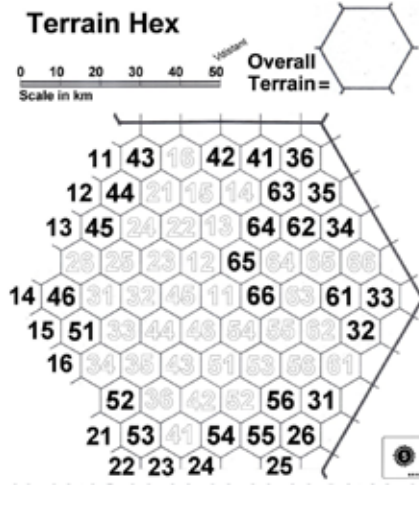
### Select A World Hex In A Triangle



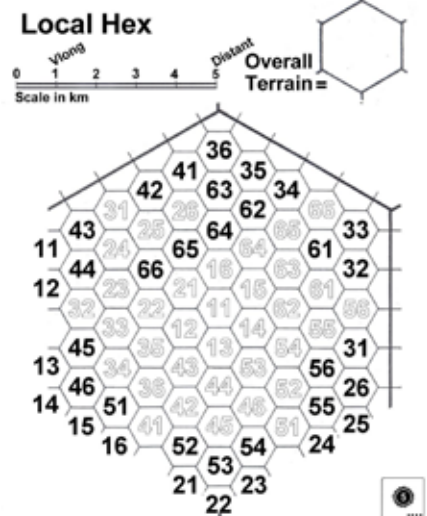
### Select A Terrain Hex Within A World Hex



### Select a Local Hex Within A Terrain Hex



### Select a Single Hex Within A Local Hex



Roll 1D to determine (1-2-3=) Black or (4-5-6=) White Numbers.

Roll 2D for the specific Hex (this random selection will not locate any of the three blank edge hexes).



# Creating World Maps 11

World Maps are populated with a subset of Terrain Types to create an overview of the world's features. Individual Terrain Hexes are then created as they are needed.

WORLD DETAILS													
St	S	A	H	P	G	L	T	TCs	Ex	HZ			
									R	L	I	E	

Enter UWP, Trade Classifications, Ex, and HZ: applicable TCs= Ic, Va, De, Tu, Fr, Ag, Fa, Di, Lo, Ni, Hi, Tz.

## GENERATING THE WORLD MAP

As instructed, mark the specific terrain type in directed World Hexes on the World Map. Within the limits of the instructions, terrain may be placed in any available World Hex. If the specific world is too small for the terrain called for, restrict the number placed to what the specific hex will contain.

1. Select a blank World Map based on World Size.
2. **Resources.** Determine Resources from the Economic Extension. Subtract system GG and Belts: place the resulting number of Resource Hexes one per Triangle.
3. **Mountains.** Place 1D Mountains in each Triangle.
4. **Chasms.** Place World Size x Chasms Sets (1D per Triangle).
5. **Precipices.** Place World Size x Precipices one per Triangle.
6. **Die-Back.** Place 1D Ruins in each Triangle.
7. **Vacuum Plain.** Place Craters (1D per Triangle).
8. **Desert.** Mark all unmarked hexes Desert.
9. **Oceans.** Randomly select Hyd x 2 Triangles as Oceans. Consolidate Ocean Triangles that share sides. Enclose Oceans with Shore lines (which may run through any type terrain). Non-Ocean Triangles are Continents (they are not consolidated; treat each Triangle as a separate Continent).
10. **Seas.** Randomly select Hyd Continents and place a one-hex Ocean (Sea) in each. Surround each with Shore in all adjacent hexes.
11. **Islands.** Convert each Mountain Hex in Ocean to Islands.
12. **Ice-Caps.** If HZ or greater, mark the top and bottom Hyd/2 rows as Ice Cap (if Hyd less than 2, no Ice Caps).
13. **More Ice Cap.** Add 1D rows to each Ice Cap.
14. **Frozen.** Mark Ocean as Ice Field and Land as Frozen Lands (except under Ice Cap).
15. **Tundra.** Mark a line 1D hexes from each Pole. Between each line and its Pole, mark Ocean as Ice Field and Land as Frozen lands (except under Ice Cap).
16. **Agricultural.** Place 2D Cropland in each Continent.
17. **Farming.** Place 1D Cropland in each Continent.
18. **Low Population.** Place one Town. Skip to 22.
19. **Non-Industrial.** Place one Town. Skip to 22.
20. **Cities.** Place Cities equal to Pop, one per Continent. If Atm=0-1, A-C, or E+ = Domed if not NIL.
21. **High Population.** Place total Pop/2 Arcologies.
22. **Rural.** Mark clear hexes within Pop hexes of City as Rural.
23. **Starport.** Place the World Starport (or Spaceport).
24. **Create A Twilight Zone.** Select one Pole Triangle and draw a vertical line directly down. Shift 2.5 times World Size hexes to one side and draw a parallel line: this is the one-World-Hex-wide Twilight Zone.
25. **Create Two Hemispheres For A Twilight World.** Mark one side of the Twilight Zone as Baked Lands and the other side as Frozen Lands (overlying existing terrain). Terrain in the Twilight Zone remains as previously created. Convert Ocean in Baked Lands to Desert. Convert Ocean in Frozen Lands to Ice Field.
26. **Penal Colony.** Mark Pop x Penal (one per Triangle).
27. **Wasteland.** If TL>5, mark 1D adjacent hexes in one Triangle Wasteland.
28. **Exotic.** Place one Exotic hex in one Triangle.
29. **Noble Lands.** Place one Noble Lands estate.
30. All other terrain remains **Clear**.

## AVAILABLE TERRAIN TYPES

Arcology  
 Baked Lands  
 Chasm  
 City  
 Clear  
 Crater  
 Cropland  
 Desert  
 Domed  
 Exotic  
 Frozen Lands  
 Ice Caps  
 Ice Field  
 Islands  
 Mountains  
 Ocean  
 Penal  
 Precipice  
 Resource  
 Ruins  
 Rural  
 Shore  
 Starport  
 Town  
 Twilight Zone  
 Wasteland



# 12a Populating World Hexes

Individual Terrain Hexes within a World Hex are created as they are needed. The process involves selecting a World Hex and generating or creating the individual Terrain hexes within it.

### SELECT THE WORLD HEX

Select the World Hex and note its Overall Terrain.

**General Concept.** The World Hex is divided into 75 Terrain Hexes, which are numbered 11-66 in Black and 11-66 in White. There are also three unnumbered hexes (which are Clear on Land or Ocean if Water).

Each World Hex is 1000 km wide.

Terrain Hexes within the World Hex are 100 km wide.

### WORLD HEXES

Each Terrain Hex within the World Hex is about 100 km in diameter.

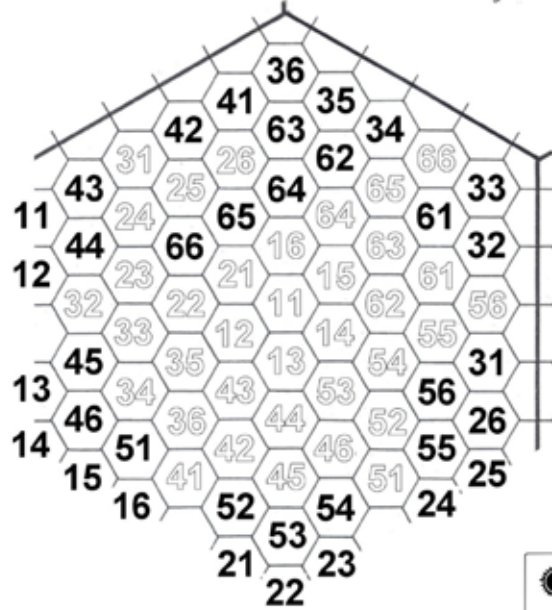
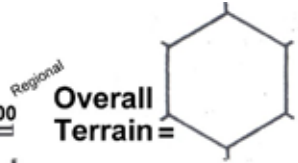
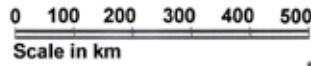
**Line of Sight.** The Horizon Chart shows the distance to the Horizon from any height.

For example, a human standing on a Size=1 world finds that the horizon is within his Terrain Hex. Someone flying at Upper Altitude (= 50 km) on a Siz= 8 world can see to the horizon which is 8 Terrain Hexes (about 800 km) distant.

The Horizon Table output is in Terrain (100 km) Hexes. R= is the height above the surface of the world.

At Far Orbit, an observer can see nearly a full hemisphere.

### World Hex



### HORIZON FROM A WORLD HEX

R=	R	T	1	2	3	4	5	6	7	8	9
Siz	Short 0.5 m	Human 1.7 m	NearSurf 5 m	NOP 50 m	Airspace3 150 m	Airspace4 500 m	Airspace5 1000 m	Mid 5 km	Upper 50 km	Orbit 500 km	Far Orbit 5000 km
1	same	same	same	same	same	same	same	same	3	10	hemi
2	same	same	same	same	same	same	same	1	4	14	hemi
3	same	same	same	same	same	same	same	2	5	16	hemi
4	same	same	same	same	same	same	same	2	6	19	hemi
5	same	same	same	same	same	same	same	2	6	21	hemi
6	same	same	same	same	same	same	same	2	7	22	hemi
7	same	same	same	same	same	same	1	2	8	24	hemi
8	same	same	same	same	same	same	1	3	8	26	hemi
9	same	same	same	same	same	same	1	3	9	27	hemi
10	same	same	same	same	same	same	1	3	9	29	hemi
11	same	same	same	same	same	same	1	3	9	30	hemi
12	same	same	same	same	same	same	1	3	10	31	hemi
13	same	same	same	same	same	1	1	3	10	33	hemi
14	same	same	same	same	same	1	1	3	11	34	hemi
15	same	same	same	same	same	1	2	3	11	35	hemi
16	same	same	same	same	same	1	2	4	11	36	hemi
17	same	same	same	same	same	1	2	4	12	37	hemi
18	same	same	same	same	same	1	2	4	12	38	hemi
19	same	same	same	same	same	1	2	4	12	39	hemi
20	same	same	same	same	same	1	2	4	13	40	hemi

Same: Horizon is in the same hex. Hemi: The entire Hemisphere is visible.



# Populating World Hexes 12b

## ALLOCATE TERRAIN

The World Hex is 1000 km in diameter and contains 75 individual Terrain hexes, each about 100 km in diameter. A Terrain Feature in a Terrain Hex is about 100 km in its longest dimension.

**The Procedure.** World Hexes within the World Triangles have been identified by Terrain Type. For the specific World Hex being populated, identify its Terrain Type. More than one type may be present (for example, Starport, City, Mountain, and Shore).

If WH is **Shore**, draw a Shore Line through the hex.

If WH is **Precipice**, draw Precipice Line through the hex.

If WH is **Chasm**, draw through the hex two roughly parallel Precipice Lines separated by 1D Terrain Hexes.

Using the World Hex column of Populating World Hexes, identify each applicable terrain type and apply the instructions. When specific hexes are required, determine the specific ones using 2D.

## Notes (Below)

Hi = If World is High Population, do this twice.

Oc= If World is Ocean World, mark Ocean surrounded by Depths as Abyss.

N1 = If Atmosphere = 3-4-5-6-7-8-9-A.

N2 = If Hydrographics = 2-3-4-5-6-7-8-9-A. May overlay Clear (creates Marsh) or Wood (creates Swamp).

WNH= White Numbered Hex(es). BNH= Black Numbered Hex(es).

Other= Other Terrain Type (default = Clear).

## POPULATING WORLD HEXES

No	World Hex=	Note	The White Terrain Hex Is:	Black Is:
31	<b>Ocean. Sea.</b>	Oc	<b>Ocean.</b> If surrounding World Hexes are Ocean, mark <b>Ocean Depth.</b>	31 <b>Ocean.</b>
33	<b>Shore</b>		<b>Ocean</b> if on the Ocean side of Shore; otherwise Land.	Land.
21	<b>Mountains</b>		If <b>Shore</b> , Land is <b>Mountain</b> ; Ocean is <b>Islands.</b>	Other.
23	<b>Chasm</b>		Chasm walls become <b>Precipices.</b>	Other.
45	<b>Precipice</b>		Mark each hex on the previously drawn Precipice Lines <b>Precipice.</b>	Other.
26	<b>Ruins</b>		Place 1D <b>Ruins</b> in BNH.	Other
74	<b>Crater</b>		Place 2D <b>Craters</b> in WNH (represents a Field of Craters).	Other.
22	<b>Desert</b>		<b>Desert.</b> Convert 2D WNH to <b>Clear.</b>	22 <b>Desert.</b>
32	<b>Islands</b>		Place 1D <b>Islands</b> (Archipelago) in WNH.	31 <b>Ocean.</b>
36	<b>Ice-Cap</b>		<b>Ice Cap.</b>	36 <b>Ice Cap.</b>
44	<b>Ice Field</b>		<b>Ice Field.</b>	44 <b>Ice Field.</b>
43	<b>Frozen Lands</b>		<b>Frozen Lands.</b>	43 <b>Frozen Lands</b>
24	<b>Cropland</b>		<b>Cropland.</b>	Other
55	<b>Town</b>	Hi	Place one <b>Town</b> in a WNH.	Other.
51	<b>City</b>	Hi	Place one <b>City</b> in a WNH.	Other.
52	<b>Domed</b>	Hi	Place one <b>Domed</b> in a WNH.	Other.
53	<b>Arcology</b>		Place one <b>Arcology</b> in a WNH.	Other.
25	<b>Rural</b>		<b>Rural.</b>	Other.
56	<b>Starport</b>		Place one <b>Starport</b> in a WNH.	Other.
41	<b>Baked Lands</b>		<b>Baked Lands.</b>	41 <b>Baked Lands</b>
11	<b>Clear</b>		Place 2D <b>Rough</b> in WNH.	11 <b>Clear</b>
11	<b>Clear</b>	N1	Place 2D <b>Wood</b> in WNH.	16 <b>Rough Wood</b>
11	<b>Clear</b>	N2	Place 2D <b>Marsh</b> in WNH.	11 <b>Clear</b>
11	<b>Clear</b>		Place 1D <b>Lakes</b> in WNH. Join adjacent Lakes.	Other
13	<b>Rough</b>	N2	Place 2D <b>Swamp</b> in WNH.	Other
85	<b>Resource</b>		Place 2D <b>Resource</b> in WNH.	Other
75	<b>Wasteland</b>		<b>Wasteland.</b>	Other
46	<b>Exotic</b>		Place 2D <b>Exotic</b> in WNH.	Other
82	<b>Noble Lands</b>		Place one <b>Noble Land</b>	Other
76	<b>Penal</b>		Place 1D <b>Penal Colony.</b>	Other





# 13a Populating Terrain Hexes

Individual Local Hexes within a Terrain Hex are created as they are needed. The process involves selecting a Terrain Hex and generating or creating the individual Local hexes within it.

### SELECT THE TERRAIN HEX

Select the Terrain Hex and note its Overall Terrain.

**General Concept.** The Terrain Hex is divided into 75 Local Hexes, which are numbered 11-66 in Black and 11-66 in White. There are also three unnumbered hexes (which are Clear on Land or Ocean if Water).

Each Terrain Hex is 100 km wide.

Local Hexes within the Terrain Hex are 10 km wide.

Land Grants.

### TERRAIN HEXES

Each Local Hex within the World Hex is about 10 km in diameter.

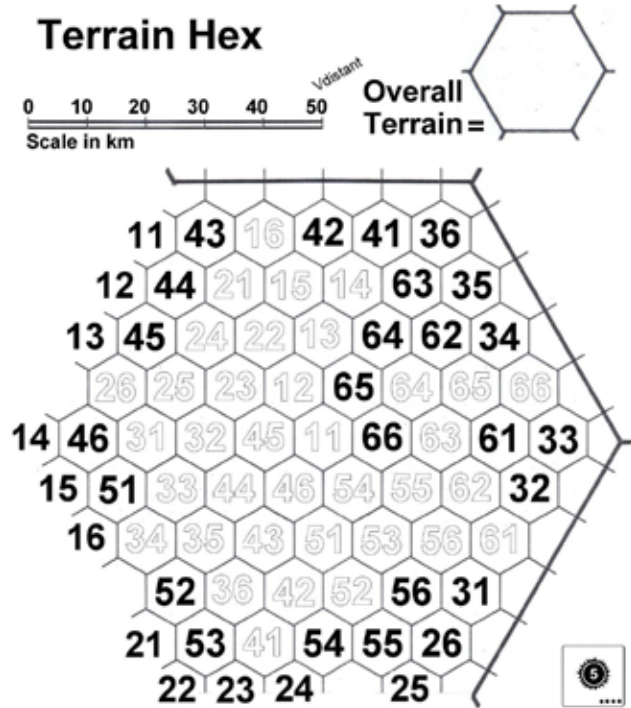
**Line of Sight.** The Horizon Chart shows the distance to the Horizon from any height.

For example, a human standing on a Size=1 world finds that the horizon is within his Terrain Hex. Someone flying at Upper Altitude (= 50 km) on a Siz= 8 world can see to the horizon which is 80 Local Hexes (about 800 km) distant.

The Horizon Table output is in Local (10 km) Hexes.

R= is the height above the surface of the world.

At Far Orbit, an observer can see nearly a full hemisphere.



### HORIZON FROM A TERRAIN HEX

R=	R	T	1	2	3	4	5	6	7	8	9
Siz	Short 0.5 m	Human 1.7 m	NearSurf 5 m	NOP 50 m	Airspace3 150 m	Airspace4 500 m	Airspace5 1000 m	Mid 5 km	Upper 50 km	Orbit 500 km	Far Orbit 5000 km
1	same	same	same	same	2	3	4	9	29	102	hemi
2	same	same	same	1	2	4	6	13	40	136	hemi
3	same	same	same	2	3	5	7	16	49	163	hemi
4	same	same	same	2	3	6	8	18	57	186	hemi
5	same	same	same	2	3	6	9	20	63	206	hemi
6	same	same	same	2	4	7	10	22	69	225	hemi
7	same	same	same	2	4	7	11	24	75	242	hemi
8	same	same	same	3	4	8	11	25	80	258	hemi
9	same	same	same	3	5	8	12	27	85	273	hemi
10	same	same	same	3	5	9	13	28	90	287	hemi
11	same	same	same	3	5	9	13	30	94	301	hemi
12	same	same	same	3	5	10	14	31	98	314	hemi
13	same	same	1	3	6	10	14	32	102	326	hemi
14	same	same	1	3	6	11	15	33	106	338	hemi
15	same	same	1	3	6	11	15	35	110	350	hemi
16	same	same	1	4	6	11	16	36	113	361	hemi
17	same	same	1	4	6	12	16	37	117	372	hemi
18	same	same	1	4	7	12	17	38	120	383	hemi
19	same	same	1	4	7	12	17	39	123	393	hemi
20	same	same	1	4	7	13	18	40	127	403	hemi

Same: Horizon is in the same hex. Hemi: The entire Hemisphere is visible.



# Populating Terrain Hexes 13b

## ALLOCATE TERRAIN

The Terrain Hex is 100 km in diameter and contains 75 individual Local hexes, each about 10 km in diameter. A Terrain Feature in a Local Hex is about 10 km in its longest dimension.

**The Procedure.** For the specific Terrain Hex being populated, identify its Terrain Type. More than one type may be present (for example, Starport, City, Mountain, and Shore).

If the Terrain Hex is **Shore**, draw a Shore Line through the hex.

If the Terrain Hex is **Precipice**, draw a Precipice Line through the hex.

Higher level **Chasm** terrain has become roughly parallel Precipices.

Using the Terrain Hex column of Populating Terrain Hexes, identify each applicable terrain type and apply the instructions. When specific hexes are required, determine the specific ones using 2D.

## Notes (Below)

Hi = If World is High Population, do this twice.

WNH= White Numbered Hex(es).

BNH= Black Numbered Hex(es).

Other= Other Terrain Type (default = Clear).

## POPULATING TERRAIN HEXES

No	Terrain Hex=	Note	The White Local Hex Is:	Black Is:
31	<b>Ocean. Sea.</b>		<b>Ocean.</b>	31 <b>Ocean</b>
71	<b>Ocean Depth</b>		<b>Ocean Depth.</b> Place 1D <b>Abyss</b> in WNH.	31 <b>Ocean</b>
33	<b>Shore</b>		<b>Ocean</b> if on the Ocean side of Shore; otherwise <b>Land.</b>	<b>Land.</b>
21	<b>Mountains</b>		If Shore, Land is <b>Mountain</b> ; Ocean is <b>Islands.</b>	Other.
23	<b>Chasm Line</b>		Chasm walls are <b>Precipices.</b>	Other.
45	<b>Precipice</b>		Mark each hex on the previously drawn Precipice Lines <b>Precipice.</b>	Other.
26	<b>Ruins</b>		Place 1D <b>Ruins</b> in BNH.	Other
74	<b>Crater</b>		Place 2D <b>Craters</b> in WNH.	Other.
22	<b>Desert</b>		<b>Desert.</b> Convert 2D WNH to Clear.	22 <b>Desert.</b>
32	<b>Islands</b>		Place 1D <b>Islands</b> in WNH. Join adjacent islands.	31 <b>Ocean.</b>
36	<b>Ice-Cap</b>		<b>Ice Cap.</b>	36 <b>Ice Cap.</b>
44	<b>Ice Field</b>		<b>Ice Field.</b>	44 <b>Ice Field.</b>
43	<b>Frozen Lands</b>		<b>Frozen Lands.</b>	43 <b>Frozen Lands</b>
24	<b>Cropland</b>		<b>Cropland.</b>	Other
55	<b>Town</b>	Hi	Place 1D <b>Towns</b> in a WNH.	Other.
51	<b>City</b>	Hi	Place one <b>City</b> in a WNH. Place <b>Suburbs</b> in adjacent WNH.	Other.
52	<b>Domed</b>	Hi	Place one <b>Domed</b> in a WNH.	Other.
53	<b>Arcology</b>		Place one <b>Arcology</b> in a WNH.	Other.
25	<b>Rural</b>		<b>Rural.</b>	Other.
56	<b>Starport</b>		Place <b>Starport</b> in WNH. Place 2 City in adjacent WNH.	Other.
41	<b>Baked Lands</b>		<b>Baked Lands.</b>	41 <b>Baked Lands</b>
11	<b>Clear</b>		<b>Clear</b>	Other
13	<b>Rough</b>		<b>Rough.</b> Place 2D <b>Clear</b> in WNH.	Clear
14	<b>Wood</b>		<b>Wood.</b> Place 2D <b>Clear</b> in WNH.	Clear
12	<b>Marsh</b>		<b>Marsh.</b> Place 2D <b>Clear</b> in WNH.	Clear
15	<b>Swamp</b>		<b>Swamp.</b> Place 2D <b>Clear</b> in WNH.	14 <b>Woods</b>
35	<b>Lake</b>		<b>Lake.</b> Place 1D <b>Islands</b> in WNH. Join adjacent Islands.	Other
85	<b>Resource</b>		Place 1D each <b>Resource, Mines, Resource Oil</b> in WNH.	Other
75	<b>Wasteland</b>		<b>Wasteland.</b>	Other
46	<b>Exotic</b>		<b>Exotic.</b> Place 1D <b>Volcanic</b> in WNH.	Other.
82	<b>Noble Lands</b>		<b>Noble Lands.</b>	Other.
76	<b>Penal</b>		<b>Penal Colony.</b>	Other.



# 14a Populating Local Hexes

### SELECT THE LOCAL HEX

Select the Local Hex and note its Overall Terrain.

**General Concept.** The Local Hex is divided into 75 Terrain Hexes, which are numbered 11-66 in Black and 11-66 in White. There are also three unnumbered hexes (which are Clear on Land or Ocean if Water).

Each Local Hex is 10 km wide.

Single Hexes within the Local Hex are 1 km wide.

### LOCAL HEXES

Each Single Hex within the Local Hex is about 1 kilometer (= 1000 meters) in diameter.

**Line of Sight.** The Horizon Chart shows the distance to the Horizon from any height.

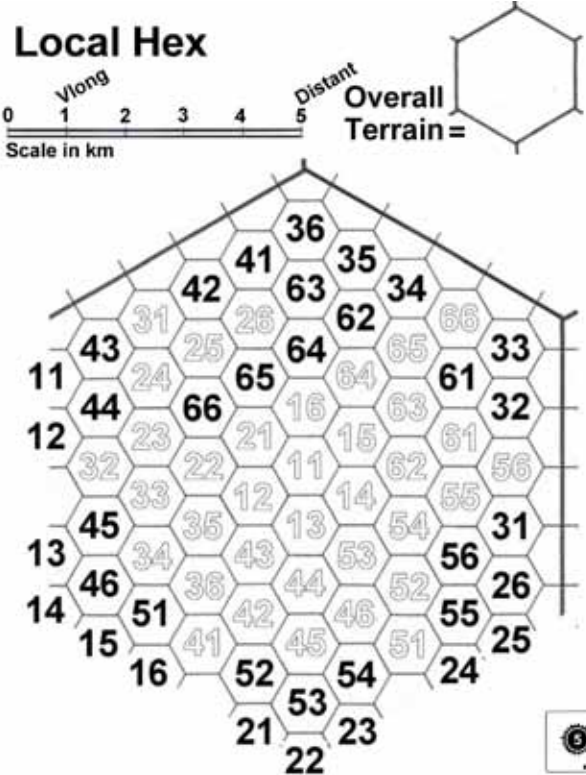
For example, A human standing on a Size=1 world can see to the horizon which is 2 single hexes distant. Someone standing on a platform 5 meters above the ground on a Siz= 8 world can see to the horizon which is 8 single hexes distant.

The Horizon Table output is in **Single Hexes.**

R= is the height above the surface of the world.

At Far Orbit, an observer can see nearly a full hemisphere.

Individual Local Hexes are created as they are needed. The process involves selecting a Local Hex and generating or creating the individual Single hexes within it.



### HORIZON FROM A LOCAL HEX

R=	R	T	1	2	3	4	5	6	7	8	9
Siz	Short 0.5 m	Human 1.7 m	NearSurf 5 m	NOP 50 m	Airspace3 150 m	Airspace4 500 m	Airspace5 1000 m	Mid 5 km	Upper 50 km	Orbit 500 km	Far Orbit 5000 km
1	same	2	3	9	15	28	40	90	287	1,025	hemi
2	1	2	4	13	22	40	57	127	403	1,360	hemi
3	2	3	5	15	27	49	69	155	492	1,628	hemi
4	2	3	6	18	31	57	80	179	568	1,857	hemi
5	2	4	6	20	35	63	89	200	634	2,062	hemi
6	2	4	7	22	38	69	98	219	695	2,247	hemi
7	2	4	7	24	41	75	106	237	750	2,419	hemi
8	3	5	8	25	44	80	113	253	802	2,579	hemi
9	3	5	8	27	46	85	120	268	850	2,729	hemi
10	3	5	9	28	49	89	126	283	896	2,872	hemi
11	3	5	9	30	51	94	133	297	939	3,008	hemi
12	3	6	10	31	54	98	139	310	981	3,138	hemi
13	3	6	10	32	56	102	144	323	1,021	3,263	hemi
14	3	6	11	33	58	106	150	335	1,059	3,384	hemi
15	3	6	11	35	60	110	155	346	1,097	3,500	hemi
16	4	7	11	36	62	113	160	358	1,132	3,612	hemi
17	4	7	12	37	64	117	165	369	1,167	3,722	hemi
18	4	7	12	38	66	120	170	380	1,201	3,828	hemi
19	4	7	12	39	68	123	174	390	1,234	3,931	hemi
20	4	7	13	40	69	126	179	400	1,266	4,031	hemi

Same: Horizon is in the same hex. Hemi: The entire Hemisphere is visible.



# Populating Local Hexes 14b

## ALLOCATE TERRAIN

The Local Hex is 10 km in diameter and contains 75 individual Single Hexes, each about 1 km in diameter.

**The Procedure.** For the specific Local Hex being populated, identify its Terrain Type. More than one type may be present (for example, Starport, City, Mountain, and Shore).

If the Local Hex is Shore, draw a Shore Line through the hex.

If the Terrain Hex is Precipice, draw a Precipice Line through the hex.

Higher level Chasm terrain has become roughly parallel Precipices.

Using The Local Hex column of Populating Local Hexes, identify each applicable terrain type and apply the instructions. When specific hexes are required, determine the specific locations using 2D.

## Notes (Below)

WNH= White Numbered Hex(es).

BNH= Black Numbered Hex(es).

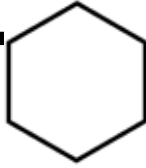
Other= Other Terrain Type (default = Clear).

## POPULATING LOCAL HEXES

No.	Local Hex=	Note	The <b>White</b> Single Hex Is:	No.	<b>Black</b> Is:
31	<b>Ocean. Sea.</b>		<b>Ocean.</b>	31	<b>Ocean.</b>
71	<b>Ocean Depth</b>		<b>Ocean Depth.</b>	31	<b>Ocean.</b>
33	<b>Abyss</b>		<b>Abyss.</b>	71	<b>Ocean Depth.</b>
21	<b>Shore</b>		<b>Ocean</b> if on the Ocean side of Shore; otherwise <b>Land.</b>		<b>Land.</b>
23	<b>Mountains</b>		If Shore, Land is <b>Mountain</b> ; Ocean is <b>Ocean.</b> )		Other.
45	<b>Chasm</b>		Chasm walls are <b>Precipices.</b>		Other.
26	<b>Precipice</b>		Mark each hex on the previously drawn Precipice Lines <b>Precipice.</b>		Other.
74	<b>Ruins</b>		Place 1D <b>Ruins</b> in WNH.		Other.
22	<b>Crater</b>		Place 2D <b>Craters</b> in WNH.		Other.
32	<b>Desert</b>		<b>Desert.</b>	32	<b>Desert.</b>
36	<b>Islands</b>		<b>Island.</b> Surround with <b>Shore.</b>	31	<b>Ocean.</b>
44	<b>Ice-Cap</b>		<b>Ice Cap.</b>	44	<b>Ice Cap.</b>
43	<b>Ice Field</b>		<b>Ice Field.</b>	43	<b>Ice Field.</b>
24	<b>Frozen Lands</b>		<b>Frozen Lands.</b>	24	<b>Frozen Lands</b>
55	<b>Cropland</b>		<b>Cropland.</b>		Other.
51	<b>Town</b>		Place <b>Town</b> in one WNH and all adjacent WNH.		Other.
52	<b>City</b>		<b>City.</b>		Other.
53	<b>Suburb</b>		<b>Suburb.</b>		Other.
25	<b>Domed</b>		Place <b>Domed</b> in one WNH and all adjacent WNH..		Other.
56	<b>Archology</b>		Place <b>Archology</b> in one WNH and all adjacent WNH.		Other.
41	<b>Rural</b>		<b>Rural.</b>		Other.
11	<b>Starport</b>		<b>Starport.</b>	52	<b>City.</b>
13	<b>Baked Lands</b>		<b>Baked Lands.</b>	13	<b>Baked Lands</b>
14	<b>Clear</b>		<b>Clear.</b> Place 1D <b>Wood</b> in WNH.		Other.
12	<b>Rough</b>		<b>Rough.</b> Place 1D <b>Clear</b> in WNH.		Other.
15	<b>Wood</b>		<b>Wood.</b>		Other.
35	<b>Marsh</b>		<b>Marsh.</b> Place 1D <b>Clear</b> in WNH.		Other.
85	<b>Swamp</b>		<b>Swamp.</b> Place 1D <b>Clear</b> in WNH.		Other.
75	<b>Lake</b>		<b>Lake.</b> Surround by <b>Shore.</b>		Other.
46	<b>Resource</b>		<b>Resource, Resource Oil, or Mines</b> (as specified).		Other.
82	<b>Wasteland</b>		<b>Wasteland</b>		Other.
76	<b>Penal.</b>		<b>Penal Colony.</b>		



# 00 Maps



The **Traveller Mapping System** uses different size World Maps corresponding to UWP Size. Most Main-Worlds generated under the system are (2D-2=) Size=0 and Size=10; a few are larger (1D+9=) Size=10 to Size=15. BigWorlds may be larger still (2D+7=): Size=9 to Size=19. Referee-initiated world creation can theoretically create yet larger worlds beyond Size=19.

## WORLD MAP DIMENSION DETAILS 1-10

Size		1	2	3	4	5	6	7	8	9	10
Diameter	Miles	1,000	2,000	3,000	4,000	5,000	6,000	7,000	8,000	9,000	10,000
Diameter	Km	1,600	3,200	4,800	6,400	8,000	9,600	11,200	12,800	14,400	16,000
Radius	Km	800	1,600	2,400	3,200	4,000	4,800	5,600	6,400	7,200	8,000
Circumference*	Km	5,027	10,053	15,080	20,106	25,133	30,159	35,186	40,212	45,239	50,265
Triangle Edge	Km	1,005	2,011	3,016	4,021	5,027	6,032	7,037	8,042	9,048	10,053
Hex	Km	1,005	1,005	1,005	1,005	1,005	1,005	1,005	1,005	1,005	1,005
Hexes/Triangle		1	3	6	10	15	21	28	36	45	55
World Hexes		12	42	92	162	252	362	492	642	812	1002
Volume=	Earths	.002	.01	.05	.125	.25	.42	.67	1	1.424	1.95
**G=		.125	.25	.375	.50	.625	.75	.875	1	1.125	1.25

## WORLD MAP DIMENSION DETAILS 11-20

Size		11	12	13	14	15	16	17	18	19	20
Diameter	Miles	11,000	12,000	13,000	14,000	15,000	16,000	17,000	18,000	19,000	20,000
Diameter	Km	17,600	19,200	20,800	22,400	24,000	25,600	27,200	28,800	30,400	32,000
Radius	Km	8,800	9,600	10,400	11,200	12,000	12,800	13,600	14,400	15,200	16,000
Circumference*	Km	55,292	60,319	65,345	70,372	75,398	80,425	85,451	90,478	95,504	100,531
Triangle Edge	Km	11,055	12,060	13,065	14,070	15,075	16,080	17,085	18,090	19,095	20,100
Hex	Km	1,005	1,005	1,005	1,005	1,005	1,005	1,005	1,005	1,005	1,005
Hexes/Triangle		66	78	91	105	120	136	153	171	190	210
World Hexes		1320	1442	1692	1962	2252	2562	2892	3242	3612	4002
Volume=	Earths	2.6	3.375	4.29	5.35	6.59	8	9.59	11.39	13.39	15.62
**G=		1.375	1.5	1.625	1.75	1.875	2.0	2.125	2.25	2.375	2.5

Dimensions in Km less noted (World Size equals diameter of the World in Miles).

\* Circumference is also Equator. Note that Triangle Edge (in km) is approximately equal to World Diameter

\*\* Assumes Density comparable to Terra.

**World Triangles.** World Triangle size varies with World Size. A World Triangle edge has hexes equal to World Size.

## ALTERNATE DENSITIES EXAMPLE -1 (DENSITY=1.1)

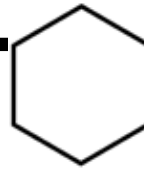
Size		1	2	3	4	5	6	7	8	9	10
World Hexes		12	42	92	162	252	362	492	642	812	1002
(Density 1.1) *G=		.14	.30	.49	.72	1.00	1.32	1.69	1.13	1.64	1.61

**Comment.** A Size=5 World with 1.1 Density has 1 G Surface Gravity and probably high concentrations of heavy metals.

## ALTERNATE DENSITIES EXAMPLE -2 (DENSITY=0.4)

Size		11	12	13	14	15	16	17	18	19	20
World Hexes		1320	1442	1692	1962	2252	2562	2892	3242	3612	4002
(Density 0.4) *G=		.55	.60	.65	.70	.75	.80	.85	.90	.95	1.00

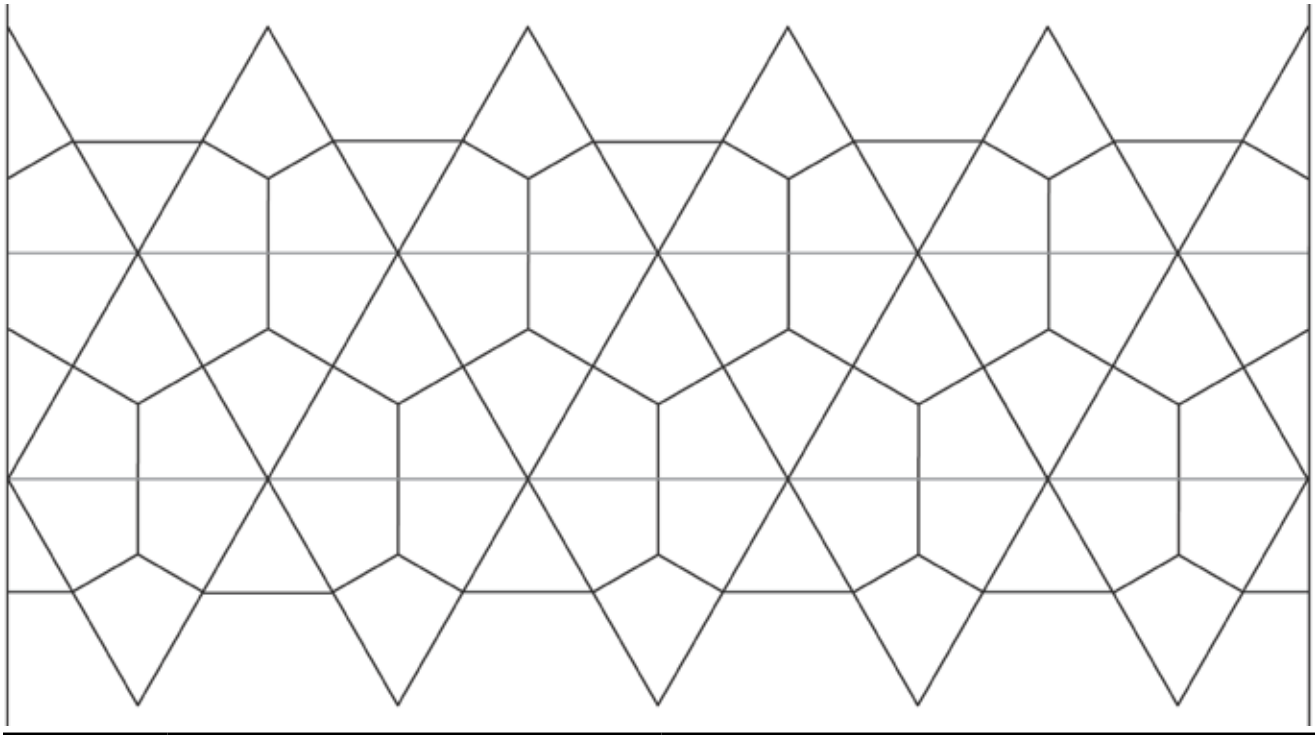
**Comment.** Size=20 World with 0.4 Density has surface 1 G and 6x the surface of Earth. It is probably low in heavy metals.



# Map Size 01

## 01 WORLD MAP

<input type="checkbox"/>	<b>1</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-	<input type="checkbox"/>
St	Siz	Atm	Hyd	Pop	Gov	Law			TL

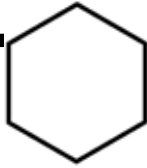


### WORLD MAP DIMENSION DETAILS

Size		<b>1</b>
Diameter	Miles	1,000
Diameter	Km	1,600
Radius	Km	800
Circumference*	Km	5,027
Triangle Edge	Km	1,005
Hex	Km	1,005
Hexes per Triangle		1
World Hexes		12
Volume=	Earths	.002
**G=		.125

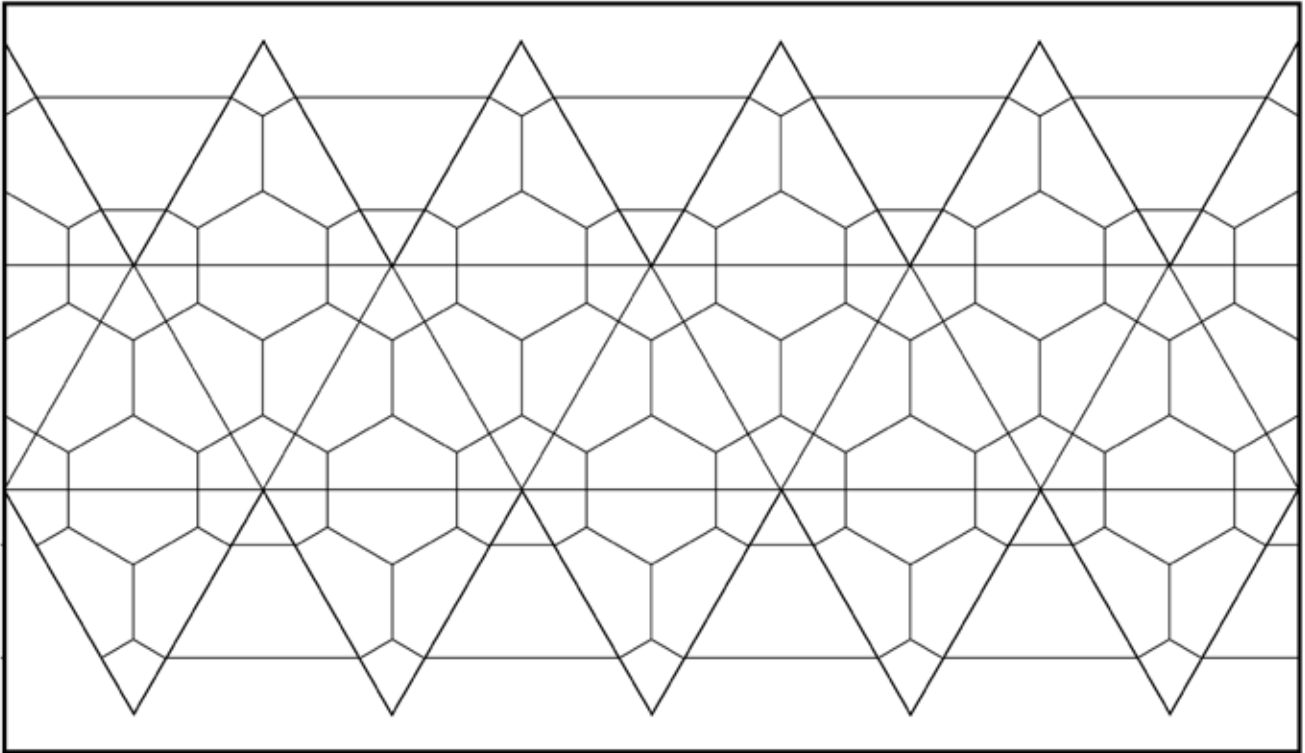


# 02 Map Size



## 02 WORLD MAP

	<b>2</b>							-	
St	Siz	Atm	Hyd	Pop	Gov	Law			TL



### WORLD MAP DIMENSION DETAILS

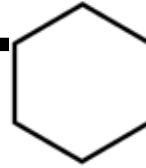
Size		<b>2</b>
Diameter	Miles	2,000
Diameter	Km	3,200
Radius	Km	1,600
Circumference*	Km	10,053
Triangle Edge	Km	2,011
Hex	Km	1,005
Hexes per Triangle		3
World Hexes		42
Volume=	Earths	.01
**G=		.25

### GG-L GAS GIANT-L

	Size	Diameter	Type
SGG	L	20	20,000
	M	21	30,000
	N	22	40,000

Use Geodesic Map-02 for mapping Gas Giant-L.

Gas Giant Mapping:  
Hex= 10,000 km

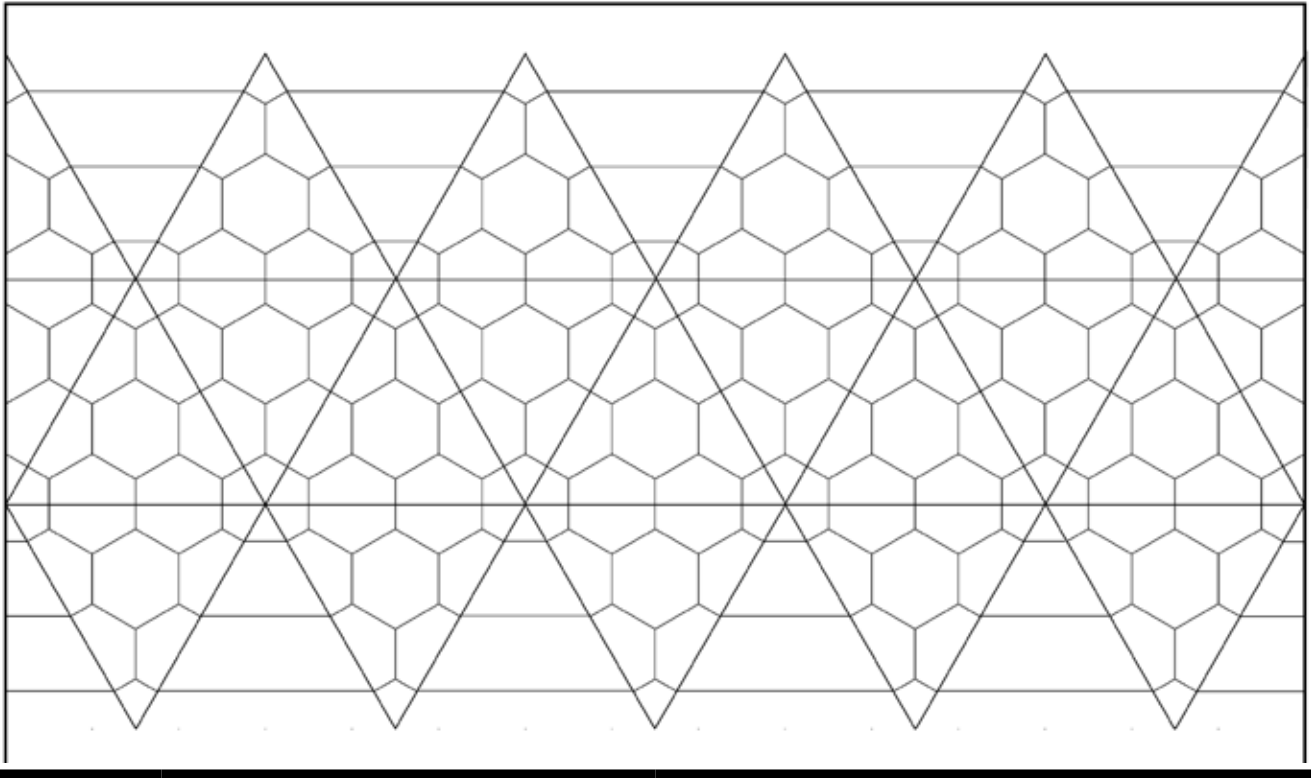


# Map Size 03

## 03

WORLD MAP

	<b>3</b>							-	
St	Siz	Atm	Hyd	Pop	Gov	Law			TL



### WORLD MAP DIMENSION DETAILS

Size		<b>3</b>
Diameter	Miles	3,000
Diameter	Km	4,800
Radius	Km	2,400
Circumference*	Km	15,080
Triangle Edge	Km	3,016
Hex	Km	1,005
Hexes per Triangle		6
World Hexes		92
Volume=	Earths	.05
**G=		.375

### GG-M GAS GIANT-M

	Size	Diameter	Type
SGG	L	20	20,000
	M	21	30,000
	N	22	40,000

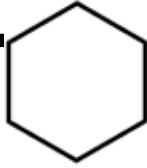
Use Geodesic Map-03 for mapping Gas Giant-M.

Gas Giant Mapping:  
Hex= 10,000 km



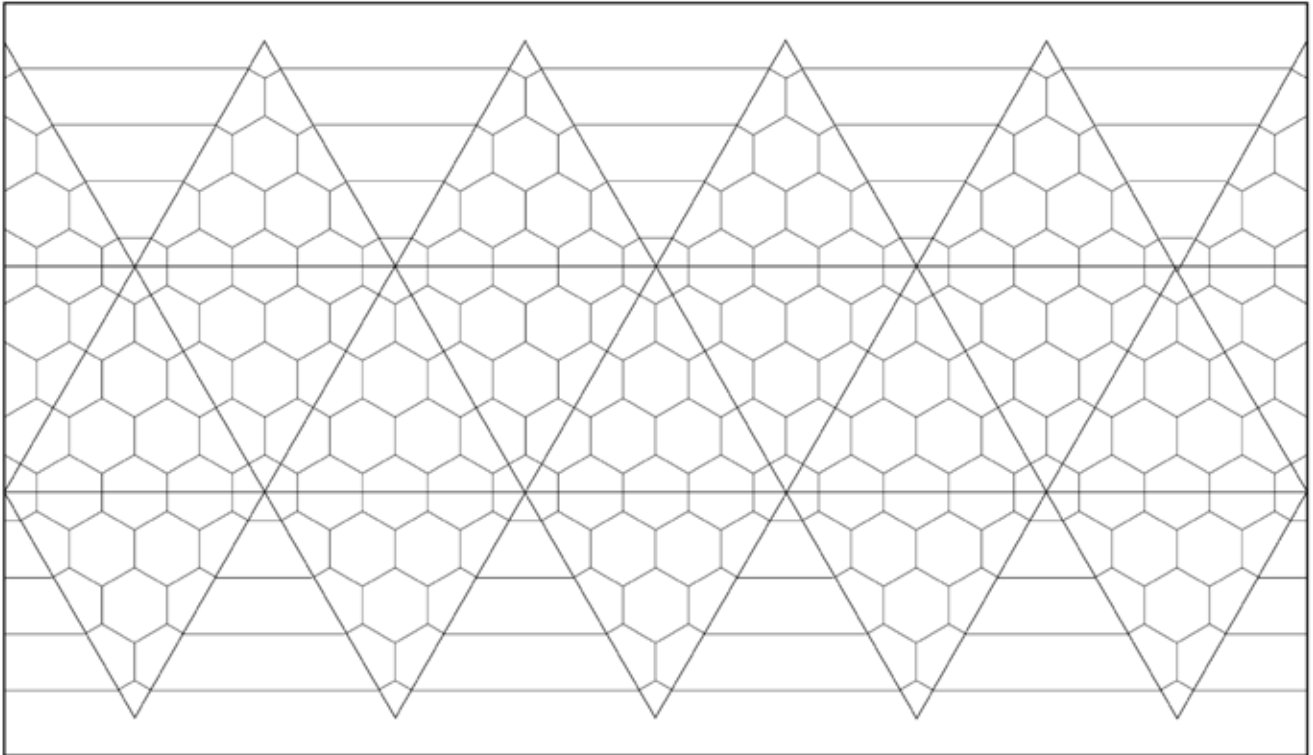


# 04 Map Size



## 04 WORLD MAP

	<b>4</b>							-	
St	Siz	Atm	Hyd	Pop	Gov	Law			TL

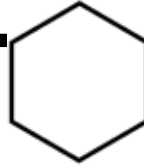


### WORLD MAP DIMENSION DETAILS

	Size	<b>4</b>
Diameter	Miles	4,000
Diameter	Km	6,400
Radius	Km	3,200
Circumference*	Km	20,106
Triangle Edge	Km	4,021
Hex	Km	1,005
Hexes per Triangle		10
World Hexes		162
Volume=	Earths	.125
**G=		.50

### GG-N GAS GIANT-N

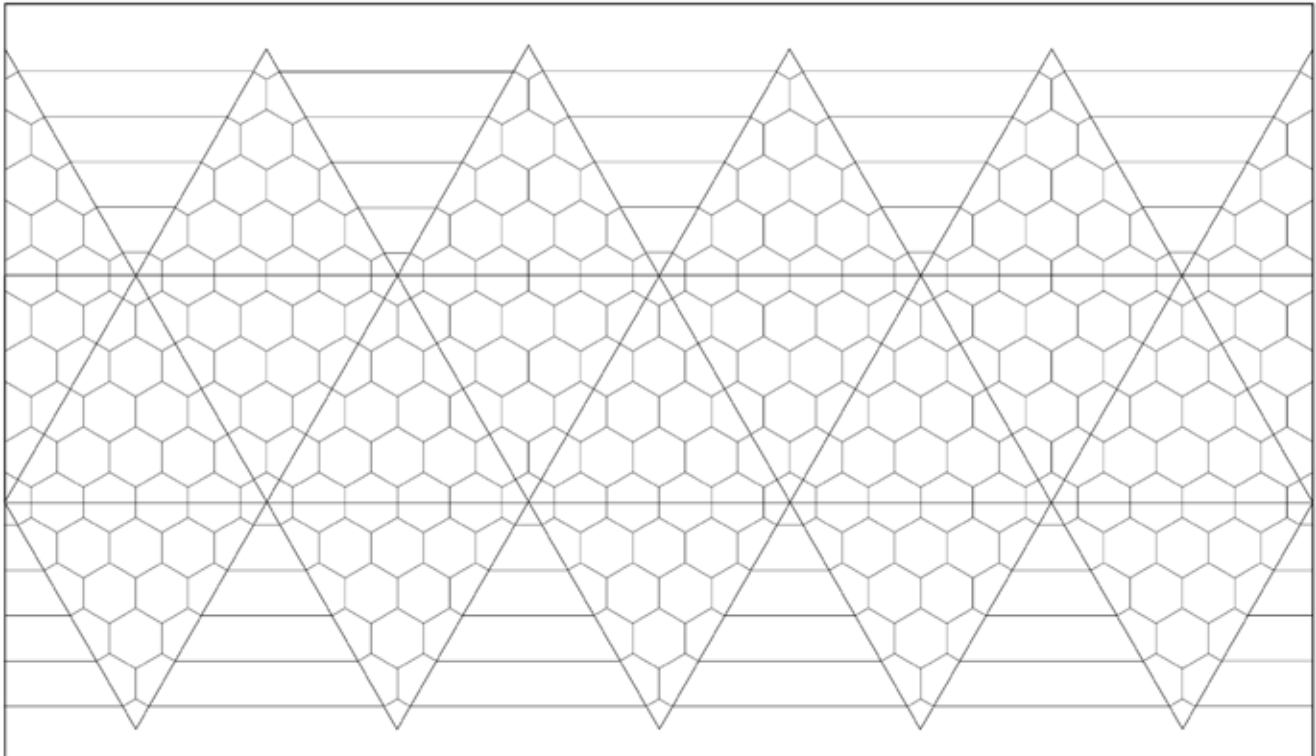
	Size	Diameter	Type
SGG tune	L	20	20,000
	M	21	30,000 N e p -
	N	22	40,000
Use Geodesic Map-04 for mapping Gas Giant-N.			
Gas Giant Mapping: Hex= 10,000 km			



# Map Size 05

## 05 WORLD MAP

	<b>5</b>							-	
St	Siz	Atm	Hyd	Pop	Gov	Law			TL



### WORLD MAP DIMENSION DETAILS

Size		<b>5</b>	
Diameter	Miles	5,000	
Diameter	Km	8,000	
Radius	Km	4,000	
Circumference*	Km	25,133	
Triangle Edge	Km	5,027	
Hex	Km	1,005	
Hexes per Triangle		15	
World Hexes		252	
Volume=	Earths	.25	
**G=		.625	

### GG-P GAS GIANT-P

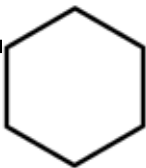
	Size	Diameter	Type	
Large Gas Giant	P	23	50,000	
	Q	24	60,000	
	R	25	70,000	Saturn
	S	26	80,000	
	T	27	90,000	Jupiter
	U	28	125,000	2 Mj
	V	29	180,000	4 Mj
	W	30	220,000	6 Mj
	X	31	250,000	8 Mj

Use Geodesic Map-05 for mapping Gas Giant-P.

Gas Giant Mapping:  
Hex= 10,000 km

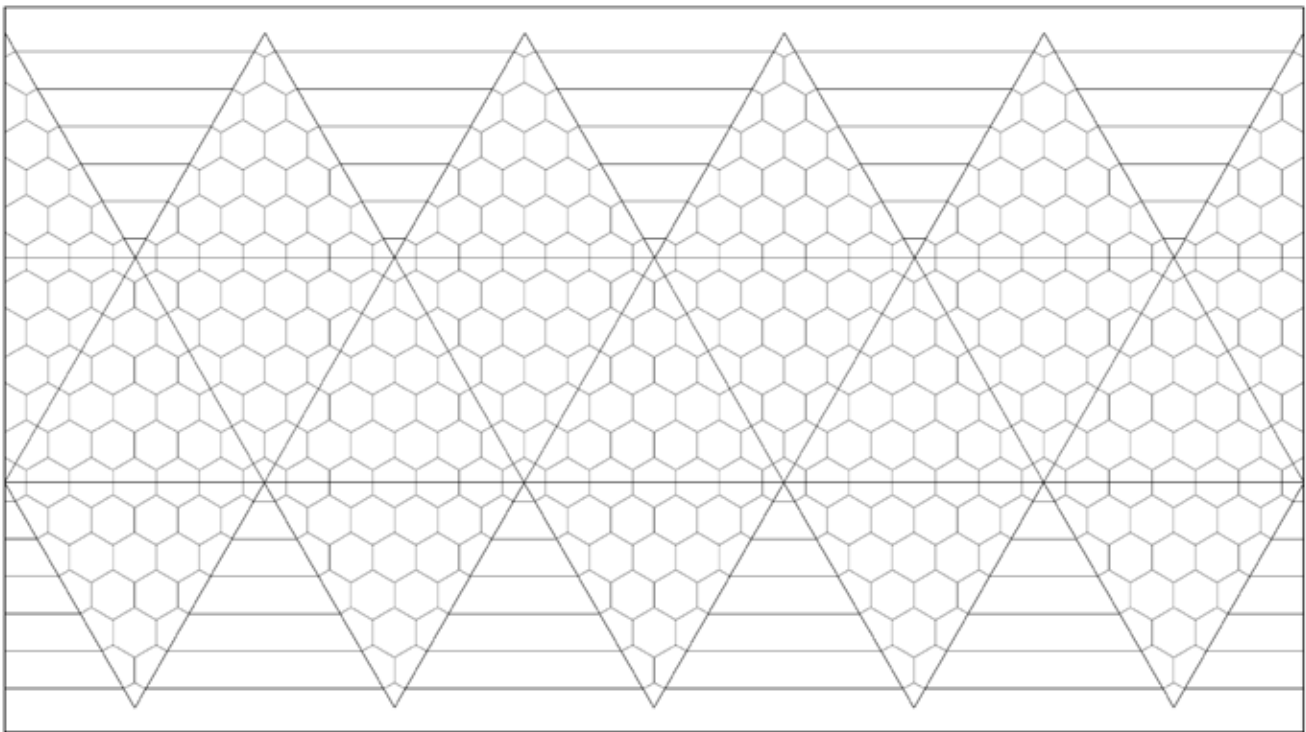


# 06 Map Size



## 06 WORLD MAP

	<b>6</b>							-	
St	Siz	Atm	Hyd	Pop	Gov	Law			TL



### WORLD MAP DIMENSION DETAILS

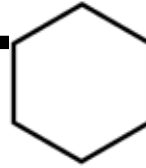
Size		<b>6</b>
Diameter	Miles	6,000
Diameter	Km	9,600
Radius	Km	4,800
Circumference*	Km	30,159
Triangle Edge	Km	6,032
Hex	Km	1,005
Hexes per Triangle		21
World Hexes		362
Volume=	Earths	.42
**G=		.75

### GG-Q GAS GIANT-Q

	Size	Diameter	Type	
Large Gas Giant	P	23	50,000	
	Q	24	60,000	
	R	25	70,000	Saturn
	S	26	80,000	
	T	27	90,000	Jupiter
	U	28	125,000	2 Mj
	V	29	180,000	4 Mj
	W	30	220,000	6 Mj
	X	31	250,000	8 Mj

Use Geodesic Map-06 for mapping Gas Giant-Q.

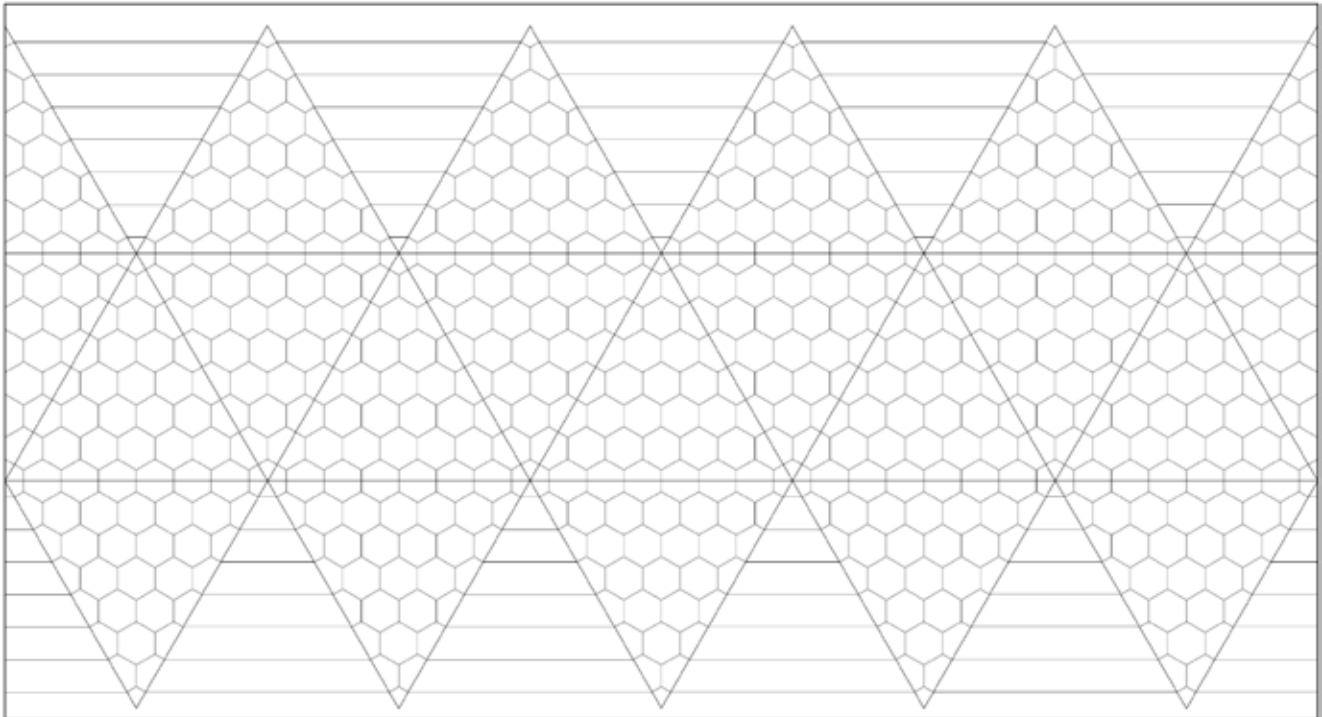
Gas Giant Mapping:  
Hex= 10,000 km



# Map Size 07

## 07 WORLD MAP

	<b>7</b>							-	
St	Siz	Atm	Hyd	Pop	Gov	Law			TL



### WORLD MAP DIMENSION DETAILS

	Size	<b>7</b>
Diameter	Miles	7,000
Diameter	Km	11,200
Radius	Km	5,600
Circumference*	Km	35,186
Triangle Edge	Km	7,037
Hex	Km	1,005
Hexes per Triangle		28
World Hexes		492
Volume=	Earths	.67
**G=		.875

### GG-R GAS GIANT-R

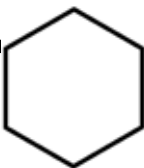
	Size	Diameter	Type	
Large Gas Giant	P	23	50,000	
	Q	24	60,000	
	R	25	70,000	Saturn
	S	26	80,000	
	T	27	90,000	Jupiter
	U	28	125,000	2 Mj
	V	29	180,000	4 Mj
	W	30	220,000	6 Mj
	X	31	250,000	8 Mj

Use Geodesic Map-07  
for mapping Gas Giant-R.

Gas Giant Mapping:  
Hex= 10,000 km

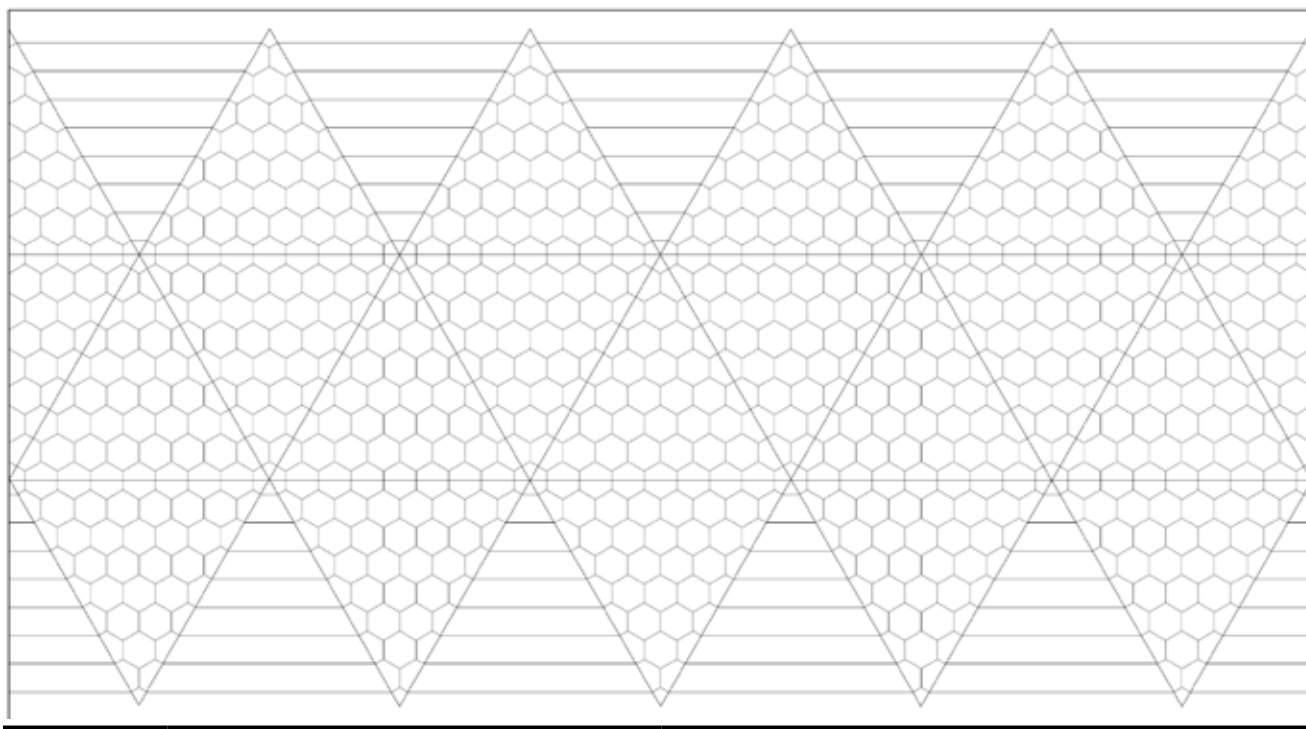


# 08 Map Size



## 08 WORLD MAP

	<b>8</b>							-	
St	Siz	Atm	Hyd	Pop	Gov	Law			TL



### WORLD MAP DIMENSION DETAILS

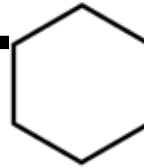
Size	<b>8</b>		
Diameter	Miles		8,000
Diameter	Km		12,800
Radius	Km		6,400
Circumference*	Km		40,212
Triangle Edge	Km		8,042
Hex	Km		1,005
Hexes per Triangle			36
World Hexes			642
Volume=	Earths		1
**G=			1

### GG-S GAS GIANT-S

	Size	Diameter	Type	
Large Gas Giant	P	23	50,000	
	Q	24	60,000	
	R	25	70,000	Saturn
	S	26	80,000	
	T	27	90,000	Jupiter
	U	28	125,000	2 Mj
	V	29	180,000	4 Mj
	W	30	220,000	6 Mj
	X	31	250,000	8 Mj

Use Geodesic Map-08 for mapping Gas Giant-S.

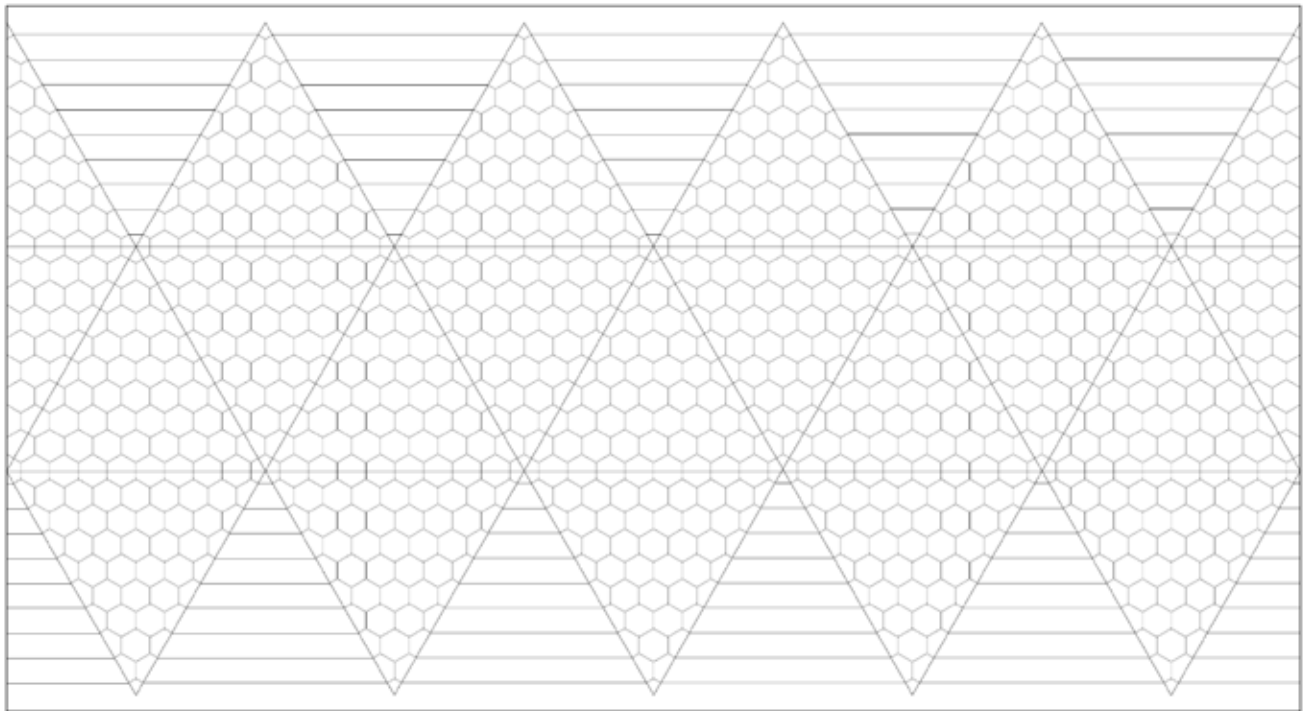
Gas Giant Mapping:  
Hex= 10,000 km



# Map Size 09

## 09 WORLD MAP

	<b>9</b>							-	
St	Siz	Atm	Hyd	Pop	Gov	Law			TL



### WORLD MAP DIMENSION DETAILS

Size		<b>9</b>
Diameter	Miles	9,000
Diameter	Km	14,400
Radius	Km	7,200
Circumference*	Km	45,239
Triangle Edge	Km	9,048
Hex	Km	1,005
Hexes per Triangle		45
World Hexes		812
Volume=	Earths	1.424
**G=		1.125

### GG-T GAS GIANT-T

	Size	Diameter	Type	
Large Gas Giant	P	23	50,000	
	Q	24	60,000	
	R	25	70,000	Saturn
	S	26	80,000	
	T	27	90,000	Jupiter
	U	28	125,000	2 Mj
	V	29	180,000	4 Mj
	W	30	220,000	6 Mj
	X	31	250,000	8 Mj

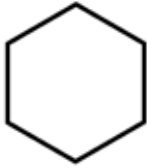
Use Geodesic Map-09  
for mapping Gas Giant-T.

Gas Giant Mapping:  
Hex= 10,000 km



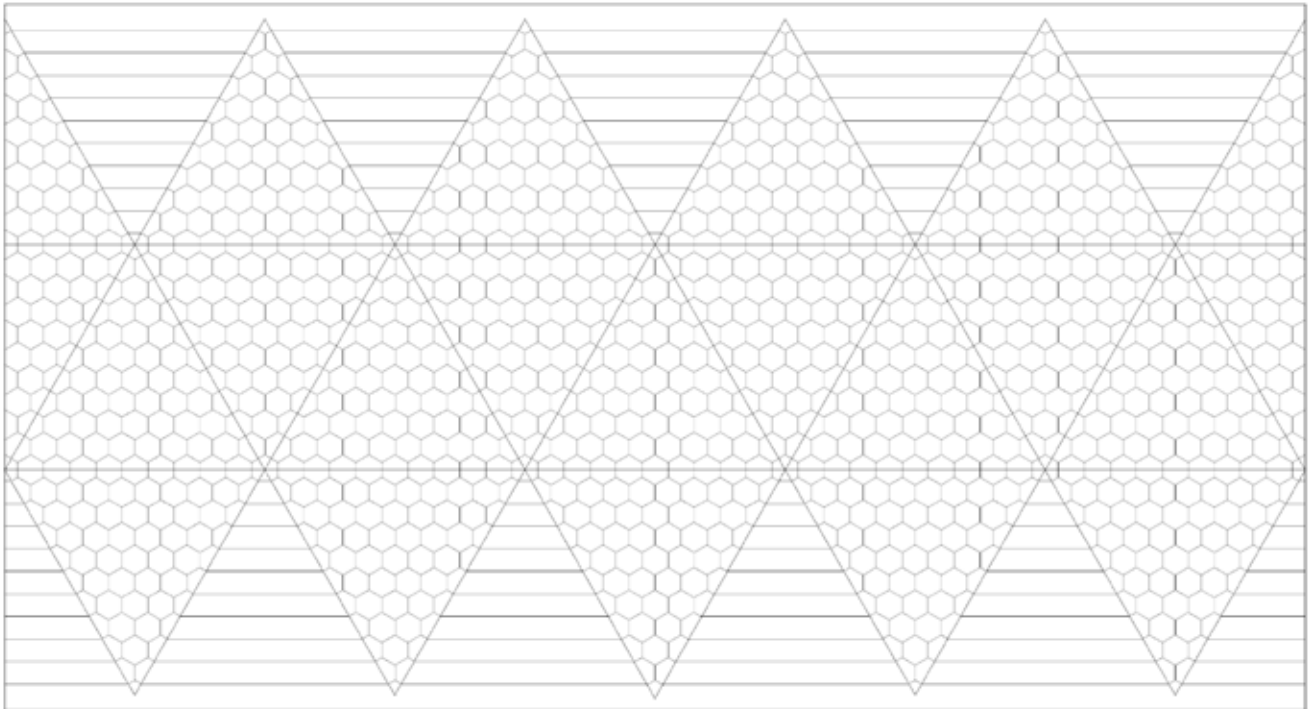
World Mapping

# 10 Map Size



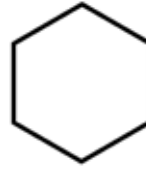
## 10 WORLD MAP

<input type="checkbox"/>	<b>A</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-	<input type="checkbox"/>
St	Siz	Atm	Hyd	Pop	Gov	Law			TL



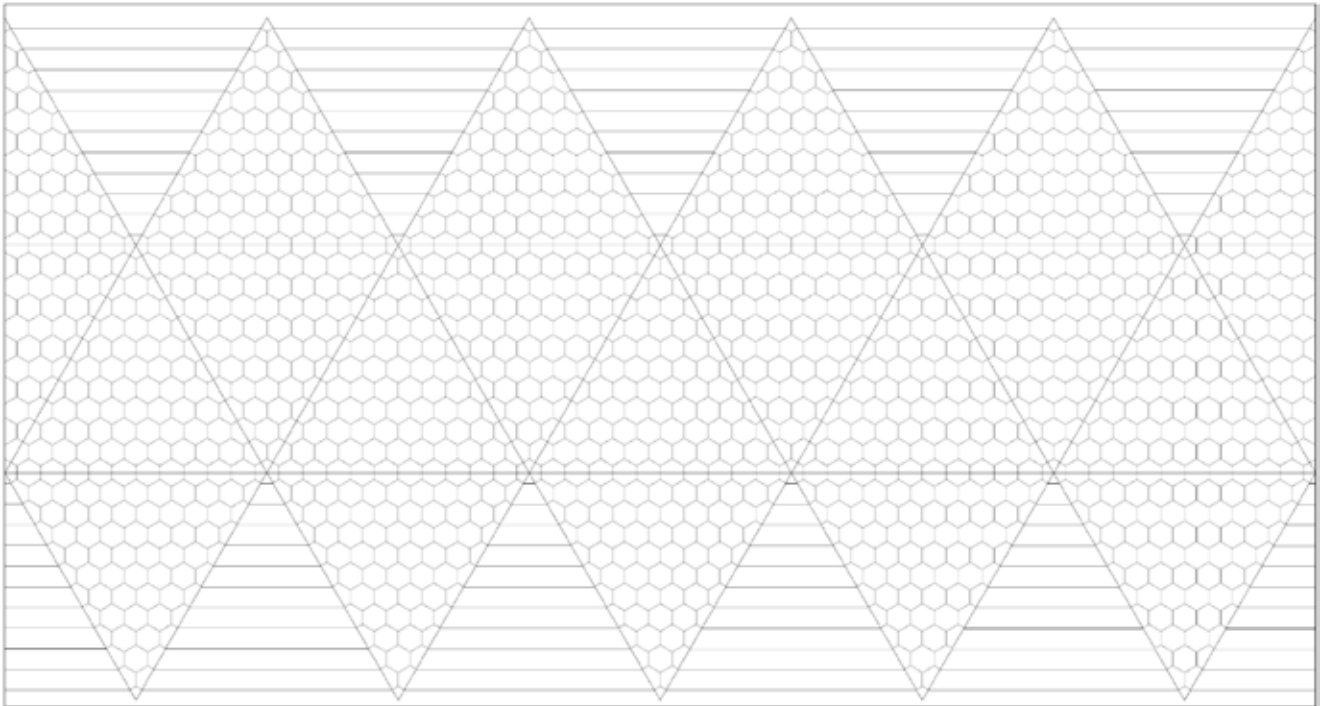
### WORLD MAP DIMENSION DETAILS

Size	<b>10</b>	
Diameter	Miles	10,000
Diameter	Km	16,000
Radius	Km	8,000
Circumference*	Km	50,265
Triangle Edge	Km	10,053
Hex	Km	1,005
Hexes/Triangle		55
World Hexes		1,002
Volume=	Earths	1.95
**G=		1.25



**11**  
WORLD MAP

<b>B</b>								
St	Siz	Atm	Hyd	Pop	Gov	Law		TL



**WORLD MAP DIMENSION DETAILS**

Size	<b>11</b>	
Diameter	Miles	11,000
Diameter	Km	17,600
Radius	Km	8,800
Circumference*	Km	55,292
Triangle Edge	Km	11,058
Hex	Km	1,005
Hexes per Triangle		66
World Hexes		1,320
Volume=	Earths	2.6
**G=		1.375

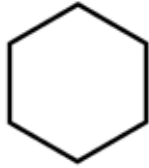
**BW BIGWORLD**

	Size	Diameter	Type	
Big World	B	11	11,000	
	C	12	12,000	
	D	13	13,000	
	E	14	14,000	
	F	15	15,000	
	G	16	16,000	
	H	17	17,000	
	J	18	18,000	
	K	19	19,000	
	Diameter in Miles			
	World Size B+ is Big World			
Big World Mapping:				
Hex= 1,000 km				



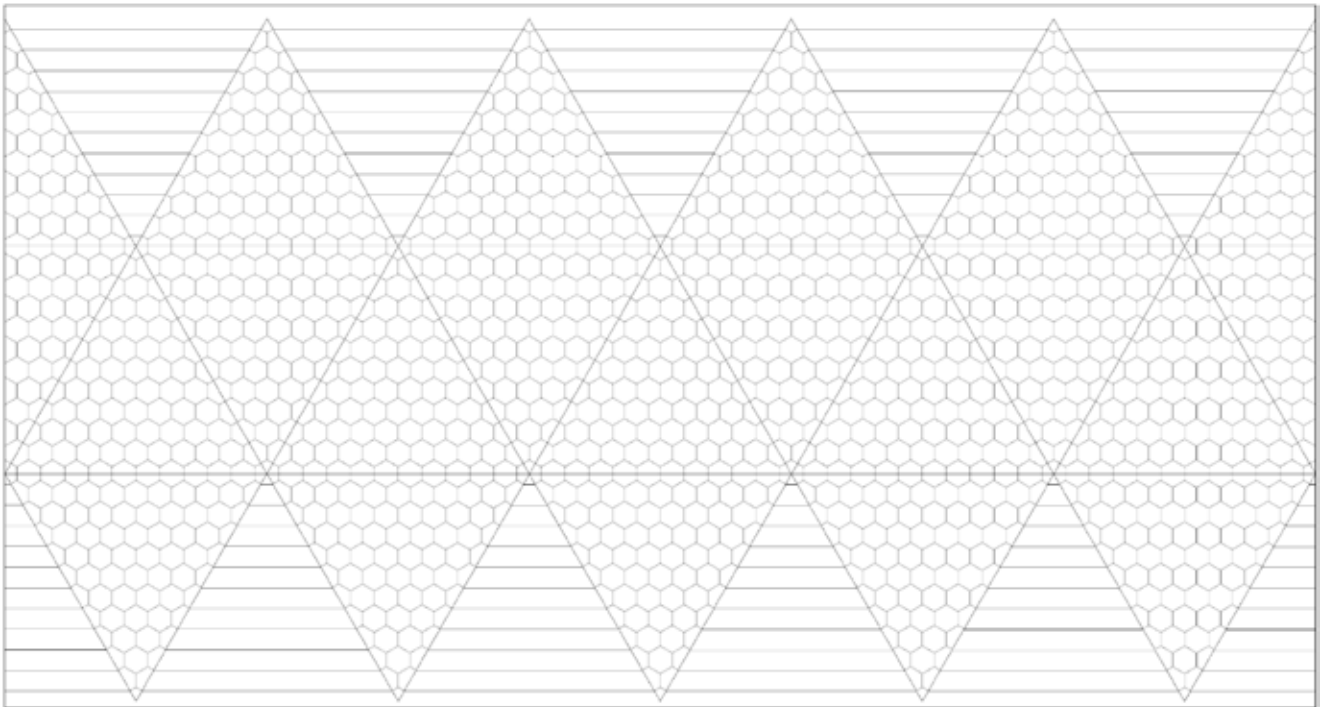


# 12 Map Size



## 12 WORLD MAP

<input type="checkbox"/>	<b>C</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-	<input type="checkbox"/>
St	Siz	Atm	Hyd	Pop	Gov	Law			TL



### WORLD MAP DIMENSION DETAILS

Size	<b>12</b>	
Diameter	Miles	12,000
Diameter	Km	19,200
Radius	Km	9,600
Circumference*	Km	60,319
Triangle Edge	Km	12,060
Hex	Km	1,005
Hexes per Triangle		78
World Hexes		1,442
Volume=	Earths	3.375
**G=		1.5

### BW BIGWORLD

	Size	Diameter	Type
Big World	B	11	11,000
	C	12	12,000
	D	13	13,000
	E	14	14,000
	F	15	15,000
	G	16	16,000
	H	17	17,000
	J	18	18,000
	K	19	19,000

Diameter in Miles  
World Size B+ is Big World

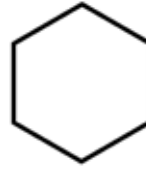
Big World Mapping:  
Hex= 1,000 km

### GG-U GAS GIANT-U

	Size	Diameter	Type	
Large Gas Giant	P	23	50,000	
	Q	24	60,000	
	R	25	70,000	Saturn
	S	26	80,000	
	T	27	90,000	Jupiter
	U	28	125,000	2 Mj
	V	29	180,000	4 Mj
	W	30	220,000	6 Mj
	X	31	250,000	8 Mj

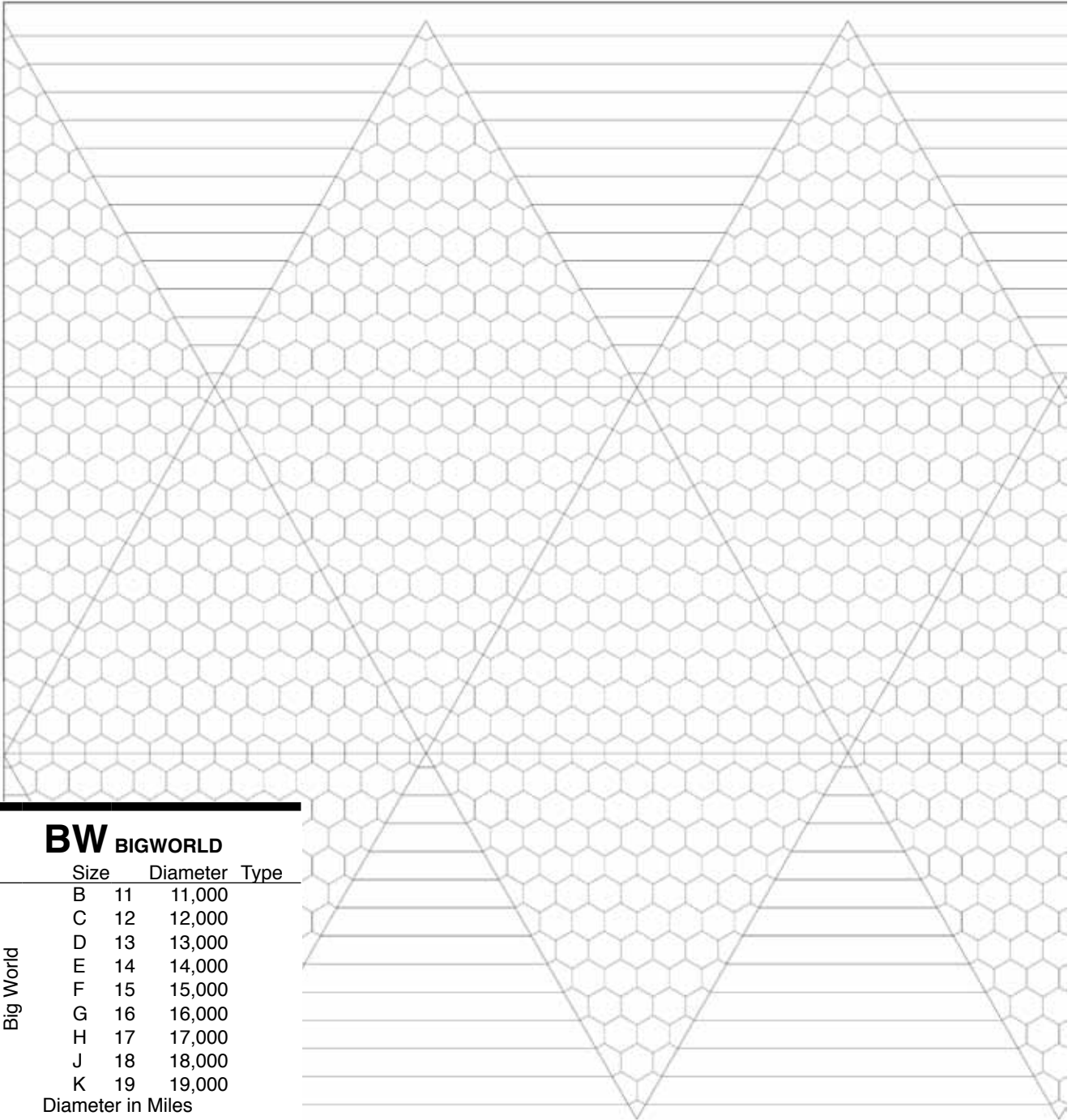
Use Geodesic Map-12  
for mapping Gas Giant-U.

Gas Giant Mapping:  
Hex= 10,000 km



# Map Size 13

<input type="checkbox"/>	<b>D</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	-	<input type="checkbox"/>
St	Siz	Atm	Hyd	Pop	Gov	Law			TL



## BW BIGWORLD

	Size	Diameter	Type
Big World	B	11	11,000
	C	12	12,000
	D	13	13,000
	E	14	14,000
	F	15	15,000
	G	16	16,000
	H	17	17,000
	J	18	18,000
	K	19	19,000

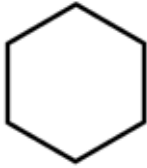
Diameter in Miles  
World Size B+ is Big World

Big World Mapping:  
Hex= 1,000 km

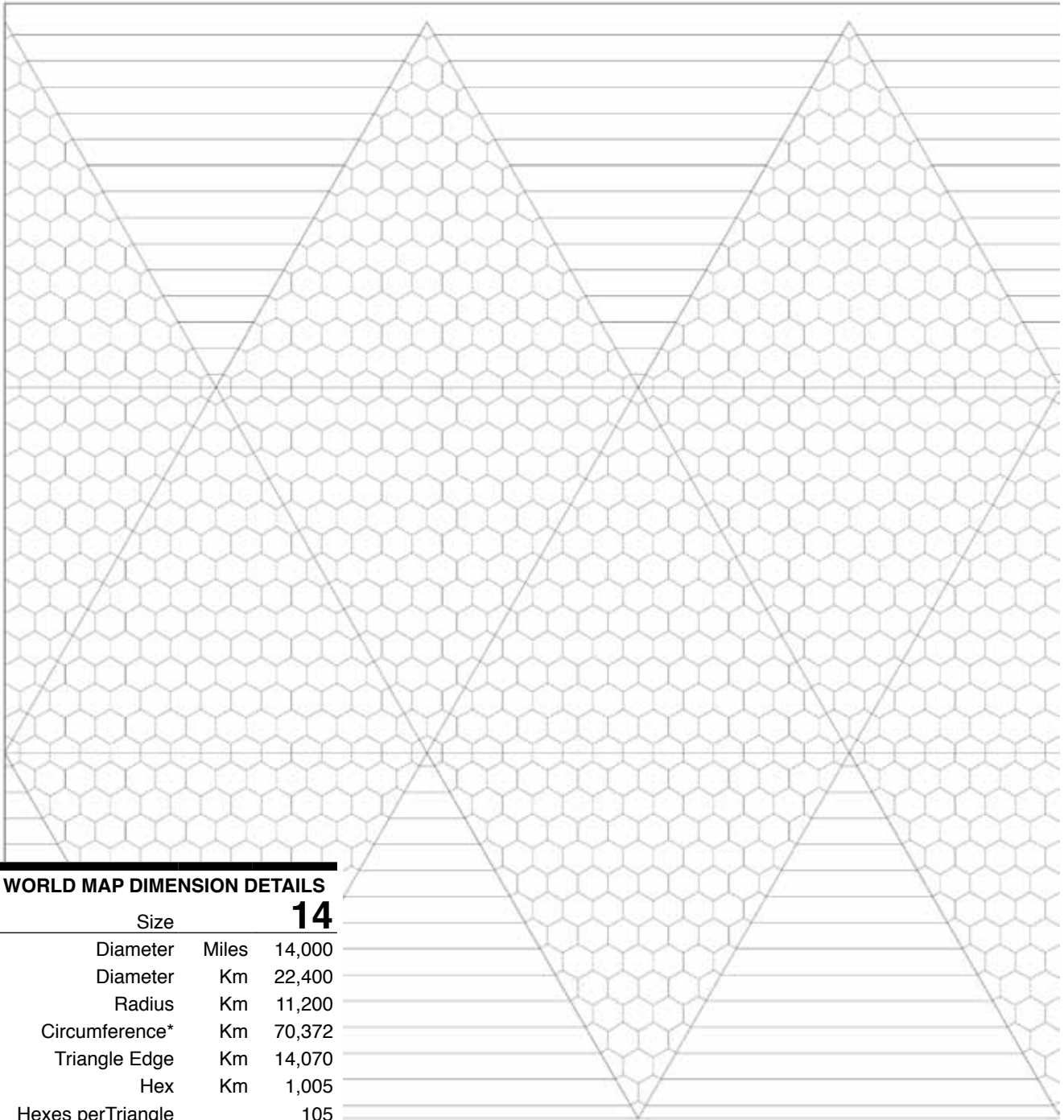
**BW BIGWORLD**  
World Size B+ is Big World



# 14 Map Size



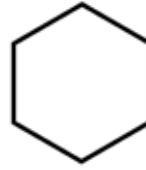
	<b>E</b>							-	
St	Siz	Atm	Hyd	Pop	Gov	Law			TL



### WORLD MAP DIMENSION DETAILS

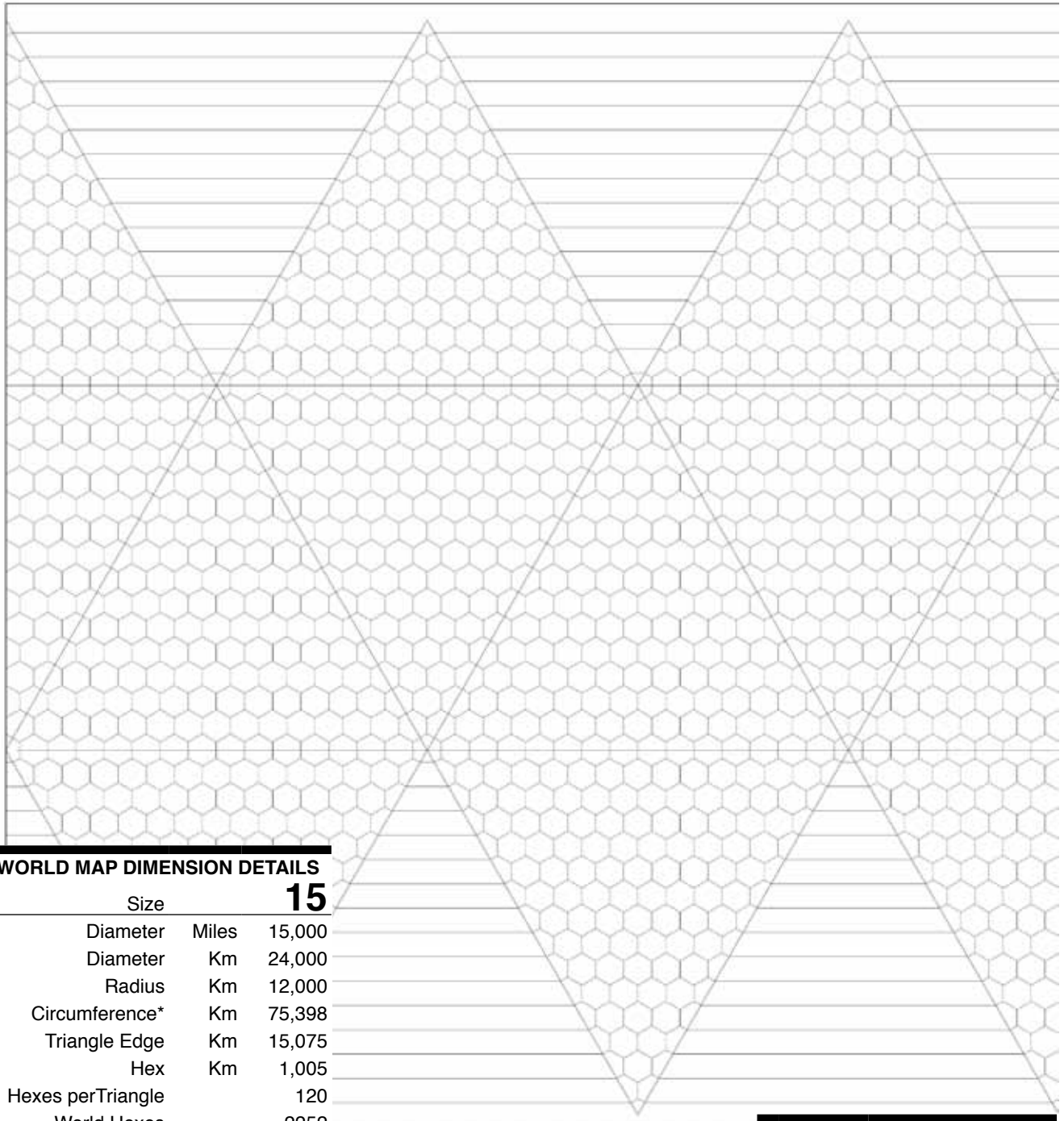
Size		<b>14</b>
Diameter	Miles	14,000
Diameter	Km	22,400
Radius	Km	11,200
Circumference*	Km	70,372
Triangle Edge	Km	14,070
Hex	Km	1,005
Hexes perTriangle		105
World Hexes		1,962
Volume=	Earths	5.35
**G=		1.75

**BW** BIGWORLD  
World Size B+ is Big World



# Map Size 15

<b>F</b>								
St	Siz	Atm	Hyd	Pop	Gov	Law		TL



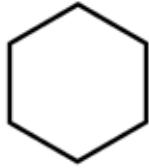
**WORLD MAP DIMENSION DETAILS**

	Size	<b>15</b>
Diameter	Miles	15,000
Diameter	Km	24,000
Radius	Km	12,000
Circumference*	Km	75,398
Triangle Edge	Km	15,075
Hex	Km	1,005
Hexes perTriangle		120
World Hexes		2252
Volume=	Earths	6.59
**G=		1.875

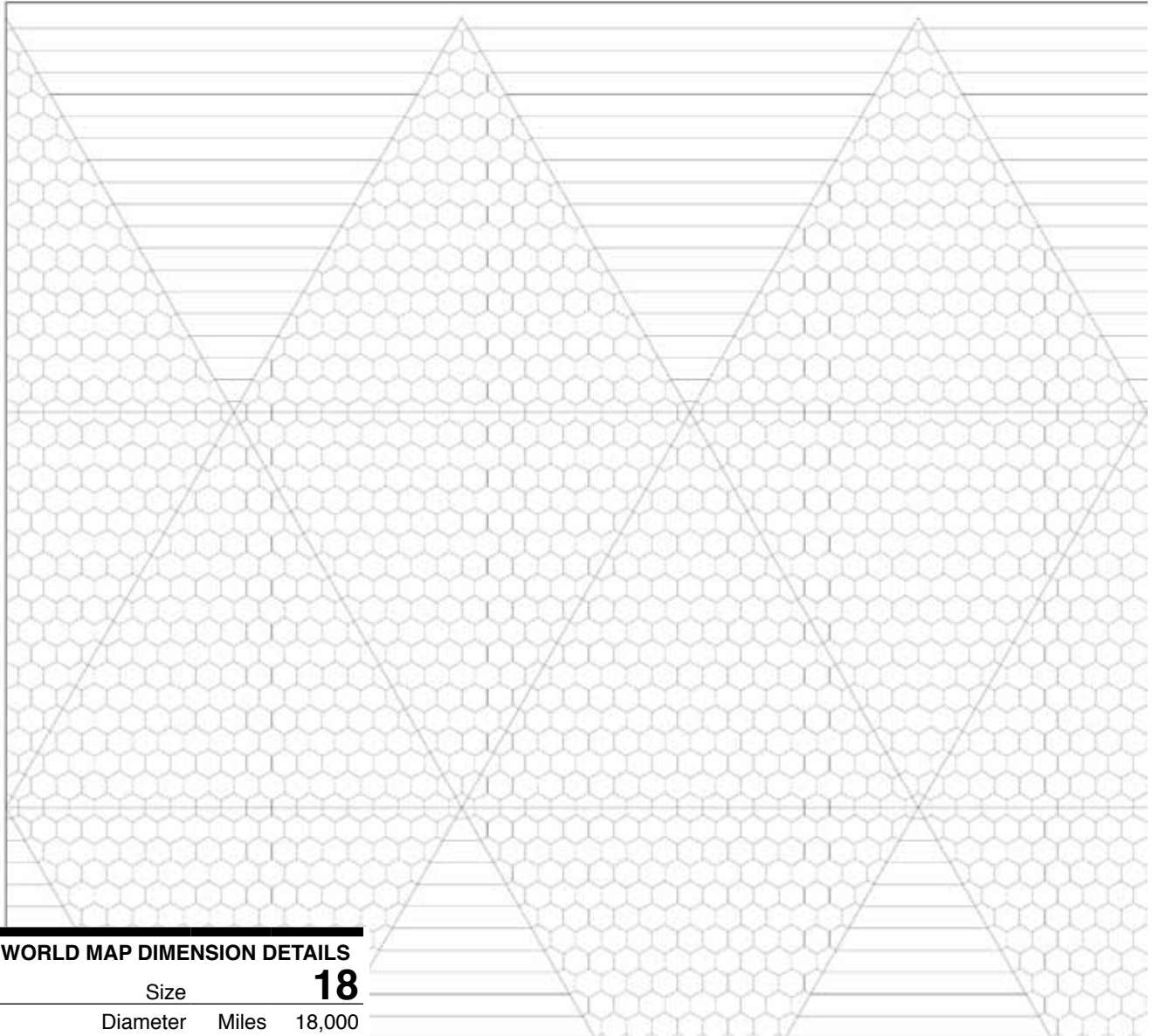
**BW** BIGWORLD  
World Size B+ is Big World



# 18 Map Size



	<b>J</b>							-	
St	Siz	Atm	Hyd	Pop	Gov	Law			TL



### WORLD MAP DIMENSION DETAILS

Size		<b>18</b>
Diameter	Miles	18,000
Diameter	Km	28,800
Radius	Km	14,400
Circumference*	Km	90,478
Triangle Edge	Km	18,090
Hex	Km	1,005
Hexes per Triangle		171
World Hexes		3,242
Volume=	Earths	11.39
**G=		2.25

**BW BIGWORLD**  
World Size B+ is Big World

### GG-V GAS GIANT-V

Size	Diameter	Type
V	29 180,000	4 Mj

Use Geodesic Map-18 with Hex Size= 10,000 km for mapping Gas Giant-V.

Gas Giant Mapping:  
Hex= 10,000 km



**GAS GIANT MAP DIMENSION DETAILS**

		<b>L</b>	<b>M</b>	<b>N</b>	<b>P</b>	<b>Q</b>	<b>R</b>
Geodesic Map		<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
Size		<b>20</b>	<b>21</b>	<b>22</b>	<b>23</b>	<b>24</b>	<b>25</b>
Diameter	Miles	20,000	30,000	40,000	50,000	60,000	70,000
Diameter	Km	32,000	48,000	64,000	80,000	96,000	112,000
Radius	Km	16,000	24,000	32,000	40,000	48,000	56,000
Circumference*	Km	100,531	150,796	201,062	251,327	301,593	351,858
Triangle Edge	Km	20,106	30,159	40,212	50,265	60,319	70,372
GG Hex	Km	10,053	10,053	10,053	10,053	10,053	10,053
GG Hexes/Triangle		3	6	10	15	21	28
GG Hexes		42	92	162	252	362	492
Volume=	Jupiters	0.015	0.05	0.125	0.25	0.42	0.66
**G=		0.76	1.1	1.6	2	2.4	2.7

**GAS GIANT MAP DIMENSION DETAILS**

		<b>S</b>	<b>T</b>	<b>U</b>	<b>V</b>	<b>W</b>	<b>X</b>
Geodesic Map		<b>8</b>	<b>9</b>	<b>12</b>	<b>18</b>		
Size		<b>26</b>	<b>27</b>	<b>28</b>	<b>29</b>	<b>30</b>	<b>31</b>
Diameter	Miles	80,000	90,000	125,000	180,000	220,000	250,000
Diameter	Km	128,000	144,000	200,000	288,000	352,000	400,000
Radius	Km	64,000	72,000	100,000	144,000	176,000	200,000
Circumference*	Km	402,124	452,389	628,319	904,779	1,105,841	1,256,637
Triangle Edge	Km	80,425	90,478	125,664	180,956	221,168	251,327
GG Hex	Km	10,053	10,053	10,053	10,053	10,053	10,053
GG Hexes/Triangle		36	45	78	171		
GG Hexes		642	812	1,442	3,242		
Volume=	Jupiters	1	1.42	3.8	11	20	30
**G=		3.2	3.6	4.9	6.9	8.4	9.7

Dimensions in Km less noted (World Size equals diameter of the World in Miles).

\* Circumference is also Equator.

Triangle Edge (in km) is approximately equal to World Diameter (in miles).

\*\* Assumes Density comparable to Terra.

**GG Hexes= 10,000 km.**

**GAS GIANT TERRAIN SYMBOLS**

<b>Calm</b>	<b>East Jet</b>	<b>East Fast Jet</b>	<b>West Jet</b>	<b>West Fast Jet</b>	<b>Turbulence</b>
<b>Vortex</b>	<b>Cyclone</b>	<b>Bloom</b>	<b>Plunge</b>	<b>Particulate</b>	<b>Anomaly</b>



# World Creation

## T1 Terrain Symbols

	1	2	3	4	5	6
1	 11 Clear	 12 Marsh	 13 Rough	 14 Woods	 15 Swamp	 16 RoughWood
2	 21 Mountain	 22 Desert	 23 Chasm	 24 Cropland	 25 Rural	 26 Ruins
3	 31 Ocean	 32 Islands	 33 Shore	 34 River	 35 Lake	 36 Icecap
4	 41 Baked Lands	 42 Twilight	 43 Frozen Lands	 44 Ice Field	 45 Precipice	 46 Exotic
5	 51 City	 52 Dome	 53 Arcology	 54 Suburbs	 55 Town	 56 Starport
6	 61 Highway	 62 Road	 63 Trail	 64 Air Corridor	 65 Grid	 66 High Speed
	 71 Ocean Depth	 72 Abyss	 73 Caverns	 74 Crater	 75 Wasteland	 76 Penal
	 81 Volcano	 82 Estate	 83 Reserve	 84 Mine	 85 Resource	 86 Oil
	 91 Airpad	 92 Vlite Airstrip	 93 Lite Airstrip	 94 Airport	 95 Heavy Airport	 96 Vheavy Airport

The details of locations on a world are identified by Terrain, including specifics about locations: its wealth, its population, its productivity, even its dangers.

World mapping divides the surface of a world into a series of hexagons (hexes) which define location and help in computing movement. Worlds are mapped with coarse scale World Hexes grouped into triangles to form a hexagon based world map. Each of the World Hexes is further divided into Terrain hexes, which may be divided into Local hexes, which may be divided into Single hexes. Each of the hexes is further detailed by a Terrain Type (or more than one Terrain Type).

**Terrain Within Terrain Within Terrain.** Terrain is mapped with a hierarchy of hexes. The result is larger hexes which may appear impassible, but when analyzed more specifically reveal potential travel routes.

For example, a World Hex identified as Mountain (and probably impassible) may prove to be composed of many Terrain hexes, some of which **are** passable. It is only when terrain is explored that characters can discover its true nature.

**MOARN Map Only As Really Necessary.** Produce detailed terrain only as needed. An important part of every adventure is encountering unexpected terrain.

## WHAT TERRAIN DOES

Terrain has three important effects:

**Terrain Provides Character.** Terrain provides character and interest to world surfaces. Terrain defines the details of locations and provides insights into potential benefits, obstacles, and consequences of exploring those locations.

**Terrain Shows Potential Value and Resources.** Terrain establishes the potential for finding value and important resources in specific locations. Certainly Wooded terrain can provide lumber; Baked Lands can probably provide pools of liquid base metal; Frozen Lands may provide solidified gases. Petro can provide fossil fuels and lubricants.

But Terrain also directs or narrows searches. Characters will probably not search Swamps for starship repair parts; they probably won't hunt tigers in Cities (but!). Terrain tells reasonable people what to expect and not to expect in specific locations.

**Terrain Affects Movement and Creates Impediments.** Terrain constrains movement by individuals and by vehicles. It clearly establishes the expected speeds for specific vehicles and it directs or channels movement by those vehicles to specific routes.

## UNDERSTANDING TERRAIN

Terrain is the character or nature of world surfaces. It may reflect the topography of land, the types of vegetations or natural features of land, the improvements or infrastructure, or a combination of these elements.

Terrain may be as simple as Clear: flat, unimproved land with no specific restrictions on travel or access. Terrain may be as complex as Domed City in Twilight Zone.

**Mapped In Hexes.** The Traveller Mapping System defines a hierarchy of mapping hexes: the 1000 km World Hex; the 100 km Terrain Hex; the 10 km Local Hex; and the 1 km Single Hex.

Larger hexes have more general terrain; smaller hexes have more specific Terrain.

**Identified by Terrain Types.** Terrain is identified by Type or Name. Each Terrain Type describes specific features which restrict or enhance travel, and which identify interesting features.

## THE TERRAIN CHARTS

Terrain is described and explained in a series of charts:

**Terrain Overview.** Fifty-four terrain types are shown in overview on this chart. Each type is named and numbered for ease of reference.

**Terrain Group Charts 1 - 9** show and describe the specific types of terrain.

**The Heights Chart** shows altitudes in the atmosphere.

**The Depths Chart** shows the depths of oceans.

**The Vehicle Speeds Chart** shows speeds for various types of vehicles.

## VEHICLE OPERATIONS

Vehicles are classified by the territory they cover.

**Local.** The vehicle is designed for travel on a daily basis in and around a specific location and within a Terrain Hex (an area 100 km in diameter). A car used for city driving or a delivery truck are Local. Such vehicles occasionally venture into adjacent Terrain Hexes.

**Regional.** The vehicle is designed for travel in several World Hexes (each about 1000 km in diameter).

Many Cargo Trucks or Truck Trains are Regional. Such vehicles occasionally venture into adjacent World Hexes.

**Continental.** The vehicle is designed for travel within a World Triangle (a cluster of 3 to 28 World Hexes).

**World.** The vehicle is designed to travel anywhere on the World. A territory classification assumes the vehicle will venture occasionally into neighboring territories.

For example, a Regional vehicle will sometimes visit adjacent Regions, but rarely other Continents..

**Vehicle Speeds.** The Vehicle Speeds Chart details the expected travel speeds for vehicles based on Terrain.





# T2 Terrain Types

The 36 basic and 18 additional Terrain types address most situations to be encountered on world surfaces.

**11. Clear.** Simple and flat. Vegetation is slight and unobtrusive.

**12. Wetland.** Flat, about half covered with Shallow water (0.5 meters deep or less). Wetland is a Marsh.

**13. Rough.** Uneven, unfavorable, obstructed, and rocky.

**14. Clear- Wooded.** Clear, more than half covered with megafloora.

**15. Wetland Wooded.** Wetland more than half covered with megafloora. Wetland Wooded is Swamp.

**16. Rough Wooded.** Rough more than half covered with megafloora.

**21. Mountain.** Dominated by steep slopes and rocky peaks or ridges.

**22. Desert.** Clear characterized by little vegetation, lack of water, and extreme temperature.

**23. Chasm.** A deep gorge well below typical land or surface levels.

**24. Cropland.** Clear characterized by extensive agricultural uses. Cropland is Clear with an overlay of Roads.

**25. Rural.** Clear which has been settled. Rural is an inferior or less productive form of Cropland. Rural is Clear terrain with an overlay of Roads.

**26. Ruins.** Includes sophont-constructed, now abandoned, buildings or installations.

**31. Ocean.** Saltwater ocean fed by continental drainage.

**32. Islands.** Includes a small group of islands in the Ocean.

**33. Shore.** The boundary between Continent and Ocean.

**34. River.** A channel of flowing water sufficient to pose a barrier to travel.

**35. Lake.** An isolated body of fresh water that occupies more than half a hex. Ground transportation bypasses (rather than bridges) lakes.

**36. Ice Cap.** A covering of frozen water near the North or South Pole.

**41. Baked Lands.** Lands under intense solar or stellar heating.

**42. Twilight Zone.** Hospitable territory between the hot and cold hemispheres of Twilight Zone planets.

**43. Frozen Lands.** In constant shadow and extremely cold.

**44. Ice Field.** The location is covered with frozen Ocean.

**45. Precipice.** An extreme change of land elevation which is an absolute barrier to ground vehicle travel.

**46. Exotic.** Abnormal, unusual, unexpected, or inexplicable elements (geysers, volcanic events), meteorologicals (fogs, hazes, constant storms), aesthetics (beautiful landscapes, stunning atmospheric displays), or other.

**51. City.** A high population community with associated governmental, cultural, educational, commercial, and manufacturing facilities.

**52. Domed.** A City with associated environmental protections against Vacuum, Tainted Atmosphere, or Weather.

**53. Arcology.** A complex of high population density hyperstructures. An Arcology is a self-sufficient community with only limited exterior contacts.

**54. Suburban.** A moderate population community associated with a City.

**55. Town (or Village).** A low population community.

**56. Starport (or Spaceport).** A landing ground for starships and interaction with off world enterprises.

**61. Highway.** A high quality transportation network component supporting wheeled vehicles.

**62. Road.** A local transport network supporting wheeled road vehicles.

**63. Trail.** A rudimentary, unpaved path for persons and Vlite vehicles.

**64. Air Corridor.** A path and assigned altitude for Flyers and under computerized air traffic control.

**65. Grid.** A surface Highway under centralized computer traffic control for safety and efficiency. Surface vehicles with Grid Controls can log into the Grid and use the roadways.

**66. High Speed.** A high-speed, high-volume passenger and cargo network using its dedicated vehicles on rails or proprietary roadbeds.

## ADDITIONAL TERRAIN TYPES

Additional Terrain types address special or less frequent situations.

**71. Ocean Depths.** A section of Ocean significantly deeper than normal.

**72. Abyss.** A section of Ocean (on an Ocean World) significantly deeper than normal.

**73. Caverns.** Surface terrain is underlain by extensive caves, tunnels, or other natural underground locations.

**74. Crater.** A large impact crater.

**75. Wasteland.** Contaminated by natural or sophont processes, which may be chemical, biological, radiation, or other processes.

**76. Penal Colony.** Contains a prison or prison camp.

**81. Volcanic.** Experiences significant geothermal or volcanic activity.

**82. Noble Estate.** Contains the private territory of a noble.

**83. Reserve.** Set aside as a protected area.

**84. Mines.** Extensively mined for natural resources.

**85. Resources.** The source of extensive and rich natural resources.

**86. Resources Oil.** The source of extensive and rich natural petrochemical resources.

**91. AirPad.** A landing ground for vertical landing and takeoff Flyers.

**92. Vlite Airport.** A rudimentary landing ground for Flyers suitable for Vlite Winged craft.

**93. Lite Airport.** A landing ground for Flyers suitable for Lite and Vlite Winged flying craft.

**94. Airport.** A landing ground for Flyers suitable for Medium and smaller Winged Flyers. Runways (usually more than one) are about 3,000 meters long.

**95. Heavy Airport.** A landing ground for Flyers suitable for Heavy and smaller Winged Flyers.

**96. Vheavy Airport.** Landing ground suitable for all winged Flyers.

\***Megafloora.** Plant life or vegetation larger in size than persons is Megafloora (a typical megafloora is a tree). Mega-flora is a barrier to most vehicles.



Altitude in the atmosphere and Depth in water are types of Terrain. They are expressed in Levels.

## ALTITUDES

Atmosphere Type determines the effects of atmosphere on travel (especially on Flyers).

The **Levels of the Atmosphere Chart 11** details the levels for various world atmosphere types.

The Surface level is the world surface. Levels above the surface correspond to the standard ranges.

Upper (Range=7) is further divided into several sublevels. Objects at a sublevel are treated for most purposes as at the level; the sublevels merely allow differentiation for various flyers and for the dissipation of the atmosphere.

**NOP Nap Of Planet** is the conventional term for flying close to the surface of a world (primarily to avoid detection). By ancient convention, on Terra/Earth (and only on Terra) this level is called NOE Nap Of Earth.

## DEPTHS

Water (or non-water ocean) on a world has depth measured in levels.

Submersibles, some forms of Armor, and some spacecraft can submerge below the surface of oceans, and may be able to venture far into the depths.

The **Depths of the Oceans Chart 12** details the various depths and when they typically are present.

**Pressure.** Objects at any appreciable depth are subject to Pressure as shown. Pressure shown in units roughly equal to Bars (or Atmospheres).

Pressure inflicts damage to objects in D. Pressure-1 includes 1D hits per Minute. A submarine resting on the Continental Shelf is subject to Pressure-15 every minute.

Altitudes	R=	Depths
Satellite	<b>11</b>	
Geo	<b>10</b>	
Far Orbit	<b>9</b>	
Orbit	<b>8</b>	
Upper8	<b>7.8</b>	
Upper6	<b>7.6</b>	
Upper4	<b>7.4</b>	
Upper2	<b>7.2</b>	
Upper	<b>7</b>	
Mid8	<b>6.8</b>	
Mid6	<b>6.6</b>	
Mid4	<b>6.4</b>	
Mid2	<b>6.2</b>	
Mid	<b>6</b>	
Airspace5	<b>5</b>	
Airspace4	<b>4</b>	
Airspace3	<b>3</b>	
NOP	<b>2</b>	Tsunami
Near Surface	<b>1</b>	Vbig Waves
Eye Level	<b>T</b>	Big Waves
Low	<b>R</b>	Waves
Contact	<b>0</b>	Surface
Pothole	<b>-R</b>	Wading
Trench	<b>-T</b>	Fording
Ditch	<b>-1</b>	Pond
Sinkhole	<b>-2</b>	Thermocline
	<b>-3</b>	Shelf
Chasm Rim	<b>-4</b>	Lake Bottom
Chasm Wall	<b>-5</b>	Deep Lake
Chasm Floor	<b>-6</b>	Bottoms
	<b>-7</b>	Depths
	<b>-8</b>	Abyss
Planetary Core	<b>-9</b>	

## INSIGHTS INTO TERRAIN

Various terrain types are related.

### Desert and Baked Lands are related.

**Desert** is dry territory, usually hot. Desert only occurs on worlds with atmospheres. **Baked Lands** are territory under constant stellar (solar) heating, usually on Twilight Zone worlds. Baked Lands may be vacuum, or may be on a world with atmosphere.

### Ice Cap, Ice Field, Frozen Lands are related.

**Ice Cap** (or Ice Sheet, Ice Pack, Glacier) is a mass of ice (or other frozen liquids and gases) accumulated toward the poles of a world; it may overlie Land or Ocean. **Ice Field** (or Ice Shelf) is a region of frozen Ocean; it overlies only Ocean; liquid Ocean may be present under the Ice Field. **Frozen Lands** is a region of very cold Land; it overlies only Land. The Ocean or Land underneath may have other terrain features present.

### Chasm and Precipice are related.

**Precipice** is a sheer cliff or geologic wall which cannot be crossed by world surface travel. **Chasm** is a canyon or deep crevasse (best thought of as paired Precipices). Chasm produces the only hospitable or habitable locations on Atmosphere= F Thin Low worlds.

### City, Domed, Arcology, Suburb, Town, Cropland, and Rural are related.

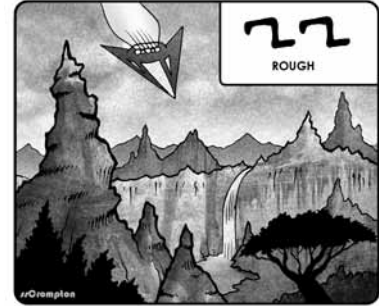
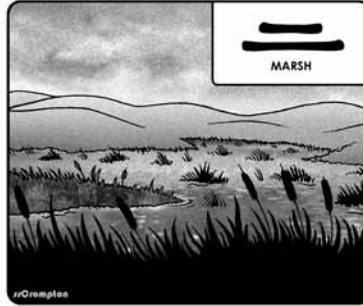
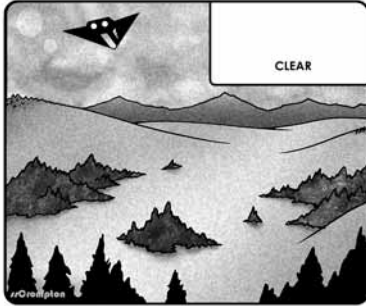
**City** is a dense highly populated location with its associated infrastructure to support the demands of the population: markets; roads and bridges; entertainment; services. **Domed** is a City in an inhospitable location requiring protection from Atmosphere (or other Threats). **Arcology** is a hyper-dense population center which avoids unnecessary interactions with other locations; it strives to be self-supplying for its energy, food, and other product needs. **Suburb** is medium-density population center near a City; it appears only near or adjacent to a City. **Town** (or **Village**) is a low-density population center isolated from other population centers. **Cropland** is agricultural land with significant population involved in its support and usually dispersed with the territory. **Rural** is similar to Cropland but not as productive. All populated terrain types include Roads, and some may include Highways.



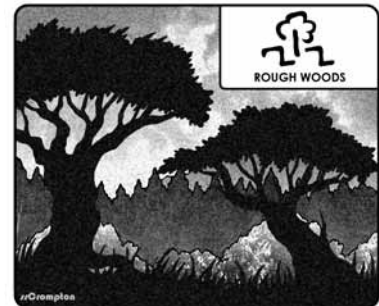
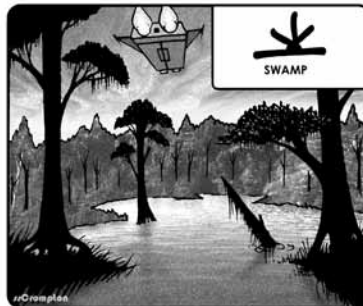
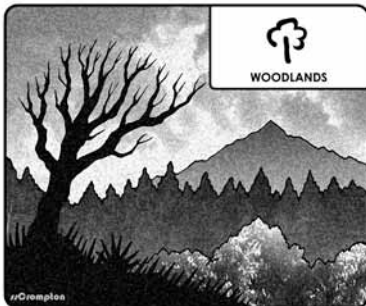
World Creation

# 01 Basic Terrain

**Terrain Group 1** is a set of basic terrain types encountered on most habitable worlds.



<b>Clear</b>	<b>11</b>	<b>Wetland</b>	<b>12</b>	<b>Rough</b>	<b>13</b>
<p>The way ahead is <b>Clear</b>: flat or rolling land with a minimum of obstructions. There may be minor barriers from surface rocks, gullies, or water channels. There may be occasional vegetation.</p>		<p>The way ahead is <b>Wetland</b>: marshlands more than half covered with shallow water (generally knee to waist deep). There is no clear or continuous land path through the area. There may be minor barriers (islands, hills, or rocks). Occasional vegetation may be present..</p>		<p>The way ahead is <b>Rough</b>: uneven, obstructed, and rocky land. Progress is indirect and time-consuming. There are major obstructions frequently encountered. There may be occasional vegetation.</p>	
<p><b>Plain. Prairie. Savannah.</b></p>		<p><b>Marsh.</b></p>		<p><b>Badlands. Broken.</b></p>	

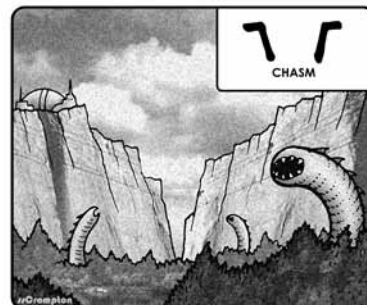
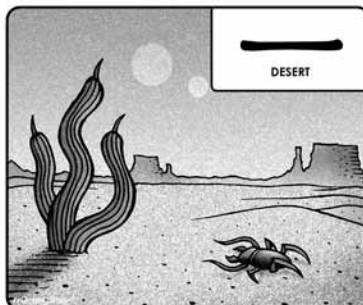


<b>Clear Wood</b>	<b>14</b>	<b>Wetland Wood</b>	<b>15</b>	<b>Rough Wood</b>	<b>16</b>
<p>The way ahead is <b>Woods: Clear</b> overlaid with megaflora (forests; large plant growth) for the majority of the area. Trees or other large vegetation are irregularly spaced no more than 3 meters apart, and often much closer, There are substantial barriers to surface vehicles.</p>		<p>The way ahead is <b>Swamp</b>: Wetlands overlaid with megaflora (forests; large plant growth) for the majority of the area. Trees or other large vegetation is irregularly spaced no more than 3 meters apart, and often closer. There are substantial barriers to surface vehicles.</p>		<p>The way ahead is <b>Thick Forest</b>: Rough overlaid with megaflora (forests; large plant growth) for the majority of the area. Trees or other large vegetation is irregularly spaced no more than 3 meters apart, and often closer. There are substantial barriers to surface vehicles.</p>	
<p><b>Woods. Forest.</b></p>		<p><b>Swamp. Bayou.</b></p>		<p><b>Deep Forest.</b></p>	

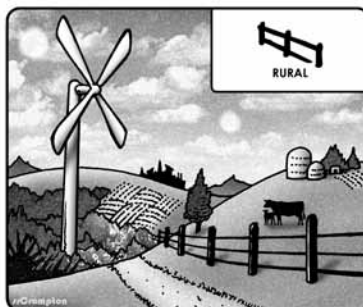
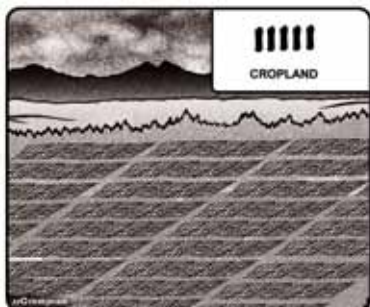


**Terrain Group 2** is a set of additional or less common terrain types encountered on hospitable world surfaces.

# Additional Terrain 02



<b>Mountain</b> <b>21</b>	<b>Desert</b> <b>22</b>	<b>Chasm</b> <b>23</b>
<p>The way ahead is <b>Mountain</b>: steep rocky peaks or ridges presenting substantial barriers to travel. Surface progress is slow and severely restricted. There may be occasional vegetation.</p>	<p>The way ahead is <b>Desert</b>: flat or rolling, often uneven or sandy. The terrain is dry with wide swings in temperature.</p>	<p>The way ahead is a <b>Chasm</b>: deep valley, canyon, or gorge substantially below the typical land levels. Progress along the Chasm is easy; climbing the Chasm walls is formidable.</p>
<b>Peaks. Range.</b>	<b>Waste. Arid Lands.</b>	<b>Canyon. Crevasse.</b>



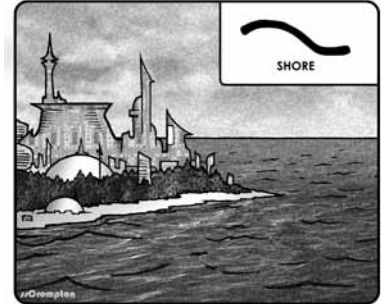
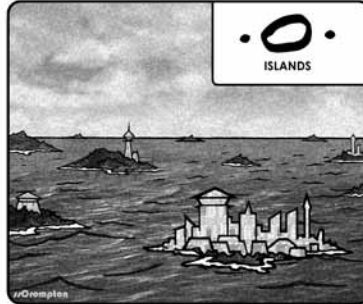
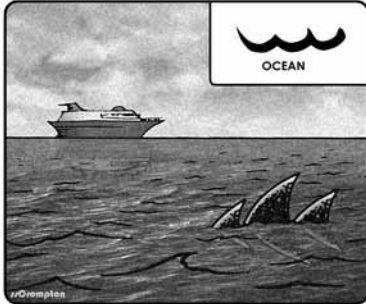
<b>Cropland</b> <b>24</b>	<b>Rural</b> <b>25</b>	<b>Ruins</b> <b>26</b>
<p>The way ahead is <b>Cropland</b>: extensive, cultivated agricultural land dedicated to the production of crops.</p>	<p>The way ahead is <b>Rural</b>: partially or sparsely settled terrain nevertheless with basic civilized amenities and infrastructure.</p>	<p>The way ahead is <b>Ruins</b>: sophisticated buildings or installations which have been abandoned and have fallen into disrepair. Ruins may be found anywhere on any world: they range from simple abandoned buildings to ruined cities from long-lost civilizations.</p>
<b>Fields. Pasture. Farmland.</b>	<b>Countryside. Bucolic. Rustic.</b>	<b>Abandoned.</b>



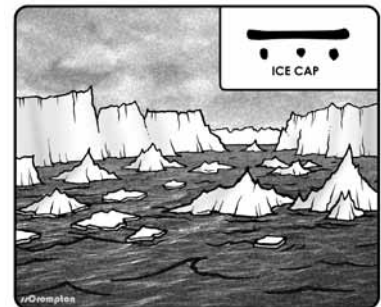
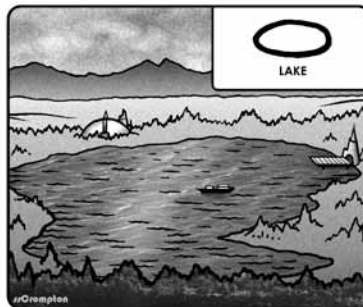
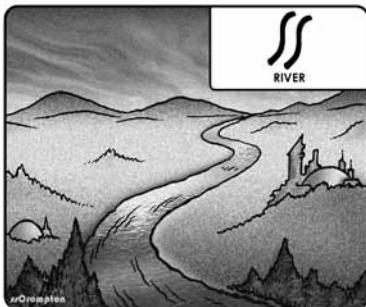
World Creation

# 03 Wet Terrain

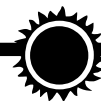
Terrain Group 3 is the basic set of water-related terrain types encountered on hospitable world surface



Ocean 31	Islands 32	Shore 33
<p>The way ahead is <b>Ocean</b>: a large body of (usually salt) water fed by drainage from continents.</p>	<p>The way ahead is <b>Islands</b>: small bits of land in an Ocean.</p> <p>Islands have no Continental Shelf.</p>	<p>The way ahead is <b>Shore</b>: the boundary between land and ocean. Shore may include other terrain types as well.</p> <p>The Water portion of a Shore hex is Continental Shelf.</p>
<b>Sea. Mar. Mere.</b>	<b>Archipelago. Atolls. Reefs.</b>	<b>Beach. Coast.</b>

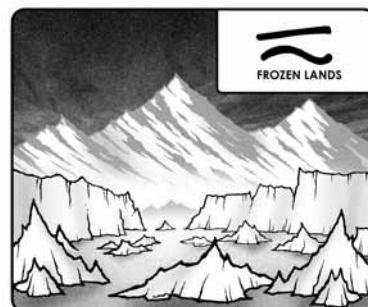
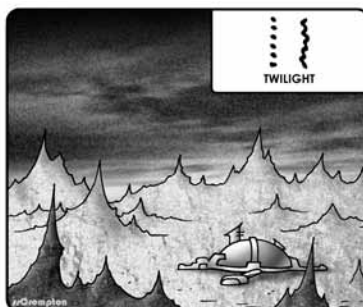
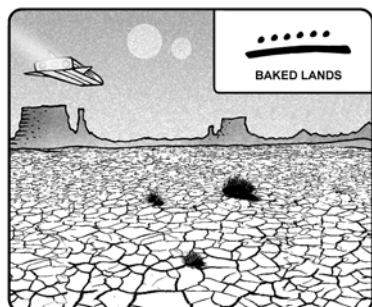


River 34	Lake 35	Ice Cap 36
<p>The way ahead is a <b>River</b>: flowing water large enough to pose a barrier to surface vehicles, and large enough to allow passage of surface water vehicles.</p> <p>River may occur in any territory. Its flow ultimately connects to Lake or Ocean.</p>	<p>The way ahead is <b>Lake</b>: a body of water covering most of a Terrain hex.</p>	<p>The way ahead is <b>Icecap</b>: frozen water (or other) in the coldest regions of the world.</p> <p>Icecap may overlay other terrain, including Land and Water.</p>
<b>Seaway. Waterway. Canal. Waterway.</b>	<b>Reservoir. Loch. Lagoon.</b>	<b>Ice Sheet. Ice Pack. Glacier.</b>

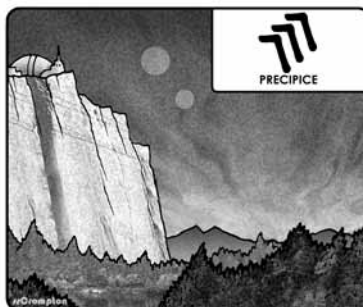
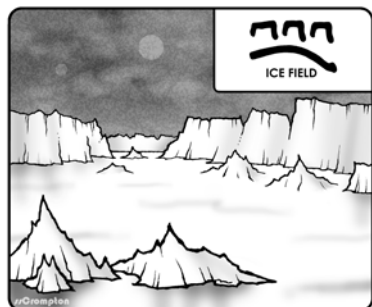


**Terrain Group 4** is the basic set of terrain types encountered on inhospitable world surfaces.

# Inhospitable Terrain 04



<p><b>Baked Lands 41</b></p>	<p><b>Twilight Zone 42</b></p>	<p><b>Frozen Lands 43</b></p>
<p>The way ahead is <b>Baked Lands</b>: territory under constant or intense stellar heating. The territory is reasonably flat and easily travelled. There are only occasional and minor barriers.</p>	<p>The way ahead is <b>Twilight Zone</b>: lands midway between the Baked Lands and the Frozen Lands of worlds locked to their star.</p>	<p>The way ahead is <b>Frozen Lands</b>: lands in constant shadow on planets locked to their star. Or, the way ahead is <b>Frozen Lands</b>: terrain on worlds far from their primary star and forever frozen. Frozen Lands overlay only Land (possibly associated River and Lake).</p>
<p><b>Hot Zone.</b></p>	<p><b>Shadowland.</b></p>	<p><b>Cold Zone.</b></p>



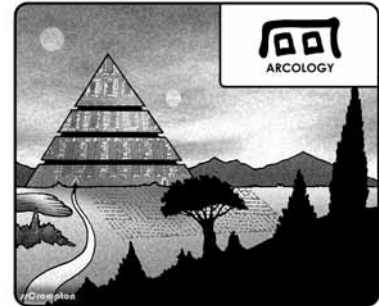
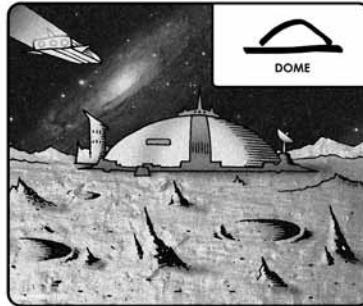
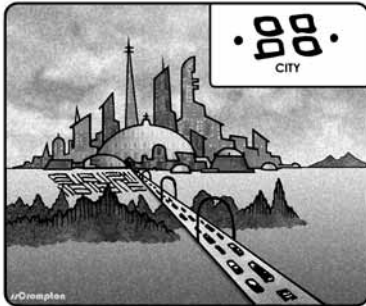
<p><b>Ice Field 44</b></p>	<p><b>Precipice 45</b></p>	<p><b>Exotic 46</b></p>
<p>The way ahead is <b>Icefield</b>: vast expanses of frozen water, gases, or other liquids.  Ice Field overlays only Ocean.</p>	<p>The way ahead is <b>Precipice</b>: an extreme change in land elevation which is establishes an absolute barrier to surface vehicles.</p>	<p>The way ahead is <b>Exotic</b>: abnormal, unusual, or inexplicable territory which provides unexpected features.</p>
<p><b>Ice Shelf.</b></p>	<p><b>Cliffs. Bluffs.</b></p>	<p><b>Enigmatic. Paradoxical. Quixotic.</b></p>



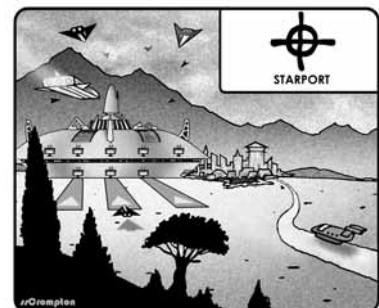
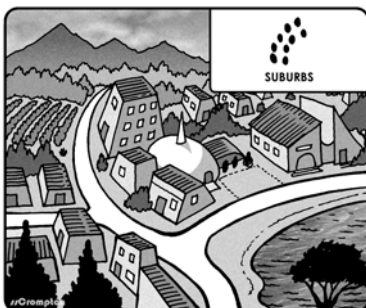
World Creation

# 05 Populated Terrain

Terrain Group 5 is the basic set of terrain types associated with population centers.



<b>City</b>	<b>51</b>	<b>Dome</b>	<b>52</b>	<b>Arcology</b>	<b>53</b>
<p>The way ahead is <b>City</b>: a major population center with governmental, cultural, educational, and commercial facilities.</p> <p>City is usually (but not always) technological.</p> <p><b>Transport Net:</b> Treat as Highway.</p>		<p>The way ahead is <b>Domed City</b>: a major population center with governmental, cultural, educational, and commercial facilities. It includes protections against environmental conditions.</p> <p><b>Transport Net:</b> Treat as Road.</p>		<p>The way ahead is <b>Arcology</b>: a complex of large high population density hyperstructures. Arcologies are self-sufficient isolated communities with only limited exterior contacts.</p> <p><b>Transport Net:</b> Treat as Road.</p>	
<b>City. Urban. Urb.</b>		<b>Domed City.</b>		<b>Habitat.</b>	

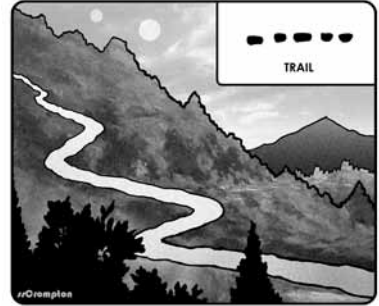
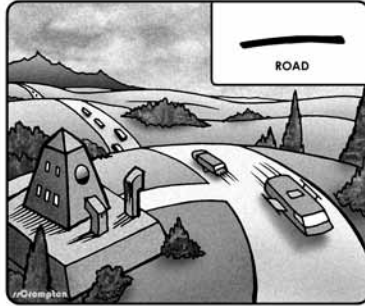
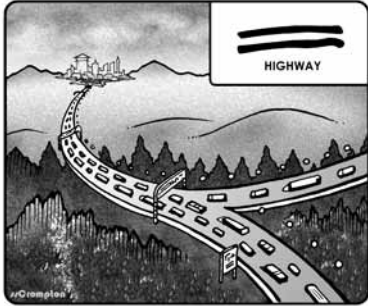


<b>Suburb</b>	<b>54</b>	<b>Town</b>	<b>55</b>	<b>Starport</b>	<b>56</b>
<p>The way ahead is <b>Suburb</b>: moderate population regions on the edges of City terrain.</p> <p><b>Transport Net:</b> Treat as Highway.</p>		<p>The way ahead is <b>Town</b>: relatively low population regions providing government, cultural, commercial, and educational support for the region.</p> <p><b>Transport Net:</b> Treat as Road.</p>		<p><b>Starport</b> is an established landing ground or designated landing area for starships and spacecraft.</p> <p>The same symbol also represents Spaceport.</p> <p><b>Transport Net:</b> Treat as Road.</p>	
<b>Burb. District. Exurb.</b>		<b>Village. Hamlet. Community.</b>		<b>Downport. Spaceport.</b>	

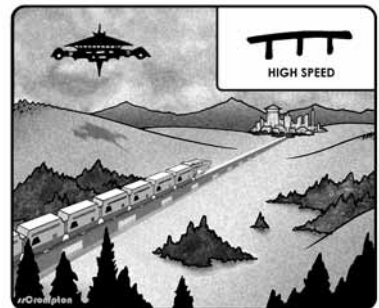
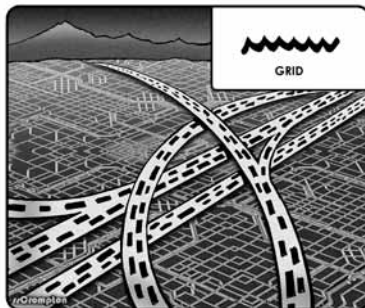
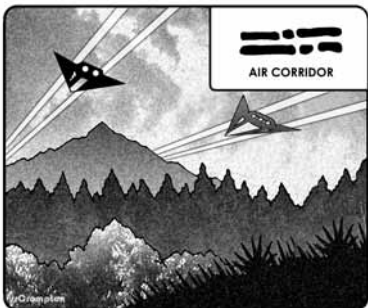


Terrain Group 6 is the set of terrain types associated with the transportation net.

World Creation  
**Transport Terrain 06**



<b>Highway 61</b>	<b>Road 62</b>	<b>Trail 63</b>
The way ahead is <b>Highway</b> : a high quality Transport network intended for wheeled road vehicles.	The way ahead is <b>Road</b> : a moderate quality Transport network intended for wheeled road vehicles.	The way ahead is <b>Trail</b> : a low quality Transport network intended for Vlite vehicles.
<b>Expressway. Pike. Freeway.</b>	<b>Street. Lane. Avenue.</b>	<b>Path. Footpath.</b>



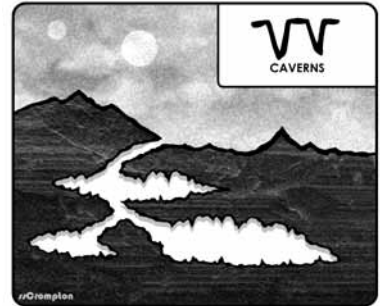
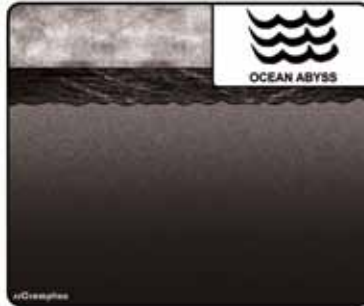
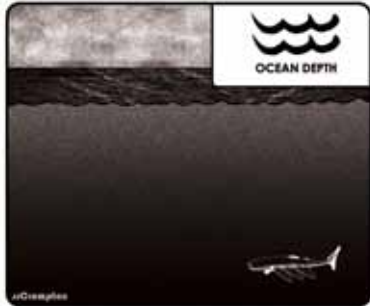
<b>Air Corridor 64</b>	<b>Grid 65</b>	<b>High Speed 66</b>
<b>Air Corridor</b> is a specified path and altitude for Flyers. It is under computer air traffic control.	The <b>Grid</b> is a controlled Highway providing automated vehicle direction for safety and efficiency.	<b>High Speed</b> dedicated high speed, high volume passenger and cargo movers, including specialized trains, which may be surface, underground, or elevated.
<b>Skyway. Air Lane.</b>	<b>Automated Highway.</b>	<b>Monorail. MagLev. Mover Line.</b>



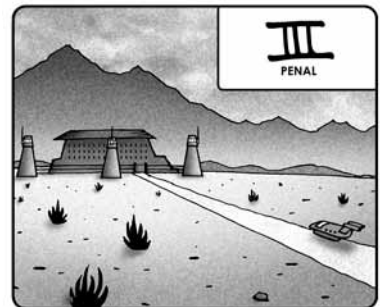
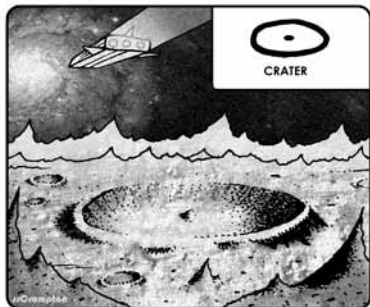


# 07 Special Terrain

Terrain Group 7 is the basic set of terrain types associated with special circumstances.



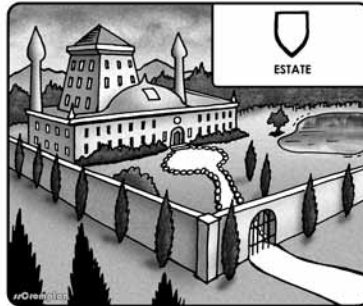
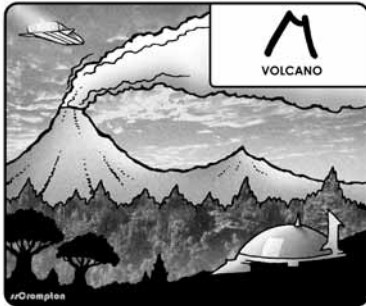
<b>Depths</b> <b>71</b>	<b>Abyss</b> <b>72</b>	<b>Caverns</b> <b>73</b>
The way ahead is a portion of the <b>Ocean</b> which is significantly deeper than normal.	The way ahead is a portion of the <b>Ocean</b> (specifically on an Ocean World) which is significantly deeper than normal (and deeper than Ocean Depth).	The way ahead is <b>Caverns</b> : an underground or subsurface network of caves, tunnels, or other natural underground locations.
Sea Depths. Pelagic.	Trench. Ocean Depths. Benthic.	Caves. Lava Tubes. Labyrinth.



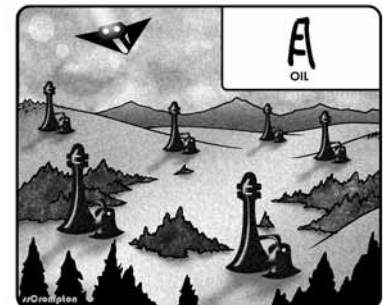
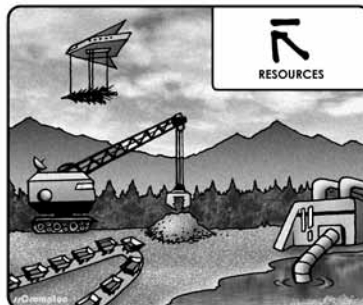
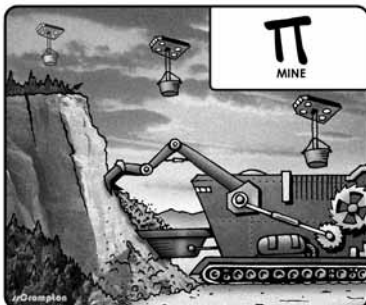
<b>Crater</b> <b>74</b>	<b>Wasteland</b> <b>75</b>	<b>Penal</b> <b>76</b>
The way ahead is a <b>Crater</b> : a significant impact crater which creates substantial barriers to movement.	The way ahead is <b>Wasteland</b> : lands contaminated by natural or so-phont processes. Contamination may be chemical, biological, radiation, or other processes.	The way ahead is <b>Penal Colony</b> : a community of convicted criminals (or political prisoners) transported here from another world.
Distinct from Volcano.	Wasteland overlays other terrain.	Penal overlays other terrain.
Impact Crater. Meteor Crater.	Wilds. Badlands. Barrens.	Concentration Camp. Gulag.

Terrain Group 8 is the set of terrain types associated with resources.

# Resource Terrain 08



<b>Volcano</b> 81	<b>Estate</b> 82	<b>Reserve</b> 83
<p>The way ahead is <b>Volcanic</b>: molten interior rock emerging to the surface. The territory is similar to Mountain. Surface progress is slow and severely restricted. There may be occasional vegetation.</p>	<p>The way ahead is <b>Estate</b>: the private lands of a wealthy or powerful government, business, or military leader.</p> <p>The estate is overlaid on other terrain, which influences surface progress. In addition, local security forces may obstruct or impede movement.</p>	<p>The way ahead is <b>Reserve</b>: lands set aside from exploitation or settlement. The territory is subject to entry and interaction restrictions in order to protect it from exploitation or interference.</p> <p>Reserve overlays on other terrain, which influences surface progress.</p>
<b>Volcanic. Caldera. Crater.</b>	<b>Compound. Noble Estate. Fortress.</b>	<b>Park. Parkland.</b>

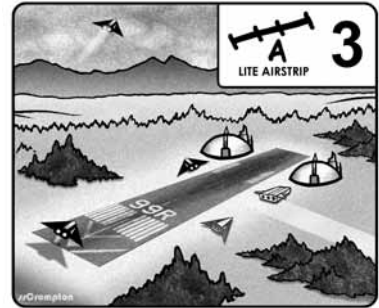
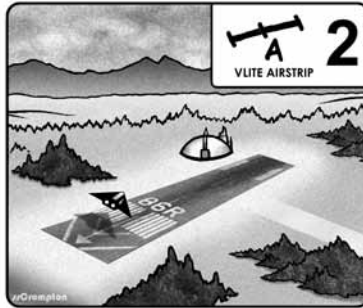
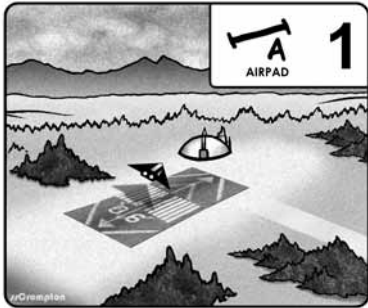


<b>Mine</b> 84	<b>Resource</b> 85	<b>Oil</b> 86
<p>The way ahead is a <b>Mine</b>: resources being exploited to produce ores or raw materials.</p> <p>Mine overlays other terrain.</p>	<p>The way ahead is a significant <b>Resource</b> which is part of the natural wealth of the world.</p> <p>Resource encompasses non-mining activities: forests, fisheries, geothermal, hydroelectric, wind power, recyclables, or dumps.</p> <p>Resource overlays other terrain.</p>	<p>The way ahead is <b>Oil Fields</b>, a significant Resource (consisting of natural petrochemicals or their analogs) which is part of the natural wealth of the world.</p> <p>Oil overlays other terrain.</p>
<b>Open Pit Mine. Quarry. Shaft.</b>		<b>Petro. Tar Pits. Resource Oil.</b>

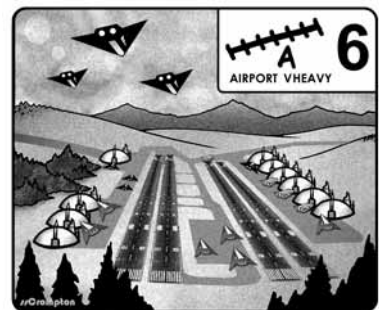
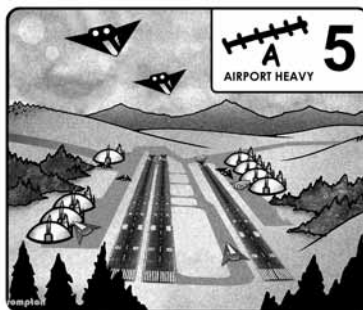
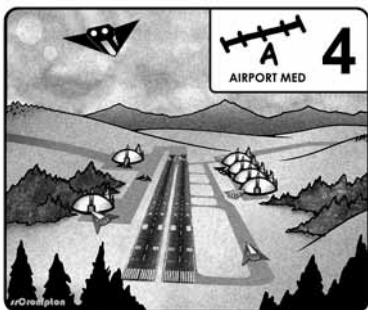


# 09 Interface Terrain

Terrain Group 9-10 is a double set of terrain types associated with Flyer landing grounds



<b>Airpad</b>	<b>91</b>	<b>Vlite Airport</b>	<b>92</b>	<b>Lite Airport</b>	<b>93</b>
<p>A rudimentary landing ground for Flyers suitable for rotary and flap winged aircraft, for VSTOL, and for grav vehicles. Not suitable for winged craft.</p> <p>The surface may be natural ground, vegetation, or simple paving.</p> <p>Pad is less than 1000 meters long.</p>		<p>A landing ground for Flyers suitable for Vlite Winged craft.</p> <p>Runway is about 2 km long.</p>		<p>A landing ground for Flyers suitable for Vlite, and Lite Winged Flyers.</p> <p>Runway is about 3 km long.</p>	
HeliPad. GravPad.		Simple Airport. Basic Airport.		Local Airport.	

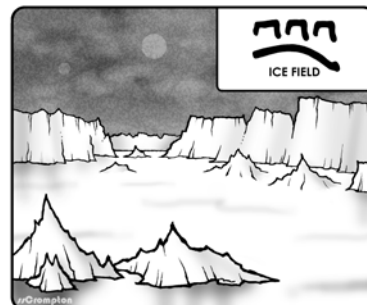
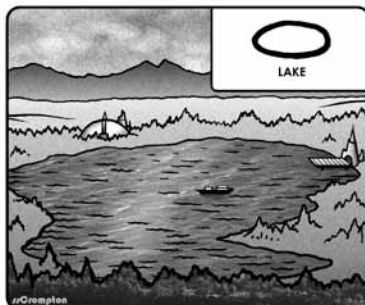
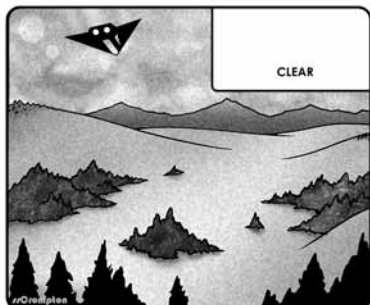


<b>Airport</b>	<b>94</b>	<b>Heavy Airport</b>	<b>95</b>	<b>Vheavy Airport</b>	<b>96</b>
<p>A landing ground for Flyers suitable for Medium and smaller Winged Flyers.</p> <p>Runway is about 4 km long.</p>		<p>A landing ground for Flyers suitable for Heavy and smaller Winged Flyers (all but Vheavy).</p> <p>Runway is about 5 km long.</p>		<p>A landing ground suitable for all winged Flyers.</p> <p>Runway is about 6 km long.</p>	
Regional Airport.		Continental Airport.		Intercontinental Airport.	

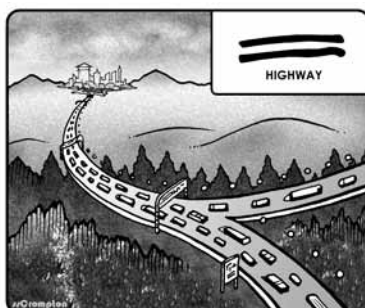
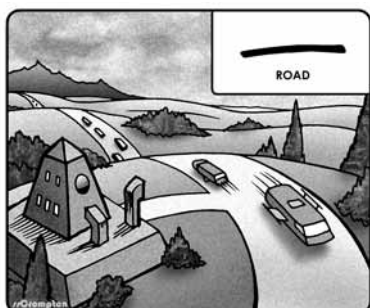


Terrain Group 9-10 is a double set of terrain types associated with Flyer landing grounds. Those in Set 10 are actually taken from other sets.

# Interface Terrain 10



<b>Open Field</b> 11	<b>Open Water</b> 35	<b>Ice Field</b> 44
<b>Open Field</b> is any terrain with at clear space suitable for a non-runway landing. It is not suitable for Winged flyers or craft which require a runway.	<b>Open Water</b> is any calm water surface usable for landings. If the terrain hex size is equal to or greater than the equivalent Airport, it may substitute for Runway for load equipped Flyers.	<b>Ice Field</b> is the equivalent of Open Field. It is not suitable for Winged flyers or craft which require a runway.
Temporary Airport.	Temporary Landing Ground.	Temporary Landing Ground.



<b>Road</b> 61	<b>Highway</b> 62	<b>Air Corridor</b> 64
<b>Road</b> can substitute for any Air-pad, or for an equivalent length Airport for Light and Vlite Winged flyers.	<b>Highway</b> can substitute for any Air-pad, or for an equivalent length Airport for any Winged flyers.	<b>Air Corridor</b> is a specified path and altitude for Flyers. It is under computer air traffic control.
Street. Lane. Route.	Freeway. Expressway.	Air Corridor. Skyway.



# 11 Altitude Chart

## ALTITUDES OF THE ATMOSPHERE

Altitude	R=	Level	Vacuum=0	Vthin=2	Thin=4	Standard=6	Dense=8	Vdense=A	Exotic	Corrosive	Insidious	Dense High	Ellipsoid				Thin Low	Comments	
													E1	E2	E3	E4			
250k km	<b>11</b>	Satellite	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Luna= 384,000 km
50k km	<b>10</b>	Geo	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	For Terra= 36,000 km
5,000 km	<b>9</b>	Far Orbit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
500 km	<b>8</b>	Orbit	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
50 km	<b>7</b>	Upper	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
20 km	<b>6.6</b>	Mid6	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	
12 km	<b>6.4</b>	Mid4	0	0	0	1	2	2	2	2	2	2	1	0	0	0	0	0	
8 km	<b>6.2</b>	Mid2	0	0	1	2	4	4	4	4	4	4	2	1	0	0	0	0	
5 km	<b>6</b>	Mid	0	1	2	4	4	4	4	4	4	4	4	2	1	0	1	2	
1000 m	<b>5</b>	Airspace5	0	1	2	4	6	6	6	6	6	6	4	4	2	0	2	2	
500 m	<b>4</b>	Airspace4	0	2	4	6	8	A	A	A	A	6	4	4	2	1	2	2	
150 m	<b>3</b>	Airspace3	0	2	4	6	8	A	A	A	A	A	6	4	2	1	2	2	
50 m	<b>2</b>	NOF	0	2	4	6	8	A	A	A	A	A	6	4	2	1	2	2	=Nap Of Planet
5 m	<b>1</b>	Near Surface	0	2	4	6	8	A	A	A	A	A	6	4	2	1	2	2	Typical Grav Altitude
1.5 m	<b>T</b>	Eye Level	0	2	4	6	8	A	A	A	A	A	6	4	2	1	2	2	Human
0.5 m	<b>R</b>	Low	0	2	4	6	8	A	A	A	A	A	6	4	2	1	2	2	Typical Lifter Altitude
Surface	<b>0</b>	Contact	0	2	4	6	8	A	A	A	A	A	6	4	2	1	2	2	
500 m	<b>-4</b>	Chasm Rim	0	2	4	6	8	A	A	A	A	A	6	4	2	1	2	2	
1000 m	<b>-5</b>	Chasm Wall	1	4	6	8	A	A	A	A	A	A	8	6	4	2	4	4	
5 km	<b>-6</b>	Chasm Floor	2	4	6	8	A	A	A	A	A	A	8	6	4	2	4	4	

**On This Table:** 0= Vacuum. 2= Vthin (includes Atm-3). 4= Thin (includes Atm-5). 6= Standard (=Earth. =Terra) (includes Atm-7). 8= Dense (includes Atm-9). A= Vdense (includes A=Exotic, B=Corrosive, C=Insidious).

### THE ATMOSPHERE TYPES

Code	Atm	Descriptor	Tainted?	Human Effects
0	0	Vacuum		Suff-3.
	1	Trace		Suff-3.
2	2	Very Thin	Tainted	Suff-2. Poison-1.
	3	Very Thin		Suff-2.
4	4	Thin	Tainted	Suff-1. Poison-1.
	5	Thin		Suff-1.
6	6	Standard		
	7	Standard	Tainted	Poison-1.
8	8	Dense		
	9	Dense	Tainted	Poison-1.
A	A	Exotic		Poison-1.
	B	Corrosive		Corrode-1. Poison-1.
	C	Insidious		Corrode-2. Poison-1.
*	D	Dense-High		
*	E	Ellipsoid		
*	F	Thin-Low		

\* Governing pressure determined from the chart.

### FLYERS AND ATMOSPHERES

Type	Prohibited	Mishap In	Operates In
Wing	0	2	2-4-6-8-A
Rotor	0-2	4	4-6-8-A
Flapper	0-2-4	6	6-8-A
LTA	0-2	4	4-6-8-A

**Mishap:** Flyer operating in Mishap Atmosphere Check Quality twice during the flight.

**Atmosphere Effects** are imposed per minute.

**Non-Humans** breathe native Air-N.

Lower Atmosphere levels produce Suff= (Native Air minus Local Air) / 2 (round fractions up).

Taint (other than in Native Atmosphere) inflicts Poison-1.

For example, a sophont normally breathing Air-9 and on a world with Air-6 can expect  $(9-6 = 3 / 2 = 1.5 = )$  Suff-1 breathing the local atmosphere. He probably needs a Breather-5 (to increase Air-6 to Air-8).



## DEPTHS OF THE OCEAN

Distance	R=	Descriptor	Pond	Stream	Lake	River	Large Lake	Harbor	Bay	Shore	Sea	Ocean	World Ocean	Pressure	Comment
150 m	<b>3</b>														
50 m	<b>2</b>	Tsunami												4	if Tsunami
5 m	<b>1</b>	Vbig Waves												3	if Vbig Waves
1.5 m	<b>T</b>	Big Waves												2	if Big Waves
0.5 m	<b>R</b>	Waves												1	if Waves
Surface	<b>0</b>	Surface	S	S	S	S	S	S	S	S	S	S	S		
0.5 m	<b>- R</b>	Wading	S	S	S	S	S	S	S	S	S	S	S		
1.5 m	<b>- T</b>	Fording	S	S	S	S	S	S	S	S	S	S	S		
5 m	<b>-1</b>	Pond	R	R	R	R	R	R	R	R	R	R	R	1	Pond
50 m	<b>- 2</b>	Thermocline	X	X	R	R	R	R	R	R	R	R	R	5	Pond Bottom
150 m	<b>- 3</b>	Shelf	X	X	R	R	R	R	R	R	R	R	R	15	Continental Shelf
500 m	<b>- 4</b>	Lake Bottom	X	X	R	R	R	R	R	X	R	R	R	50	Lake Bottom
1000 m	<b>- 5</b>	Deep Lake	X	X	R	X	R	R	R	X	R	R	R	100	Deep Lake
5 km	<b>- 6</b>	Bottoms	X	X	X	X	X	X	X	X	X	R	R	500	Ocean Bottom
50 km	<b>- 7</b>	Depths	X	X	X	X	X	X	X	X	X	X	R	5,000	Max Non Ocean World
500 km	<b>- 8</b>	Abyss	X	X	X	X	X	X	X	X	X	X	R	50,000	Ocean World Abyss
5,000 km	<b>- 9</b>		X	X	X	X	X	X	X	X	X	X	R	500,000	Never Encountered?

### On This Table:

X= Not Accessible; Not Available.

R= Requires suitable equipment and protection.

S= Swimmers and Swimming.

### DAMAGE

Any object under water is subject to Pressure as shown. Pressure-1 inflicts 1D hits per minute on Armor. If Armor is penetrated, Sealed is also penetrated.

**Inverse Damage.** A native from a specified depth requires protected enclosures equal to the difference in Pressure when venturing out of its native level.

Pressure in Bar (= one Atmosphere). Pressure-1 inflicts 1D hits per minute.



World Creation

# 13 Vehicle Speeds

**BASE TERRAIN SPEEDS**

No	Terrain	Person	Car	Truck	OffRoad	ACV	Wheel	Track	Lift	Grav	Mole	Legged
11	Clear	1	no	no	4	6	5	4	3	5	1	2
14	Clear Wooded	1	no	no	no	5	4	2	3	5	1	2
12	Wetland	1	no	no	3	4	3	1	3	5	1	2
15	Wetland Wooded	1	no	no	no	no	2	no	3	5	1	1
13	Rough	1	no	no	2	no	3	3	3	5	1	2
16	Rough Wooded	1	no	no	no	no	2	no	3	5	1	1
21	Mountain	1	no	no	no	no	2	no	3	5	1	1
22	Desert	1	no	no	4	6	5	4	3	5	1	2
23	Chasm	no	no	no	no	no	no	no	3	5	1	no
24	Cropland	1	Road	Road	4	6	5	4	3	5	1	2
25	Rural	1	Road	Road	4	6	5	4	3	5	1	2
26	Ruins	1	no	no	4	6	5	4	3	5	1	2
31	Ocean	no	no	no	no	6	no	no	3	5	1	no
32	Islands	no	no	no	4	6	no	3	3	5	1	no
33	Shore	no	no	no	no	6	no	3	3	5	1	2
34	River	no	no	no	no	6	2	1	3	5	1	no
35	Lake	no	no	no	no	6	1	1	3	5	1	no
36	Icecap	1	no	no	2	6	4	3	3	5	1	2
41	Baked Lands	1	no	no	2	6	5	4	3	5	1	2
42	Twilight Zone	1	no	no	2	6	5	4	3	5	1	2
43	Frozen Lands	1	no	no	2	6	5	4	3	5	1	2
44	Icefield	1	no	no	2	6	5	4	3	5	1	2
45	Precipice, Cliffs	1	no	no	no	no	no	no	3	5	1	2
46	Exotic	1	no	no	3	6	5	4	3	5	1	2
51	City	1	Hwy	Hwy	4	6	5	3	3	5	1	2
52	Domed	1	Road	Road	4	6	5	3	3	5	1	2
53	Arcology	1	Road	Road	4	6	5	3	3	5	1	2
54	Suburban	1	Hwy	Hwy	4	6	5	3	3	5	1	2
55	Town	1	Road	Road	4	6	5	3	3	5	1	2
56	Starport	1	Road	Road	4	6	5	3	3	5	1	2
61	Highway	1	Hwy	Hwy	Hwy	Hwy	Hwy	Hwy	3	5	1	2
62	Road	1	Road	Road	Road	Road	Road	Road	3	5	1	2
63	Trail	1	Vlite	Vlite	Vlite	Vlite	Vlite	Vlite	3	5	1	2
64	Air Corridor	no	no	no	no	no	no	no	3	5	1	no
65	Grid	no	Hwy	Hwy	Hwy	Hwy	Hwy	Hwy	3	5	1	2
66	High Speed	no	no	no	no	no	no	no	3	5	1	no

**VEHICLE SPEEDS**

	kph	Air	Water	Land	Land	Gravitics	Transport
1	- 6	Creep	5	Person	Mole		
2	- 5	Crawl	10	Legged			Trail
3	- 4	Xslow	20	OffRoad		Lifters	
4	- 3	Vslow	30	Boat	ATV		
5	- 2	Slow	50	LTA	Ship	Tracked	
6	- 1	Standard	100	Flapper	Sub	MTV	Wheeled
7	0	Cruise	300	Rotor		STV	Air Cushion
8	+1	Fast	500	Wing			

**Vlite:** restricted to Vlite vehicles.  
**no:** Vehicle may not use this terrain.

Typical speeds for vehicles. User may push the vehicle to Speed +1 subject to mishap. Gravitics speeds represent NOP Nap Of Planet operations. Vehicles may not exceed Speed-10 in atmosphere unless designed for greater than Speed-10.

# Trade and Commerce Between The Stars

Interstellar trade is the transport of commercial goods from one world to another in the pursuit of profit. Successful traders obey the ancient First Law of Trade: Buy Low And Sell High

Merchants who follow it make money, grow rich, and become successful; those who don't go bankrupt.

The Traveller Trade and Commerce system details a consistent process for encountering and pricing trade goods, and for determining the market for goods on a variety of worlds.

## THE VOCABULARY OF INTERSTELLAR TRADE

Several terms and concepts are used on the trade and commerce flowcharts.

**Lot.** A lot is a single shipment of goods. A lot is identified by its displacement in tons (one ton equals 13.5 cubic meters). Each lot is a distinct shipment and may not be subdivided. A ship captain may accept or reject specific lots based on their best fit within the ship's cargo hold. A lot can be freight, cargo or mail.

**Freight.** Freight is a lot owned by someone who either wishes to retain ownership of it or has contracted to sell the goods to someone and is shipping them to the buyer. An individual who is shipping his personal effects to a new home is shipping freight. A company that has sold an air/raft to a customer and is now shipping it to that customer is shipping freight.

The standard price for shipping freight is Cr1,000 per ton. The payment covers shipment in the cargo hold from the current location to the starship's next port of call.

**Mail.** A lot of communications information being shipped under special contract for a postal or express service. Governments operate postal services; private companies operate express services.

Mail is always of incidental size (never major or minor sized lots). To be allowed to carry mail, the ship must be armed and the crew must include a gunner. Each mail lot always consists of at least one ton. Each ton of mail is shipped at a premium rate of Cr15,000.

**Cargo.** Cargo consists of goods purchased by a speculator or merchant and carried on the speculation that they can be sold at the destination for a profit. A merchant who buys laser rangefinders on an industrial world and ships them to another world in hopes of selling them for a profit is shipping cargo. A merchant who has empty cargo hold space and fills it with locally purchased goods rather than ship empty space is shipping cargo.

A speculator may buy goods and ship them; he considers the lot cargo, while the ship carrying the goods considers it freight. A starship captain may find insufficient freight available on a world and may become a speculator and buy cargo in order to fill unused freight space. The first law of cargo trade is an ancient one: buy low and sell high. Those

who follow it make money, grow rich and become successful. Those who don't, go bankrupt.

**Merchant.** A merchant is an individual or company that operates a cargo-carrying starship. Merchants may also be speculators.

**Speculator.** A speculator is an individual or company that buys goods in the expectation that they can be sold at a profit later (and usually on another world). A speculator does not necessarily operate a cargo-carrying starship; a speculator may ship its cargo as freight and pay standard freight rates in order to transport the goods to a profitable market.

**Source World.** A source world is the world where goods originate. The UWP of the Source World is required before goods can be purchased and it is necessary in order to determine the costs of the goods when engaging in speculative trade.

**Market World.** A market world is the world where goods are to be shipped; it is the market or destination for trade goods. The UWP of the Market World is required before the goods can be sold and it is necessary in order to determine the selling price of the goods when engaging in speculative trade.

**Cost.** Cost is the amount paid for a cargo when bought at its Source World.

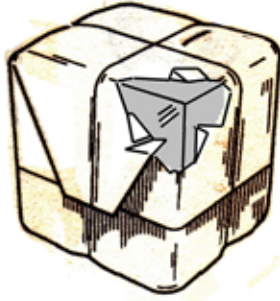
**Price.** Price is the amount a cargo is expected to sell for at its market world. It is possible to compute the base price of goods before arriving at a world simply by analyzing the market world's UWP. Careful merchants do this to predict the relative appeal of goods at various accessible worlds.

Price is an expected price; selling price is the actual price determined at the moment of sale.

**Selling Price.** Selling Price is the amount a cargo actually sells for at its market world using the Actual Value Table. Selling price for goods varies as the actual market place conditions fluctuate and it is determined at the moment of sale using the Actual Value Table.

**Delivery.** A lot is delivered when it is off-loaded at a location comparable to the location where it was loaded. Goods taken in orbit at the Source World are delivered when off-loaded in orbit at the Destination World. Goods loaded on the surface at the Source World are delivered when offloaded on the surface at the Destination World.





Thus, the two common forms of shipment are  
**OTO.** Orbit To Orbit.

**STS.** Surface To Surface.

This standard (similar to FOB) applies to both cargo and passengers. Changes standard terms (delivering OTO to Surface, or STS to Orbit) command a 10% surcharge.

### THE CARGO ID

The Cargo ID is a basic identification of the economic nature (but not the precise identity) of trade goods in commerce. It is based on the Trade Classifications and the Tech Levels of the worlds involved.

**Identifying Cargos.** A cargo is identified by stating its source world's Tech Level, Trade Classifications, and Cost. Tech Level is derived directly from the source world UWP. All trade classifications possible are determined and then listed together (the determination of trade classifications is covered below). Cost is determined using the cost system.

**Applicable Trade Classifications.** For cost and price purposes, a subset of the Trade Classifications applies:

**Ag As Ba De Fl Hi In Lo Ni Po Ri Va**

Other Trade Classifications may influence availability, but they do not influence value.

For example, a cargo from Regina A788899-C Ri Pa Ph An Cp is identified as: C-Ri Pa Ph Cp Cr5200.

A cargo from Zivije C6B199C-B Fl He Hi In is identified as: B-Fl He Hi In Cr3100.

A cargo from Chronor A6369A5-D Hi Cp is identified as: D-Hi Cp Cr3300 Zh.

Lower cost cargos are always preferable because they allow more potential profit.

**Further Identifying Cargos.** Using the Cargo ID, match one of the Trade Classifications to the Random Trade Goods Charts and roll 1D. The result is the basic type of trade goods. Again roll 1D and determine the specific trade goods. Finally, match one other Trade Classification to the

Trade Goods Detail List to further add detail to the goods.

For example, the goods from Zivije have a Cargo ID = B Fl He Hi In Cr3100. The only Trade Classification that matches the Random Trade Goods Table is Fl, which appears on Random Trade Goods 2. Roll 1D (=3 = Pharma). Roll 1D again (=5 = Antibiotics). Finally, the other Trade Classification for the Cargo is Hi, which is on the Trade Goods Detail List (Hi = Processed).

The goods from Zivije are Processed Antibiotics.

### PLAYER SKILLS

The skills of characters involved in transactions can influence trade situations.

**Steward.** Mod on the roll for available High Passengers. Purser (the Head Steward) is typically tipped Cr100 per High Passenger.

**Admin:** Mod on the roll for available Mid Passengers. Steward is typically tipper Cr50 per Mid Passenger.

**Streetwise.** Mod on the roll for Low Passengers.

**Broker.** The Broker concept is about negotiating the best deal between a buyer and a seller. In its simplest form, the Broker transaction requires very little work while nevertheless earning a commission. The value of the Broker is the knowledge and expertise he provides when problems or exceptions arise. Broker is a DM (equals half Broker Skill, rounded up) on the Actual Value Table (to a maximum of Mod of +4). Brokers receive 5% of the final sale price per DM.

**Liaison:** Liaison allows consultation and bargaining with local freight handlers in order to receive a larger allotment of freight. Liaison is a Mod for available Freight.

**Medic:** Mod on Low Passenger Check C3 to awaken. Attending Medic is tipped Cr10 per successful awakening.

**Trader:** Trader provides an understanding of market processes and is used in Estimating Sales Price.

### SPECIAL RULES

The following special rules also apply to trade activity.

**Estimating Sale Price.** Trader skill allows the partial prediction of the Actual Value Table throws. Use of Trader skill allows one die on the Actual Value Table (the table uses two dice) to be thrown early; knowing one of the dice results beforehand allows a more accurate prediction of the sale price of goods. For example, the 2D throw from 2 to 12 indicates actual values between 40 percent and 170 percent of base price. If one die is thrown early and it is a 6, then the character knows that the final actual value must range between 7 and 12 (between 100 percent and 170 percent).

**Accelerated Delivery:** In standard practice, local merchants are allowed four days to deliver goods to a waiting ship. It is possible to accelerate delivery of goods by paying a premium of 10% of base cost per day of advanced delivery.

**Required Execution:** Once goods are offered for sale and the Actual Value Table is consulted, the goods must be sold at the price indicated. A sale may be stopped at any point before the dice are rolled on the Actual Value Table.

This invites a strategy for cautious merchant players (with Trader skill): roll the dice on the Actual Value Table individually. If the first die is exceptionally low, the deal can be abandoned.

### PLAYER SKILLS FOR TRADE AND COMMERCE

Skill	Mod
Steward	for High Passengers
Admin	for Mid Passengers
Streetwise	Low Passengers
Broker	apply half-Broker on Actual Value Table
Liaison	for Available Freight
Trader	apply to Estimating Sales Price

### Imbalance Items

The Random Trade Goods tables may produce Imbalance Items: goods in oversupply locally; often they are imports no longer in demand (and thus available for shipment elsewhere).

For Trade Goods identified as Imbalances (in the Random Trade Goods Table), use the Trade Classifications dictated by the table and re-roll on the indicated Random Trade Goods Table to identify the goods. If these goods are sold on a market world with this Trade Classification, increase their Price +Cr1,000.

For example, a Free Trader calls on Knorbes E888787-2 Ag Ri An Re and determines what trade goods are available. The merchant rolls on the Random Trade Goods table (he elects to roll under Ag-1) and the result is Imbalance Na. He rerolls on the Na Random Trade Goods Table (= 4 = Rares, then =5 = Pelts). There is a shipment of Rare Pelts in the back of a warehouse.

He identifies the cargo as 2-Ag Ri Cr3,200. If he sells these goods on a world with trade classification Na, the selling base price will automatically be increased +Cr1,000.

### Trade Good Details

If the supplying world for Random Trade Goods has additional Trade Classifications (and one or more appears on the Trade Good Details table) select one as a prefix: The Rare Pelts from Zivije deserve the prefix Quality when described to a buyer.

### The Low Lottery

It is customary for the captain to contribute Cr10 out of each Low Passage towards a lottery administered by the Steward. Each Low Passenger randomly guesses the number of low passengers who will survive the trip; the closest guess by a successful awakenee is the winner.

### TYPES OF INTERSTELLAR TRADE GOODS

Interstellar trade goods may be of any type, but some are more probable than others. Ordinary materials (perhaps iron ingots) are probably not prime interstellar trade goods.

**The 14 Broad Types of Goods:** Interstellar Trade Goods fall into 14 distinct types.

**Consumables.** Consumables are food and drink, and may also include aromatics. Consumable foods are fashionable gourmet goods (caviar), common flavorings (spices), or staples (basic life-sustaining food) necessary on worlds where it cannot be produced economically. Consumable drinks are flavored waters, alcoholic beverages, milks, nectars, syrups, decoctions such as teas, or exotic wines. Consumable aromatics are smell sources or food enhancers.

**Data.** Data is Information which can be consumed, reproduced, or processed on the Market World: Books, tapes, software, creative works, wafers, and scientific data.

**Entertainments.** Creative works and diversions are always in demand.

**Imbalances.** If a trade item's production cost is very low, it can be shipped and sold at a market for less than it costs to produce locally. Worlds with low labor costs often produce very cheap goods for interstellar markets.

### The 14 Trade Good Types

Consumables	Novelties	Samples
Data	Pharma	Scrap/Waste
Entertainments	Rares	Uniques
Imbalances	Raws	Valuta
Manufactureds	Red Tape	

**Manufactureds.** Worlds with established factories export their products to worlds which cannot produce them.

**Novelties.** New products never before seen (or perhaps just never before marketed) are powerful commodities.

**Pharma.** Pharmaceuticals and Medicine for the treatment of all manner of illness or disability are a prime candidate for interstellar trade. Some medicines may be produced in excess quantity and made available for export in order to help bring down the costs of overall production. Some medicines are best processed or manufactured close to the source of raw materials; the finished product is then exported to other worlds.

**Rares.** Many trade goods are in demand because of their rarity or relative scarcity.

**Raws.** One of the basic trade goods in interstellar trade is raw materials. The exploration of space is driven in part by a search for essential raw or basic materials in the hopes that they can be found and made available at competitive prices, even after the cost of their transportation over interstellar distances.

**Red Tape.** Because there are interstellar governments, the products of their bureaucracy must be distributed through its area of authority. Red tape shipments include originals or reproducible masters of regulations, files of information about citizenry and companies, and reports.

Much of the red tape shipped between worlds is not sold; it is transported as freight to archives or other offices of the bureaucracy. But some of the information can be purchased and then shipped to other worlds where it can be sold to businesses or organizations which can use it. For example, tax records may indicate likely customers for specific goods; reports might provide clues (after analysis) for prediction of future tax revenues, economic trends, or commercial activity.

**Samples.** Newly discovered, created, or manufactured items may be shipped to other worlds for analysis, research, or evaluation.

**Scrap/Waste.** The trash of some worlds can become the valued treasure of others.

**Uniques.** Some products are unique: they cannot be easily synthesized or reproduced. An exotic wood that adds interest as a decoration or flavor as when burned for cooking; an herb which provides a special flavoring; an iridescent feather which becomes fashionable for a limited time; a pebble that makes gentle noises when heated.

**Valuta.** Sometimes shipments between worlds consist of money itself. Interstellar trade eventually produces an inequity in the balance of payments for specific worlds, and to bring the economy back into equilibrium, a physical exchange of money is required.



## THE TRADE GOODS CHARTS

This section cannot be comprehensive: interstellar trade encompasses thousands of distinct trade goods. Nevertheless, the random trade goods creation system can produce 36 different goods per basic trade classification, and thousands of distinct trade goods before it consistently repeats. This list is 264 examples of probable trade goods.

Accountings	Bulk Oxygen	Expert Systems	Luminescents	Reparables
Adhesives	Bulk Particulates	Famous Wafers	Mag Emitters	Replicating Clays
Aged Meats	Bulk Pelts	Fast Drug	Magnetics	Repulsant
Allotropes	Bulk Petros	Fauna	Mandates	Respirators
Alloys	Bulk Pharma	Fermented Fluids	Masterpieces	Restoratives
Anagathics	Bulk Precipitates	Filter Mask	Meat Delicacies	Robots
ANIFX Blocker	Bulk Protein	Fine Aromatics	Mechanicals	Secretions
ANIFX Dyes	Bulk Spices	Fine Art	Meson Barriers	Seedstock
ANIFX Emitters	Bulk Synthetics	Fine Carpets	Metals	Self-Defenders
Antibiotics	Bulk Textiles	Fine Dusts	Minerals	Self-Solving Puzzles
Antidotes	Bulk Woods	Fine Furs	Money Cards	ShimmerCloth
Antifungals	Candies	Fission Suppressant	Monumental Art	Silanes
Anti-Matter	Carbons	Flavored Air	Motile Plants	Silver
Antique Art	Catalysts	Flavored Drinks	Museum Items	Skin Tones
Antiques	Chelates	Flavored Waters	Music	Slow Drug
Antiseptics	Coinage	Flavorings	Musical Instruments	Sludges
Antitoxins	Cold Light Blocks	Flill	Navigators	Software
Antivirals	Cold Sleep Pills	Flora	Nectars	Soothants
Archeologicals	Cold Welders	Flowers	Noisemakers	Sophont Cuisine
Armor	Collectible Books	Fluidic Timepieces	Non-Fossil Carcasses	Sophont Hats
Aromatics	Collectibles	Fluidics	Nostrums	Soundmakers
Art	Combat Drug	Foodstuffs	Novel Flavorings	Sparx
Artifacts	Combination	Fossils	Nutraceuticals	Spices
Attractants	Contemplatives	Fruit Delicacies	Obsoletes	Stimulants
Aware Blockers	Corrosives	Fused Metals	Ores	Strange Crystals
Awareness Pinger	Counter-prions	Gallium	Organic Gems	Strange Seeds
Backups	Crafted Devices	Gemstones	Organic Polymers	Synchronizations
Biologics	Cryo Alloys	Germanes	Osmancies	Tactiles
Branded Clothes	Cryogems	Gold	Painkillers	Textiles
Branded Devices	Currency	Gravitics	Palliatives	Thorium
Branded Drinks	Databases	Group Symbols	Panacea	Tisanes
Branded Foods	Decoctions	Hats	Parts	Unusual Dusts
Branded Oxygen	Decorations	Health Foods	Pattern Creators	Unusual Fluids
Branded Tools	Delicacies	Heat Pumps	Pelts	Unusual Ices
Branded Vacc Suits	Disposables	Holo Sculpture	Percept Blockers	Unusual Minerals
Bulk Abrasives	Dominants	Holo-Companions	Pheromones	Unusual Rocks
Bulk Carbon	Drinkable Lymphs	Humming sand	Photonics	Upgrades
Bulk Carbs	Dupe Masterpieces	Ices	Pigments	Uranium
Bulk Copper	Echostones	Improvements	Platinum	Used Goods
Bulk Dusts	Educationals	Incenses	Plutonium	Vacc Gems
Bulk Ephemerals	Edutainments	Incomprehensibles	Polymer Sheets	Vacc Suit Patches
Bulk Fats	Electronics	Insidiants	Polymers	Vacc Suit Scents
Bulk Fibers	Emotion Lighting	Insulants	Pseudomones	Variable Tattoos
Bulk Foodstuffs	Encapsulants	Iridium Sponge	Radioactive Ores	VHDUS Blocker
Bulk Gases	Envirosuits	IR Emitters	Radioactives	VHDUS Dyes
Bulk Herbs	Ephemerals	Iridescents	Radium	VHDUS Emitters
Bulk Ices	Excretions	Isotopes	Rare Minerals	Vision Suppressant
Bulk Iron	Exotic Aromatics	Jewelry	Raw Sensings	Wafers
Bulk Metals	Exotic Crystals	Juices	Reactive Plants	Warm Leather
Bulk Minerals	Exotic Fauna	Lanthanum	Reactive Woods	Weapons
Bulk Nitrates	Exotic Flora	Lek Emitters	Reclamation Suits	Wines
Bulk Nutrients	Exotic Fluids	Light-Sensitives	Recordings	Writings
Bulk Organics	Exotic Sauces	Livestock	Regulations	

Generic trade activity has no need for specific trade good identifications. Trade goods are identified for the benefit of adventurers: for the curious merchant character who asks "What's in that container?" checks the manifests, and perhaps even breaks a seal and looks inside.

**Accountings.** Data reconciling expenditures by government and business.

**Adhesives.** Bonding agents.

**Aged Meats.** Meats enhanced in flavor and texture by traditional methods.

**Allotropes.** Specific unusual forms of chemical elements useful for industry.

**Alloys.** Metallic mixtures created to create or enhance the characteristics of metals.

**Anagathics.** Pharma capable of extending lifespan.

**ANIFX Blocker.** Transparent or translucent flexible sheets which are opaque to wavelengths ANIFX.

**ANIFX Dyes.** Pigments colored in wavelengths ANIFX.

**ANIFX Emitters.** Objects which glow (or regularly or intermittently pulse) in the wavelengths ANIFX.

**Antibiotics.** Pharma capable of targeting and killing microbes and biologics.

**Antidotes.** Pharma which counteract poisons (inorganic poisons) within organisms.

**Antifungals.** Pharma that targeting and killing fungi.

**Anti-Matter.** Non-trivial amounts of anti-matter (in magnetic or gravitic containment vessels).

**Antique Art.** Works of fine art more than 100 years old.

**Antiques.** Crafted objects more than 100 years old.

**Antiseptics.** Pharma which kill microbes on the skin and outer surfaces of sophonts and fauna.

**Antitoxins.** Pharma which neutralize specific poisons (typically organic toxins) within organisms.

**Antivirals.** Pharma which treat virus infections.

**Archeologicals.** Detritus of sophont cultures or civilizations excavated for its insights into its creators. Some archeologicals are devices whose uses may not be apparent.

**Armor.** Personal protective devices and apparel.

**Aromatics.** Substances which emit attractive or beneficial scents or smells

**Art.** Sophont produced visual objects or images illustrating abstract thought or emotion. Typically, paintings, drawings, or sculpture.

**Artifacts.** Objects produced by the high-tech civilization of the Ancients (as distinct from archeologicals).

**Attractants.** Substances (typically pheromones) which create a compulsion to move closer to the attractant source.

**Aware Blockers.** Objects opaque to Awareness.

**Awareness Pinger.** Device which emits a recurrent signal which can be sensed by Awareness.

**Backups.** Media files capturing a totality of data processing activity. Backups are added to the available resources of computer systems which are not directly connected to the original generator (usually because of distance).

**Biologics.** Organic materials useful in industry.

**Branded Clothing.** Fashionable apparel characterized by a brand name which serves as a guarantee of quality.

**Branded Devices.** Fashionable personal devices characterized by a brand name serving as a guarantee of quality.

**Branded Drinks.** Fashionable beverages characterized by a brand name which serves as a guarantee of quality.

**Branded Foods.** Fashionable foodstuffs characterized by a brand name serving as a guarantee of quality. Brand names may imply social or group membership affinities.

**Branded Oxygen.** Fashionable breathing gases characterized by a brand name serving as a guarantee of quality.

**Branded Tools.** Fashionable equipment for specific skill sets and characterized by a brand name which serves as a guarantee of quality.

**Branded Vacc Suits.** Fashionable environmental suits with a brand name serving as an assurance of quality (or of fashionability).

**Bulk Abrasives.** Simple granulated compounds with uses as cutting, finishing, or polishing.

**Bulk Carbon.** Carbon (pure, or in compounds) suitable for use in industry.

**Bulk Carbs.** Carbohydrate nutrients suitable for the creation of synthetic foods.

**Bulk Copper.** Pure or alloyed copper metal suitable for use in industry.

**Bulk Dusts.** Homogeneous mineral materials of extremely small diameter.

**Bulk Ephemerals.** Captured or acquired materials with useful qualities. Ephemeral materials include natural compounds which degrade easily or quickly, and foods which lose their freshness quickly.

**Bulk Fats.** Edible nutrient fats and oils suitable for the creation of synthetic foods.

**Bulk Fibers.** Animal or plant component fibers suitable for the creation of textiles.

**Bulk Foodstuffs.** Edibles, grains, nutrients.

**Bulk Gases.** Captured atmospheric, environmental, geothermal, or volcanic gases with uses in industry.

**Bulk Herbs.** Plant structures and components suitable for medicinal purposes.

**Bulk Ices.** Low temperature solids which become liquids or gases at habitable sophont temperatures, and suitable for industry.

**Bulk Iron.** Pure or alloyed iron metal suitable for commercial or industrial uses.

**Bulk Metals.** Smelted metallic elements of reasonable purity and suitable for use in industry.

**Bulk Minerals.** Simple compounds produced by natural geologic processes.

**Bulk Nitrates.** Nitrogen compounds (natural excretions or droppings from animals, or synthetic processed compounds) suitable for use in agriculture or industry.

**Bulk Nutrients.** Animal or plant mixed nutrients (fats, proteins, carbs) suitable for the creation of synthetic foods.

**Bulk Organics.** Animal or plant components with a variety of uses.

**Bulk Oxygen.** Breathing gases for typical sophonts, typically in large compressed gas containers.

**Bulk Particulates.** Useful mineral particles characterized by very small sizes and consistent chemical properties.

**Bulk Pelts.** Animal skins suitable for the production of furs, leathers, or other coverings.

**Bulk Petros.** Native hydrocarbon fossil fuels and other

petrochemicals. Low technology levels may use Petros for fuel; they are more universally used as lubricants and feedstocks for the creation of plastics.

**Bulk Pharma.** Animal or plant components suitable for refinement into or reduction to pharmaceuticals.

**Bulk Precipitates.** Locally produced chemicals in powdered or granular form.

**Bulk Protein.** Animal or plant protein nutrients suitable for the creation of synthetic foods.

**Bulk Spices.** Plant structures and components suitable for culinary purposes.

**Bulk Synthetics.** Artificially produced materials mimicking (or improving upon) the characteristics of one or more other materials.

**Bulk Textiles.** Cloth and fabric suitable for industry.

**Bulk Woods.** Plant structures suitable as large scale or small scale construction materials.

**Candies.** Snacks, treats and delicacies usually (but not always) appealing to the sweet sensors of the taste sense.

**Carbons.** Processed Carbon (pure, or in compounds) suitable for use in industry.

**Catalysts.** Specific elements, compounds, or organics which improve the efficiency of industrial processes.

**Chelates.** Pharma which bind to and remove heavy metals from an organism.

**Coinage.** Metal or plastic tangibles or manipulables used as money.

**Cold Light Blocks.** Individualized rectangular units which glow brightly and without accompanying heat. The blocks constantly recharge based on magnetic, gravitic, or photonic principles.

**Cold Sleep Pills.** Pharma which produces suspended animation in animals and sophonts.

**Cold Welders.** Simple wands which fuse specific polymers using enzyme reactions.

**Collectible Books.** Random titled bound books of various levels of rarity.

**Collectibles.** Objects of limited availability and in demand across a broad spectrum of interested individuals.

**Combat Drug.** Pharma capable of increasing personal C1 and C3 and typically used by soldiers in battle.

**Combination.** Breathing devices which compress Very Thin (Atm 2-3) or Thin (Atm 4-5) to Standard (Atm 6). Combination incorporates a filter component which allows use in tainted atmospheres.

**Contemplatives.** Simple textured totems reputed to provide comfort, inspiration, or self-assurance to sophonts.

**Corrosives.** Substances (gases, fluids) capable of penetrating traditional or normal sealed barriers. Corrosives are components of corrosive atmospheres (Atm B).

**Counter-prions.** Pharma which (as a food additive) actively counteract prions.

**Crafted Devices.** Small items of equipment which have been carefully created for quality and reliability.

**Cryo Alloys.** Metallic alloys which achieve their characteristics through cold tempering.

**Cryogems.** Gemstones encountered in very low temperatures (although stable at habitable temperatures).

**Currency.** Paper money or certificates of value.

**Databases.** Collections of information suitable for support of government or commerce.

**Decoctions.** Plant-based beverages produced by mashing followed by boiling.

**Decorations.** Attractive or pleasing objects suitable for enhancing buildings, rooms, or walls.

**Delicacies.** Rare or unusual foods prepared according to local cultural recipes. Delicacies may have market value for their rarity, their taste, or for their traditional cultural value.

**Disposables.** Useful objects intended for single or limited use before being discarded.

**Dominants.** Substances (scents, pheromones) which reduce the will to resist in individuals.

**Drinkable Lymphs.** Animal-based beverages produced from lymph fluids harvested from world-specific fauna.

**Dupe Masterpieces.** Mass market reproductions of craftsman produced priceless masterpieces.

**Echostones.** Mineralogical objects which repeat sounds from the environment. The most prized of echostones repeat with a significant delay (minutes or hours), and artful arrangements of echostones can fill a room with music or background sounds.

**Educationals.** Software-based materials produced (by government or industry) to increase knowledge or awareness of specific subject matter, often with a specific viewpoint or with a propagandistic flavor.



**Edutainment.** Software-based materials with demographically targeted entertainment value produced (by government or industry) to increase knowledge or awareness of specific subject matter, often with a specific viewpoint or with a propagandistic flavor.

**Electronics.** Electronic materials useful in industry.

**Emotion Lighting.** Illumination systems controlled by sensors which respond in individual or group emotions.

**Encapulants.** Fluids which naturally flow around objects they encounter, forming coatings as they dry or cure.

**Envirosuits.** Environmental or protective suits.

**Ephemerals.** Objects of value which degrade without special efforts or conditions to preserve their characteristics or freshness.

**Excretions.** Useful substances produced as waste products from organisms.

**Exotic Aromatics.** Scent emitting substances with strange, unusual, or esoteric characteristics.

**Exotic Crystals.** Organic or mineralogical crystals with strange, unusual, or esoteric characteristics.

**Exotic Fauna.** Animals with strange, unusual, or esoteric characteristics.

**Exotic Flora.** Plants with strange, unusual, or esoteric characteristics.

**Exotic Fluids.** Liquids (and some gases) with strange, unusual, or esoteric characteristics.

**Exotic Sauces.** Culinary liquids with strange, unusual, or esoteric characteristics.

**Expert Systems.** Software systems with a strong skill

set related to a specific subject.

**Famous Wafers.** Classic or well-known recorded personality entertainments.

**Fast Drug.** Pharma capable of decreasing the metabolism (making the universe appear to move more quickly).

**Fauna.** Animals. Domesticated exotic animals.

**Fermented Fluids.** Organic fluids which have been processed to induce an alcoholic content.

**Filter Mask.** A breathing device which allows breathing (if otherwise possible) in Tainted atmosphere (Atm 2,4,7,9).

**Fine Aromatics.** High quality scent sources.

**Fine Art.** High quality objects created by artists.

**Fine Carpets.** High quality floor coverings.

**Fine Dusts.** High quality homogeneous mineral materials of extremely small diameter.

**Fine Furs.** High quality animal pelts.

**Fission Suppressant.** Device capable of suppressing nuclear fission within a small radius (50 meters).

**Flavored Air.** Breathing gases supplemented with additives which appeal to smell and taste. Some flavored air masks taint; others are more palatable versions of intrinsic taints. A sophont who breathes Air-9 (Dense, Tainted) may seek out an appropriate Flavored Air to remind it of home.

**Flavored Drinks.** Beverages whose primary characteristic is flavor (as opposed to nourishment). Many flavors are mildly addictive.

**Flavored Waters.** Water supplemented with flavors.

**Flavorings.** Additives which provide interesting, attractive, or unusual taste and smell sensations.

**Fiill.** Organic gems characterized by beautiful lek and mag emissions. Fiill are prized by sophonts with awareness.

**Flora.** Plant life including megafloa (larger than size-4) and exotic flora not capable of growing on other worlds.

**Flowers.** Attractive plant components.

**Fluidic Timepieces.** Chronometrical devices based on fluidic principles.

**Fluidics.** Fluidic materials useful in industry.

**Foodstuffs.** Assorted plant and animal products suitable for consumption and nutrition.

**Fossils.** Geologically preserved remains of local flora and fauna.

**Fruit Delicacies.** Edible fruits enhanced with a variety of culinary treatments to create attractive (or unusual) flavors and textures.

**Fused Metals.** Combinations of elemental metals and alloys fused by heat for structural or specialty use.

**Gallium.** Elemental gallium in certified purity levels and suitable for use as money.

**Gemstones.** Attractive examples of precious stones.

**Germanes.** Germanium-based compounds useful in industry. Germanes are an analog of methane.

**Gold.** Metallic gold in certified purity levels and suitable for use as money.

**Gravitics.** Gravitic materials useful in industry.

**Group Symbols.** Items of clothing worn to show a connection to a group. Occasionally, group symbols become fashionable for non-members (athletic jerseys for non-athletes; fighter pilot jackets for ordinary citizens).

**Hats.** Head coverings, especially decorative.

**Health Foods.** Foodstuffs with real or imagined health promoting components.

**Heat Pumps.** Personal equipment capable of drawing heat from the environment.

**Holo Sculpture.** Large scale three dimensional images intended for outdoor display.

**Holo-Companions.** Holographic projections controlled by software and programmed to interactively accompany an individual. Dogs (vacc-suited or not) as companions to vaccinated surface travellers.

**Hummingbirds.** Granular minerals which vibrate (creating sounds) in response to light, heat, or other stimulus.

**Ices.** Frozen delicacies, although not necessarily consumable by Humans.

**Improvements.** New feature additions to common or important devices.

**Incenses.** Organic substances which, when burned, produce aromas.

**Incomprehensibles.** Objects for which there is no readily apparent use (they do have a use; it is not readily apparent).

**Insidiants.** Substances (gases, fluids) capable of penetrating traditional or normal sealed barriers. Insidiants are components of insidious atmospheres (Atm C).

**Insulants.** Substances, coatings, or objects which inhibit thermal equilibrium.

**Iridescent.** Attractive, decorative objects which change color based on the angle of viewing.

**Iridium Sponge.** Elemental iridium exposed to vacuum and gases to create an internal sponge texture. Iridium is principal component of positronic brains.

**IR Emitters.** Devices which emit (glow, pulse, strobe) in the IR wavelengths ANIFX. Distinct from ANIFX Emitters in that they are tuned to specific individual wavelengths.

**Isotopes.** Elements refined to a high level of purity as to isotopic content.

**Jewelry.** Decorative personal accessories crafted from precious metals and gems or gemstones.

**Juices.** Vegetable or fruit liquids.

**Lanthanum.** Elemental lanthanum. This material is crucial to the construction of jump drives.

**Lek Emitters.** Devices which emit (glow, pulse) in the Lek wavelength.

**Light-Sensitives.** Sensors and reactive substances which respond to various wavelengths of light.

**Livestock.** Live animals suitable for herd or flock creation, or less frequently, for slaughter.

**Luminescents.** Panels which reactively emit a variety of wavelengths in response to external conditions.

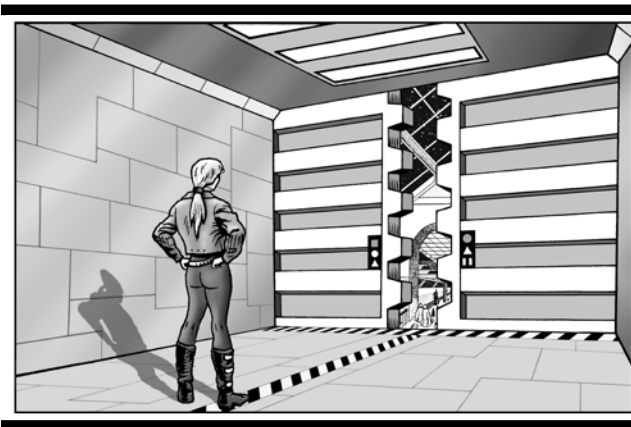
**Mag Emitters.** Devices which emit (glow, pulse) in the Mag wavelength.

**Magnetics.** Interesting or useful devices employing the principles of magnetism.

**Mandates.** Administrative or judicial orders for distribution to a wide variety of individuals, businesses, functionaries, and organizations.

**Masterpieces.** Works created by craftsmen.

**Meat Delicacies.** Edible meats enhanced with a variety of culinary treatments to create attractive (or unusual) flavors



and textures.

**Mechanicals.** Individual component parts for machines.

**Meson Barriers.** Thin sheets capable of reducing the transit of mesons.

**Metals.** Elemental or alloyed metals suitable for technological uses.

**Minerals.** Natural resources materials useful when incorporated into manufactured products, and (or) capable of being refined into its component compounds or elements.

**Money Cards.** Machine readable incremental certificates of value. Pre-loaded debit cards.

**Monumental Art.** Large scale (larger than life size) sculpture created to impose concepts, personalities, or ideologies on the public or citizenry.

**Motile Plants.** Flora capable of changing location.

**Museum Items.** The wide array of items suitable for display and exemplifying the history, art, technologies, or personalities of a location, region, people, or other activity.

**Music.** Recordings of musical performances.

**Musical Instruments.** Devices capable of producing music when used by individuals with Music skill.

**Navigators.** Portable devices which show current location (and perhaps other data).

**Nectars.** Nutrient rich liquid produced by plants.

**Noisemakers.** Natural objects which create loud or jarring sounds in response to heat, touch, or other stimulus.

**Non-Fossil Carcasses.** Pre-historic preserved (frozen, dessicated, mummified) carcasses of animals or sophonts. Pre-historic, in the case of each world, is before initial settlement of the world.

**Nostrums.** Pharma of unproven efficacy. Nostrums are often branded and aggressively marketed.

**Novel Flavorings.** Natural or synthetic food additives

**Nutraceuticals.** Foodstuffs and nutrients with Pharma capabilities.

**Obsoletes.** Devices which have been supplanted or replaced by newer, better, or more technologically advanced devices which accomplish the same purposes.

**Ores.** Mineralogical materials with a high content in desirable components and suitable for their extraction.

**Organic Gems.** Small valuable objects of organic origin, often highly prized for their appearance. Includes jet, pearl, ivory, bone, amber, sparx, and fill.

**Organic Polymers.** Large molecules with useful char-

acteristics produced through life processes.

**Osmancies.** Recordings of smell performances.

**Painkillers.** Pharma which reduce or eliminate pain.

**Palliatives.** Pharma which reduce symptoms.

**Panacea.** Pharma which cure disease or malady. Technically, the term panacea indicates a cure for all diseases and maladies. Panacea may be true Pharma, or it may be a nostrum.

**Parts.** Common device component replacements.

**Pattern Creators.** Automated devices which place patterns and decorations on walls, floors, and ceilings. Pattern creators are a form of interior decoration; some are constantly laying down new patterns; others are instructed to change the patterns daily, or monthly.

**Pelts.** The skins or outer coverings of animals.

**Percept Blockers.** Fabric sheets which are opaque to the perception sense.

**Pheromones.** Chemicals which trigger natural behavioral responses in animals.

**Photonics.** Photonic materials useful in industry.

**Pigments.** Coloring agents.

**Platinum.** Metallic platinum in certified purity levels and suitable for use as money.

**Plutonium.** Radioactive elemental metal useful in industry and medicine.

**Polymer Sheets.** Plastic sheets.

**Polymers.** Plastics in raw or unprocessed form.

**Pseudomones.** Chemicals which imitate the activities pheromones.

**Radioactive Ores.** Minerals with significant radioactive metal content.

**Radioactives.** Radioactive materials useful in industry.

**Radium.** Radioactive elemental metal useful in industry.

**Rare Minerals.** Scarce or rarely occurring simple compounds produced by natural geologic processes.

**Raw Sensings.** Digital data acquired through the normal course of operations by large scale computer operations.

**Reactive Plants.** Plants which exhibit some response (movement, color change, scent release, collapse, flower release) to a stimulus.

**Reactive Woods.** Woods which exhibit some response (color change, iridescence, scent release) to a stimulus.

**Reclamation Suits.** Personal environmental suits which recapture (or reclaim) water vapor exhaled or perspired by the user. Reclamation suits are common in water-poor environments (Desert worlds).

**Recordings.** Records of performances, including concerts, plays, and readings.

**Regulations.** Software, printed materials, and other items which convey the implementations of laws by bureaucratic organizations.

**Reparables.** Inoperative devices (generally considered junk) capable of being repaired, restored, or refurbished to usable or near new condition.

**Replicating Clays.** Novelty soil materials which spontaneously combine and replicate in patterns and colors.

**Repulsant.** Substances (scents, pheromones) which repel or create a sense of aversion in individuals.

**Respirators.** Breathing devices which compress Very

Thin (Atm 3) or Thin (Atm 5) to Standard (Atm 6).

**Restoratives.** Pharma capable of reversing specific organic effects, or restoring organic components to a previous state. Some restoratives have cosmetic effects; others reverse organic damage from disease or accident; still others halt or reverse aging.

**Robots.** Mechanical artificial sophonts.

**Secretions.** Useful substances produced by organisms for specific purposes; industrial or commercial uses of the substance may differ from the original organic purpose..

**Seedstock.** Propagation materials for plants suitable for crop production, or for hybridization.

**Self-Defender.** Personal handgun with features which enhance its uses in defense and reduce its uses in offense.

**Self-Solving Puzzles.** Intricate devices which use mechanical, electronic, or other principles to move components from one state to another.

**ShimmerCloth.** Textiles produced in colorful patterns. Shimmercloth colors are active rather than passive or reflective; some patterns change in long cycles.

**Silanes.** Silicon based compound useful in industry.

**Silver.** Metallic silver in certified purity levels and suitable for use as money.

**Skin Tones.** Temporary cosmetic skin colorants.

**Slow Drug.** Pharma capable of increasing the metabolism (making the universe appear to move more slowly).

**Sludges.** Industrial waste materials.

**Software.** Computer applications.

**Soothants.** Pharma (or devices, or objects) which reduce anxiety.

**Sophont Cuisine.** Various foodstuffs prepared according to a specific sophont cultural traditions and recipes.

**Sophont Hats.** Interesting head coverings from local sophont cultures.

**Soundmakers.** Natural objects which create unusual sounds in response to heat, touch, or other stimulus.

**Sparx.** Organic gems characterized by a piezo process which delivers a mild electric tingle. Sparx are prized by sophonts with touch as a primary sense.

**Spices.** Food flavorings and additives.

**Stimulants.** Pharma which temporarily increase physical characteristics.

**Strange Crystals.** Mineralogical or organic crystals suitable for decoration or jewelery.

**Strange Seeds.** Flora reproduction vectors with unusual characteristics and suitable for decoration or for industrial application.

**Synchronizations.** Data files and applications which make local data bases interactively merge the content of distinct data bases.

**Tactiles.** Natural objects which respond to touch by emitting heat or light, changing shape, or vibrating.

**Textiles.** Cloth or fabric suitable for creation of garments and coverings.

**Thorium.** Radioactive metal useful in industry.

**Tisanes.** Plant-based beverages produced by dissolving essential plant elements in water or oil.

**Unusual Dusts.** Fine particle collections with unusual characteristics suitable for industry.

**Unusual Fluids.** Chemical fluids with unusual characteristics suitable for industry.

**Unusual Ices.** Low temperature compounds and combinations with unusual characteristics suitable for industry.

**Unusual Minerals.** Natural geological substances with unusual characteristics suitable for industry.

**Unusual Rocks.** Unrefined and undifferentiated minerals with unusual characteristics suitable for industry.

**Upgrades.** Software improvements.

**Uranium.** Radioactive elemental metal useful in industry and medicine.

**Used Goods.** Objects which have been previously purchased and used for some reasonable period of time; they show some wear.

**Vacc Gems.** Small valuable objects (mineralogical) prized for their unusual qualities. Vacc gems are formed by the long term action of vacuum (and other effects: radiation, stellar wind, magnetic fields) on minerals or crystals.

**Vacc Suit Patches.** Adhesive repair units for vacc suits.

**Vacc Suit Scents.** Aromatic additives which remove, disguise, or transform existing smells within vacc suits.

**Variable Tattoos.** Body or skin markings which slowly change (randomly, or in cycles) over time.

**VHDUS Blocker.** Transparent or translucent flexible sheets which are opaque to wavelengths VHDUS.

**VHDUS Dyes.** Textile dyes with colors in the wavelengths VHDUS.

**VHDUS Emitters.** Objects which glow (or regularly or intermittently pulse) in the wavelengths VHDUS.

**Vision Suppressant.** Pheromone which temporarily shuts down the vision sense.

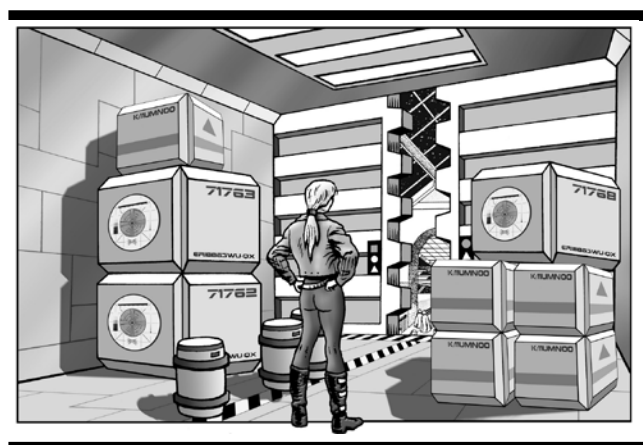
**Wafers.** Recorded personalities labeled by donor sophont and general donor skillset.

**Warm Leather.** Luxury materials composed of prepared animal skins which channel heat to the exterior surfaces.

**Weapons.** Small arms intended for personal, security, or military use.

**Wines.** Alcoholic beverages of sufficient quality or novelty to justify shipment over interstellar distances.

**Writings.** Printed published texts.







**Random Trade Goods**

**Ag-1 Ag-2 As De Fa Fl Ga Ic**

<b>1 Ag-1</b> <small>Also Ga</small>	<b>Ag-2</b> <small>Also Fa</small>	<b>As</b>	<b>De</b>	<b>Fl</b>	<b>Ic</b>
<b>Raws</b>	<b>Raws</b>	<b>Raws</b>	<b>Raws</b>	<b>Raws</b>	<b>Raws</b>
1 Bulk Protein	Bulk Woods	Bulk Nitrates	Bulk Nitrates	Bulk Carbon	Bulk Ices
2 Bulk Carbs	Bulk Pelts	Bulk Carbon	Bulk Minerals	Bulk Petros	Bulk Precipitates
3 Bulk Fats	Bulk Herbs	Bulk Iron	Bulk Abrasives	Bulk Precipitates	Bulk Ephemerals
4 Bulk Pharma	Bulk Spices	Bulk Copper	Bulk Particulates	Exotic Fluids	Exotic Flora
5 Livestock	Bulk Nitrates	Radioactive Ores	Exotic Fauna	Organic Polymers	Bulk Gases
6 Seedstock	Foodstuffs	Bulk Ices	Exotic Flora	Bulk Synthetics	Bulk Oxygen

<b>2 Consumables</b>	<b>Consumables</b>	<b>Samples</b>	<b>Samples</b>	<b>Samples</b>	<b>Samples</b>
1 Flavored Waters	Flowers	Ores	Archeologicals	Archeologicals	Archeologicals
2 Wines	Aromatics	Ices	Fauna	Fauna	Fauna
3 Juices	Pheromones	Carbons	Flora	Flora	Flora
4 Nectars	Secretions	Metals	Minerals	Germanes	Minerals
5 Decoctions	Adhesives	Uranium	Ephemerals	Fiill	Luminescents
6 Drinkable Lymphs	Novel Flavorings	Chelates	Polymers	Chelates	Polymers

<b>3 Pharma</b>	<b>Pharma</b>	<b>Valuta</b>	<b>Pharma</b>	<b>Pharma</b>	<b>Pharma</b>
1 Health Foods	Antifungals	Platinum	Stimulants	Antifungals	Antifungals
2 Nutraceuticals	Antivirals	Gold	Bulk Herbs	Antivirals	Antivirals
3 Fast Drug	Panacea	Gallium	Palliatives	Palliatives	Palliatives
4 Painkillers	Pseudomones	Silver	Pheromones	Counter-prions	Restoratives
5 Antiseptic	Anagathics	Thorium	Antibiotics	Antibiotics	Antibiotics
6 Antibiotics	Slow Drug	Radium	Combat Drug	Cold Sleep Pills	Antiseptics

<b>4 Novelties</b>	<b>Novelties</b>	<b>Novelties</b>	<b>Novelties</b>	<b>Novelties</b>	<b>Novelties</b>
1 Incenses	Strange Seeds	Unusual Rocks	Envirosuits	Silanes	Heat Pumps
2 Iridescent	Motile Plants	Fused Metals	Reclamation Suits	Lek Emitters	Mag Emitters
3 Photonics	Reactive Plants	Strange Crystals	Navigators	Aware Blockers	Percept Blockers
4 Pigments	Reactive Woods	Fine Dusts	Dupe Masterpieces	Soothants	Silanes
5 Noisemakers	IR Emitters	Magnetics	ShimmerCloth	Self-Solving Puzzles	Cold Light Blocks
6 Soundmakers	Lek Emitters	Light-Sensitives	ANIFX Blocker	Fluidic Timepieces	VHDUS Blocker

<b>5 Rares</b>	<b>Rares</b>	<b>Rares</b>	<b>Rares</b>	<b>Rares</b>	<b>Rares</b>
1 Fine Furs	Spices	Gemstones	Excretions	Flavorings	Unusual Ices
2 Meat Delicacies	Organic Gems	Alloys	Flavorings	Unusual Fluids	Cryo Alloys
3 Fruit Delicacies	Flavorings	Iridium Sponge	Nectars	Encapsulants	Rare Minerals
4 Candies	Aged Meats	Lanthanum	Pelts	Insidiants	Unusual Fluids
5 Textiles	Fermented Fluids	Isotopes	ANIFX Dyes	Corrosives	Cryogems
6 Exotic Sauces	Fine Aromatics	Anti-Matter	Seedstock	Exotic Aromatics	VHDUS Dyes

<b>6 Imbalances</b>	<b>Imbalances</b>	<b>Imbalances</b>	<b>Uniques</b>	<b>Imbalances</b>	<b>Uniques</b>
1 As	Po	Ag	Pheromones	In	Fossils
2 De	Ri	De	Artifacts	Ri	Cryogems
3 Fl	Va	Na	Sparx	Ic	Vision Suppressant
4 Ic	Ic	Po	Repulsant	Na	Fission Suppressant
5 Na	Na	Ri	Dominants	Ag	Wafers
6 In	In	Ic	Fossils	Po	Cold Sleep Pills

**WHICH TRADE CLASSIFICATION TO USE?**

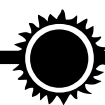
Ag As De Fa Fl Ga Ic In Na Po Ri Va Cp Cs Cx

If World TCs are not on the list, use Na Non-Agricultural.  
 If World has more than one on the list, pick one randomly.  
 If World TC=Ag is selected, pick randomly between Ag-1 and Ag-2.

**COST AND PRICE INFLUENCERS**

Ag As Ba De Fl Hi In Lo Ni Po Ri Va

Only these 12 Trade Classifications factor into Trade Goods Cost and Price.



Random Trade Goods
<b>Na In Po Ri Va Cp Cs Cx</b>

	1 Na Raws	In Manufactureds	Po Raws	Ri Raws	Va Raws	Cp Data <small>also Cs Cx</small>
1	Bulk Abrasives	Electronics	Bulk Nutrients	Bulk Foodstuffs	Bulk Dusts	Software
2	Bulk Gases	Photonics	Bulk Fibers	Bulk Protein	Bulk Minerals	Expert Systems
3	Bulk Minerals	Magnetics	Bulk Organics	Bulk Carbs	Bulk Metals	Databases
4	Bulk Precipitates	Fluidics	Bulk Minerals	Bulk Fats	Radioactive Ores	Upgrades
5	Exotic Fauna	Polymers	Bulk Textiles	Exotic Flora	Bulk Particulates	Backups
6	Exotic Flora	Gravitics	Exotic Flora	Exotic Fauna	Ephemerals	Raw Sensings

	2 Samples	Scrap / Waste	Entertainments	Novelties	Novelties	Novelties
1	Archeologicals	Obsoletes	Art	Echostones	Branded Vacc Suits	Incenses
2	Fauna	Used Goods	Recordings	Self-Defenders	Awareness Pinger	Contemplatives
3	Flora	Reparables	Writings	Attractants	Strange Seeds	Cold Welders
4	Minerals	Radioactives	Tactiles	Sophont Cuisine	Pigments	Polymer Sheets
5	Ephemerals	Metals	Osmancies	Sophont Hats	Unusual Minerals	Hats
6	Polymers	Sludges	Wafers	Variable Tattoos	Exotic Crystals	Skin Tones

	3 Novelties	Manufactureds	Novelties	Consumables	Consumables	Consumables
1	Branded Tools	Biologics	Strange Crystals	Branded Foods	Branded Oxygen	Branded Clothes
2	Drinkable Lymphs	Mechanicals	Strange Seeds	Branded Drinks	Vacc Suit Scents	Branded Devices
3	Strange Seeds	Textiles	Pigments	Branded Clothes	Vacc Suit Patches	Flavored Drinks
4	Pattern Creators	Weapons	Emotion Lighting	Flavored Drinks	Branded Tools	Flavorings
5	Pigments	Armor	Silanes	Flowers	Holo-Companions	Decorations
6	Warm Leather	Robots	Flora	Music	Flavored Air	Group Symbols

	4 Rares	Pharma	Rares	Rares	Rares	Rares
1	Hummingbird	Nostrums	Gemstones	Delicacies	Vacc Gems	Monumental Art
2	Masterpieces	Restoratives	Antiques	Spices	Unusual Dusts	Holo Sculpture
3	Fine Carpets	Palliatives	Collectibles	Tisanes	Insulants	Collectible Books
4	Isotopes	Chelates	Allotropes	Nectars	Crafted Devices	Jewelry
5	Pelts	Antidotes	Spices	Pelts	Rare Minerals	Museum Items
6	Seedstock	Antitoxins	Seedstock	Variable Tattoos	Catalysts	Monumental Art

	5 Uniques	Data	Uniques	Uniques	Samples	Valuta
1	Masterpieces	Software	Masterpieces	Antique Art	Archeologicals	Coinage
2	Unusual Rocks	Databases	Exotic Flora	Masterpieces	Fauna	Currency
3	Artifacts	Expert Systems	Antiques	Artifacts	Flora	Money Cards
4	Non-Fossil Carca	Upgrades	Incomprehensibles	Fine Art	Minerals	Gold
5	Replicating Clays	Backups	Fossils	Meson Barriers	Ephemerals	Silver
6	ANIFX Emitter	Raw Sensings	VHDUS Emitter	Famous Wafers	Polymers	Platinum

	6 Imbalances	Consumables	Imbalances	Entertainments	Scrap / Waste	Red Tape
1	Ag	Disposables	In	Edutainments	Obsoletes	Regulations
2	Ri	Respirators	Ri	Recordings	Used Goods	Synchronizations
3	In	Filter Masks	FI	Writings	Reparables	Expert Systems
4	Ic	Combination	Ic	Tactiles	Plutonium	Educationals
5	De	Parts	Ag	Osmancies	Metals	Mandates
6	FI	Improvements	Va	Wafers	Sludges	Accountings

**TRADE GOODS DETAIL**

As Strange He Strange Ni Unprocessed Ri Quality  
 Ba Gathered Hi Processed\* Oc Va Exotic \*\*  
 De Mineral Ic Cryo Po Obscure Wa Infused  
 Di Artifact Lo [no label]  
 FI Unusual \* Omit for Industrial  
 Ga Premium \*\* Omit for Asteroid

Goods on these tables with additional Trade Good Detail labels use that as a prefix.

For example, Tisanes (Ri 4-3) from a Desert Non-Industrial Rich world may be Mineral Tisanes or Unprocessed Tisanes. Nectars (Ag-1 1-4) from an Agricultural Rich world are Quality Nectars.



## Trade and Commerce

# Passengers and Freight

### CHECKLIST

- A. Offload Freight, Mail, and Passengers
  - Purser and Medic may receive Tips
  - Low Lottery
- B. Determine Market for Cargo and sell if profitable.
- C. Find Passengers
  1. Roll for High Passengers.
  2. Roll for Middle Passengers.
  3. Roll for Low Passengers.
- D. Find Freight, Cargo, and Mail.
  1. Find Freight Available.
  2. Find Cargo by Trade Goods Table.
  3. Find Mail availability.
- E. Depart.

### MERCHANT SHIP REVENUES

Item	Base Income
High Passage	Cr10,000
Middle Passage	8,000
Low Passage	1,000
Freight (per ton)	1,000
Cargo Trade Goods	profits
Mail (if fitted to carry Mail)	15,000

Standard prices for basic services.

### PREMIUM PASSAGE PRICING

Passage Demand	High	Mid	Low
-5	5,000	3,000	500
-4	6,000	4,000	600
-3	7,000	5,000	700
-2	8,000	6,000	800
-1	9,000	7,000	900
0	10,000	8,000	1,000
+1	11,000	9,000	1,100
+2	12,000	10,000	1,200
+3	13,000	11,000	1,300
+4	14,000	12,000	1,400
+5	15,000	13,000	1,500

Passage Demand is created in the ship design process.

### BROKERS

Broker	Starport	Mod	Comm
Broker-7+	A	+4	20%
Broker-6	AB	+3	15%
Broker-5	AB	+3	15%
Broker-4	ABC	+2	10%
Broker-3	ABC	+2	10%
Broker-2	ABCD	+1	5%
Broker-1	ABCD	+1	5%

Brokers influence the Cargo Actual Value Table, but must be paid their commission for the transaction.

## A OFFLOADING

Priority offload High Passengers.  
Priority Offload Mail

Offload Mid Passengers  
Offload Freight

Awaken Low Passengers  
For each, Check C3; Mod + Medic  
Failure = Death

## B SELLING CARGO

Calculate Local Cargo Market Price  
Hire Broker (optional)  
Consult Actual Value Table

If Broker used, deduct commission.

## C PASSENGERS

Roll once for each type on the day the ship leaves port.

**1** High = Flux + Pop at Cr10,000  
Mod = + Steward

**2** Mid = Flux + Pop at Cr 8,000  
Mod = + Admin

**3** Low = Flux + Pop at Cr 1,000  
Mod = + Streetwise

**Passage Demand Mod.** A ship specific Passage Demand Mod may be applied, if available

**Premium Pricing** is possible based on ship design specifications.

## D FREIGHT

Roll once for each type each day until ship has enough freight and cargo.

**1.** Freight = (Flux + Pop) x (total TCs + 1)  
Mod = + Liaison

Use total local TCs from this list (only):

Ag As Ba De Fl Hi Ic In  
Lo Na Ni Po Ri Va

**2** Cargo = up to 100 tons available  
Cost from Buying Goods as Cargo  
Note Cargo ID.  
Note Type from Trade Goods Table

**3** Mail = Possibly 1 ton  
Requires Mail Vault.

Each day, accepted freight is loaded into the hold and payment credited.

The ship leaves when the Captain decides it is ready.

### MERCHANT SHIP REVENUES

Item	Base Income
High Passage	Cr10,000
Middle Passage	8,000
Low Passage	1,000
Freight (per ton)	1,000
Cargo Trade Goods	profits
Mail (if fitted to carry Mail)	15,000

Standard prices for basic services.

### MAIL SHIPMENTS

There may be mail or private express (parcel) shipments destined for other worlds. The steward can inquire at the starport about availability.

Each mail shipment is one ton. Payment is a Voucher for Cr15,000 redeemable at any A Starport.

Destination World must be at least Importance-2 less than current world.

**Long Term Mail Contracts.** Mail and Private Express contracts can be negotiated on a Long-Term basis.

Contracts are awarded to a low bid. A ship specifies a route (between two worlds with an **Importance** difference of at least 2). Roll on the table: if the Bid from the Table is acceptable, the ship wins the contract.

### LONG TERM MAIL CONTRACTS

	10 Round Trips	5 Round Trips
2D	Low Bid	Low Bid
2	Cr8,000	Cr4,000
3	Cr10,000	Cr6,000
4	Cr12,000	Cr8,000
5	Cr13,000	Cr10,000
6	Cr14,000	Cr13,000
7	Cr15,000	Cr15,000
8	Cr16,000	Cr18,000
9	Cr18,000	Cr22,000
10	Cr20,000	Cr24,000
11	Cr22,000	Cr28,000
12	Cr24,000	Cr30,000

Bid is per Jump.

**10 Round Trips** in a calendar year allows negotiating a similar contract (at one level of bid higher) for the same route in the next year.

The ship must have an installed 1-ton Mail Vault.

## E DEPARTURE

Ship departs upon orders by Captain usually (but not always) when loaded with cargo and passengers.



**IDENTIFYING A CARGO**

TL      Tc1    Tc2    Tc3    Tc4    Tc5      Cost  
**8 - De Hi In Na Po      Cr1,800**

Sourceworld TL    Sourceworld Trade Classifications      computed cost of goods per ton.

**A BUYING GOODS**

Determine Sourceworld Tech Level  
Base Cost = Cr3,000

**Trade Class Effects**

Code	Source	Cost Mod
Ag	Agricultural	-1,000
As	Asteroid Belt	-1,000
Ba	Barren World	+1,000
De	Desert World	+1,000
Fl	Fluid Oceans	+1,000
Hi	High Population	-1,000
Ic	Ice Capped	(none)
In	Industrial	-1,000
Lo	Low Population	+1,000
Na	Non-Agricultural	(none)
Ni	Non-Industrial	+1,000
Po	Poor World	-1,000
Ri	Rich World	+1,000
Va	Vacuum World	+1,000

Tech Level Effect = Plus TL x Cr100

Total Cost=

**B SELLING GOODS**

Determine Marketworld Tech Level  
Base Price = Cr5,000

**Trade Class Effects =**

Source	Market	
Ag > Ag	As De	Hi In Ri Va +1,000 per
As > As		In Ri Va +1,000 per
Ba >		In +1,000 per
De >	De	+1,000 per
Fl >	Fl	In +1,000 per
Hi >		Hi +1,000 per
Ic >		(none)
In > Ag	As De Fl	Hi In Ri Va +1,000 per
Lo >		(none)
Na >	As De	Va +1,000 per
Ni >		(none)
Po > Ag		Hi In Ri -1,000 per
Ri > Ag	De	Hi In Ri +1,000 per
Va >	As	In Va +1,000 per

TL Effect = 10% x Source TL minus Market TL

Total Price=

**ACTUAL VALUE**

Flux	Value
-5	40%
-4	50%
-3	70%
-2	80%
-1	90%
0	100%
+1	110%
+2	120%
+3	130%
+4	150%
+5	170%
+6	200%
+7	300%
+8	400%

Less than - 5 = - 5.  
More than +8 = +8.  
DM +Broker/2  
(max +4)  
Trader = +D of Flux  
(max+5).

Free Trader **Beowulf** begins a trading journey starting at Efate A646930-D Hi In An, jumping to Alell, then Uakye, and finally a return jump to Efate.

The Trader has a cargo. Cargo ID=**D-Hi In Cr 2,300**  
=Cr3,000 -1,000 -1,000 plus TL Effect = 13 x100 =1,300  
= Cr2,300.

Beowulf carries it to Alell B56789C-A Ri Pa Ph where it has price Cr7,800.  
=Cr5,000 +[In> Ri =+1,000 =6,000] plus TL Effect (=13 -10 = 3 x10% x6,000 = +1,800 = Cr7,800).

He offers them using the Actual Value Table and rolls 0 = 100%. The goods sell for Cr7,800 producing a profit of Cr5,500 per ton.

Beowulf now buys cargo on Alell B56789C-A Ri Pa Ph. Cargo ID from **A-Ri Cr5,000**.  
=Cr3,000 +1,000 plus TL Effect = 10 x100 =1,000 =Cr5,000.

The Free Trader now carries it to Uakye B439598-D Ni where it has price Cr4,200.  
=Cr5,000 + [no TCs] plus TL Effect =10 - 13 = -3 x 10% x 6,000 = -1,800 = Cr4,200.

Beowulf offers them on the Actual Value Table. His first die roll = 1; the best value he can get for the goods is 100% (and he may get as low as 40%). He cancels the transaction and moves on.

The FreeTrader now carries the cargo to Efate where it has price Cr4,900.  
=Cr5,000 +[Ri>Hi, Ri>In =+2,000] =7,000 plus TL Effect =10 -13 =-3 x10% x7,000 = -2,100 = Cr4,900).

The trader offers them on the market using the Actual Value Table. This time he finds a Broker-4 to help him. He rolls on the Actual Value Table = +3 - 1 [+2] = +4 = 150% of Price. Net =Cr5,880.  
=Cr4,900 x 150%= Cr7,350 (minus 20% commission Cr1,470) =Cr5,880.

He makes a profit of Cr880 per ton.  
=Cr5,880 - original cost of Cr5,000. Transport costs probably made this a losing transaction.

**COST AND PRICE INFLUENCERS**

**Ag As Ba De Fl Hi In Lo Ni Po Ri Va**

Only these 12 Trade Classifications factor into Trade Goods Cost and Price.



# Trade Classifications

## Quick Generation

Directly create the Trade Classifications for a world without creating the UWP (if the situation will not otherwise use the UWP). The UWP can be created later if necessary. Pick one of the two tables and roll 4D for the row followed by 1D for the column. The result is the reasonable, random Trade Classifications for the world.

### WORLD TRADE CLASSIFICATIONS 1

4D	1	2	3	4	5	6
4	Ba De	De He Po	Di Fl Oc	Hi Ic In Va	Ba De He	De He Hi In Na Po
5	Ba He	De Hi In	As Ba Va	He Na Po Pi	De Hi Pr	De He Hi In Po
6	Di He	Ba He Po	Ba Fl He	De Na Po Pi	Di Ic Va	De He Na Ni Po
7	De Pi	Fl Oc Ph	De Di Po	He Na Ni Po	De He Hi	He Hi In Na Po
8	Ba Fl	Fl Hi Oc	De Ph Ri	Ba De He Po	Na Ph Pi Va	De Hi In Na Po
9	Di	De He Lo	Fl Ph Wa	De Di He Po	Hi In Na Va	Hi Ic In Na Va
10	Ag	Oc Ph Pi	Fl Hi Wa	Ic Na Ph Pi	Fl He Ni	As Hi In Na Va
11	Ri	Ph Wa	Na Pi	He Ni	Hi Po	Ni Oc
12	Hi In	Fl Ni	Ni Pa	Hi In	Ic Va	Fl Lo
13	Ni	Ga	Va	Po	De Lo	Ri
14	(blank)	(blank)	(blank)	(blank)	(blank)	(blank)
15	Lo	Ph	Wa	Pi	Ic	Fl
16	Hi In	Lo Wa	Ni Va	Ag Pi	De Po	Lo Va
17	Po	Hi Pr	Na Ni	Pa Ph	Ph Po	Ri Wa
18	Na	Hi In Oc	Ph Pi Po	Hi Ic In Na	Ag Ga Ni Ri	As Na Ph Pi Va
19	Ba	De Po Ph	Hi In Po	Ga Pa Ph Ri	As Na Ni Va	Ic Na Ph Pi Va
20	Lo Oc	De Ni Ri	De Ni Pr	De Na Ni Po	Ba De Po	De Na Ph Pi Po
21	Di Fl	De Hi Po	Oc Ph Ri	Ic Na Pi Va	De He Ph	He Na Ph Pi Po
22	Ba Oc	Di He Po	Di Fl He	Ag Ga Ni Pr	Hi Oc Pr	De He Na Pi Po
23	Di Oc	De He Pi	As Di Va	As Na Pi Va	Ic Ba Va	De He Ph Pi Po
24	De Di	De Ph Pi	Ba Fl Oc	Ic Na Ni Va	De Di He	De He Na Ph Pi Po

### USING THESE CHARTS

World Trade Classifications 1 and 2 allow the random creation of TCs without the generation of complete world details or UWPs.

### Trade in Uncharted Territory

For a trading ship travelling in unknown territory, these tables create potential Market Worlds.

Without fully creating UWPs, the Referee can present several possible worlds and allow the trader to make decisions about profitability.

**Trade Maps.** Any reasonable trader makes inquiries about what lies ahead. Responses can provide trade maps (often on a scrap of paper or shared as a quick download) showing a series of worlds and TCs.

### Character Homeworlds

Character homeworlds and birthworlds depend on TCs for the skills they confer. These charts create the essential TCs without fully detailing UWPs.

### Destinations

Patrons and information sources often describe worlds based on their TCs.

Destination worlds can be defined using these charts.

### Discoveries

A Scout Discovery can be quickly defined by these charts.

### Land Grants

Noble Land Grants can be defined using these charts.

### REVERSE WORLD CREATION

Worlds can be created based on their known TCs. The process of elimination determines which world details are available based on the TCs. Other details are selected or created.

### WORLD TRADE CLASSIFICATIONS 2

4D	1	2	3	4	5	6
4	De Ph	Ni Oc Pr	Pa Ph Ri	Oc Pi	Fl Oc	De He Ph Pi
5	Oc Ph	Na Po Pi	De Lo Po	As Va	Di Wa	De He Po Pi
6	Ic Ba	Ni Oc Ri	Ni Ri Wa	Hi In Na	Pi Po	Na Po Ph Pi
7	Ic Di	Fl Lo Wa	Hi Pr Wa	Na Ni Po	Oc Ri	Hi In Na Po
8	Ba Po	De Pi Po	Fl Ni Oc	Ag Ga Ri	Ic Lo Va	De Hi In Po
9	Di Po	He Ph Pi	Ic Na Pi	Ic Na Ni	Ag Ni Pr	De Hi Na Po
10	Ba Ga	He Hi In	Fl He Lo	Ri Ph Wa	As Ni Va	Ic Ph Pi Va
11	Di Ga	Fl He Ph	Na Ph Pi	Fl He Ni	De Ni Po	Ri Ph
12	Na Po	Ic Lo	Fl Ph	Ic Pi	Fl He	Ic Ni
13	He Pi	Ag Ri	Ni Ri	Ni Wa	Ag Ga	Ag
14	(blank)	(blank)	(blank)	(blank)	(blank)	(blank)
15	Ba	Di	De	He	Oc	Hi
16	Lo Po	Fl Hi	Pi Wa	De Ni	He Lo	Ni Po
17	Ga Lo	Ag Ni	Ph Pi	Hi Wa	Hi Ga	Ni Pr
18	Fl Wa	Hi Ic In	He Lo Po	Fl He Hi	Ag Ni Ri	He Hi In Po
19	Ba Va	Fl Lo Oc	Ag Ga Ni	Ga Hi Pr	Pa Ph Pi	He Ph Pi Po
20	Di Va	Fl Ni Wa	Ga Ni Pa	De Na Po	Ic Ni Va	De Na Ph Po
21	De Hi	Na Ph Po	Ni Pr Wa	De He Ni	As Lo Va	De Ph Pi Po
22	De He	He Pi Po	Na Pi Va	Ga Pa Ph	Na Ni Va	De He Ni Po
23	De Ri	Ic Pi Va	Ph Pi Wa	Ic Ph Pi	He Ni Po	De He Lo Po
24	Hi Oc	Hi Na Po	Hi In Wa	He Po	Ba Wa	De He Hi In

For example, Scout Eneri Dinsha discovers a new world.

To determine quickly what that world is, he decides to roll on Table 2. He rolls 4D for the row (= 4+3+5+1 = row 13) and 1D for the column (= 3 = column 3). He has discovered an Ni Ri Non-Industrial Rich world.

# Trade Classifications

The key to trade is the broad array of trade classifications which distill the details of the Universal World Profile into easily understood two-letter codes. Understanding the trade classifications gives insight into the details of worlds.

The Trade Classifications are two-letter codes (with format: Capital-lower) which identify an important or unusual detail of the world. For example, Ba is the trade classification for Barren: a world with no population.

## SEVEN TYPES OF TC

Trade Classifications fall into seven distinct categories: Planetary, Population, Economic, Climate, Secondary, Political, and Special.

### As De Fl Ga He Ic Oc Va Wa

**Planetary** trade classifications use the UWP elements SAH and relate to physical world characteristics.

### Di Ba Lo Ni Ph Hi

**Population** trade classifications use the UWP Population and provide insight into current local population.

### Pa Ag Na Pi In Po Pr Ri Px

**Economic** trade classifications the UWP elements AHP and generally relate to economic aspects of the world.

### Fr Co Tu Tz Tr Ho Lk

**Climate** trade classifications use the UWP elements SAH and the Habitable Zone of the system.

### Fa Mi Mr Pe Re

**Secondary** trade classifications use the UWP elements SAH and the Habitable Zone of the system.

### Cp Cs Cx Cy

**Political** trade classifications detail aspects of interstellar government.

### Sa Fo Pz Da An Ab

**Special** trade classifications detail unusual world details.

## TRADE CLASSIFICATIONS

The Trade Classifications Table indicates the required world UPP characteristics for each classification. Examine a world for all possible trade classifications.

## USING TRADE CLASSIFICATIONS

Trade Classifications have many important uses:

**Trade.** Some (but not all) Trade Classifications are used to evaluate the purchase cost and the selling price of trade goods.

**Homeworld and Birthworld Skills.** The trade classification for a world determine the skills a character receives during character generation because of his birthworld or homeworld.

**Land Grant Income.** The trade classifications for a world cumulatively determine the income which a Land Grant produces for its holder.

## HOW MANY TCS FOR A WORLD?

When evaluating a world, generate all possible trade classifications.

Planetary, Population, and Economic Trade Classifications are dictated by the UWP elements; there is no random or discretionary choice involved.

Climate and Secondary Trade Classifications depend on the orbit of the world. They are imposed only if the entire star system is generated.

Political and Special Trade Classifications are discretionary. They are imposed by the referee based on his discretion or the situation.

In practice, most worlds have between one and three Trade Classifications. A world may have as many as five or six or more TCs. It is possible for a world to have no Trade Classifications.

## TRADE CLASSIFICATION LIST

Code	Trade Classification
Ab	Data Repository
Ag	Agricultural
An	Ancient Site
As	Asteroid
Ba	Barren
Co	Cold
Cp	Subsector Capital
Cs	Sector Capital
Cx	Capital
Cy	Colony
Da	Danger (Amber Zone)
De	Desert
Di	Dieback (000-T)
Fa	Farming
Fl	Fluid
Fo	Forbidden (Red Zone)
Fr	Frozen
Ga	Garden World
Ho	Hot
He	Hellworld
Hi	High Population
Ic	Ice-Capped
In	Industrial
Lk	Locked
Lo	Low Population
Mi	Mining
Mr	Military Rule
Na	Non-agricultural
Ni	Non-industrial
Oc	Ocean World
Pa	Pre-Agricultural
Pe	Penal Colony
Ph	Pre-High
Pi	Pre-Industrial
Po	Poor
Pr	Pre-Rich
Px	Prison or Exile Camp
Pz	Puzzle (Amber Zone)
Re	Reserve
Ri	Rich
Sa	Satellite
Tr	Tropic
Tu	Tundra
Tz	Twilight Zone
Va	Vacuum
Wa	Water World



## Trade Classifications

### Ab to Lk

**Ab** **Ab Data Repository**  
The world has a centralized collection point for information and data. Organizations and governments deposit records of their transactions and output in this collection point.

**Ag** **Ag Agricultural**  
The world has climate and conditions which promote farming and ranching. It is a producer of inexpensive foodstuffs. It also is a source of unusual, exotic, or strange delicacies.

**An** **An Ancient Site**  
The world (or the star system) includes one or more locations identified as the ruins of the long-dead race called the Ancients. Ancient Sites are exploited for the Artifact remains of this long dead technological civilization.

**As** **AS Asteroid Belt**  
The world is an asteroid belt which is the primary world or mainworld in the system. It is a producer of raw materials and semi-finished goods, especially ores, metals, and minerals.

**Ba** **Ba Barren World**  
The world has no population, government, or law level. It has never been developed; it has no local infrastructure beyond the starport (if that).  
A Barren world UWP has a default zero Tech Level.

**Cx** **Cx Cold World**  
The world is at the lower temperature range of human endurance; typically in HZ+1.

**Cp** **Cp Subsector Capital**  
The world is the political center of a group of tens or dozens of star systems (typically a subsector).

**CS** **CS Sector Capital**  
The world is the political center of a group of hundreds of star systems (typically a sector).

**CX** **CX Imperial Capital**  
The world is the overall political center of an interstellar government controlling thousands of star systems.

**Cy** **Cy Colony**  
The world is a colony Owned by the Most Important, Highest Population Highest TL world within 6 hexes.  
Add the remark O:nnnn (=hex of owning world).

**Da** **Da Dangerous**  
Some aspect of the world (conditions, customs, laws, life forms, climate, economics, or other) is not well understood or easily understood by typical visitors, and it presents a danger.  
The world is a TAS Amber Zone.

**De** **De Desert World**  
The world has no open or standing water. This lack of water significantly reduces the level of agricultural development.

**Di** **Di Die-Back**  
The world was once extensively settled and developed, but at some time in the last thousand years its inhabiting sophonts died out leaving behind the remnants of their civilization  
A Die-Back world UWP has a non-zero Tech Level.

**Fa** **Fa Farming**  
The world has climate and conditions which promote farming and ranching. In addition, it is in the Habitable Zone and not a Mainworld.

**Fl** **Fl Fluid Oceans**  
The world's oceans are not composed of water. Non-water oceans may be valuable sources of raw materials for industry.

**Fo** **Fo Forbidden**  
Some conditions, customs, laws, life forms, climate, economics, or other circumstance presents an active threat to the health and well-being of individuals. The world is a TAS Red Zone.

**Fr** **Fr Frozen**  
The world lies substantially beyond the Habitable Zone of the system (HZ+2 or greater) and environmental temperatures are well below the freezing point of many gases.

**Ga** **Ga Garden World**  
The world is hospitable to most sophonts. Its size, atmosphere, and hydrographic make it an extremely attractive world. A Garden World has a safe environment which does not require protective equipment for humans and sophonts which share the human environment.

**He** **He Hellworld**  
The world is inhospitable to most sophonts. Its size, atmosphere, and hydrographic make it an extremely unattractive world.

**Hi** **Hi High Population**  
The world's population is one billion or more (Pop = 9 or A or more). High population worlds, because of the economy of scale for production, produce quality inexpensive trade goods.

**Ho** **Ho Hot World**  
The world is at the upper temperature range of human endurance; typically in HZ -1.

**IC** **IC Ice-Capped**  
The world's water is locked in ice-caps.

**In** **In Industrial**  
The world has a strong manufacturing infrastructure and is a producer of many types of goods.

**LK** **LK Locked**  
The world is a satellite (in orbits Ay through Em) which is locked to the planet it orbits. A Locked satellite does not have a Twilight Zone; its day length equals the time it takes to orbit its planet.

**LO Low Population**

The world has a non-zero-population less than 10,000. Low Population fluctuates wildly and may change significantly on a yearly (or less) basis.

Locals are Transients: merchants, corporate employees, military, security, or research personnel.

**Mi Mining**

The world is the site of extensive mineral resource exploitation. It is not a Mainworld and is located in a star system with an Industrial Mainworld.

**Mr Military Rule**

The non-Mainworld is ruled by the military from a nearby world.

**Na Non-Agricultural**

The world is unable to produce enough food agriculturally to feed its population; synthetic food production generally meets basic food needs.

**Ni Non-Industrial**

The world has a non-zero population (more than 10,000 and less than one million). The TC Non-Industrial remains constant and reflects an expected population level.

Inhabitants of a Non-Industrial world are Settlers: part of a permanent settlement not yet a Colony.

**OC Ocean World**

The world surface is covered with very deep seas. There is no (= less than 1%) land above sea level.

**Pa Pre-Agricultural**

The world is a candidate for the Agricultural trade classification; its population is just outside the requirement for Agricultural.

**Pe Penal Colony**

The world is a dumping ground for individuals who will not / do not / cannot conform to standards of behavior.

**Ph Pre-High**

The world is a candidate for elevation to the High Population trade classification; its population level is just below the requirements for High.

**Pi Pre-Industrial**

The world is a candidate for the Industrial trade classification; its population is just below the requirements.

**PO Poor**

The world has poor grade living conditions: a scarcity of water and a relatively sparse atmosphere.

**Pr Pre-Rich**

The world is a candidate for the Rich trade classification; its population is just outside the criteria for Rich.

**PX Prison. Exile Camp.**

The non-mainworld population consists of criminals or undesirables transported here from other worlds.

**PZ Puzzle**

Some aspect of the world (conditions, customs, laws, life forms, climate, economics, or other) is not well or easily understood by typical visitors.

The world is a TAS Amber Zone.

**Re Reserve**

The world has been set aside (by the highest levels of government) to preserve indigenous life forms, to delay resource development, or to frustrate inquiry into local conditions.

**Ri Rich**

The world has an untainted atmosphere which is comfortable and attractive for most sophonts, and has a population suitable as a workforce.

**Sa Satellite**

The world is the satellite of a planet (or gas giant) in the system.

**Tr Tropic**

The world is relatively warmer than normal (although it is considered habitable). Its orbit is at the inner (warmer) edge of the Habitable Zone. The world has a Hot climate (at the upper limits of human temperature endurance).

**Tu Tundra**

The world is relatively colder than normal (although it is considered habitable). Its orbit is at the outer (colder) edge of the Habitable Zone. The world has a Cold climate (at the lower limits of human temperature endurance).

**TZ Twilight Zone**

The world is tidally locked with a Temperate band at the Twilight Zone, plus a Hot region (hemisphere) facing the Primary and a Cold region (hemisphere) away from the Primary.

**Va Vacuum World**

The world has no atmosphere.

**Wa Water World**

The world surface is covered with water; there is very little land (= less than 10%) above the water surface.

Lo

Mi

Mr

Na

Ni

Oc

Pa

Pe

Ph

Pi

Po

Pr

Px

Pz

Re

Ri

Tr

Tu

Tz

Va

Wa

**TERMINOLOGY**

**Asteroid Belt.** A series of small fragments (Size less than 1) orbiting a star and considered a MainWorld.

**Belt.** An asteroid or planetoid belt.

**Habitable Zone HZ.** The orbit (or orbits) around a star which allow local world temperatures and conditions

conducive to human (or similar sophont) habitation.

**MainWorld.** The one principal, primary, or most important world in a star system.

The MainWorld may be a planet or a satellite or an asteroid belt.

**Planet.** A world orbiting a star.

**Planetoid Belt.** A series of small fragments orbiting a star (a planetoid belt which is a MainWorld is called an Asteroid Belt).

**Satellite.** A world orbiting a planet.

**World.** A planet or a satellite.





# Trade Classifications

## WorldGen TCs

Create the applicable Trade Classifications for the Main-world and apply Trade Classifications for other worlds in the system. Ba requires Starport E, or X. Cp, Cs, Cx are usually Starport A (alternates are possible at the Referee's discretion). Politicals and Specials are assigned by Referee (not generated). Lk, Tz, Ho, and Co refer to climate but are not properly TCs.

	Code	Siz	Atm	Hyd	Pop	Gov	Law	Definition	Comment
Planetary	As	0	0	0	--	--	--	Asteroid Belt	
	De	--	23456789	0	--	--	--	Desert	
	Fl	--	ABC	123456789A	--	--	--	Fluid	
	Ga	678	568	567	--	--	--	Garden World	
	He	3456789ABC	2479ABC	012	--	--	--	Hellworld	
	Ic	--	01	123456789A	--	--	--	Ice-Capped	
	Oc	ABC	3456789ABC	A	--	--	--	Ocean World	
	Va	--	0	--	--	--	--	Vacuum	
	Wa	3456789A	3456789ABC	A	--	--	--	Water World	
Population	Di	--	--	--	0	0	0	Dieback (000-T)	
	Ba	--	--	--	0	0	0	Barren	
	Lo	--	--	--	123	--	--	Low Population	
	Ni	--	--	--	456	--	--	Non-Industrial	
	Ph	--	--	--	8	--	--	Pre-High	
Hi	--	--	--	9ABCDEF	--	--	High Population		
Economic	Pa	--	456789	45678	48	--	--	Pre-Agricultural	
	Ag	--	456789	45678	567	--	--	Agricultural	
	Na	--	0123	0123	6789ABCDEF	--	--	Non-Agricultural	
	Px	--	23AB	12345	3456	--	6789	Prison or Exile Camp	MW
	Pi	--	012479	--	78	--	--	Pre-Industrial	
	In	--	012479ABC	--	9ABCDEF	--	--	Industrial	
	Po	--	2345	0123	--	--	--	Poor	
	Pr	--	68	--	59	--	--	Pre-Rich	
Ri	--	68	--	678	--	--	Rich		
Climate	Fr	23456789	--	123456789A	--	--	--	Frozen	HZ +2 or outer
	Ho	--	--	--	--	--	--	Hot	HZ- 1
	Co	--	--	--	--	--	--	Cold	HZ+1
	Lk	--	--	--	--	--	--	Locked	Close Satellite
	Tr	6789	456789	34567	--	--	--	Tropic	HZ - 1
	Tu	6789	456789	34567	--	--	--	Tundra	HZ +1
	Tz	--	--	--	--	--	--	Twilight Zone	Orbit 0-1
Secondary	Fa	--	456789	45678	23456	--	--	Farming	HZ but not MW
	Mi	--	--	--	23456	--	--	Mining	Not MW. MW=In
	Mr	--	--	--	--	--	--	Military Rule	
	Pe	--	23AB	12345	3456	6	6789	Penal Colony.	Not MW
Re	--	--	--	1234	6	45	Reserve		
Political	Cp	--	--	--	--	--	--	Subsector Capital	(Starport=A) Imperial
	Cs	--	--	--	--	--	--	Sector Capital	(Starport=A) Imperial
	Cx	--	--	--	--	--	--	Capital	(Starport=A) Imperial
	Cy	--	--	--	56789A	6	0123	Colony	--
Special	Sa	--	--	--	--	--	--	Satellite	Far Satellite
	Fo	--	--	--	--	--	--	Forbidden	(Red Zone)
	Pz	--	--	--	789ABCDEF	--	--	Puzzle	(Amber Zone)
	Da	--	--	--	0123456	--	--	Dangerous	(Amber Zone)
	Ab	--	--	--	--	--	--	Data Repository	
An	--	--	--	--	--	--	Ancient Site	--	

**Cp, Cs, Cx:** Capitals may have other starport types at discretion of the Referee. **Non-MW:** Not on system MainWorld.

**Cy:** A colony is Owned by another world. Note the owning world with O:nnnn (=hex of owning world). The Owner is the Most Important, Highest Population, Highest TL world within 6 hexes. **Mr:** Military Rule by the regional Allegiance power.



Trade Classifications
<b>WorldGen TCs</b>

Create the applicable Trade Classifications for the Main-world and apply Trade Classifications for other worlds in the system. Ba requires Starport E, or X. Cp, Cs, Cx are usually Starport A (alternates are possible at the Referee's discretion). Politicals and Specials are assigned by Referee (not generated). Lk, Tz, Ho, and Co refer to Climate but are not properly TCs.

Code	Siz	Atm	Hyd	Pop	Gov	Law	Definition
	0123456789A	0123456789ABCDEF	0123456789A	0123456789ABCDEF	0123456	0123456789	
As	0	0	0				As
De		23456789	0				De
Fl		ABC	123456				Fl
Ga	678	56 8	567				Ga
He	3456789A	2 4 7 9ABC	012				He
Ic		01	012				Ic
Oc	A	23456789ABC		A			Oc
Va		0					Va
Wa	3456789A	3456789ABC		A			Wa
Di				0	0	0	Di
Ba				0	0	0	Ba
Lo				123			Lo
Ni				456			Ni
Ph				8			Ph
Hi				9ABCDEF			Hi
Pa		456789	45678	4 8			Pa
Ag		456789	45678	567			Ag
Na		0123	0123	6789ABCDEF			Na
Px		23 AB	12345	3456		6789	Px
Pi		012 4 7 9		78			Pi
In		012 4 7 9ABC		9ABCDEF			In
Po		2345	0123				Po
Pr		6 8		5 9			Pr
Ri		6 8		678			Ri
Fr	23456789		123456789A				Fr
Ho							Ho
Co							Co
Lk							Lk
Tr	6789	456789	34567				Tr
Tu	6789	456789	34567				Tu
Tz							Tz
Fa		456789	45678	23456			Fa
Mi				23456			Mi
Mr							Mr
Pe		23 AB	12345	3456	6	6789	Pe
Re				1234	6	45	Re
Cp							Cp
Cs							Cs
Cx							Cx
Cy				56789A	6	0123	Cy
Sa							Sa
Fo							Fo
Pz				789ABCDEF			Pz
Da				0123456			Da
Ab							Ab
An							An

**Cp, Cs, Cx:** Capitals may have other starport types at discretion of the Referee. **Non-MW:** Not on system MainWorld.

**Cy:** A colony is Owned by another world. Note the owning world with O:nnnn (=hex of owning world). The Owner is the Most Important, Highest Population, Highest TL world within 6 hexes. **Mr:** Military Rule by the regional Allegiance power.



TL DRIVE TECH LEVEL AVAILABILITY		Fantastic Technology																								Impossible					
		Drive	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35
In System	M Maneuver	-	-	1	3	5	7	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	G Gravitic	-	1	4	7	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	R Rocket	1	4	7	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	H HEPlaR	-	1	3	5	7	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	N NAFAL	-	-	1	4	7	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	T Thruster	-	-	-	1	-	-	2	-	-	3	-	-	4	-	5	-	6	-	-	7	-	-	8	-	-	9	-	-	-	-
	Z Lifters	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	O1 Orion1	-	1	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	O2 Orion2	-	-	-	-	-	3	-	4	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	O2 Orion2.5	-	-	-	-	-	-	-	-	-	5	6	6	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
O3 Orion3	-	-	-	-	-	-	-	-	-	-	-	-	7	8	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Interstellar	J Jump	-	-	1	-	2	3	4	5	6	7	8	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	H Hop	-	-	-	-	-	-	-	-	-	1	-	2	3	4	5	6	7	8	9	-	-	-	-	-	-	-	-	-	-	-
	S Skip	-	-	-	-	-	-	-	-	-	-	-	1	-	2	3	4	5	6	7	8	9	-	-	-	-	-	-	-	-	-
	L Leap	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	2	3	4	5	6	7	8	9	-	-	-	-	-	-	
	B Bound	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	2	3	4	5	6	7	8	9	-	-	-	-	
	V Vault	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	2	3	4	5	6	7	8	9	-	-	
	6 Six	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	2	3	4	5	6	7
	7 Seven	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	2	3	4	5
	8 Eight	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	2	3	4
	9 Nine	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	2	3
R Reality	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	2	3	4	5	6	7	8	
I Inertialess	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	
Power	P P- Plant	-	1	2	3	4	5	6	7	8	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	A AntiMatter	-	-	-	-	-	-	-	-	-	-	1	2	3	4	5	6	7	8	9	-	-	-	-	-	-	-	-	-	-	-
	U Fission	-	1	2	3	4	5	6	7	8	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	C Collector	-	-	-	-	-	-	-	1	2	3	4	5	6	7	8	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Tools are used to adapt, change, or control an environment. Tool-using cultures are groups of beings (not necessarily sophonts) with the ability to find or make tools. But, using tools is not enough:

**Technology is the ability to use tools to make other tools.**

Only when societies make the leap to using tools to make tools do they become technological. Technology builds on the successes of earlier tool-making experiences, and enables a progression to ever-higher levels.

There are three specific values to technology.

**Technology is a labor multiplier.** A laborer with technology can produce more than a similar person unassisted.

**Technology enhances quality.** Technological output is more consistent and has higher quality.

**Technology can achieve impossibilities.** A person using technology can create objects or results which are impossible without the use of technology.

## DEFINING TOOLS

Tools are the objects and processes that sophonts use to manipulate the universe. A hammer is a tool for construction; a communicator is a tool for information exchange.

### Tools Shape Their Users

Technological societies benefit from the tools they use, but they are also shaped by their tools. A society with efficient biological tools naturally focuses on biological mechanisms and processes. A society with effective thermoplastic technologies makes most of its output in plastic.

**Tools and Tools<sup>2</sup>.** Technology is the use of tools to make other tools. The term **Tools<sup>2</sup>** refers to tool-making tools, which can be as simple as axes used to shape simple levers, or blacksmith equipment to forge iron, or as complex as computer-controlled machine tools and sophisticated .

## DESCRIBING TECHNOLOGY

Technology is described by a hierarchy of Technological Levels (or Tech Levels or TLs). Each TL represents a significant increase over the capabilities of the previous TL.

**Powers of 10.** A TL is roughly an order of magnitude increase in capability (across the three measures of technology: labor enhancement, quality improvement, and achievement of impossibilities).

**Technological Levels** are numbered on a scale beginning with TL-0 and extending through 15 and higher.

The Tech Level for an object is often appended to the object name. Rifle-5 is a tech level 5 firearm. Comm-10 is a tech level 10 communicator.

Tech Level can also describe a world, society, or culture. The world Regina was TL-12 at the start of the Golden Age. The Aslan Colonies which spanned the Great Rift are generally TL-14. The Kursae regressed to about TL-4.

## There Are Alternatives To Technology

There are also non-technological activities which can achieve the results of technology. Social groups with poor access to tools (ocean dwellers with limited access to fire, or sophonts with clumsy manipulators) may develop alternative or non-technological cultures.

**Cultures.** Some societies use Culture (the behavioral norms and expectations of a society) as a substitute for technology. A culture that expects higher labor output per individual, or greater attention to quality, or even spontaneous innovative responses to challenges is substituting cultural imperatives for technology.

**Disciplines.** Some individuals adopt Disciplines which increase their efficiency or improve their output quality. Members of a martial arts discipline are more effective (efficient) because of their devotion to its principles.

**Geneering.** Some species develop (or already have) the ability to alter their own genetics, and these altered individuals become tool-substitutes. The Pseudo-Technological Hypothesis remains unsettled: if a geneering culture creates a being (a tool) which can then create other and different geneered beings (other tools), does that meet the definition of technology?

**Parasitism or Symbiosis.** Some sophonts are themselves unable to use tools: they attach themselves to hosts (sophont tool users). The parasites themselves are not tool users, but may achieve the benefits of technology through their hosts.

## Nevertheless

The vast majority of sophont cultures throughout the universe (90% of sophont cultures; 99% of sophont cultures reaching beyond their own homeworld) build their civilizations with and on technology.

**USING TECHNOLOGY**

Worlds (societies, cultures, civilizations, stellar federations, interstellar empires) are classified by their available technology. Each is evaluated on the available technology and assigned a Technology Level (or Tech Level, or TL).

Technology Level indicates the common capabilities of the world in the creation of and use of technology.

The data entry for a world may state that it is TL-10. The Visitors can expect to find TL-10 equipment in common use in society; they can expect that local repair shops can fix TL-10 equipment; they can expect they can find TL-10 devices for sale.

**Common TL Excludes Other TLs.** The local TL identifies the vast majority of TL activity. Visitors to a TL-10 world rarely encounter TL-5 equipment, and almost never find TL-15 equipment.

**Use Does Not Imply Manufacture.** The world TL indicates the expected TL of commonly used equipment. Industrial worlds probably manufacture goods at their TL, but other worlds may not have such manufacturing capability.

**The Spectrum of Technology**

Technology is spread across a range of Technology Levels. Although the majority of goods on a world reflect its Tech Level, there may be higher TL goods (experimental models, prototypes, or early versions) or there may be lower TL goods (advanced or improved versions of older or more mature technology).

This spectrum of technology is called **TL Stages**.

**Expressing Tech Level Stages**

A device shows the TL at which it was created or manufactured: Device-10 was manufactured at TL-10; Advanced Device-13 was built at TL-13.

**Base TL.** When a device has a Stage prefix, its Base TL can be calculated from the prefix.

Early Device-9 implies that standard or base TL for the Device is TL-10. Advanced Device-12 implies that standard or base TL is TL-9.

**What A Factory Produces.** A TL-12 factory can produce a variety of stage effects at Tech Level 12:

Experimental Device-12 (implies base TL=15).

Advanced Device-12 (implies base TL= 9).

**CALCULATE BASE TL**

	Stage	TL	Base TL=
Exp	Experimental	-3	+3
Pro	Prototype	-2	+2
Ear	Early	-1	+1
Std	Standard	0	0
Bas	Basic	0	0
Alt	Alternate	0	0
Imp	Improved	+1	- 1
Gen	Generic	+1	- 1
Mod	Modified	+2	- 2
Adv	Advanced	+3	- 3
Ult	Ultimate	+4	- 4

**Applying Tech Level Stage Effects**

Most devices have a natural or native Tech Level: for example, Revolver-4. Such a device exists along the available spectrum of technology: Early Revolver-3, Improved Revolver-5, Ultimate Revolver-8.

Early Revolver-3. Mod -1. Built at TL-3.

Revolver-4. Mod 0. Built at TL-4.

Improved Revolver-5. Mod +1. Built at TL-5.

For example, Record Player-5: a device to produce sound from analog disk sound recordings. The device produces satisfactory sound to an ordinary listener if 1D is equal or less than TL. It produces satisfactory sound for a music connoisseur if 2D is equal or less than TL.

TL 5 is the Record Player's base tech level. All Record Players across the spectrum of tech levels produce some acceptable level of sound. The differences between tech levels reflect QREBS (and even QREBS can produce extremely good results on lower tech level equipment).

The advantage of higher TL Stage Effects is a small increase in performance and significant QREBS benefits. For example, Advanced Record Player-8 has no detectable advantage in sound output (to an ordinary listener) over an Improved Record Player-6 (although a connoisseur would be aware of the differences).

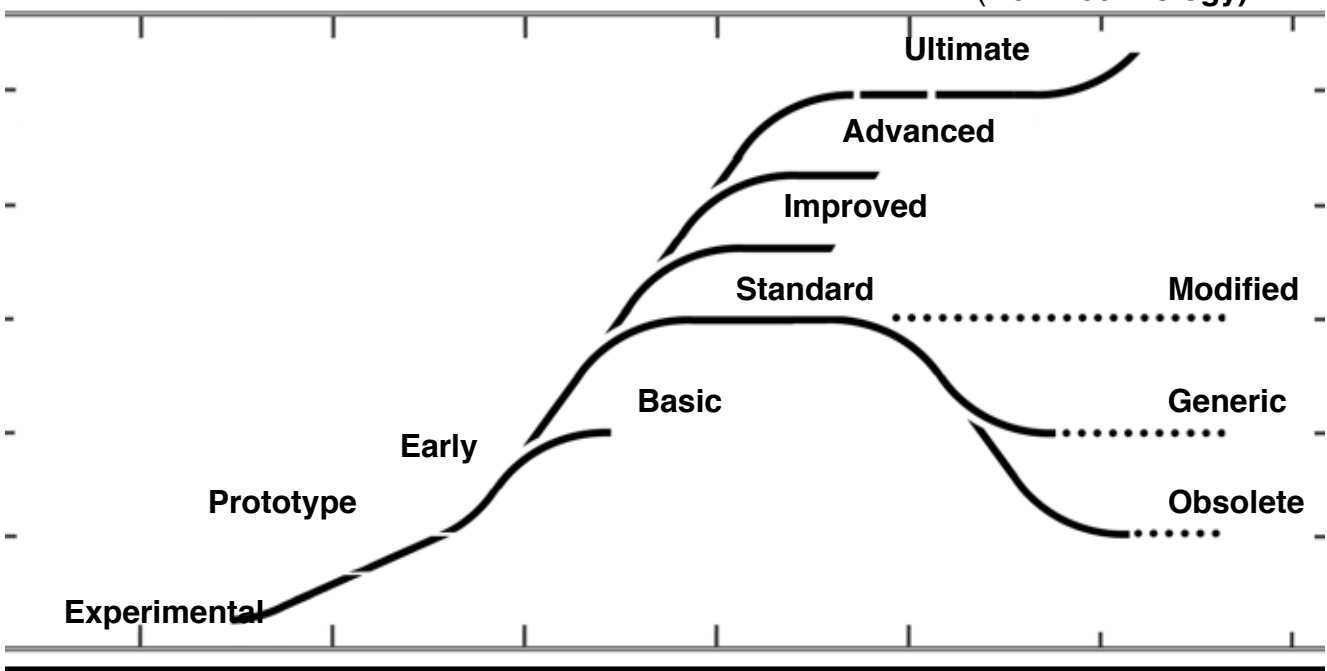
**Mods Are Reflected in the Tech Level.** A device shows its performance tech level (rather than its base tech level); its Mod is included in the TL (and not added in again).

**WHAT A FACTORY CAN MANUFACTURE**

	Stage	TL	Base TL=		For Example:			
Exp	Experimental	-3	+3	three levels lower than current	Experimental	Device-12	Base TL= 9	=TL- 3
Pro	Prototype	-2	+2	two levels lower than current	Prototype	Device-12	Base TL= 10	=TL- 2
Ear	Early	-1	+1	one level lower than current	Early	Device-12	Base TL= 11	=TL- 1
Std	Standard	0	0	current TL	Standard	Device-12	Base TL= 12	=Base TL
Bas	Basic	0	0	current TL	Basic	Device-12	Base TL= 12	=Base TL
Alt	Alternate	0	0	current TL	Alternate	Device-12	Base TL= 12	=Base TL
Imp	Improved	+1	+1	one level higher than current	Improved	Device-12	Base TL= 13	=TL +1
Gen	Generic	+1	+1	one level higher than current	Generic	Device-12	Base TL= 13	=TL +1
Mod	Modified	+2	+2	two levels higher than current	Modified	Device-12	Base TL= 14	=TL +2
Adv	Advanced	+3	+3	three levels higher than current	Advanced	Device-12	Base TL= 15	=TL +3
Ult	Ultimate	+4	+4	four levels higher than current	Ultimate	Device-12	Base TL= 16	=TL +4

In addition, Base TL for a device can be set at any level at or above original Base TL.

# TECH LEVEL STAGES



## TECH LEVEL STAGES

Tech Level Stages describe locations in the long term cycle of technological development. For example, **Experimental** is handmade from exciting new technology, usually one-of-a-kind, and often dangerous and unreliable. **Prototype** is the first step before early mass production. There are perhaps a dozen examples of any one prototype. **Early** is the first mass-produced design, before the technology has been completely refined. **Standard** is the version with the expected features for the technology when it is mature and stable. **Basic** is a cheaper, bulkier, less-featured version of the standard item. **Alternate** is a rethinking of the application of technology, often emphasizing different results or outputs. **Improved** is the implementation of additional features. **Modified** is a specialized version created in response to specific needs. **Generic** is equivalent to Standard but produced at lower cost using higher tech level manufacturing capabilities. **Advanced** has significant added capabilities beyond Improved. **Ultimate** implements significant improvements learned over the life cycle of the product. Post Ultimate is new technology.

**Understanding Tech Level Stages.** Analyze a common type of device (a car, a rifle, an entertainment system, a communicator) by assigning it TL Stages and visualize precisely what each Stage means.

## TECH LEVEL STAGE EFFECTS

TL	Stage	TL	Cost	Mod	Q	R	E	B	S	Comments
Exp	Experimental	-3	x10	-3	Q	-2	-3	+3	-3	One of a kind. Lesser capabilities. Much heavier. High cost.
Pro	Prototype	-2	x5	-2	Q	-2	-2	+2	-2	Rare. Lesser capabilities. Heavier and more costly.
Ear	Early	-1	x2	-1	Q		-1	+1	-1	Primitive. Heavy. Costly.
Std	Standard	0	x1	0	Q					Typical of available models.
Bas	Basic	0	/2	0	Q		-1	+1		Heavier, but cheaper, than Standard.
Alt	Alternate	0	x1	0	Q	F	F	F	F	Different capabilities.
Imp	Improved	+1	x1	+1	Q	+1	+1	-1	+1	Some improved capabilities. Greater Ease of Use.
Gen	Generic	+1	/2	0	5	0	0	0	0	Cheaper than (but near identical to) Standard.
Mod	Modified	+2	/2	+2	Q	+2	+2	-2	+2	Includes changed to postively affect performance.
Adv	Advanced	+3	x2	+3	Q	+3	+3	-3	+3	Lighter, added capabilities. More costly.
Ult	Ultimate	+4	x3	+4	Q	+4	+4	-4	+4	Lighter, most effective. More costly.

F= Flux (the value may vary depending on the manufacturer). Q= Quality = 2D-2..

## VARIANT TONNAGES USING TECH LEVEL STAGE EFFECTS

Tonnage (volume) for objects varies with Tech Level Stage Effects: there are differences between Things, Ships, and Guns; this table shows the standard variations.

TECH LEVEL STAGE EFFECTS										ShipMaker	Drive	GunMaker	ThingMaker
TL	Stage	TL	Cost	Mod	Q	R	E	B	S	Tonnage	Efficiency	Mass	Mass
Exp	Experimental	-3	x10	-3	Q	-2	-3	+3	-3	x 3	0.5	x 2	x 3
Pro	Prototype	-2	x5	-2	Q	-2	-2	+2	-2	x 2	0.8	x 1.9	x 2
Ear	Early	-1	x2	-1	Q		-1	+1	-1	x 1	0.9	x 1.7	x 1.5
Std	Standard	0	x1	0	Q					x1	1.0		
Bas	Basic	0	/2	0	Q		-1	+1		x 1	0.9	x 1.3	x 1.2
Alt	Alternate	0	x1	0	Q	F	F	F	F	x 1	1.0	x 1.1	x 1
Imp	Improved	+1	x1	+1	Q	+1	+1	-1	+1	x 1	1.1	x 1	x 1.5
Gen	Generic	+1	/2	0	5	0	0	0	0	x 1	0.9	x 1	x 1.5
Mod	Modified	+2	/2	+2	Q	+2	+2	-2	+2	/2	1.1	x 0.9	x 0.9
Adv	Advanced	+3	x2	+3	Q	+3	+3	-3	+3	/3	1.2	x 0.8	x 0.8
Ult	Ultimate	+4	x3	+4	Q	+4	+4	-4	+4	/4	1.3	x 0.7	x 0.5

F= Flux (the value may vary depending on the manufacturer). Q= Quality = 2D-2

For example, Device-10 has a base tech level 10. The prefix Advanced alerts the user to the fact that a device is +3 to Tech Level (Advanced Device-13 has base TL-10).

**Many Base Tech Levels Per Device.** Base Tech Level uniquely identifies a reference TL for a device (for example, the Base Tech Level for a Nuclear Damper is 12; by definition, a Standard Nuclear Damper is TL12).

Devices may be produced with a Base Tech Level at any value higher than the one defined for it. For example, a Standard Nuclear Damper-13 is possible with all of its abilities (costs, size, abilities) the same except for TL.

The spectrum of Stage Effects from Experimental through Ultimate may be applied to these other Base Tech Levels. It remains to be determined (by QREBS, for example) if, under some specific circumstances, an Ultimate Nuclear Damper-16 (from a Base TL-12) is superior to a Standard Nuclear Damper-16.

### Applying Stage Effects QREBS

Stage Effects can produce increases in QREBS values.

**QREBS Mods.** The increases shown in the Stage Effects Table are Mods to the QREBS rolls; they are not absolute values. For example, an Advanced Device-12 exhibits Reliability=-Flux +3 (for a possible range from -3 to +8).

Stage Effects does not provide a Mod for Quality.

**Resolving QREBS.** QREBS values are determined after a device is acquired by an individual. Stage Effects Mods are applied when the device is actually put into use.

### AVAILABLE TECHNOLOGY

Travellers visiting new worlds seek out the technology they offer, to improve the equipment they have, or to find new devices that will help them in their quests.

The technology level of specific devices available at a specific world is based on a comparison between the device's Base Tech Level and the current world Tech Level.

Four results are possible: Not Available, Primitive Only, Base TL, Sophisticated Devices.

### Not Available

**- 4**

If Local TL is less than Base TL minus 3, the device cannot be produced locally. It is not available. For example, Nuclear Damper-12 is not available on a TL 8 world.

### Primitive Versions Available

**- 1 - 2 - 3**

If the Local TL equals Base TL minus 1, minus 2, or minus 3, the device is available in a primitive version.

For example, a TL-9 World can produce an Experimental Nuclear Damper-9. A TL-10 World can produce a Prototype Nuclear Damper-10. A TL-11 World can produce an Early Nuclear Damper-11. These primitive versions are subject to the QREBS modifications for the stage effect.

### BASE TECH LEVEL

**TL**

When Local Tech Level and Base Tech Level are equal, the Standard, Basic, and Alternate versions may be produced. A factory on a TL-12 World can produce Standard Nuclear Damper-12, Basic Nuclear Damper-12, and Alternate Nuclear Damper-12.

### Sophisticated Versions Available

**+1 or more**

When Local TL exceeds Base TL, the device may be produced at increasingly beneficial QREBS values.

### Decimal Tech Levels

Decimal Tech Levels allow a greater understanding of the historical relationships between devices.

Tech Level 1 spans the earliest levels of technology to the cusp of the Age of Sail. Decimal Tech Levels allow identification of developments within the TL: the Bronze Age TL 1.0, the Iron Age TL 1.3, and the Middle Ages TL 1.6. Finer distinctions are also possible: The Early Middle Ages TL 1.5, or the beginnings of the Age of Sail TL 1.9.

## AN IMPRECISE PROGRESSION

Tech Levels rank technology; they do not define how far a society will go, or how fast it will progress.

Technological progress is often (as here) presented as a linear sequence: a steady progression from TL-5 to TL-6 to TL-7. The reality is far more complex:

### Societies Are Contaminated By Other Technologies

Knowing a technology is possible corrupts the development process.

Unless a society develops in true isolation, it absorbs other technologies as it encounters them. There is no Prime Directive: there is no external rule that protects developing technologies from interference. Individuals and companies are free to sell technology to any markets that will buy it.

The result is that societies have a wide range of available technologies: imported devices, local adaptations, crude imitations, and even local alternatives. Once a society knows something is possible (because a visiting star captain had a working device), it can attempt to duplicate it.

### Not All Technological Societies Advance

Technology does not require advancement.

A society may adopt only enough technology to meet its needs and then content itself with a static stability. Some cultures value social stability: technology that disrupts society may be banned or suppressed.

A culture which values reproduction may pursue technology to enhance reproduction: the resulting overpopulation leads to social and technological collapse.

A pleasure-seeking culture concentrate on technology that supports its hedonism.

### Not All Technological Societies Survive

Technology does not mandate survival.

A society may face challenges which overwhelm its tech level. Or technology may itself destroy a society. Plague or disaster can wipe out a society whose Technological level is insufficiently advanced. A violent culture may discover nuclear weapons and destroy itself (or follow cycles of development and regression). An irresponsible culture may adopt nuclear power without sufficient safeguards, or genetic modifications or industrialization without considering the long-range consequences.

### Not All Technological Societies Prosper

Technology does not guarantee prosperity.

An oppressive society may depend on technology to maintain its domination of the population.

A culture may concentrate its technology (for reasons incomprehensible outside of that culture) in areas other than the general welfare: in strange or useless or peripheral activities that do not improve or advance society in general. It may construct mounds of soil, or pyramids. It may bury vast wealth with its dead. It may subsidize idleness; or devote major resources to culinary delights. It may embrace cultural restrictions that prevent technological advancement.

---

## PUNCTUATED TECHNOLOGY

The steady increase in Technological Levels is punctuated by Leaps: major advances that bring new concepts. The effects of such Leaps are felt for many levels to follow.

**TL-1 Using Tools To Make Tools.** The greatest technological leap is the first: the increase from TL-0 to TL-1. The culture, which already uses simple tools (rocks; clubs) uses them to make other, more sophisticated tools.

**TL-4 Division of Labor and Mass Production.** The invention (or the discovery) of division of labor and mass production marks the transition from individual craftsmen to relatively unskilled labor. Objects use the significant increase in labor efficiency to reduce costs and increase quality.

**TL-7 Processors.** The widespread availability of information processors and integrated electronic circuits makes possible sophisticated devices which supplant tedious sophont thought processes.

**TL-10 Gravity Manipulation.** Practical gravity manipulation and its associated transportation systems revolutionize travel and the movement of goods.

**TL-13 Effective Biological Sciences.** Cloning, bio-engineering, and the forced-growth process makes genetic manipulation (geneering) possible.

**TL-16 Artificial Persons.** The widespread availability of artificial persons, practical robots, artificial intelligence in computers, and self-aware mechanisms replaces sophonts in most non-creative activities.

**TL-19 Matter Transport.** The availability of elemental matter portals (transporting raw materials across AU distances efficiently) transforms concepts of physical value.

**TL-22 Individual Transformations.** The lines between individuals blur as bodies become customizable, replaceable, and disposable.

**TL-25 Psionic Engineering.** Technological tools based on psionic principles revolutionize communications and manufacturing.

**TL-28 Stellar Scale Physical Manipulation.** Technology develops capabilities to manipulate worlds and stars: to move them, harvest them for their matter and energy, and convert them to other large scale objects.

**TL-31 Pocket Universes.** The ability to create and manipulate pocket universes infinitely expands available resources and turns all but the most adventurous inward.

**TL-33 The Technological Singularity.** Society reaches a critical point in its development.

---



---

## THE KNOWN PARADIGM SHIFTS

---

**Jump-** Efficient Travel Beyond the Home System.

**Fusion Plus-** Efficient Portable Power Generation.

**Reality Manipulation-** Revision of event flow.

---

## THE PARADIGM SHIFTS

There are a very few significant technological advancements that most societies never discover. These paradigm shifts are concepts that require such a profound change in basic understandings of principles that they are discovered only by phenomenal genius, or phenomenal luck, or both.

The total number of possible paradigm shifts remains unknown but is probably very small.

### Three Known Examples Are:

**Jump Technology** enables a ship to transition into Jump Space and emerge some great distance away within a reasonable time (effectively multiples of 170 times the speed of light). Jump drive (and its many variations) makes interstellar flight practical. Those who do not discover jump drive are condemned to NAFAL movement between the stars.

**Fusion Plus** (or Cold Fusion or Fusion+ or F+) produces an efficient (producing very little waste heat) energy output through catalyzed fusion of hydrogen.

Cold fusion is distinguished from Fusion by its small size: Fusion is suitable for large multi-kiloton installations; Fusion Plus is a small, relatively portable installation suitable for vehicles and homes.

Cold fusion disconnects ordinary activity from the cost of energy. Those who do not discover Fusion Plus are handicapped by high energy costs in everything they attempt.

**Reality Manipulation** allows editing of reality on a real-time basis: manipulation of physical laws, and revision or reversal of event flow.

Reality manipulation allows its users to attempt many different processes in pursuit of their goals while substantially decreasing the consequences and their costs. Those who do not discover Reality Manipulation face real and irreversible consequences for their mistakes.

### The Favored Society Effect of Paradigm Shifts

A very few (one in a thousand) societies independently make a paradigm shift at the proper time and discover one of the crucial technological advances. These favored, fortunate societies gain in two ways: they have an important technological principle that gives them power over their less fortunate neighbors, and the discovery imparts to their collective self-image a level of confidence or self-esteem that places them in a dominant position in interstellar society.

For example, the discovery of Jump Drive by the Vilani (at a time when all of its neighbors were using NAFAL Not-As-Fast-As-Light drives) gave them a technological advantage and reinforced their own self-image as the natural rulers of interstellar space. They used their discovery to found an empire that lasted thousands of years.

**The Favored Society Effect Inverse.** Many societies send out expeditions to the stars and find the universe is already settled. Some societies are visited by starfarers bringing new technology and the implied message that the stars

are home to better, stronger, superior cultures. Most such societies retreat to their own territories, content to rule their homeworld and focus inward.

The Kisthdra first ventured beyond their home system in NAFAL-driven ships on expeditions expected to take hundreds of years. Instead, their crews returned home aboard Vilani starliners less than a decade after they left. The realization that the stars had already been conquered, and that they belonged to someone else, crushed the collective spirit of Kisthdra society: they rarely venture beyond their world even now.

The overall result is interstellar domination by a favored few sophonts, and many worlds each home to a unique race with its own introspective interests.

## SPECIAL TECH LEVEL CONSIDERATIONS

Contacts between worlds of differing Tech Levels can produce a variety of interactions.

### Tech Levels For Interstellar Societies

The Tech Level for an interstellar society is based on the TLs of its significant worlds. Determinations are made for defined regions (usually a subsector). If the interstellar society is larger than a subsector, it is divided into subsector-sized regions, with higher tech subsectors dominating their lower tech subsector neighbors.

**Highest TL Industrial World in a Subsector.** The TL of the interstellar society equals the highest TL for an Industrial World. The TL governs the construction of the military and naval forces of the society.

**Highest TL Important World in a Subsector.** The highest generally available TL within a society equals the highest TL for its most important world. Such technology is generally imported or produced locally under license and extrality agreements.

### Tech Levels for Contacted Worlds

Tech Levels for worlds advance based on the contacts they have with outside technologies.

**External Contamination.** The Rate of Technological Advance Chart works best with uncontaminated cultures free of outside influence. The results are unreliable or inapplicable for cultures exposed to outside forces with higher tech levels.

**Lower Tech Worlds.** A world which has developed an independent technology maintains its native Tech Level for the majority of its territory. Some regions (typically near the starport) may have slightly higher tech levels based on the availability of imported goods.

Any such world with Importance 1+ automatically shifts to the Fast Track. Other worlds maintain their current Track.

**Higher Tech Worlds.** A world with technology higher than its exterior contacts maintains its higher technology.

**Low Population and Non-Industrial Worlds.** Lo and Ni worlds are dependent on other worlds for their TLs. The TL does not independently change.



### **THERE IS A MAXIMUM**

Every Tech Level is built on the advances of the previous ones, and ultimately, tool-making tools surpass the capabilities of the sophonts who use them. Computers surpass sophonts in intelligence, and more importantly, in sophont-like insights. Computer interfaces raise the abilities of sophonts to new levels and blur the distinction between tool and user.

Geneering and medical science increase the intelligence and talents of sophonts to a degree that accelerates technological advance even more.

**Technological knowledge increases exponentially.** Each Tech Level represents an expanding body of knowledge: many of the technological discoveries themselves increase the rate at which technology advances.

**Technological progress accelerates exponentially.** The time between technological levels decreases, assuming a large population working on technology and sufficient resources being devoted to it, and assuming the cultures involved care about advancing technology.

As a society reaches beyond TL-21 and approaches TL-Z, technology provides everything, in high quality, on demand, to everyone in the society. Robots and sophontoids do all the work; artificial intelligences manage all of society's systems; individuals can choose any number of entertainments or challenges, access most of the knowledge of the universe, do anything, experience everything, and all without risk, and strangely enough, without challenge or a feeling of reward (which recalls the importance of the Third Law Of Trade).

**The Technological Singularity.** The endpoint in the TL scale achieves tools that are self-replicating, self-improving, and panscient.

TL-Z =  
The Technological Singularity=  
**TL-33**

At the Technological Singularity, all things are possible: tools<sup>2</sup> respond to all needs with no discernible delay.

**The Technological Singularity is Unstable.** The features and the abilities of the Technological Singularity promote any number of consequences, all of which lead to changes that end the Technological Singularity. At the singularity, sophonts must grow or die. Various societies choose various options, but in every circumstance, they must choose:

#### **Some consequences are:**

Society moves beyond technology advancing to metaphysical pursuits which transcend a physical existence.

Society retreats to a simple, non-technological pastoral existence.

Society collapses, losing its high tech tools and beginning the cycle of technological development again.

Society fragments; some factions transcend; others retreat; still others struggle to maintain or reacquire the Singularity.



# TECHNOLOGY-1

	Era	Era	Energy	Society	Environ	Comms
Vlow Tech	<b>0</b>	Primitive Stone Age	Personal Effort Fire	Tribe. Clan.	Natural. Crude Shelters.	Personal Senses. Messengers.
	<b>1</b>	Bronze Age 3500 BC	Water Power	Ethnic Groups.	Settlement. Villages.	Memorization.
	<b>1.3</b>	Iron Age 1300 BC			Towns. Roads. Canals.	Writing.
	<b>1.6</b>	Middle Ages 600 AD		Kingdoms.	Cities.	
	<b>2</b>	Age Of Sail 1500 AD	Wind. Sail.	Nations.		Printing.
	<b>3</b>	Industrial Revolution 1700 AD	Coal. Steam.	Democracies.		
	<b>3.3</b>	1800 AD				
Low Tech	<b>3.6</b>	1850 AD				Code by Wire.
	<b>4</b>	Mechanization 1900 AD	Electricity.		Skyscrapers	Sound by Wire. Image Capture.
	<b>5</b>	1930 AD	Oil. Petrochemicals.	Dictators.		Broadcast Sound. Sound Recording.
	<b>6</b>	Nuclear Age 1950 AD	Nuclear Fission.	Superpowers.	Suburbs.	Broadcast Images. Video Recording.
Mid Tech	<b>7</b>	1975 AD	Geothermal. Solar.			
	<b>8</b>	2000 AD	Renewables.			Personal Comms.
	<b>9</b>	2050 AD	Early Fusion.		Arcologies	3D Images/ Video.
High Tech	<b>10</b>	2100 AD	Practical Fusion.	Non-Geographic Communities.		
	<b>11</b>	Imperial Average Circa Year Zero	[FusionPlus].			
	<b>12</b>					
Vhigh Tech	<b>13</b>	Imperial Maximum Circa 550		Robots.		CommPlus.
	<b>14</b>		Exotics. Collectors.	Temporary Personality Transfer		
	<b>15</b>	Imperial Maximum Circa 1107		Mindwipe.		
Xhigh Tech	<b>16</b>	Darrian Maximum	Experimental AM.	Artificial Persons. The Under Society.		
	<b>17</b>			Permanent Personality Transfer		
	<b>18</b>		Exotics. Collectors.			
Uhigh Tech	<b>19</b>	The Far Far Future				Limited Matter Transport.
	<b>20</b>					
	<b>21</b>			Deconstruction of Cities	Scattered Site Dwellings.	

# TECHNOLOGY-2



Transport	Medicine	Science	Computers	Era	Era	
Walking.	Herbal Medicine Mystical Therapy.		Counting.	Primitive Stone Age	<b>0</b>	
Beasts of Burden.	Basic Diagnosis.		Abacus Quipu.	Bronze Age 3500 BC	<b>1</b>	
Wheel.				Iron Age 1300 BC	<b>1.3</b>	
Galleys.				Middle Ages 600 AD	<b>1.6</b>	Vlow Tech
Saling Ships.	Internal Anatomy.		Algebra.	Age Of Sail 1500 AD	<b>2</b>	
	Crude Surgery.	Mechanics.	Calculus.	Industrialization 1700 AD	<b>3</b>	
Steamships.				1800 AD	<b>3.3</b>	
Railroads.				1850 AD	<b>3.6</b>	
	Antiseptics. Anesthetics.	Medical.	Analog Computers.	Mechanization 1900 AD	<b>4</b>	Low Tech
Groundcars.	Internal Imaging.	Polymers.	Electric Calculators.	1930 AD	<b>5</b>	
		Electronics.	Model /1.	Nuclear Age 1950 AD	<b>6</b>	
Rockets to Orbit.	Organ Transplants. Slow Drug.	Programmer.	Model /2.	1975 AD	<b>7</b>	Mid Tech
		Photonics.		2000 AD	<b>8</b>	
NAFAL.	Cryogenics. Fast Drug.	Gravitics.	Model /3.	2050 AD	<b>9</b>	
Gravity Manip. Lifters to Orbit.	Anti-Virals.	Fluidics.	Model /4.	2100 AD	<b>10</b>	High Tech
		Magnetics.	Semi-Organic Brain. Model /5.	Imperial Average Circa Year Zero	<b>11</b>	
	Anti-geriatrics.		Positronic Brain. Model /6.		<b>12</b>	
	Effective Cloning. Forced Growth.	Biologics.	Wafer Technology. Model /7.	Imperial Maximum Circa 550	<b>13</b>	Vhigh Tech
	Geneering.		Self Aware Model /8.		<b>14</b>	
	Anagathics.		Model /9.	Imperial Maximum Circa 1107	<b>15</b>	
			True Artificial Intelligence.	Darrian Maximum	<b>16</b>	Xhigh Tech
					<b>17</b>	
					<b>18</b>	
Elemental Matter Transport.				The Far Far Future	<b>19</b>	Uhigh Tech
Global Raw Matter Transport.					<b>20</b>	
System Raw Matter Transport.					<b>21</b>	



# TECHNOLOGY-3

	Era	Era	Speed1	Speed2	Weapons	Hvy Wpns
	<b>0</b>	Primitive Stone Age	Walking	<b>1</b>	5 kph Clubs. Rocks	
	<b>1</b>	Bronze Age 3500 BC	Beasts of Burden	<b>2</b>	10 kph Blades. Spears.	
	<b>1.3</b>	Iron Age 1300 BC	Wheel			Massive Armies
Vlow Tech	<b>1.6</b>	Middle Ages 600 AD	Galleys	<b>3</b>	20 kph	Siege Weapons
	<b>2</b>	Age Of Sail 1500 AD	Sailing Ships	<b>4</b>	30 kph	
	<b>3</b>	Industrial Revolution 1700 AD			Musket	Cannon
	<b>3.3</b>	1800 AD	Steamships	<b>5</b>	50 kph	
	<b>3.6</b>	1850 AD	Railroads	<b>6</b>	100 kph Revolver	Artillery
Low Tech	<b>4</b>	Mechanization 1900 AD			Cartridges	Mortars
	<b>5</b>	1930 AD	GroundCars	<b>7</b>	300 kph Rifle. Machinegun.	
	<b>6</b>	Nuclear Age 1950 AD		<b>8</b>	500 kph	
Mid Tech	<b>7</b>	1975 AD	Rockets To Orbit	<b>9</b>	700 kph	
	<b>8</b>	2000 AD		<b>10</b>	1000 kph	
	<b>9</b>	2050 AD	Civil SST	<b>11</b>	2000 kph	
High Tech	<b>10</b>	2100 AD	Civil Space Transport	<b>12</b>	3000 kph	
	<b>11</b>	Imperial Average Circa Year Zero				
	<b>12</b>					
Vhigh Tech	<b>13</b>	Imperial Maximum Circa 550				
	<b>14</b>				Psi-Shields	
	<b>15</b>	Imperial Maximum Circa 1107				
Xhigh Tech	<b>16</b>	Darrian Maximum			Fusion Rifle	Black Globe
	<b>17</b>					
	<b>18</b>				Personal Damper	Disruptors
Uhigh Tech	<b>19</b>	The Far Far Future	Elemental/Limited Matter Transport		Disintegrator Pistol	
	<b>20</b>		Global Matter Transport		Disintegrator Wand	White Globe
	<b>21</b>		System-Wide Matter Transport		Relativity Rifle	

# TECHNOLOGY-4



Space Travel									Tech	Era	Era	
Stargazing										Primitive Stone Age	<b>0</b>	Vlow Tech
										Bronze Age 3500 BC	<b>1</b>	
									Mechanical	Industrial Revolution 1700 AD	<b>3</b>	Low Tech
										Mechanization 1900 AD	<b>4</b>	
									Electronics	1930 AD	<b>5</b>	Low Tech
										Nuclear Age 1950 AD	<b>6</b>	
									Programmer	1975 AD	<b>7</b>	Mid-Tech
									Photonics	2000 AD	<b>8</b>	
										2020 AD	<b>8.2</b>	Mid-Tech
										2030 AD	<b>8.5</b>	
										2040 AD	<b>8.7</b>	
									Fluidics	2050 AD	<b>9</b>	High Tech
										2065 AD	<b>9.3</b>	
										2080 AD	<b>9.6</b>	High Tech
									Gravitics	2100 AD	<b>10</b>	
									Magnetics	Imperial Average Circa Year Zero	<b>11</b>	High Tech
									Biologics		<b>12</b>	
										Imperial Maximum Circa 550	<b>13</b>	High Tech
											<b>14</b>	
										Imperial Maximum Circa 1107	<b>15</b>	High Tech
										Darrian Maximum	<b>16</b>	
											<b>17</b>	Xhigh Tech
											<b>18</b>	
											<b>19</b>	Unhigh Tech
										The Far Far Future	<b>20</b>	
											<b>21</b>	



# TECHNOLOGY-5

	Era	Era	Weapons	Defenses	Sensors1	Sensors2
Vlow Tech	<b>0</b>	Primitive Stone Age				
	<b>1</b>	Bronze Age 3500 BC				
	<b>1.3</b>	Iron Age 1300 BC				
	<b>1.6</b>	Middle Ages 600 AD				
	<b>2</b>	Age Of Sail 1500 AD				
	<b>3</b>	Industrial Revolution 1700 AD				
	<b>3.3</b>	1800 AD				
Low Tech	<b>3.6</b>	1850 AD				
	<b>4</b>	Mechanization 1900 AD				
	<b>5</b>	1930 AD				
	<b>6</b>	Nuclear Age 1950 AD				
Mid Tech	<b>7</b>	1975 AD	Missile			Sound Sensor Densitometer
	<b>8</b>	2000 AD	Mining Laser CommCaster		Jammer Communicator	Mass Sensor
	<b>9</b>	2050 AD	Slug Thrower	SandCaster	Scope Radar	Analyzer/ Sniffer Deep Radar
High Tech	<b>10</b>	2100 AD	KK Missile DataCaster		Neutrino Detector	Proximeter Life Detector
	<b>11</b>	Imperial Average Circa Year Zero	Particle Accelerator			Activity Sensor
	<b>12</b>		Fusion Gun	Nuclear Damper	Stealth Mask EMS	Field Sensor
Vhigh Tech	<b>13</b>	Imperial Maximum Circa 550	Meson Gun		Grav Sensor	
	<b>14</b>		Jump Damper	Mag Damper	Visor	
	<b>15</b>	Imperial Maximum Circa 1107			CommPlus	
Xhigh Tech	<b>16</b>	Darrian Maximum	Tractor/Pressor	Black Globe		
	<b>17</b>			Grav Scrambler		
	<b>18</b>		Disruptor		Holovisor	
Uhigh Tech	<b>19</b>	The Far Far Future	Scrubbing	Proton Screen	Scanner	
	<b>20</b>		AM Missiles	White Globe		
	<b>21</b>		Stasis			



Flux=	- 5	- 4	- 3	- 2	- 1	0	+1	+2	+3	+4	+5
Points=	- 2		- 1		0			+1		+2	
<b>22</b>	True Scrubbing		Silver Globe		Individual Transformations						
<b>23</b>	Planetary Core Energy Tap		Grey Goo		Practical PsychoHistory		Rapid Terraform		Leap Drive		
<b>24</b>	PlanetBreaker Bombs		Programmable Goos		Engineered Societies		Portals Rosettes				
<b>25</b>			Psionic Engineering		Simultaneous Lives		Event Manipulation Capsule Dyson		Teleport Inertialless		
<b>26</b>	Stellar Energy Tap		Stasis Globe		Implantable Ethics		World Scale Constructs		Bound Drive		
<b>27</b>	PlanetBuster Bombs		Reality Manipulation		Socioneering		Ringworlds				
<b>28</b>			Reality Engineering		Group Personalities		Not-Foam Manipulation		Reality Drive		
<b>29</b>	Starkillers				Happiness		Rigid Dysons		Vault Drive		
<b>30</b>			Remote Technology				Stellar Scale Constructs				
<b>31</b>							Pocket Universes		Six Drive Exp Eight Drive		
<b>32</b>									Seven Drive Exp Nine Drive		

## Z

### The Technological Singularity

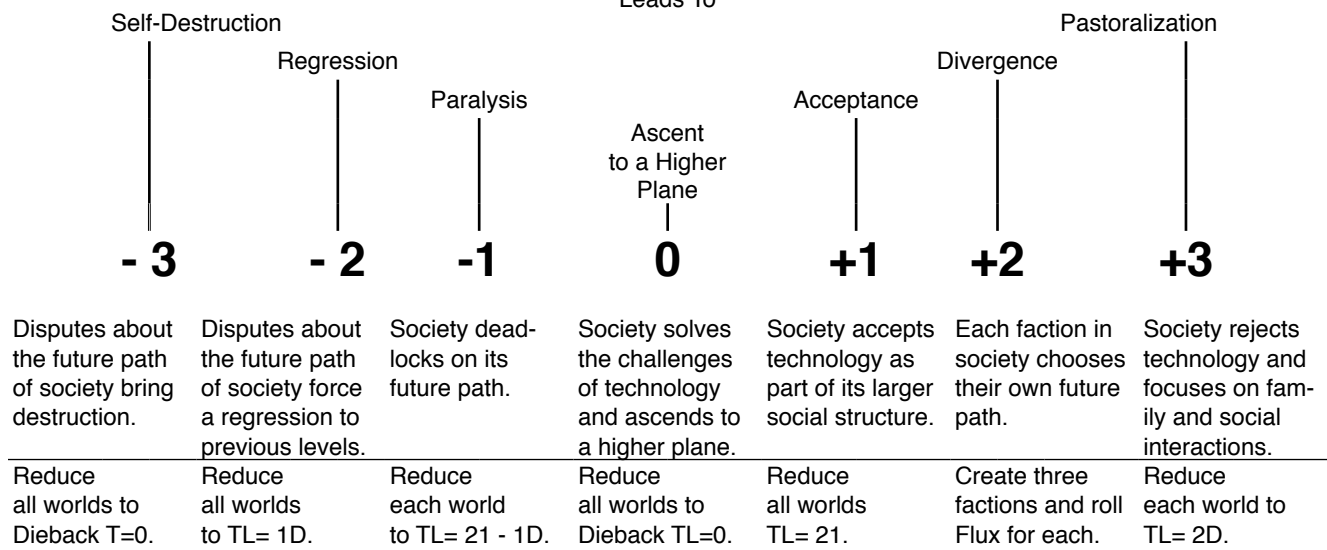
Levels above 21 are the Accelerating Tech Levels: each is of short duration and each leads at an ever-accelerating pace to the next. The technologies addressed by TLs above 21 are frighteningly powerful and exceptionally susceptible to disaster.

**Which Way?** As a society progresses to each new Accelerating Tech Level, Flux determines the focus technology column for the Level (although the other technology also becomes available). When the society reaches TL-Z, the sum of the Points for that technology is a DM on a single Societal Flux for Destiny.

#### THE SINGULARITY

#### TL-Z

Leads To







## POST-21 FANTASTIC TECHNOLOGY

Technology beyond TL-21 borders on or achieves the fantastic: it not routinely available to lower tech levels, and it harnesses capabilities only dreamed of by lesser beings.

Fantastic technology provides fantastic challenges as well. Each individual society faces decisions on the use of technology: for good or ill, to build or to destroy, to conquer or to uplift; to share or to squander. Those challenges, more than the technology itself shape the face of the universe.

### Weapons of Incredible Power

**Planetbreaker Bombs 24.** Devices which split worlds: instruments of massive world-scale destruction including the ejection of one or more continent-size fragments.

**True Scrubbing 22.** The ability to destroy all life on a world: inflicting nuclear fire and kinetic impacts to destroy entire world surfaces; anti-atmosphere weapons to destroy the live-giving atmospheres of whole planets; poisons and toxins that rip the life out of entire ecologies.

**Planetbuster Bombs 27.** Devices which destroy entire worlds: the conversion of the planets myriad planetoids.

**Starkillers 29.** Devices which destroy stars: suppressors of stellar nuclear fire; enhancers of stellar fusion processes; triggers of runaway quantum reactions; and randomizers of gravitational force.

### Energy Sources of Great Magnitude

**Planetary Core Energy Tap 23.** The ability to harvest and direct the energy within planetary cores to meet the high energy demands of reality engineering.

**Stellar Energy Tap 26.** The ability to harvest and direct the energy within stellar cores to meet the high energy demands of reality engineering.

### Powerful Fields of Protective Ability

**Silver Globe 22.** Devices or fields that perfectly reflect all incoming energy and impinging matter.

**Stasis Globe 26.** Devices or fields that perfectly preserve contents from the effects of time.

### The Goos

**Grey Goo 23.** Self-replicating nano-processes capable of reducing objects (everything: people, cities, living matter, entire world surfaces) to a chaotic froth.

**Programmable Goos 24.** Refinements in goo technology through structural directions and safeguards to create a spectrum of nano processes with tailored purposes: mining, construction, healing, recycling, and others.

### Dramatic Changes in the Organization of Society

**Practical PsychoHistory 23.** The ability to make exact and accurate predictions of the social behavior of large groups of sophonts and, based on those predictions, to shape the course of future history. The ability to predict the long term consequences of specific events.

**Engineered Societies 24.** The ability to create social and cultural structures based on detailed specifications. Just as Geneering manipulates genetic structure, Socieneering manipulates social and cultural structure to improve efficiencies, reflect desired values, and propagate them throughout society.

**Implantable Ethics 26.** The ability to define right conduct and to implant (or impose) its consequent constraints on individuals. The concept includes internal monitoring and self-correction behaviors.

**Socieneering 27.** The ability to tailor the structure of society (or parts of society) to achieve specific purposes or results. Contrasted with Psychohistory, which Socieneering changes society itself to achieve desired goals.

**Individual Transformations 22.** The capacity to change the physical capabilities of individual sophonts, including enhanced characteristics, alternate bodies, and the ability to shift between those alternatives.

**Group Personalities 28.** The ability to blend distinct or diverse personalities into one master personality (either temporarily or permanently). Group personalities manifest a variety of experiences and abilities for greater efficiency, creativity, and responsibility. Members of the group share in the insights, abilities, and decisions of the overall personality.

**Simultaneous Lives 25.** The ability to share experiences with others, including shared decision-making, shared sensory input, and shared consequences.

**Happiness 29.** The ability to provide a mental state of well-being (characterized by positive emotions ranging from contentment to intense joy) without necessarily supplying the physical or existential underpinnings. The process can be tailored to a range from individuals to whole worlds.

### Transformation of Worlds

**Rapid Terraforming 23.** The ability to manipulate the characteristic elements of a world. Rapid Terraforming includes the ability to restructure existing worlds, change their orbits, and change their atmospheric and surface details to conform to some desired standard, all within a reasonable timeframe somewhat less than a sophont adulthood. The term Terraforming includes any world specification (not just Terra-like).

**Rosettes 24.** The ability to move whole worlds into structured gravitational systems. A rosette is a gravitational

---

## FANTASTIC TECHNOLOGY

---

Weapons of Incredible Power

Energy Sources of Great Magnitude

Powerful Fields of Protective Ability

The Goos

Dramatic Changes in the Organization of Society

Transformation of Worlds

Distanceless Access to Remote Locations

Reality Manipulation

Interstellar Drives of Capable of Tremendous Reach

---



system of a heavier and lighter bodies orbiting in a regular repeating pattern around a common barycenter; the mechanics of creating a Rosette are the first step in the process of creating Dyson Worlds.

**Many Capsule Dyson Sphere 25.** The ability to create a system of multiple worldlets (capsules; planetoids) dedicated to harvesting and using the energy of a central star in support of the power needs of the local population.

**World Scale Physical Constructs 26.** The ability to manipulate the non-stellar elements of a star system. World scale physical constructs includes the ability to create worlds (star mining the matter required) within reasonable time frames (typically less than a sophont adulthood).

**Ringworlds 27.** The ability to create a solid habitable ring around a central star: a surface with an area a million times that of a world.

**Rigid Dyson Spheres 29.** The ability to create a solid shell surrounding a central star: a surface with an area hundreds of times that of a ringworld, and efficiently captures the total energy output of the star.

**Stellar Scale Physical Constructs 30.** The ability to manipulate the elements of a star system, including the star itself. Stellar scale physical constructs includes the ability to create (!) stars and their associated worlds within reasonable time frames (typically less than a sophont adulthood).

**Distanceless Access to Remote Locations**

**Portals 24.** The ability to create portals: instantaneous connections between distant locations.

**Pocket Universes 31.** The ability to create very small (in a realtive sense) parallel or alternate universes containing isolated star systems and accessible from the true universe through a variety of portals.

**Reality Manipulation**

**Event Branch Manipulation 25.** The ability to evaluate the potential consequences of imminent events and to select between such choices.

**Reality Manipulation 27.** The ability to edit reality, primarily through redos: limited retrospective changes to past events to alter their effects on the present.

**Not-Foam Manipulation 28.** The ability to conjure the existence of matter and energy in structured quantities from the elementary quantum froth of the universe.

**Interstellar Drives of Capable of Tremendous Speed**

**Post-Jump Drives 17.** Higher Order Jump Drives are order of magnitude improvements on the foundational Jump Drive: Hop, Skip, Leap, Bound, Vault, and beyond with the potential of crossing the galaxy in mere hours.

**Inertialess Maneuver 25.** The ability to eliminate inertia in spacecraft. Inertialess ships are unrestricted by velocity vectors and achieve very high speeds nearly instantaneously. When inertialessness is turned off, the ship reverts to its previous state of inertia.

**Reality Drive 28.** Drives capable of reaching almost any destination with a minimum of cost and time.

**PSIONIC ENGINEERING 25**

The ability to manipulate matter (at all scales from the sub-atomic to the macro) without physical interaction through use of individual psionic powers: the psionic engineer “encourages” matter to move and interact to accomplish the desired results. Psionic engineering is one possible prerequisite to many large scale physical constructs.

**REALITY ENGINEERING 28**

The ability to manipulate matter (at all scales from the sub-atomic to the macro) without physical interaction through detailed choices in the many branches of potential relaiy: the reality engineer selects potential matter motions and interactions to accomplish the desired results. Psionic engineering is one possible prerequisite to many large scale physical constructs.

**THE OTHER PLANES**

A society which moves beyond technology advances to metaphysical pursuits which literally transcend a physical existence. The name for this concept is the Other Planes (often called the Higher Planes).

In a hypothetical interaction with someone on a Higher Plane, the question (and the conversation) is simple:

*What are the other planes like?  
You wouldn't understand.*

**REMOTE TECHNOLOGY ADD-ON 30**

The ability to operate other technology at a distance: to activate the effects of other ordinary or advanced technology across World, Space, and Interstellar distances.

The technology includes addressing distances between the operator and the device, and between the device and its effect; it includes the ability to transcend or overcome intervening barriers.

RTAO includes transcending forward barriers of time: setting events in motion which then proceed without further attention or supervision.

RTAO Socioneering is conducted by operators who are at some great distance from that society.

RTAO Stellar Constructs sets into motion events to produce the required result at some remote location, or at some point in the future.

**MATTER TRANSPORT AND TELEPORT**

**Matter Transport 19-20-21** is the ability to move matter from one location to another by converting it to energy, sending it across some distance, and reconverting it to matter.

**Teleportation 25** is the ability to destructively scan an object in one location, transmit the information from that scan to another location, and there use it to recreate the object.

# The Lifespans of Intelligent Species

Sophont species have appeared throughout the galaxy from its earliest eons. Each has (or had) a lifespan during which it rose from savagery, built its civilization, and eventually died out.

The lifespan of a species is defined as the length of time from its earliest achievement of intelligence and technology (Technological Level 0) to its ultimate demise and extinction.

It is possible to determine the past details of a sophont species' rise and to make predictions about its future progress.

## THE LIFESPAN ARC

The lifespan of an intelligent species follows a general pattern of continual progress with occasional pauses or regressions, although individual species may experience many detours and exceptions along the way.

### The Typical Arc

The typical sophont species lifespan begins when the species achieves Tech Level 0.

The species spends some number of generations at each succeeding Tech Level. Generally, the time spent in higher Tech Levels becomes shorter and shorter.

Circumstances unique to the species may alter its progress with pauses, regressions, and shift to faster or slower progression tracks.

Ultimately, the species tops out at the maximum ordinary Tech Level (TL 21) and begins the process of approaching the TL Z singularity and that associated fundamental change in the species.

**Exceptions: The TL Cap.** A sophont species may have a TL Cap: an intrinsic upper limit on its Tech Level. A species with a TL Cap which reaches this limit begins a Long Plateau without significant advancement. Others may reach some point less than maximum ordinary and ultimately decline back to primitive levels.

### Three TL Progress Tracks

A sophont species follows one of three advancement tracks:

**Lethargic.** The species' progress through the Tech Levels is extremely slow; its lifespan is millions of years.

**Average.** The species' progress upward through the Tech Levels is average; its lifespan is on the order of hundreds of thousands of years.

**Fast.** The species' progress through the Tech Levels is extremely rapid, with a lifespan on the order of tens of thousands of years.

## GENERATIONS

The time a sophont species spends at each Tech Level is measured in generations.

**The Length of a Generation.** A single generation is the time required for a newborn individual to reach maturity and

produce children. The period equals the species' Life Stages 0+1+2+3+4. For Humans, a generation equals 20 years.

The Sophont Species Lifespan Table indicates the base time spent at each Tech Level for each of the three progress tracks (Lethargic, Average, and Fast), showing the base number of generations (multiply by 1D).

For example, the Table shows a Lethargic species will spend Base Generations = 1,000 at TL 4 (multiply by 1D); the species will spend as little as 1,000 generations, and as much as 6,000 generations (or more) at this TL. A Fast species will spend as much as 6 generations and as little as 1 generation at TL 4.

## BUMPS ALONG THE WAY

A sophont species may encounter exceptions to otherwise straightforward progress. For example, a species may experience a pause because of a natural resource shortfall or a natural calamity, or a regression because of cultural, religious, or social beliefs. War may be an explanation for technological increases, but it can equally explain shifts in the rate of technological progress.

**Process:** If the Generations die roll = 6, the species passes six times Base Generations in the era and, at the end of that period, consult the Progression Events table and implement the event.

**Pause.** The species may pause for a greater than normal time at a specific Tech Level. Roll 1D for the number of additional generations spent at this TL.

**Regression.** The species may regress temporarily. At the end of the period, the species TL is reduced by 1D. Normal advances occur thereafter.

**Shift To Lethargic/ Average/ Fast.** The species shifts from its current TL Progress Track to the specified Track. If the specified Track is the current Track, there is no change.

## TL PROGRESSION EVENTS TABLE

1D	Progression Event	
1	Pause	Pass 1D Generations at TL.
2	Regression	Reduce TL 1D and continue.
3	Shift to Lethargic	Future changes = Lethargic.
4	Shift to Average	Future changes = Average.
5	Shift to Fast	Future changes = Fast.
6	Decline	Future changes = TL reductions

The species continues on the new track until another Shift occurs.

**Decline.** The species has peaked in its upward progress in TL and future changes are declines to lower TLs.

If a species already in Decline achieves this result again, it changes direction and begins to again progress upward.

A species in Decline which reaches TL 0 dies out and becomes extinct.

### THE LONG PLATEAU

If the sophont species has a Technological Level Cap (imposed in the process of Sophont Creation), it stops advancing when it reached the TL of the cap.

A species which has stopped advancing is in a static period called the Long Plateau.

There are interesting effects by reason of a TL Cap. The society becomes convinced that there is no further technological progress possible: it creates theories and rationalizations justifying and confirming that no additional progress is possible. The occasional visionaries are condemned as dreamers or irrational. Society itself turns its attention to other matters: social and psychological theories; life in balance with the environment; expansion in territory; a broad spectrum of entertainments.

As long as the society does not encounter higher technological levels, there will be nothing to shake its firm conviction that no higher technological levels exist or are possible.

After 1D \* 100 \* TL Generations, roll 1D on the Long Plateau Events table for an Event. If that TL Cap is not removed, continue this cycle.

### Occasional Variations

A sophont species in a Long Plateau may experience Regression, Decline, Crisis, or a New Awakening. After 1D \* 100 \* track Generations at current TL, roll on the Long Plateau Variations table.

**New Awakening.** The species becomes revitalized, undergoes a period of social upheaval, and sheds its TL Cap. Future progress is ordinary; the Long Plateau is over.

**Regression.** The species is reduced 1D Tech Levels. It then progresses normally (still subject to its TL Cap).

**Decline.** The Long Plateau ends; future changes in TL are negative. It is possible for later results to again reinstate advances in TL. The TL Cap is removed.

**Crisis.** The species experiences a culture shattering crisis similar to the TL Singularity Crisis. Consult the Singularity table, with all its results, but substituting Extinction for Ascent to a Higher Plane.

### Assumes No External Contamination

The Rate of Technological Advance Chart assumes the sophont species has not encountered any higher technology. The results are unreliable or inapplicable for cultures exposed to outside forces with higher tech levels.

**Encountering Outside Technology.** If there are encounters with higher technology, the sophont species can reasonably be expected to advance to the encountered Tech Level minus 1D within a generation, and to the encountered TL minus 1 within two generations.

**TL Cap Remains.** Nevertheless, the society cannot surpass the encountered Tech Level; its TL Cap remains in place, and when the outside technology is removed, local TL Regresses until it is at or under the TL Cap.

### The Long Plateau Ends

If the TL Cap is removed, then the Long Plateau ends.

### THE TINROA

The Tinroa (Generation= 20 years; Pace= Lethargic) advanced lethargically until they reached TL 10 (average 1D 3.5 = 114,500 Generations = 8 million years).

**Regression.** The Tinroa experienced a Regression. Instead of advancing to TL 11, they retreated to TL 8 (=1D x Track Generations = 3 x 100 = 300 Generations = 6,000 years at TL 8).

**Shift to Fast Track.** The Tinroa shifted to the Fast Track. They rapidly progressed (at an average of 3.5 Generations per TL) through TLs 9 to 33 (through TLs 10-11-12-13-14-15 (twenty-four TLs at 3.5 Generations each = 84 Generations = 1680 years).

After a little more than 8 million years (and only a tiny fraction at high TLs), the Tinroa reached the Technological Singularity and disappeared as a sophont species. Archaeological evidence of their civilization is found on a few worlds just beyond the Imperial border in Foreven sector.

### WHY CALCULATE SPECIES LIFESPAN?

The Information in this chapter can be used in at least two ways...

**Calculate Probable Current Age Of The Society.** The time since TL0 for any current society can be estimated based on its rate, current TL, and the average die roll of 3.5. The Probable Age of a society is provided on the Probable Age Table. Age is shown in Generations; multiply by Generation Years for a value in years.

**Calculate Actual Current Age of the Society.** A more complex calculation using die rolls and the complete procedures reveals the actual age of a society. The mismatch between its probable and actual age may show complexities in its history.

**Calculate the Total Lifespan of an Extinct Society.** The complex calculation with die rolls and complete procedures provides the total lifespan of an extinct species.

### LONG PLATEAU EVENTS TABLE

1D Long Plateau Events	
1	New Awakening* Long Plateau ends.
2	Regression TL reduced 1D.
3	Regression TL reduced 1D
4	Decline* Future changes = TL reductions.
5	Decline* Future changes = TL reductions.
6	Crisis Singularity.

\* TL Cap removed. Long Plateau ends.



# Species Life Span

## RATE OF TECHNOLOGICAL ADVANCE

Lethargic	Average	Fast	Era	TL	
10,000	1,000	100	Primitive Stone Age	0	Vlow Tech
10,000	1,000	100	Bronze Age 3500 BC	1	
1,000	100	10	Age Of Sail 1500 AD	2	Vlow Tech
1,000	100	10	Industrialization 1700 AD	3	
100	10	1	Mechanization 1900 AD	4	Low Tech
100	10	1	1930 AD	5	
100	10	1	Nuclear Age 1950 AD	6	Low Tech
100	10	1	1975 AD	7	
100	10	1	2000 AD	8	Mid Tech
100	10	1	2050 AD	9	
100	10	1	2100 AD	10	High Tech
100	10	1	Imperial Circa Year 0	11	
100	10	1		12	High Tech
100	10	1	Imperial Circa 550	13	
100	10	1		14	Vhigh Tech
100	10	1	Imperial Circa 1107	15	
100	10	1	Darrian Maximum	16	Xhigh Tech
100	10	1		17	
100	10	1		18	Xhigh Tech
100	10	1	The Far Far Future	19	
100	10	1		20	High Tech
100	10	1		21	
80	8	1		22-23-24	
60	6	1		25-26-26	
40	4	1		28-29-30	
20	2	1		31-32	
10	1	1		33	

Intelligent species discover technology and advance through the successive Tech Levels at rates determined by genetic, environmental, and cultural factors.

## THE SPECIES LIFESPAN CALCULATION PROCESS

Calculate the Lifespan of an intelligent species in Generations.

**Generations:** A Generation equals the sum of a sophont's Life Stages 0+1+2+3+4 (in years). For Humans, one generation is 2+4+4+4+4 = 20 years.

**Pace:** A sophont species is initially identified as Lethargic, Average, or Fast. This pace remains until an event changes it.

**Species Life Span.** The table column heading

for the species' Pace shows Base Generations. The species spends total Generations= Base Generations times 1D at each Tech Level.

**Progression Events.** There may be interesting and future-shaping events during the course of the Species Life Span.

If the Generations die roll = 6, the species passes six times Base Generations in the era and, at the end of that period, consult the Progression Events table and implement the event.

## THE PACE OF TECHNOLOGY

1D	Initial Lifespan Pace
1	Lethargic
2	Lethargic
3	Average
4	Average
5	Fast
6	Fast

Roll once to begin the process.

## TL PROGRESSION EVENTS TABLE

1D	Progression Event
1	Pause Pass 1D Generations at TL.
2	Regression Reduce TL 1D and continue.
3	Shift to Lethargic Future changes = Lethargic.
4	Shift to Average Future changes = Average.
5	Shift to Fast Future changes = Fast.
6	Decline Future changes = TL reductions

## THE TECH LEVEL CAP

A sophont species may have a TL Cap: an intrinsic upper limit on its Tech Level. A species which reaches its TL Cap begins a Long Plateau without significant advancement.

After 1D \* 100 \* TL Generations, roll 1D on the Long Plateau Events table for an Event.

If that TL Cap is not removed, continue this cycle.

## LONG PLATEAU EVENTS TABLE

1D	Long Plateau Events
1	New Awakening* Long Plateau ends.
2	Regression TL reduced 1D.
3	Regression TL reduced 1D
4	Decline* Future changes = TL reductions.
5	Decline* Future changes = TL reductions.
6	Crisis Singularity.

\* TL Cap removed. Long Plateau ends.

Imagine a species (Generation= 20 years) Tech Level Capped at 12, spending perhaps 1D= 3 \* 100 \* 12 \* 20 = 72,000. 140,000, 400,000 years at the same Tech Level, convinced that any increase is impossible: that there is no higher TL possible.

## INTERSTELLAR COMMUNITY TECHNOLOGY LEVELS

For interstellar organizations, two general questions arise:

### What is its Average Tech Level?

Interstellar Tech Level is the average of the community's [the region's, the sector's] **Important Worlds**. The Tech Levels of other worlds may vary (but are usually lower than Important Worlds).

### What is Maximum Tech Level?

Maximum TL is the highest TL of an Important World with an Industrial trade classification. Some other worlds may have a higher TL, but for the capabilities of the community, they are ignored.

INTERSTELLAR COMMUNITIES			
Definition	Probable Name Includes	Possible Name Includes	
<p><b>System.</b> A territory ruled by a single government; usually applies to a MainWorld and its associated star system. Some are Government: Balkanized or Government: Colony.</p>	Authority Freehold Republic, Greater Republic System Territory	Society, Grand Society Theocracy Monarchy, Kingdom, Principality Nation, State Colony	System
<p><b>Confederation.</b> A loose group of Systems (or Federations) operating under an agreement to work together for identified common causes. The governing document defines what the common causes are and how they are handled, and what areas remain the domain of the local systems.</p>	Alliance, Allegiance Coalition Confederation, Confederacy Dependency, Co-Dependency League Members, Membership Pact	Assembly, Assemblage Association, Associated Confederate Disjuncture, Disjunction Independency Members, Membership Manifesto, Manifest	Confederation
<p><b>Hegemony.</b> A group of states informally dominated (economically, culturally, militarily) by more powerful leader states. Some hegemonies are dominated by powerful species, cultures, or memes.</p>	Commonality, Commonwealth Hegemony, Hegemon Hierate	Accord, Accordance Co-Dominion, Co-Dominium Concord, Concordate, Concordance People. Populate	Hegemony
<p><b>Federation.</b> A group of Systems with a common central government but independence in internal affairs. Centralized government is responsible for activities affecting all states: diplomacy, defense, universally applicable statements of rights.</p>	Council Federation, Federacy Union, United	Conjuncture, Conjunction Federate Interaction, Interacterate Unitedness, Unification, Unity Interdependency	Federation.
<p><b>Empire.</b> A group of states (or groups of states) united under, and declaring allegiance to, a single supreme authority. Empires typically involve local declarations of allegiance in return for economic, diplomatic, or defense benefits.</p>	Domain, Dominion, Dominium Empire, Imperium Hierarchy Supremacy	Consulate Imperio, Diguo Protectorate, Protectionate	Empire
<p><b>Not Generally Defined.</b> Some states defy strict definition: exceptions to the general classification scheme.</p>	Concept, Mission, Meme Group, Combine, Conglomerate Stronghold, Bastion, Redoubt Regency	Fist, Arm, Wing, Limb, Sword Glory, Triumph, Honor, Splendor, Exalt Pentarchy, Quadarchy, Quintarchy Squadron, Fleet, Army, Vanguard Camorra	Not Defined

### STANDARD BUSY OR RURAL?

Communities are further defined as Busy, Standard, or Rural.

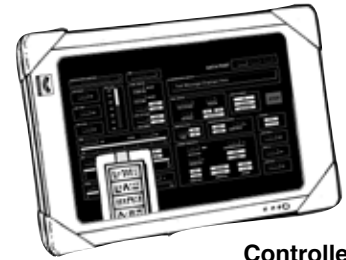
**Busy Empire/Community** has heavy intersystem traffic and most worlds can expect to be visited regularly.

**Standard** is the rules-driven, table-driven level of ship traffic.

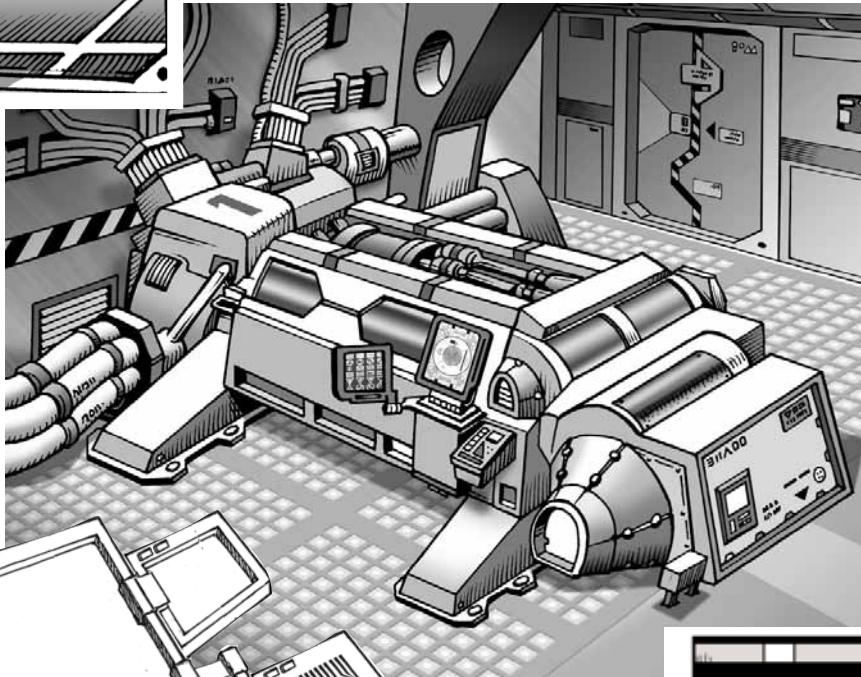
**Rural Empire/Community** has relatively low ship traffic for all most important worlds.



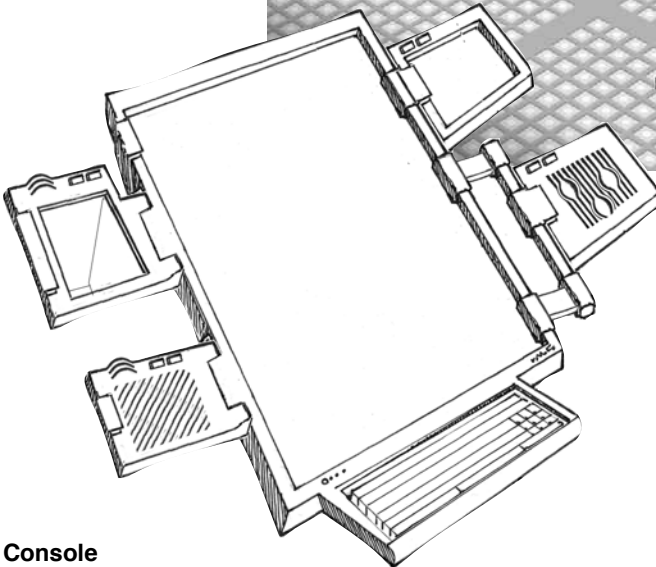
**Mainframe**  
the primary Computer  
on the ship.



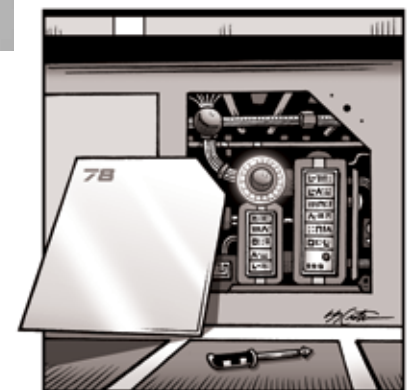
**Controller**  
a portable,  
less-powerful, console.



**Mechanism**  
the device  
or function  
on-board ship  
which is being  
controlled.



**Console**  
a crew workstation coupled with a mechanism or function.



**Control Panel / Data Port**  
the basic connection interface  
to a drive or device

# Computers, Consoles, and Controllers

The computing power that controls starships (and that can also control vehicles, factories, installations, even homes and communities) is essential to any technological society.

Computers, calculating devices, and information processors have always assisted individuals in their efforts to find answers and to avoid tedium. As technology increases, computers take over greater and greater responsibilities in society: they are the control and governing systems for most modern devices. Computers and calculating devices have always assisted individuals in their efforts to find answers and to avoid tedium. Consoles are small computers that serve two basic functions: They provide information to users, and they automate activities. Consoles are distributed throughout a ship or installation, each associated with one or more mechanisms or functions. In addition, they are networked together and with the primary ship's computer.

**Computers** are mainframes: large devices with great computing power.

**Consoles** are individual user interfaces with ergonomic accommodation for the user.

**Controllers** are small portable computers carried by individuals.

**Control Panels** are local access points to various mechanisms.

**Brains** are added independent intelligence processing units which increase the initiative of consoles and computers.

Taken together, the mix of computers, consoles, controllers, and brains makes most ships capable of routine operations with a minimum of direct control by users.

## THE HIERARCHY OF COMPUTERS

Computers are produced in three general sizes (equivalent to Large, Medium, and Small).

### Mainframes

**Large** Computers are **Mainframes** with great processing power. They are generally too large to be moved once installed. Mainframes control the operations of industry, commerce, retail, and bureaucracies.

**Ship's Computers** are a form of Mainframes: they are the central automated information and data processor for a starship.

### Consoles

**Medium** Computers are **Consoles**, commonly installed and available throughout technological societies. A Console is the equivalent of a desktop computer (although at higher tech levels vastly more powerful). With associated input and output devices and supporting power supplies, data storage units, and backups, many consoles are the equivalent of a desk or large acceleration couch. Consoles may be

**Control Consoles** with specialized analog input and output to direct vehicles or weapons, or pilot starships or small craft.

**Operating Consoles** for normal control of devices and mechanisms, or

**Workstations** for access to and manipulation of data.

### Controllers

**Small** Computers are portable Controllers; equivalent devices range from notebook, laptop, or tablet computers, to smartphones, to device remotes.

## Control Panels and Data Ports

Control Panels (which are not computers) are the interface between various control systems and specific devices or drives. They are present on almost all sophisticated devices: a set of controlling knobs, switches, buttons, and readouts that convey basic (and often raw) data to the user and allow him to make complex adjustments. Working directly with a Control Panel is an Impossible Task (figurati).

A Data Port is a truly basic Control Panel: nothing more than a connection port which can feed to a controller, console, or computer.

Computers, Consoles, and Controllers connect to the Control Panel to make the operation of devices easier and more efficient.

## THE PRINCIPLES OF COMPUTERS

The individual who operates a computer is the **User**. Users are typically Sophonts (some exceptions allow computers to interact with devices).

The **Computer** is an information processor: a set of circuits which accepts **Input**, manipulates it, and produces **Output** according to some set of **Programming** instructions. Output provides information to the **User** and controlling instructions to one or more mechanisms.

The User and the device interact through an **Interface**: a set of controls which allow the User to receive information and to exert control.

## The Underlying Physical Principles

Computers are based on a variety of physical principles (usually both transparent to and unimportant to the User).

An **Electronic** device manipulates electrons (electricity)



within circuitry. Most devices are by default electronic.

Electronic devices are relatively small, sturdy, and resistant to most environmental issues. They are vulnerable to EMP.

A **Photonic** device (or a Fiber Optic device) manipulates photons (light) in light channel circuits. Photonic devices are resistant to EMP Effects, have lower power requirements, and have reduced waste heat output when compared to Electronic devices.

A **Fluidic** device manipulates fluids (liquids or gases) flowing in channels. Fluidic computers are resistant to EMP Effects, have lower power requirements, and have reduced waste heat output when compared to Electronic devices. They are sensitive to temperature variations.

A **Mechanical** device uses simple physical interactions (clockwork gears, cams, levers, and springs) to manipulate data and produce output.

A **Positronic** device uses the flow of positrons (anti-electrons) within the random structure of specially prepared metal sponges to process input. Positronic devices are holographic and adaptable to new circumstances.

### Programming

All computers use a structure of logical programming steps to accomplish their intended activity. For practical game reasons, Programming can be a Characteristic, Skill, or Knowledge, or some combination of the three.

**Consoles and Controllers are Task Enablers:** with a player character User in control, they **enable** a user to more effectively attempt tasks.

The Programming for a Console can accept some or all of a Character's C+S+K, augment or enhance it, and **enable** the resolution of a task.

**Mainframes are Task Resolvers:** they resolve tasks by themselves, either operating independently, or as directed by a User.

The Programming for a Mainframe can substitute for the abilities of a Character and **resolve** tasks.

A Mainframe has C+S+K equal to its design Tech Level. It may operate as directed by users, or it may function independently.

### Computer and Console Intelligence

Computers are powerful processors of information and most give the impression of great intelligence. Depending on their power (which is a function of Tech Level), they are capable problem solvers and task resolvers.

Most computers above TL-9 present some appearance of Intelligence (or of Computer Intelligence). This appearance of intelligence is accomplished in three different ways:

**Powerful Programming.** The computer has extensive coded instructions which present an appearance of intelligence and responsiveness. It responds well to scripted or controlled circumstances.

**Semi-Organic Brains.** The computer is controlled by a non-sophont organic brain supplemented by circuitry. The brain provides the native free will that controls its actions.

Extensive geneering and training adapt the semi-organic brain for its particular function.

**Sophont Brains.** The computer is controlled by a sophont brain integrated into the computer. The brain may be a clone of a talented sophont (with or without the associated original memories), or a brain removed from a damaged, unreparable, or aged body.

Because of various ethical dilemmas, sophont brains are rarely installed in computers or consoles.

**True Artificial Intelligence.** The computer is controlled by a self-aware structure of coded instructions with origins in programming, an organic personality, or some other source.

### Connections

Any Console or Controller can be physically or wirelessly connected to a mechanism (a drive, a turret, a sensor).

A **Direct** connection couples the Console or Controller to the Control Panel of the Mechanism (or to the Network). An appropriate cable provides the connection, translating photonic, fluidic, or electronic signals as necessary for the controlled mechanism.

A Wireless connection allows the Controller or Console to interact with the Data Port across a physical separation.

**Wireless Electronic Connections WEC** use radio frequencies to bridge the physical separation. WEC can be disrupted by EMP.

**Wireless Gravitic Connections WGC** use gravitic effects to bridge the separation. WGC can be disrupted by the presence of gravitic devices.

**Wireless Magnetic Connections WMG** use magnetic effects to bridge the separation. WMC can be disrupted by the presence of metals, electrical devices, and EMP.

### DATA PORTS AND CONTROL PANELS

The foundation of computer control is the Data Port and the Control Panel.

#### Control Panel

Many mechanisms have Control Panels through which they accept basic input.

A Control Panel has basic knobs, switches, and rudimentary readouts. A Control Panel imposes no additional space or tonnage requirements on the mechanism.

A Control Panel allows only rudimentary control of the mechanism (and used at +3 levels of difficulty: an Easy 1D task becomes Formidable 4D).

A Control Panel usually includes a Data Port.

For example, 200-ton Free Trader Beowulf is equipped with a Jump Drive: a 15-ton industrial mechanism with high power needs and requiring close management by a crew member. The Jump Drive has a Control Panel with basic input and readout capability. The panel, however, is not suited to actually controlling the mechanism.

#### Data Port

Nearly all technological mechanisms have a Data Port which allows a controller to be attached.

A Data Port imposes no additional space or tonnage requirements on the mechanism. A Data Port by itself cannot be used to control a mechanism; it is a connection between the mechanism and some sort of sophisticated controller.

The Data Port is a physical interface for a connecting cable; it may include a wireless connection.

## CONTROLLERS

A Controller (or Hand or Manipulator Controller) is a portable device capable of interfacing with a mechanism and operating or controlling it. It includes basic displays to show status and operation, and operating controls to provide input. The Controller lacks specialized features of the more sophisticated Control Console or Operating Console, and is thus harder to use.

Controllers allow a user to move about the ship while still observing mechanism operation and providing input and adjustment. They also allow on-site interaction and diagnostics when repairing and refitting.

A Hand Controller is like a smartphone, a remote, a tablet, or a notebook computer.

On board the *Beowulf*, its drive room crew moves about monitoring the operation of its mechanisms. The Engineer carries a Controller which allows her to monitor the outputs and power consumption of the Jump Drive. Some minor faults or glitches can be managed with a simple instruction from the Controller; others will require moving to the Console.

## CONSOLES

Consoles are identified by their function: Control, Operating, and General.

A Console is a workstation coupled with an ergonomic accommodation for the User (usually some sort of seating). The Console is related to the size of the User; while its computing processors may be quite small, the Console must be large enough to display data to, and accept input from the user. On deck or floor plans, a Console usually occupies one deck square.

A Console is permanently installed in place. It cannot be moved to other locations.

### General Console

A **General Console** or **Workstation** allows the user to interact with data for common administrative purposes. The Computer provides access to common office activities: language use, math, communications, information, and entertainment.

In businesses, the General Console is called a Workstation; public installations are often called Data Stations.

The Free Trader *Beowulf* has a General Console for use by the Steward. It is used for accounting, cargo management, and even entertainment services.

### Operating Console

An **Operating Console** allows the user to monitor the activities of a mechanism and to make adjustments to its operation, although not in real time. Operating Consoles are best adapted to mechanisms which operate continuously, and whose operation must be adjusted for efficiency or for changed circumstances.

An Operating Console is attached to the power plant or jump drive on a ship, or sensors. Free Trader *Beowulf* has

several dedicated Operating Consoles, including one for the Jump Drive, the Power Plant, and turrets.

### Control Console

A **Control Console** allows specialized input to the Computer. It is specifically adapted to the mechanisms being controlled and allows real time responses. It may have a joystick, steering wheel, or tiller to convert fine hand or manipulator motions to control signals. It may have foot or ped controls to allow additional simultaneous input.

A Control Console is attached to a weapons turret, the pilot function on a ship, or the driver function for a vehicle.

*Beowulf* has a Control Console on the Bridge; its analog controls allow the pilot to fly (steer) the ship as needed.

## MAINFRAMES

Mainframes are large computers with considerable processing and computing power. Their components may be concealed behind panels or bulkheads for security and efficient use of space. The Mainframe operates as a mechanism and is typically controlled or accessed through a Console.

**Mainframe Models.** Mainframes are produced in a series of Models (from 1 through 9 and sometimes higher) identifying their general size and capacity.

The mainframe Model reflects its size in equivalent Console computing power. A Model/1 is equivalent to one Console; a Model/9 is equivalent to nine Consoles.

Free Trader *Beowulf* has a Mainframe Model/2bis computer. The size of a small compartment, it works behind the scenes, connecting to various Consoles for actual access or operation. When necessary, a user can enter the computer compartment for maintenance or direct access.

## AN OVERVIEW

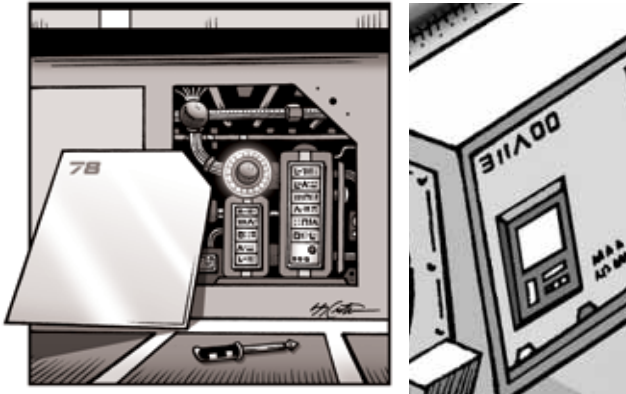
A Console is a **Task Enabler**. It can resolve a task with an undifferentiated  $C+S=TL$ , but it needs a crew person to make the decision and give the execution command. If that crew member has  $C+S$  greater than the Console, then the task can be resolved using his (or her, or its) his own  $C+S$ . The crew member cannot add only skill, or only characteristic; he contributes his complete  $C+S$ .

A Console with a Brain installed can operate independently, the Brain substituting for the Crew person.

A Computer is a **Task Resolver**. It can resolve a Task itself with  $C+S=TL$  and without the intervention or supervision of a crew member. The computer expresses itself through consoles. It can apply its own  $C+S$  (if higher than a console) to a console. It can serve as the crew person to make the decision for a console. The computer can provide this supervision to consoles equal to its Model Number (bis models add 1 to the Model Number).

A computer, like a console, can be equipped with a brain to provide it with independent decision capability.

## CONTROL PANELS



### HOW CONTROL PANELS FUNCTION

In terms of User interaction, Control Panels and Data Ports have very little function.

A Data Port is little more than a connection: User interaction is limited to connecting a cable or wireless repeater to associate it with a controller or console.

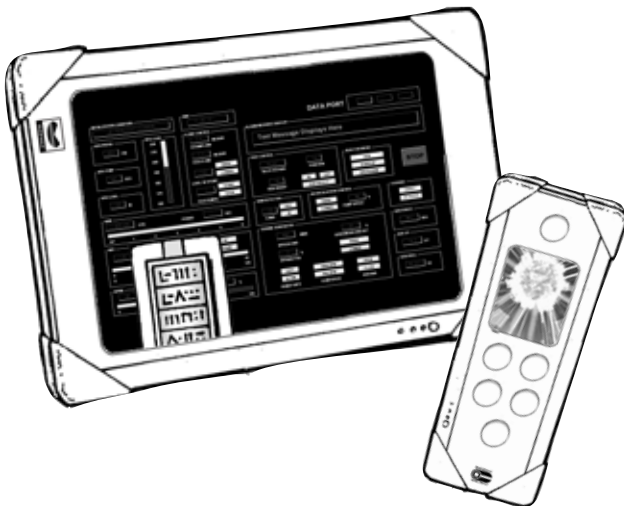
A Control Panel is primarily a diagnostic interface. The User connects it to a console which then allows some degree of control.

### HOW CONTROLLERS FUNCTION

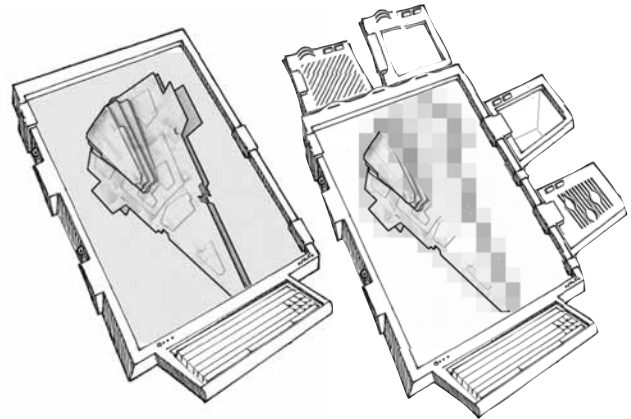
Controllers provide an interface which allows the User to view device information and input basic instructions. Theoretically, a Controller can provide as much direction as a Console, but in practical terms any activity beyond basic instruction is tedious and error-prone.

Nevertheless, controllers provide the users the ability to move around the ship and issue basic commands without being confined to a console. Pre-programmed or standard instructions can be issued with a touch, and basic problems can be reviewed without racing to a console.

## PORTABLE CONTROLLERS



## CONSOLES



### HOW CONSOLES FUNCTION

Consoles provide feedback-governed direction to mechanisms. Without such control, the mechanism cannot function (or it functions only minimally).

**Routine Processes.** A Console can govern routine processes without the intervention of a User. The Computer or Console performs its routine functions continuously, without direction from Users, and without Users generally being aware of the activity. Life Support mechanisms provide life support without being noticed by users; the Power Plant provides electricity without any effort by Users.

**Self-Directed.** Within the limits of its abilities, the Console adapts to circumstances. It adjusts environmental conditions within a ship in response to changes; it turns off lights when a compartment has no occupants; it seals compartments in the event of a breach; it alerts users and other Consoles when emergencies occur.

On the other hand, Consoles cannot show initiative: anything beyond routine operations are exceptions and require the intervention of a User.

### Resolving Exceptions

A Console is a **Task Enabler**. When presented with a task, the Console can enable the task using its inherent Characteristic, Skill, and Knowledge (=TL), but the user is required to give the final instruction.

**User Override.** A User can override the operation of a Controller with his C+S+K if it exceeds the TL of the console.

For example, Eneri Dinsha 77777 Engineer-2 Jump-Knowledge-2 can apply  $7+2+2=11$  to operation of the Jump Drive on a ship. On a primitive TL-9 trader, Eneri can resolve tasks through the console and override it with his C+S+K. On an advanced TL-14 cruiser, the console is significantly better than he is and he should be content to look at the console's results and touch the Execute panel every so often.

The task resolution function is consulted in response to exceptions: unusual or unexpected situations, choices between seemingly equal fact sets, or unclear situations that lie beyond the capabilities of the mechanism and the Console.

**Controllers.** Portable Controllers are less-capable versions of Consoles. They enable the same tasks but at two levels of difficulty higher.

## HOW MAINFRAMES FUNCTION

Mainframes are powerful (and potentially independent) processors with central data banks and reference libraries and access to sensors and inputs throughout the ship or installation. They monitor the activities of the various consoles and their mechanisms.

A Mainframe operates (subject to high level direction) without requiring an intervening User.

### The Power To Resolve Tasks

A Mainframe is a **Task Resolver**. It can resolve a variety of assigned tasks without the intervention of a user.

Presented with a task (through prior prioritization or instructions), a Mainframe may resolve a task using its TL (which represents the sum of its available C+S+K).

The mainframe resolves tasks through consoles, substituting its C+S+K for that of the console. It may simultaneously resolve tasks (through distinct consoles) equal to its model number. The mainframe may also resolve the same task through several consoles and select the best outcome.

### The Power To Supplement Consoles

The mainframe as a ship's computer can supplement or augment the operations of individual consoles.

A Ship's Computer can substitute its C+S+K (= TL) to any task being enabled by a Console. Model Number is the number of Consoles which may be supplemented at one time (a Model/2 may supplement two Consoles at one time). Bis model computers add one to their capability.

## Programs

Programs for computers and consoles allow them to exercise control over mechanisms and processes.

Any Skill, Characteristic, or Knowledge may be a Program. Computers associated with a specific mechanism are equipped with the specific Programs they need to properly enable or resolve tasks.

## MAINFRAME



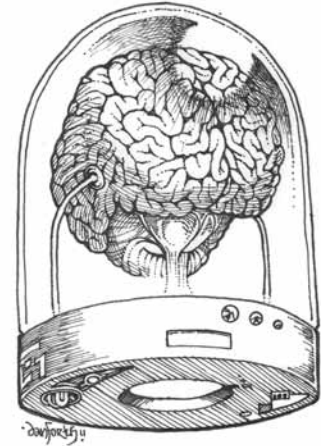
For example, a crew member attempting an Astrogation task normally requires Astrogation skill. A console being used for Astrogation has within it a program called Astrogation, allowing the crew person to supervise the task without actually having the skill. A crew member actually having Astrogator skill is more likely to notice if the output is obviously wrong.

## HOW BRAINS FUNCTION

Ordinary control processes on board ships (and elsewhere) envision control consoles which are controlled, supervised, or managed by people.

A Console has a base ability which may exceed the abilities of its operator, but the operator nevertheless provides direction and makes choices.

### ORGANIC BRAIN



### Brain-Controlled Consoles

A brain installed in a console or computer is the equivalent of a user or operator. The brain substitutes its C+S+K for the Console's TL. The console or computer becomes able to function with its native C+S+K and independent of an external user.

Such consoles are self-aware, well-trained, and fully-equipped to control their assigned functions.

### Brains For Consoles

An appropriate brain is selected for the console. The choices are the same as for robots. One difference is that the Brain has no requirement for senses, limbs, or a body; all input and output is channelled through the Console.

**Organic Brain.** A living brain is harvested from a sophont and installed in the console.

**Organic Clone Brain.** A living brain is created through cloning from a sophont.

**Semi-Organic Clone Brain.** A living brain is created through cloning from an animal (that is, a non-sophont). In association with extensive development, training, and geneering, the brain has intelligent abilities which approach those of a sophont.

**Electronic (or Photonic or Fluidic) Brain.** A structure of electronic (less often fluidic or photonic) circuits operate as a logical data processor.

**Positronic.** A structure of iridium sponge contains a raw pattern of possible neural pathways which are developed through use by a flow of positrons. The result is a holographic intelligence pattern within the brain.



## CONSOLES, CONTROLLERS, COMPUTERS, AND BRAINS

A **Console** enables a Task when supervised by a User provided the Console will accept input of User C. The Task is resolved with the User C+S+K; if Console TL is greater than C+S+K, use TL instead.

A **Controller** (connected to a Console) allows the Task at one level of Difficulty higher.

A **User** can attempt a Task through a Control Panel (but the attempt is Impossible).

A **Computer** resolves a Task (without a User) through a Console. Model Number is the number of simultaneous Tasks (Consoles) it may resolve.

A **Brain** is a permanently installed User-replacement in a Console.

### COMPUTERS

Model/ Stage	Model	TL	MCr	Tonnage	Computer Notes	
0	Model/0	8	0.1	Console	<b>Model.</b> Computer Model name.	
1	Model/1	9	1.5	1	(bis = second or enhanced).	
1b	Model/1 bis	9	3.0	1	<b>TL.</b> Tech level of the computer.	
2	Model/2	10	5.0	2	<b>KCr.</b> Computer cost.	
2b	Model/2 bis	10	7.5	2	<b>Tonnage.</b> Ship tons required for the computer.	
3	Model/3	11	10.5	3	<b>Console=</b> 0.5 tons; one deck square.	
3b	Model/3 bis	11	14	3		
4	Model/4	12	18	4		
5	Model/5	13	27	5	Computers are identified by Model	
6	Model/6	14	39	6	Number (expressed as Cells, or Con-	
7	Model/7	15	52	7	sole Equivalents). Model/0 is little more	
8	Model/8	16	68	8	than a centralized server; a Model/5 is	
9	Model/9	17	85	9	five Console-Equivalents. Bis indicates	
fib	Fiber Optic	fib	+1	x 1.5	x 2	enhanced capability (adds 1 Cell).
phot	Photonic	phot	+3	/ 2		Tons= Model Number.
flu	Fluidic	flu	+4	x 2	x 2	Cells= Model Number.
mech	Mechanical	mech				Base TL= Model Number + 8
pos	Positronic	pos				"Bis" adds +1 Cell.
C	Control Console		9	0.2	Console	C+S= TL.
O	Operating Console		8	0.1	Console	MCr= Model * (Model+.5).
W	Workstation		7	0.05	Console	Install one or more Ship's Computers
H	Controller		8	0.05		to support the console network.
P	Control Panel		5			
D	Data Port		5			

### CONSOLES AND CONTROLLERS

Unit	Function	C=	S=	K=	Comment	Difficulty
User	Task Resolver	Native	Native	Native	any Sophont	Computer
Task Resolver	Use C+S+K= TL	User	Not	Required.		Standard
Console	Task Enabler	Use C+S+K= TL			User Required. User provides C+S+K.	Standard
Control		(allows user input of C1 C2 C3 C4 C5))				Standard
Operating		(allows user input of C4 C5)				Standard
General		(allows user input of C4 C5)				Standard
Controller	Task Enabler	Use C+S+K= TL.			Increased Difficulty. Portable.	+2 Levels
Control Panel	Data Access				Attached to mechanism.	+3 Levels
Brain	User Replacement	Native	Native	Native	Eliminates need for User at Console.	
		(converts all input requirements to C4 C5)				

Difficulty reflects the difficulty a crew member experiences using the controls shown. Otherwise, the mechanism's controls resolve the task normally.

For example, a Control Console TL9 has the equivalent of C+S=9. C=5 S=4. An Improved Control Console TL9 built at TL10 operates with C=5 S=4 +1.



### TECH LEVEL STAGE EFFECTS

TL	Stage	TL	Cost	Mod	Q	R	E	B	S	Comments
Exp	Experimental	-3	x10	-3	Q	-2	-3	+3	-3	One of a kind. Lesser capabilities. Much heavier. High cost.
Pro	Prototype	-2	x5	-2	Q	-2	-2	+2	-2	Rare. Lesser capabilities. Heavier and more costly.
Ear	Early	-1	x2	-1	Q		-1	+1	-1	Primitive. Heavy. Costly.
Std	Standard	0	x1	0	Q					Typical of available models.
Bas	Basic	0	/2	0	Q		-1	+1		Heavier, but cheaper, than Standard.
Alt	Alternate	0	x1	0	Q	F	F	F	F	Different capabilities.
Imp	Improved	+1	x1	+1	Q	+1	+1	-1	+1	Some improved capabilities. Greater Ease of Use.
Gen	Generic	+1	/2	0	5	0	0	0	0	Cheaper than (but near identical to) Standard.
Mod	Modified	+2	/2	+2	Q	+2	+2	-2	+2	Includes changed to positively affect performance.
Adv	Advanced	+3	x2	+3	Q	+3	+3	-3	+3	Lighter, added capabilities. More costly.
Ult	Ultimate	+4	x3	+4	Q	+4	+4	-4	+4	Lighter, most effective. More costly.

F= Flux (the value may vary depending on the manufacturer). Q= Quality = 2D-2..

Consoles are identified by Tech Level, and subject to Tech Level Stage Effects. Some devices (specifically Consoles and Controllers) are continually redeveloped at each new Tech Level: for example, Console-9, Console-15. Each individual device is affected independently by Tech Level Stage Effects.

For example, Control Console-9 uses TL-9 to compute its C+S=9.

Early Control Console-9 still computes its C+S=9 based on TL-9, but is built at TL-8. It is subject to Mod -1, costs twice as much, has EOU -1, Bulk +1 (requires +1 deck squares), and has Safety -1; compared to Console-8, its advantage is C+S=9 versus C+S=8.

Advanced Control Console-9 still computes its C+S=9 based on TL-9, but is built at TL-12. It is subject to Mod+3, costs the same, is more reliable, has greater EOU, is smaller, and is safer.

**Comparing The Benefits of Consoles.** A wide range of Consoles (and other items) can be built at the same Tech Level. Some factories may build Standard Console-10 with its standard features (primarily C+S= 10); others may have continued to upgrade old technology and produce Ultimate Console-6 with its additional features (still C+S= 10, plus Mod +4, and lighter, most effective, more costly). A research lab may produce Experimental Console-13 (also C+S= 10, and suffering from Mod-3, and very bulky, unreliable, hard-to-use, dangerous, costly).

#### Consoles Which Can Be Built At TL-10

Tech Stage	Console	C+S	Mods	Eas	Ave	Dif	For	Sta	Hop	Imp	Bey
Experimental	Console-13	10	-3	100	58	16	3	-	-	-	-
Prototype	Console-12	10	-2	100	72	26	5	-	-	-	-
Early	Console-11	10	-1	100	83	38	10	2	-	-	-
Standard	Console-10	10	0	100	92	50	16	3	-	-	-
Improved	Console- 9	10	+1	100	97	63	24	6	-	-	-
Generic	Console- 9	10	0	100	97	63	24	6	-	-	-
Modified	Console- 8	10	+2	100	100	74	34	10	2	-	-
Advanced	Console- 7	10	+3	100	100	84	44	15	4	-	-
Ultimate	Console- 6	10	+4	100	100	91	56	22	6	1	-

#### Using Consoles

In the operation of a starship, the Astrogator routinely uses his Console to prepare for, and execute, Jump. Lord Rolling 6789AB Astrogator-2 aboard his customized yacht enjoys doing the Jump calculations himself.

first Die is Uncertain and rolled secretly.

To calculate an interstellar jump-4.  
Formidable ( 4D ) < Int + Astrogator  
Uncertain (1D)

Assume the Uncertain Die is a 6; the worst possible.  
For his Console-15, if the other three dice = 9 or less, then the calculations are successful. If the other three dice = between 10 and 14, the calculations may still be successful, but need to be manually confirmed.

To manually confirm jump-4 calculations (24 hours).  
Staggering ( 5D ) < Edu + Astrogator  
Uncertain (1D).

Lord Rolling could calculate the jump himself C+S=11 and (assuming the Uncertain Die is a 6) must roll 5 or less on 3D; otherwise, he will need to manually confirm his results.

The TL-15 yacht has a Standard Console-15 dedicated to Astrogation, and a Model/7 Computer.

For Lord Rolling C+S=9+2= 11. He basically relies on the Console to run the calculations. The Console-15 includes Astrogator and its C+S=15; it must roll 15 or less on 4D. The

# Personalities and Brains

Every sophont (whether natural or artificial) has a Personality: a unique set of non-corporeal elements that define and empower him independent of his body.

Through most of history, the personality has been integral with the body; never independent of it. Technology makes it possible to free the personality from the body: to record them, edit, enhance, and re-implant them in their original bodies, and even in new bodies.

The basic technology that allows the recording of personalities in turn allows a wide variety of personality manipulations. Recorded personalities can be overlaid on others for a variety of purposes including mindwipes, life insurance, temporary skills, recreational personalities, and other effects.

## THE PERSONALITY

The essence of every self-aware character is his personality. The elements of a Personality are Intelligence, C5 (Education or Training or Instinct), Sanity, a set of Skills and Knowledges and Talents, a set of unique memories, and a sense of self (one's identity). Some personalities have a Social Standing or a Charisma; others have none.

**The Origins of Personality.** For organic beings, Personality develops naturally in the course of life. Artificially receive their personalities when they are created.

**Personalities Are Self-Altering.** An active personality is constantly changing in response to its experiences. A per-

## THE ELEMENTS OF THE ISOLATED PERSONALITY

An Isolated Personality has:

- C4= Intelligence,
- C5= Education or Training or Instinct,
- C6= Social Standing, Charisma, or Caste,
- CS= Sanity,
- CP= Psionics (if the original had Psionics),
- a set of Skills and Knowledges and Talents,
- a set of unique memories,
- a sense of self (of one's identity).

sonality changes every minute, and as recordings age, they increasingly diverge from the current personality or later recordings.

## A Personality Can Be Recorded

Personality Scanners make an editable, reproducible record of a Personality from any sophont. The record preserves the Elements of a Personality in a digital format.

**The Scanner.** Brainscan technology is commonplace and part of modern medical diagnostic practice. Any ship (or other) Autodoc has the ability to perform a brainscan (it takes about an hour).

**Formats.** A recorded personality can be saved as an electronic file. For safekeeping and convenience, the recorded personality file is usually written to a Wafer.

## IPP ISOLATED PERSONALITY PROFILE

The Standard Characteristics		Not Used			Social Standing		
C	C1	C2	C3	C4	C5	C6	
Strength	0	0	0	5	6	7	
Dexterity							
Endurance							
The Analog Characteristics		Not Used			Charisma Caste or		
Str	Dex	End	Int	Edu	Soc		
Strength	Agility or Grace	Vigor or Stamina	Intelligence	Training or Instinct	Charisma Caste or		

## CHARACTERISTICS

Char Abb	Characteristic	H	Description	GP
C1	Str	Strength	H physical power	S
C2	Dex	Dexterity	H hand-eye co-ordination	D
C2	Agi	Agility	A body co-ordination	A
C2	Gra	Grace	A body-limb co-ordination	G
C3	End	Endurance	H resistance to fatigue	E
C3	Sta	Stamina	A long-term task persistence	S
C3	Vig	Vigor	A short-term fatigue resistance	V
C4	Int	Intelligence	H ability to think and reason	I
C5	Edu	Education	H achievement level in school	E
C5	Tra	Training	A based on cultural heritage	T
C5	Ins	Instinct	A based on genetic heritage	I
C6	Soc	Social Standing	H large group hierarchy	S
C6	Cha	Charisma	A small group hierarchy	C
C6	Cas	Caste	A genetic group hierarchy	K
CS	San	Sanity	H mental health and stability	S
CP	Psi	Psionics	H extra-sensory mental power	P

H= Human Characteristic (may be present in non-humans).  
 For a Character to be Human, all Characteristics must be H.  
 A= Analog (non-Human) Characteristic.

### **A Recorded Personality Can Be Edited**

Recorded Personality files can be edited by a skilled operator using specific software (each species requires different editing techniques) and a powerful computer.

**The Editing Process.** Editing alters the Recorded Personality. Editing can easily remove Elements of a Recorded Personality; the process is used for Mindwipes, creating single skill wafers, and even recreational personalities.

Editing can (with some difficulty) add Elements to a Recorded Personality but with an increased risk of insanity.

### **A Recorded Personality Can Be Permanently Implanted Only On the Original or on A Clone Of The Original**

Personality controls the voluntary and self-aware functions of a body; it also controls involuntary body functions. As a consequence, a Recorded Personality can only be permanently implanted on the original brain from which it was recorded, or on a clone of that original brain.

An Implant is permanent (as opposed to an Overlay, which is temporary): the new personality replaces the old personality completely. This process allows:

**Life Insurance.** Implanting the recorded personality of a now dead sophont onto a clone of that original.

**Mindwipe.** Re-Implanting the edited recorded personality of a sophont onto its original brain. The edited personality has been reduced to effectively nothing: all elements of the personality have been removed. The process is reversible: if the original Recorded Personality has been retained, it can be Re-Implanted over the latest Personality implant.

**Selective Mindwipe.** A Recorded Personality can have selected elements removed (Memories, Skills, even Identity) before it is Re-Implanted. Selective Mindwipe can remove specific memories (for therapeutic purposes, as punishment, or to conceal an identity or ability from Psionic probing).

### **A Recorded Personality Can Be Overlaid On The Same Genetic Profile, But It Degrades**

A Recorded Personality can be temporarily overlaid on any individual of the same Genetic Profile.

An Overlay is temporary (an Implant is permanent): the overlay replaces any competing elements while allowing non-competing elements to remain. If the Overlaid Personality contains only Astrogation-9, then all other elements of the individual remain, but he now has Astrogation-9 (if the individual originally had Astrogation-12, that ability is lost).

**Personality Degradation.** Overlaid personality elements are dominant; original elements are suppressed. But, overlaid personalities cannot (for very long) survive the slight variations in genetic structure encountered in non-donor individuals. Each quantified skill degrades at one level per day.

Upon awakening from a sleep period, each quantified skill and characteristic is reduced -1. For example, if the overlaid personality includes Mechanics-3, and Gravitics-2, then upon awakening from the first sleep period, it has Mechanics-2, and Gravitics-1.

The overlaid personality abruptly degrades upon awakening from the seventh sleep period, and the suppressed personality re-emerges.

**The Risk Of Insanity.** There is a risk that the personality will descend into insanity. Upon awakening from a sleep period, Check San. If this roll fails, San is reduced -1.

### **A Recorded Personality Can Be Run On A Computer, But It Degrades.**

A Recorded Personality which includes the Identity element can be run on a computer: the result is a functioning Personality expressing itself in the computer interface.

The overlaid personality is dominant, interposing itself between the operating system and the conversational interface. It may keep its presence secret, or not.

**Overlaid Personalities On Computers Are Unstable.** A Recorded Personality on a Computer dissipates after about a day. The original suppressed computer interface re-emerges over when the overlaid personality dissipates.

### **A Person Can Run His Personality On A Computer, And Monitor Its Activities (But It Degrades).**

A person can establish a feedback loop with his Recorded Personality as it runs on a Computer and monitor its activities. The person feels like he is in the computer.

**Jacking In.** To monitor the activities of a Recorded Personality being run on a Computer, a person establishes a connection between his Wafer Jack and the computer.

When the person disconnects, the Recorded Personality continues in the computer until it dissipates.

### **A Very Few Overlaid Recorded Personalities Do Not Degrade But Instead Become Permanent.**

Occasionally (Epic Fail or Epic Success depending on the circumstance), an Overlaid Personality (on a Person or a Computer System) avoids dissipation and remains in place.

**Undegraded Personalities On People.** If a personality overlaid on a person fails to degrade, it remains in place permanently. The personality of the original person is permanently replaced. But, if the original personality had been recorded, it can itself be re-implanted.

**Undegraded Personalities on Computers.** If a personality overlaid on a Computer fails to degrade, it remains in place permanently as a Rogue Isolated Personality (a Rogue IP). While the original interface for the Computer can be re-run, the Rogue IP remains present in the Computer.

A single skill which fails to degrade becomes permanent; the individual has an added skill. If a complete personality fails to degrade, the personality of the individual is permanently replaced by the overlaid personality.

---

## **THE BASIC RULES OF RECORDED PERSONALITY**

**A Personality Can Be Recorded.**

**A Recorded Personality Can Be Edited.**

**A Recorded Personality Can Be Overlaid On The Same Genetic Profile, But It Degrades.**

**A Recorded Personality Can Be Implanted On the Original or its Clone.**

**A Recorded Personality Can Be Run On A Computer, But It Degrades.**

**A Person Can Monitor His Personality Running On A Computer.**

**Rarely, An Overlaid Recorded Personality Becomes Permanent (and Does Not Degrade).**

---



### Overlaid Personalities Degrade

Normally, a Personality which is Run on a Computer or Overlaid on a Person Degrades. Sometimes (Epic Fail or Epic Success depending on circumstance) this Degradation fails. When the person awakens expecting the final dissipation, the overlaid personality emerges dominant. When a personality in a Computer reaches the 24 hour dissipation point, the overlaid personality emerges dominant.

**Online Personality Degradation.** The natural degradation process for Recorded Personality online is

Reduce Int -1 daily.

Check San to avoid -1 San daily.

If Known San =0, alter Int + Flux (permanently) daily.

**The Referee's Call.** The possibility of non-degradation of a Personality is very low and subject to Referee discretion.

### Rogue IP

A Recorded Personality Running on a Computer which survives Degradation becomes a Rogue IP.

**Location.** A Rogue IP "lives" in the central processor of a Computer system. It has the sensory capabilities of that system, including inputs and information relayed from other connected processors.

**Move Transfers.** A Rogue IP can transfer itself from its current location to any other location connected to it. Within a computer system, the Transfer is a Move; the old version is erased as the new version occupies a new location.

**Copy Transfers.** A Rogue IP can send itself to a new system outside its current system. The old version remains in place while many (hundreds or thousands) of copies are transmitted or communicated; many, even most are unsuccessful, while one may take hold in a new system.

### POSITRONIC BRAINS

Positronic brains begin as blank slates. A positronic brain is activated, giving it consciousness and self-awareness. It is immediately connected to a flash-learning system which floods the brain with information and the techniques and abilities to use it. In a matter of weeks, the brain has reached the equivalent of Life Stage 3 and is ready to be installed in a robot body.

**Cannot Be Recorded or Overlaid.** A positronic brain is dependent on the random structure of its noble metal sponge. Its personality can be imitated (by an expert system), but it cannot be recorded. Personalities cannot be overlaid on it or implanted.

---

### IMPORTANT CONCEPTS ON PERSONALITY

**Psionics.** An organic personality that knows Psionics and is in an organic brain retains its Psionic abilities.

**Positronics:** A positronic personality is holographic and unique to its specific Positronic Brain; it cannot be recorded or transferred.

**Genetics:** Personalities can only be overlaid species with the same Genetic Profile (Human= SDEIES) or on a non-Positronic computer.

---

**Positronic Aging.** Positronic Brains are subject to aging. They are eventually degraded by the effects of positrons on the iridium substrate. This aging effect is the natural and inescapable consequence of positronic brain activity.

Positronic Brains begin Aging Checks after Int \* 2 years, and every four years thereafter. At the appropriate stage, perform an Aging Check as Check Int. Success reduces San -1 (Intelligence itself is unaffected).

---

### MISSILE BRAINS

Missiles can be equipped with a variety of guidance and control systems.

**Unguided (C+S)= 0** Minimum Missile Size = **1**  
The Missile is unguided: it is launched at a target with no further intervention from an operator.

**Hardwired (C+S)= 5** Minimum Missile Size = **3**  
The Missile is hardwired with a rudimentary decision-making systems. It operates independently once launched.

**Guided (C+S)= Operator** Minimum Missile Size = **4**  
The Missile is guided by a Gunner in the launching Mount. The Missile takes its C+S from the Characteristic and Skill of the Operator.

**Distance Effects.** Guidance by an Operator at a distance ultimately declines in quality. (C+S) is modified by minus World Range (R=). If (C+S)-R becomes less than 5, the Missile reverts to Hardwired (C+S)=5.

**Attention Effects.** The Operator must be participating in the Guidance process when the missile attacks. If not, the Missile reverts to Hard-Wired (C+S)=5.

**Self-Aware (C+S)= varies** Minimum Missile Size = **5**  
Self-Aware missiles are equipped with a Brain (Electronic, Positronic, Semi-Organic, usually not Organic) which operates the missile and guides it to its target.

Self-Aware Brains are constantly fed sensor data about the current ship's position and the location of other ships and targets in the area. When in jump or not on duty, the Brains are fed random situations and information.

The Brains are constantly gaming the information, competing with each other for high scores and other rewards.

Although Missile Brains communicate with each other, there are no communications channels with the ship or crew; it is important that Brains never learn that, when actually deployed, the end of the mission is final. Self-Aware Missiles self-destruct if their mission is unsuccessful.

**DataCasters.** One purpose of DataCasters is to communicate with enemy Self-Aware Missile Brains. Success shocks the Brain into inaction or turning on its launchers.

**Self-Aware (C+S).** C+S for a Self-Aware Missile is determined at the time of Launch:  
C= 6 + 1D. S= 1D. Plus Flux.

**Download** Minimum Missile Size = **5**  
A Missile Gunner can Download his Personality into a Missile (or several missiles) and send them on their way.  
Each missile is guided by the personality of the Operator (which would dissipate anyway after several days).

---



# Brains

## A BRAINS AND INTELLIGENCE

Basic Type	C4=Intelligence	KCr	Units (Liters)	C4 Int	Theoretical	MaxCost	KCr	Skills
Organic Brain	From original	30	3					native
Organic Clone Brain	G	C4 * 10	1	1 - 6			6	60
Organic Clone Brain	G+D	C4 * 10	2	2 - 12	+Flux		17	120
Organic Clone Brain	G+DD	C4 * 10	3	3 - 18	+Flux +Flux		28	180
Organic Clone Brain	G+DDD	C4 * 10	4	4 - 24	+Flux +Flux +Flux		41	240
Semi-Organic Clone Brain	0	10	1	0			0	10
Semi-Organic Clone Brain	0+D	C4 * 10	2	1 - 6	+Flux		11	60
Semi-Organic Clone Brain	0+DD	C4 * 20	3	2 - 12	+Flux +Flux		22	120
Electronic Brain	D	C4 * 10	1	1 - 6	+Flux		11	60
Electronic Brain	DD	C4 * 20	2	2 - 12	+Flux +Flux		22	120
Positronic Brain	1	5	1	1			1	10
Positronic Brain	D	C4 * 5	2	1 - 6	+Flux		11	30
Positronic Brain.	DD	C4 * 20	2	2 - 12	+Flux +Flux		22	240
+ Wafer Jack		1	0					
+ Emotional Supplement		C4*10	0					

G= Genetic Intelligence in original sophont brain (1-6).

0= Semi-Organic Brains have no genetic intelligence (thus their base = 0).

D= 1D6 (may be rolled, or may be specified).

A Brain D can have Intelligence equal to 1D (from 1-6). A Brain DD can have Intelligence equal to 2D (from 2-12).

A Brain G+D can have Intelligence equal to the C1 Gene (=1-6) plus 1D (1-6).

**Final Intelligence.** Brains are purchased based on their tested C4 Int as they leave the factory. Actual C4 Int gradually settles in over the course of the first year. At the one year anniversary of the robot construction, apply Flux to each D (but not G). Theoretically, a Positronic Brain D can ultimately have Int = 11; and Max Int = 18 (Max Int for G+DDD = 24).

**Units** = total space required in liters.

**Installed In A Console.** A Brain installed in a Console allows the Console to operate independently, regardless of its intelligence. If the Brain has C+S+K greater than Console TL, then that value may be used instead of TL.

## B BRAIN EDUCATION TRAINING INSTINCT

A Brain has characteristic C5 based on factory input.

C4 Intelligence	Based on selected Brain.
C5 Education	= 2 KCr10
C5 Education	= 4 KCr40
C5 Education	= 6 KCr90
C5 Training	= 2 by default
C5 Instinct	= 6 * D no cost. based on Pattern

**Training.** The default, and easiest to create, C5 is Training. Use of Training envisions mental growth in a robot after it is manufactured. Training cannot exceed C4.

**Education.** Education cannot exceed C4.

**Instinct.** If the original pattern has Instinct, then the Brain should have Instinct.

**Limits on Skills.** The sum of C4 and C5 is the limit on initially installed / implanted / programmed skills and levels.

## D SANITY

The creation process creates Sanity; testing defines it.

CS Sanity -Organic Brain	DD	no cost
CS Sanity -Semi-Organic Brain	D	San * KCr10
CS Sanity -Semi-Organic Brain	DD	San * KCr20
CS Sanity -Electronic Brain	DD	San * KCr 1
CS Sanity -Positronic Brain	DD	San * KCr 1

**Sanity** of 5 or 6 is reasonable for a Brain rarely facing challenges or unusual circumstances.

## C BRAIN SOCIAL CHARISMA CASTE

A Brain has **one** social characteristic.

C6 Social Standing	not normally possible
C6 Charisma	= R default no cost
C6 Charisma	= 1D Cha * KCr10
C6 Charisma	= 2D Cha * KCr20
C6 Caste	= 0 if Pattern has Caste

**Charisma C6 = R.** Standard conditioning establishes C6 Charisma = R (for Robot). The R value is equivalent to zero; the Brain defers to or obeys any organic sophont.

**Charisma C6 = 1D or 2D.** Some Brains are conditioned with C6 Charisma (1D = 1-6). Brains with Charisma assume supervisory roles over Brains with lower Charisma.

**Caste.** If the original pattern has Caste, then the Brain has Caste.

## E SKILLS

A brain can acquire skills equal to C4 + C5.

**One Primary:** Select one Primary Skill equal to one-half Intelligence.

**Two Secondaries:** Select two different Secondary Skills or Knowledges, each equal to one-quarter C4.

**A Hobby:** Select a Hobby equal to one quarter C4.

A Brain with Instinct can allocate a Skills in number equal to C4, each wil level equal to Instinct.

A Brain can increase skills though C5=Edu or Tra.



# Wafers

Wafer Technology records essential skills, knowledges, talents, memories, and even personalities on portable Wafers: thin chips which temporarily implant specific elements of a personality. A Wafer may contain

- ▶ a set of Skills (some combination of Skills, Knowledges, and Talents; consider Skills to include any combination of the three),
- ▶ a set of memories and experiences, and
- ▶ a sense of self.

**Wafer Use.** A Wafer transfers its contents to the user.

Once in use, a Wafer provides the user with its Skills (replacing any named Skills the user has, while retaining the others). If the Wafer has memories and experiences, they are available to the user. If the Wafer has a sense of self, it **replaces** the user's sense of self.

The Wafer uses the local mind's Intelligence and C5 (and other Characteristics as required). The most effective implantation is in a body with a mind with high Intelligence and high Education (or C5).

The personality and skills from the Wafer are transferred to the User when first activated; the wafer can be removed without affecting the subsequent personality and skill activity. However, self-updating requires the wafer remain in place until the end of use.

**Wafer Jack.** A Wafer Jack allowing direct insertion and use of a Wafer. Wafer Jack Implant-13. KCr100.

A Wafer Headset is an adequate substitute. Wafer Jack Headset-13. KCr10 (reduces effective skill level minus 2).

**Self and Memories Degrade.** The sense of self (and any memories) degrade abruptly after seven days. The natural personality reasserts itself when the body reawakens after the seventh sleep period.

**Skill Degrade.** Skill level is highest for the first personal day; each skill then degrades one level per day until zero. Talents degrade similarly. Knowledges degrade after seven days. A user may retain some level of Skill (depending on initial level) for several days after memory and self have faded.

**Genetic:** Wafers are Genetic. To function, they require the user have the same Genetic Profile. A Human user requires a Wafer labelled Genetic SDEIES. If the Genetics don't match, the Wafer does not function.

**Self-Updating.** Wafers are self-updating: the experiences of the individual user are added to the skill or set of memories if the wafer remains in place during the effective period. The sense of self acquires memories which are available to the next user of the Wafer.

**Sanity Checks.** Wafer use stresses the mind and brain of the user. Depending on Tech Level Stage, the user faces Sanity Checks at various points during use.

**Skill Limits.** Wafers are limited by TL Stage (and at a maximum regardless of TL of 15). If the Skill has included Knowledge, then the Skill has one such Knowledge at a maximum level 6. A Wafer may contain an independent Knowledge (maximum level 6) instead of a Skill. A Wafer may contain a Talent instead.

## THREE WAFER TYPES

Three sorts of Wafer are generally available: SSW Single Skill Wafer, EPW Emergency Personality Wafer, and Entertainment Wafers.

### SSW Single Skill Wafer

The Wafer contains a single Skill (plus associated Knowledge), or independent Knowledge, or Talent. Some experience memories may be associated with the Skill. The user's personality predominates. Base cost for SSW-13 with Skill-15 and associated Knowledge-6 is KCr210.

**Emergency Sets.** Many ships carry a reserve kit of SSW for emergency use. In the event of a Maneuver Drive malfunction, the user can select an SSW with Engineer-15 Maneuver Drive-6 to diagnose and repair the problem.

### EPW Emergency Personality Wafer

The Wafer contains a recorded personality with memories and experiences plus five Skills. The recorded personality predominates. Base cost for EPW-13 with five Skill-15 and associated Knowledge-6 is KCr1,050 (approximately MCr1).

**Emergency Personalities.** Major organizations maintain EPWs specifically created to address extreme or unusual situations. The Wafer is loaded with a specific (perhaps edited) personality suited for specific situations.

### EW Entertainment Wafer

The Wafer contains a less intense personality transfer for entertainment purposes: the user feels like he is the new personality until it dissipates upon awakening from the next sleep period, but he retains memories of the experience.

Many entertainment chips are multi-user: several users network into the same story, each assuming one of the story roles within a common experience. If the story line is not completed, the Wafer stores memories to be continued in a later session. Base costs for EW-13 is Cr100.

For example, an EPW on an Experimental EPW Wafer-13 (produced at TL-10) records a personality and five skills at TL/4=TL-13/4=3.5=3= Skill-3 each for a cost of KCr1,000; an Ultimate EPW-13 (produced at TL-17) holds a personality and five skills at Skill-13 each for a cost of

## SETS EMERGENCY SSW SETS

A collection of Single Skill Wafers which together provide the essential skills for operation of a ship or small craft (or other installation). Typical Starship collection shown:

Skill+ Knowledge	Skill+ Knowledge
Astrogator-N	Medic-N
Pilot-N+ Spacecraft ACS-6	Steward-N
Pilot-N+ Small Craft-6	Sensors-N
Gunner-N+ Bay Wpns-6	Engineer-N+ Jump Drive-6
Gunner-N+ Orillery-6	Engineer-N+ Life Support-6
Gunner-N+ Screens-6	Engineer-N+ Maneuver-6
Gunner-N+ Spines-6	Engineer-N+ Power Systm-6
Gunner-N+ Turrets-6	Pilot-N+ Spacecraft ACS-6

For Ship Tech Level, N= TL Stage allowed skill level.



A WAFERS		Experi-mentl	Prototype	Early	Standard	Improved	Modified	Advanced	Ultimate
TL-10	Exp	W-13							
TL-11	Exp	W-14	Proto W-13						
TL-12	Exp	W-15	Proto W-14	Early W-13					
TL-13	Exp	W-16	Proto W-15	Early W-14	Wafer-13				
TL-14	Exp	W-17	Proto W-16	Early W-15	Wafer-14	Imp W-13			
TL-15	Exp	W-18	Proto W-17	Early W-16	Wafer-15	Imp W-14	Mod W-13		
TL-16	Exp	W-19	Proto W-18	Early W-17	Wafer-16	Imp W-15	Mod W-14	Adv W-13	
TL-17	Exp	W-20	Proto W-19	Early W-18	Wafer-17	Imp W-16	Mod W-15	Adv W-14	Ult W-13
TL-18	Exp	W-21	Proto W-20	Early W-19	Wafer-18	Imp W-17	Mod W-16	Adv W-15	Ult-W-14
TL-19	Exp	W-22	Proto W-21	Early W-20	Wafer-19	Imp W-18	Mod W-17	Adv W-16	Ult W-15
TL-20	Exp	W-23	Proto W-22	Early W-21	Wafer-20	Imp W-19	Mod W-18	Adv W-17	Ult W-16
TL-21	Exp	W-24	Proto W-23	Early W-22	Wafer-21	Imp W-20	Mod W-19	Adv W-18	Ult W-17
Max Skill Level = TL/4		=TL/3	=TL/2	= TL	= TL	= TL	= TL	= TL	= TL
User contributes C = User C		=User C	=User C	=User C	=User C	=User C	=User C	=User C	=User C
Cost per total levels KCr100/L		KCr50/L	KCr20/L	KCr10/L	KCr10/L	KCr5/L	KCr20/L	KCr60/L	

**EPW:** Emergency Personality Wafer includes personality and five Skills (and Knowldges).

**SSW:** Single Skill Wafer includes one Skill (and included Knowledge).

**Entertainment:** Downloadable personality wafer (for entertainment purposes only) with scripted storyline. Cr100 each.

## B SKILL AND PERSONALITY WAFER

### Sanity Check

The required Sanity Check depends on TL Stage.

Stage	Required Check
Exp Experimental	Hard Check San per Use.
Pro Prototype	Hard Check San per Day.
Ear Early	Check San per Use.
Std Standard	Check San per Day.
Bas Basic	Check San per Day.
Alt Alternate	Check San per Day.
Imp Improved	Easy Check San per Use.
Gen Generic	Check San per Day.
Mod Modified	Easy Check San per Day.
Adv Advanced	Easy Check San Once at end.
Ult Ultimate	Easy Check San Once on end.
Entertainment	Easy Check San Once.

### Skills and Knowldges

Based on TL Stage

Skill=	Knowldge=
TL/4	
TL/3	Any skill
TL/2	with included
TL	Knowldges
TL	thus includes
TL	one such
TL	Knowldge
TL	at Level-6.
TL	Max Skill=15.
TL	Max Kno=6.

### Personality and Skill Degradation

Based on Personal Day on wakening from required sleep period.

**Skills:** Each skill degrades one level per day.

**Knowldges:** Knowldges begin to degrade after seven days.

**Talents:** Each Talent degrades one level per day.

**Personality:** Personality degrades abruptly after 7 days.

**Natural Personality:** reasserts itself when the body reawakens after the seventh sleep period.

## EPW EMERGENCY WAFER PERSONALITY

A Wafer Personality uses the occupied body's:

- C4= Intelligence,
- C5= Education or Training or Instinct,
- C6= Social Standing, Charisma, or Caste,
- CS= Sanity,
- CP= Psionics (if it has Psionics).

A Wafer Personality has:

a set of unique memories, and sense of self.

set of 5 Skills (and Knowldges) or Talents

First Skill-N+ [Knowldge-6]

Second Skill-N+ [Knowldge-6]

Third Skill-N+ [Knowldge-6]

Fourth Skill-N+ [Knowldge-6]

Fifth Skill-N+ [Knowldge-6]

A Wafer Personality updates with the memories of each user experience.

## SSW SINGLE SKILL SET

A Single Skill Wafer uses the occupied body's

- C4= Intelligence,
- C5= Education or Training or Instinct,
- C6= Social Standing, Charisma, or Caste,
- CS= Sanity,
- CP= Psionics (if it has Psionics).

A Single Skill Wafer provides one Skill (and associated Knowldge) or one Talent.

First Skill-N+ [Knowldge-6]

or Talent-N

or Knowldge-6

The Skill, Knowldge, or Talent updates with memories of user experience.

# Psionics

Hidden behind the known mental characteristics is the incredible and often untapped power called Psionics.

Every character has an obscure and usually unreferenced characteristic called Psionics (abbreviated Psi or CP). The characteristic remains obscure until (or unless) the individual is made aware of it through an awakening event.

Characters do not generate Psionics until it is first called for by the situation or the referee.

## UNDERSTANDING PSIONICS

Psionics is the ability to interact –through the powers of the mind, and independent of physical bodily activity– with the environment.

**Basic Terms:** An individual using a psionic ability is an **Operator** or a **Psionic**. If he is interacting with a physical thing or device, it is an **Object**. If he is interacting with a living being (an animal or a sophont), it is a **Subject**. The functional capability of an Operator to use Psionics is a **Psionic Ability** or simply **Ability**.

**Psionics is Obscure.** Most people doubt the existence of Psionics; they dismiss it as quack science, and generally look down on those who do believe in it.

**Psionics is Culturally Inappropriate.** Most cultures in the universe reject Psionics (because of its potential for abuse; because it is poorly documented; and because its scientific foundations are suspect).

**Psionics is Forbidden Knowledge.** For some empires or worlds, psionics is a field of knowledge that is not

discussed in polite society. Raising the subject to ordinary citizens can lead to social rejection, cultural ostracism, and legal harassment.

**Psionics is Elitist.** Those individuals capable of practicing Psionics are a minority, often a very small minority. Because of the potential advantages that Psionics can provide, and because it is available only to a very few, the majority of the population fears it.

## Confusion About Psionics

Psionics is often confused with the otherwise ordinary or normal abilities of various sophonts. Blind sophonts do not understand vision and may call humans Psionic because they can sense things by sight. Various talents and senses with a good physical basis are labeled Psionic by the ignorant or uneducated.

**Extra Sensory Perception (Sensing).** Psionics allows the acquisition of information from the environment (the same function that the senses fulfill) without the direct use of the physical senses. Each of the senses has a Psionic analog: a Psionic may be able to see at a distance (Clairvoyance), or hear at a distance (Clairaudience).

**Extra Corporeal Manipulation (Manipulation).** Psionics allows the manipulation of the environment (the same function that manipulators fulfill) without using the body, hands, arms, or manipulators. The basic physical actions have Psionic analogs: a Psionic may be able to move objects without touching them (Telekinesis) or transport them from one place to another (Teleportation).

**The Intuitions.** Psionics allows the acquisition of limited knowledge not available by any other means, including partial knowledge of events before they occur. Because the future is not immutable, the Intuitions provide an inexact understanding of possible future events.

## Fatigue

The use of Psionics is physically demanding. Operators are relatively easily fatigued.

Failure of a Psionics task, in addition to normal effects, produces unconsciousness for 1D minutes in the first instance and 1D hours in the second instance.

After every Psionics task, Check End. Failing the End Check advances the Operator's Personal Day to the next category.

## TRADITIONAL EQUIVALENCES OF PSIONIC ACTIVITY

Traditional	Psionic
Astral Projection	OoB - Out Of Body Experience
Clairience	Psi-Smell (analog of Smell)
Clairaudience	Psi-Hearing (analog of Hearing)
Clairgustance	Psi-Smell (analog of Taste)
Clairsentience	Psi-Touch (analog of Touch)
Clairvoyance	Psi-Vision (analog of Vision)
Cryokinesis	Eshift - Energy Shift/ Removal
Electrokinesis	Eshift - Energy Shift/ Addition
Healing	The Touch - Biochemical Processes
Levitation	Move against Gravity
Mind-Reading	Mentation - access to Mental Proceses
Out of the Body	OoB
Psychokinesis	Move
Pyrokinesis	Eshift - Energy Shift/ Addition
Remote Viewing	Psi-Vision
Telekinesis	Move - Physical LocationChange
Telepathy	Mentation - mental Communication
Teleportation	Teleport

The traditional names for paranormal activity have their equivalents in Psionics, as shown in this table.

## THE AWAKENING

Psionics is the capability to use Psionic Abilities (which are similar to skills, knowledges, and talents). It is an obscure characteristic which remains unknown to the character until it is awakened by a suitable experience or mentor.

A character's first realization that he may have some psionic ability is called an Awakening.

In one of the extreme moments of life (when confronted by great danger; when presented with few or no apparent alternatives) a character undergoes a Crisis. The referee makes the decision to impose an Awakening:

**The Sanity Check.** The character Checks Sanity (which, by secret direction of the referee, fails). The character is overwhelmed by a sense of calm and great power. At that instant, the Referee secretly creates the character's CP (= 2D +3 - Life Stage) and uses it as a powerful favorable Mod for the remainder of the Crisis. Record this value for the character.

After the Crisis, the Referee says to the Character (as a voice in his head):

"I think I might be Psionic."

**The Search For Truth.** The character now has a choice: to pursue a personal quest to find out more about Psionics, or to ignore the insight, perhaps leaving a nagging feeling of unfulfilled potential.

**The Immediately Available Information.** Data banks and references provide the following general information.

Psionics is illegal. It infringes on individual liberties. It invades privacy. It circumvents protections like walls and locks. It is often terribly abused for power and morally corrupt activities.

Psionics is quackery; it has no basis in science. It is the stuff of legends and myths and primitive belief.

Small ads (popups, printed pages, spam) promote various "Sciences of the Mind" and potential for "self-development." Targeted promotions for various self-development societies will continue to appear for several days after the initial search.

Supposedly, every world has a (secret illegal well-hidden) Psionics Institute devoted to Psionics training.

**Psionics Institute.** Any organization dedicated to research and training in the psionic sciences. Institutes have existed since before star flight, although usually with limited success. At some point in the development of every society, students of the mind sciences make the requisite breakthroughs and develop a scientific basis for their studies.

Psionics Institutes are dedicated to refining the psionic sciences and disseminating that information to those who can use it. Within local cultural limits they privately promote psionics to those who will listen.

## THE VARIOUS PSIONICS INSTITUTES

Every High Population world has a Psionics Institute dedicated to some aspect of the sciences of the mind. The key is the high population of the world: providing enough potential recruits to sustain the organization. Psionics Institutes on worlds with Pop less than 9 are usually frauds.

### A Psionics Institute May Be Open Or Cloaked

Psionics Institutes exist in a variety of forms.

**Open Institutes.** On worlds which tolerate Psionics, the Institutes which teach Psionics are Open. They have offices and classrooms accessible to most people, often advertise in local media, and are listed in local directories.

**Cloaked Institutes.** Because Psionics is illegal and considered immoral in the Imperium, Psionics Institutes on High Population worlds within the Imperial borders are Cloaked. They are hidden from public attention and attract students through word of mouth or through circumspectly worded or veiled invitations.

**False Institutes.** On many worlds, a false institute is interposed between the public and the true Psionics Institute. The false institute provides harmless meditation training (at high cost and dubious effectiveness). Promising candidates are carefully evaluated and may be invited to attend the true institute.

### THE TRUE INSTITUTES

A True Psionics Institute provides psionics testing, training, and even mentoring.

A visit to a True Institute will provide basic information about the Psi Characteristic CP, the universal sophont structure of Psionics, the three branches of Psionics, and the typical regime of Psionics testing.

---

### THE PSIONICS INSTITUTE

Flux    Institute Name

- 5 <World> Institute of Psionics
  - 4 <City> Institute of Psionics
  - 3 <PatronName> Institute of Psionics
  - 2 Room 28, Psych Department, <World> University
  - 1 <World> Industrial Training Center
  - 0 <World> Psionic Institute
  - +1 <Name> Retreat for Personal Development
  - +2 Imperial Society of Magicians and Wonderworkers
  - +3 Society for the Development of Psionics
  - +4 Zhodani Cultural Exchange Institute
  - +5 The Gimalarash Institute
-

## CP= Psi

Every character, indeed, every sophont has an obscure and usually unreferenced characteristic called Psionics (abbreviated Psi). Characters do not generate Psionics until it is first called for by the referee and the situation.

Psionics is the capability to use Psionic Abilities.

**Universal Structure.** All sophonts generate Psionics with 2D +3 -Life Stage (not Term). A character tested in infancy for Psi rolls 2D +3. Characters are more likely to be tested in adulthood: a human character at age 18 (Life Stage 3) rolls 2D +3 -3.

**Psionics Is Not Genetic.** Psionics is random in almost all sophonts. Sophont Creation envisions a variety of Psionics ability structures are possible.

**Untrained Psionics Degrades.** Regardless of test re-

---

## THE 5 STAGES OF PSIONICS

Practitioners of Psionics progress in their science through four (ultimately five) distinct **stages**, each with its own meaning and importance.

### Stage Elements

- |   |                                  |
|---|----------------------------------|
| 1 | Basic Aptitude                   |
| 2 | ESP Extra Sensory Perception     |
| 3 | ECM Extra Corporeal Manipulation |
| 4 | Ethics                           |
| 5 | Practical Experience             |

---

## THE TWO BRANCHES OF PSIONICS

Psionics can be divided into two distinct branches:

<b>ESP</b>	Extra Sensory Perception	The ability to acquire sensory data directly to the mind.
	Extra Corporeal Manipulation	The ability to manipulate without the use of the body.

---

## TENTATIVE IDENTIFICATION OF FELLOW PSIONICS

The process of recognizing, meeting, and interacting with other Psionics can be a dangerous one. Revealing psionic ability to a non-Psionic (and especially an undercover enforcer) can lead to arrest, punishment, even death. Those who understand Psionics understand a simple question which also serves as a secret recognition code:

### What Stage Are You? Huh?

The person clearly has no clue what this question means. The conversation progresses to other subjects. Or

### What Stage Are You? Second. And you?

The conversation has begun; each has tentatively revealed an interest in, and an understanding of, Psionics.

---

## RECORDING PSIONIC INFORMATION

Initial Discovery	Characteristic: Roll 2D+3 - Life Stage
Testing	Psi= <input type="text"/>

Roll 2D+3 -Life Stage for personal Psi.

sults, Psi reduces -1 per Life Stage if the individual has not received training.

**Recording Psionics.** Psionics is not normally indicated in references to a character. When necessary, it is stated independently as CP=N or Psi=N, with the value in eHex.

## PsiNull

Some individuals are devoid of psionic ability.

If the Psionic roll is exactly 2, regardless of Life Stage or Mods, the individual has NO Psionic ability: the condition is called PsiNull. Their minds and mental processes do not register to others with Psionic ability. Mentation (Cloud Other Mind, Read Other Mind, Tell Other Mind, and Control Other Mind) has no effect against them.

For untested individuals first exposed to Psi, the Referee should 2D roll privately; if the result is 2, treat them as PsiNull; otherwise disregard.

Some PsiNulls are also blank or undetectable to Perception: a sophont using Perception (or a Psionic using Psi Perception) senses nothing within the individual.

## Psionics Is An Organic Ability

Non-organic (electronic, fluidic, photonic, positronic) brains are incapable of psionics. On the other hand, a semi-organic brain with psionic ability is capable of psionics and may even be enhanced by its non-organic computing power.

Organic personalities with psionic ability retain that ability but cannot use it while in purely electronic form. If overlaid or implanted on an organic or semi-organic brain, the psionic abilities of the personality become usable again.

On the other hand, organic personalities in purely electronic form are effectively PsiNull: they cannot be detected, sensed, or affected by Psionics.

## THE PSIONICS BRANCHES

There is a rational basis for the practice and effects of Psionics. Almost all of Psionics can be assigned to one of two branches: ESP or ECM.

**ESP Extra Sensory Perception** encompasses all methods of information acquisition outside of the normal senses. The information acquired bypasses the senses and flows directly to the mind.

**ECM Extra Corporeal Manipulation** addresses the ability to manipulate the environment directly by the mind and without the use of the body.

## Psionics Testing

A Psionics Institute provides high quality testing and evaluation of an individual for Psionics Ability.

**Preliminaries.** The Psi Test involves detailed brain-scanning and further evaluation (including under stress) of the individual. The Test takes a full day.

A Psi Test costs Cr1,000. For suitable or for impecunious candidates, the cost may be waived.

**The Test.** The Psi Test generates the individual's Psi. If Psi has already been generated (in an Awakening), that value is used. Reduce it by -1 for each full four years since it was generated.

If Psi has not been previously generated, create it with

2D +3 - Life Stage.

**Psionics Potential.** Any character with Psi=7 or greater is recorded by an Institute as having potential, and they recommend that he should be trained. Anyone can proceed, however, regardless of recommendation.

**Psionic Abilities Are Acquired.** Once a character has been tested for Psi and received initial training, he begins his life-long quest to acquire (learn, discover) a variety of Psionic Abilities.

**PSIONICS EDUCATION AND TRAINING**

Psionics Institutes provide Education or Training for characters with potential. The process consists of a series of training sessions which investigate the character's psionic abilities.

Psionics, however, has an element of philosophy enmeshed in its teachings. To encourage an understanding of the universe, any specific Psionics Institute will only provide one Training Session. A Training Session is surprisingly short: it takes about a week. Individuals are encouraged to then venture into the world and explore their newfound abilities. Once that session is complete, the character must (in his travels) find another Psionics Institute for his next Training Session.

**THE FIRST STAGE**

The character learns his basic psionic aptitude (sort of an IQ for Psionics) and a simple trick.

A character attending his first training session reviews his psionic strength and decides if it should be balanced, or if it should be concentrated in one of the Basic Abilities.

Every Psionic has (or may have) three Basic Abilities: Direct, Self, and Remote. These abilities control the circumstances and results of psionic activity.

The first training decision is whether to remain equal in all three, or if he should concentrate his powers in one or two areas. This decision will last a lifetime.

<b>Attention Level</b>	(See Personal Day)
<b>Optimal</b>	Hasty Mod +1, Cautious Mod +1
<b>Ordinary</b>	No Mods
<b>Tired</b>	Hasty Mod - 1, Cautious Mod - 1
<b>Sleepy</b>	Check Endurance before any task or Check Half-Stamina or Half-Vigor. * Failure = Character falls asleep for 1D minutes in first instance; 1D hours in second instance.
<b>Required Rest or Sleep</b>	= Personal Day /3 hours returns to <b>Optimal</b> = Personal Day /4 hours restores to <b>Ordinary*</b> = Personal Day /6 hours restores to <b>Tired*</b>
* not available to Vigor.	

To Cloud Other Minds (reflex)

Distance (nD) < **Psi** [+Direct/Self] [-Remote] -Mental Size^2  
Cautious is possible (but not less than 1D).

Mod minus Psi-Shield is possible.

[brackets show optional terms].

Slash shows first/second alternate choices (choose one).

Student Enaj Shlataliak Psi-7 D-S-R=18-17-7, working on an assignment at PsiLab at school, tries to cloud the mind of a mouse (Mental Size-2). The mouse seems aggressive, and Enaj doesn't want to touch it, and contact here doesn't make any difference, so R=1 and Difficulty is 1D.

Psi-7. Direct-18. minus Remote-1. minus Mental Size-2^2=4. Enaj must roll 7+18-1-4=20 or less on 1D. The result is automatic and the mouse falls limp.

He turns his attention to the dog (Mental-Size-3) which is across the schoolyard R=3 and Difficulty= 3D.

Psi-7. Direct-18. minus Remote-3. minus Mental Size-3^2=9. Enaj must roll 7+18-3-9= 13 on 3D. He tries and fails. Check Endurance 2D less than 7, rolls 8 and feels a wave of fatigue, followed by several minutes of unconsciousness. Enaj has learned a valuable lesson.

At his instructor's urging, he tries again, this time with Caution, Difficulty becomes 2D and the result is automatic. He has learned another valuable lesson.

The class graduation exercise is a game of tag against classmates, most are Mental Size-5.

One strategy is Contact. Psi-7. Direct-18. not Remote. minus Mental Size-5^2=25. minus Target's Psi-Shield-7 (in this case). Contact Difficulty= 1D. He must roll -7 or less on 1D; Enaj finds this doesn't work. Check Endurance (which he passes).

The next strategy is targeting the mentally slower students (there are a few with Mental Size-4; total C4+C5 is less than 18, Psi-5; Psi-Shield-5). Enaj has Psi-7. Direct-18. not Remote. Mental Size-4^2=16. minus Target's Psi-Shield-5. 7+18-16-5= 4. Contact Difficulty=1D. He must roll 4 or less on 1D, which is at least probable.

Enaj soon learns that he can also do this from a short distance. R=1. Psi-7. Direct-18. Remote-1. Mental Size-4^2=16. minus Target's Psi-Shield-5. He must roll 3 or less on 1D.

He moves across the playground to R=2. Psi-7. +Direct-18. minus Remote-2. Mental Size-4^2=16. minus Target's Psi-Shield-5. He must roll 2 or less on 2D. He elects Cautious, and now must roll 2 or less on 1D. But he realizes that he runs the risk of failure and Check Endurance.

Cloud Other Minds has proven a tricky skill to learn, but Enaj is also now a little less afraid of angry dogs.

**RECORDING PSIONIC INFORMATION**

Stage One	= Psi x6 distributed to	Direct	Self	Remote	Max=Psi	Psi-Shield
Basic Aptitude	Aptitude= <input type="text"/>	D=	S=	R=		Shield=

Distribute Basic Aptitude Points to Direct-Self-Remote. Remote may not exceed Psi.



**Basic Ability Allocation**

The character has **six times** Psi in points available to allocate to D-R-S Direct, Self, and Remote. It is possible to allocate zero points to an Ability. Many Psionic efforts may be expressed toward others (through Direct) or on oneself (through Self); all of the Senses require Self.

**Direct** requires physical contact between the operator and the subject. Psionic tasks assume Direct. Direct is limited to R= 0 Contact. Interestingly enough, Direct has no effect on self.

**Self** is a separate discipline that reflects the power of Psionics onto the individual himself.

**Remote** operates at a distance from the operator and without physical contact. Any Psionic activity not in physical contact requires a Remote component equal to R=Range. Remote Psionic tasks add a Remote component (and cost). Remote is limited to a maximum R= Psi; a character with Ps-7 cannot have Remote greater than 7.

New students are instructed in three basic concepts: Fatigue, Caution, and Psi-Shield, and a basic Ability.

**Fatigue.** After every use of Psi (including ESP, ECM, and Intuitions), there is a momentary feeling of overwhelming fatigue.

Check Endurance (2D). Failure produces 1D minutes of unconsciousness and reduces Attention Level one lower.

However, if the Psi use has automatic success (no die roll is required), the Check Endurance is waived.

Note that the Check requirement is Endurance: if the sophont has Vigor use half-Vigor; if the sophont has Stamina, use half-Stamina.

**Caution.** A User may declare an action Cautious. Reduce the Difficulty dice by 1D (which may make it automatic).

**Psi-Shield.** With suitable exercises, the First Stage Psion builds a personal Psi-Shield equal to Psi. A User may supplement Psi-Shield with Self.

**Ability: Cloud Other Minds.** Students are instructed in the ability to Cloud Other Minds. They typically start with mice (Mental Size-3) or dogs (Mental Size-4) and graduation to trying it on each other in the class.

Finally, the character is declared a **First Stage Psion**.

Eneri Dinsha 777777 with Psi=7 has 6 x7 = 42 points to allocate to Basic Abilities. He can allocate 0 points to an Ability. He could allocate the three Direct, Remote, Self as:

D-S-R=18-17-7 (a roughly even split, allowing for the personal maximum 7 in Remote).

D-S-R=0-42-0 (all to Self; most of the character's activities will be directed toward himself).

D-S-R=20-20-2 (a roughly even split; Remote use is restricted to R=2 just about to 50 meters).

D-S-R=42-0-0 (concentrating on Direct; activity will always require physical contact; use of the Senses will not be possible).

**THE ESP BRANCH OF PSIONICS**

<b>ESP</b>	Extra	The ability to
	Sensory	acquire sensory data
	Perception	directly to the mind.

To Spot An Object

Range (nD) < Psi-Sense +BM +Self [-Remote] +Mod

Cautious is possible (but not less than 1D).

[brackets show optional terms].

Slash shows first/second alternate choices (choose one).

**THE SECOND TRAINING SESSION**

The character learns his aptitude for ESP.

A character attending his second training session determines explores his ESP Extra Sensory Perception abilities. There are six Psionic Senses corresponding to the six natural senses.

**Sensing Mirrors The Known Senses**

Sensing operates in very same way as the known senses: Vision, Hearing, Touch, Smell, Awareness, and Perception. The distinction is that an Operator need not have the corresponding physical sense in order to have a Psionic Ability. The use of the Psionic Senses uses CP and Abilities in the Sense Action requirements for Constant. Other applicable Mods are imposed and the Action is resolved. Use of the Psi-Senses is Remote; Range is counted from the operator.

**Basic Ability Allocation**

The character has **six times** Psi in points available to allocate to the six Psionic Senses. It is possible to allocate zero points to a Sense.

Use of the Psionic Senses

**Psionic Sense Constants.** The points allocated to the Psionic Sense become the Sense Constant. Psi- Touch and Psi- Smell actions (normally required to be in contact and using 2D) are instead resolved with dice equal to Range. If Psi-Vision is selected, any three adjacent wavelengths may be selected.

The Psionic Senses operate without regard to barriers and obstructions. Objects larger or smaller than Benchmarks produce a Benchmark equal to the difference in Size.

**Decisions.** Most students decide to allocate their points equally to all of the six senses. For Humans, this gives them access to the two non-Human senses Awareness and Perception.

Some Humans eschew the non-Human senses and allocate points only to Human senses, with corresponding increases. Others elect to concentrate their points in one or two senses for considerably enhanced Vision, or Hearing, or even Smell.

**Achievement of Second Stage Psion.** At the end of

**RECORDING PSIONIC INFORMATION**

Stage Two	= Psi x6 distributed to	Vision	DS	Hearing	DS	Smell	DS	Touch	DS	Aware	DS	Percep	DS
ESP Aptitude	Aptitude= <input type="text"/>	V=		H=		S=		T=		A=		P=	

Distribute ESP Aptitude Points to the six Senses: Vision-Hearing-Smell-Touch-Aware-Percep

the Second Training session, the character has learned the basics of ESP, and the character is declared a **Second Stage Psion**.

For example, Human Citizen Uvasti Seng 666B99 Psi-5 D-R-S= 25-5-0 has found a new Psionics Institute for his Second Training Session. He has (Psi-5 x 6 =) 30 points to allocate among the Psionic Senses. He decides to concentrate and allocates all 30 points to Psi-Vision.

After the session, in his ship, he stands in the cargo hatch and experiments. About a kilometer away (Range = 5) there is a person on the road under some lights. He looks out into the distance (he isn't looking for the person; the action determines if he Spots or notices it). His Vision Action is V-16-RGB. He must roll 16 or less on 5D (about a 40% chance of noticing it). He rolls 16 and he Spots the person.

To **Spot** an Object

Range < Vision + Benchmark + Adjust + Comment  
5D < 16

Now he scans the darkness across the tarmac. He cannot see anything. He turns to his Psi-Vision. There is a Size-5 Attack Beast also about a kilometer away R=5.

To **Spot** an Object Psi-Vision

Range < Psi-Vision + Benchmark - Remote + Mod  
5D < 30

Uvasti has Psi-Vision=30, Benchmark (Range minus Size=) 0. Remote is Range= -5. There is no additional Mod. He must roll 25 or less on 5D. He is amazed at how clearly he can see in the dark. Then (Check End [not C5]) he has a momentary feeling of fatigue; he closes the cargo hatch and retires for the night, encouraged that his newfound ability does, indeed, seem to be an incredible improvement on ordinary sight.

## THE THIRD TRAINING SESSION

The character explores his aptitudes for ECM.

A character attending his third training session determines explores ECM Extra Corporeal Manipulation.

**Extra Corporeal Manipulation** uses psionic ability to move or change matter or energy in the environment. In a very general way, Manipulation represents active (rather than passive) Psionics; it may be Remote or Direct.

**There are six Psionic ECM Abilities:** Move, Teleport, EShift, The Touch, OOB, and Mentation.

### Basic Ability Allocation

The character has **six times** Psi in points available to allocate to the six Psionic ECM Abilities. It is possible to allocate zero points to an Ability. The points allocated to the ECM Ability become the Constant in the use of the Ability.

A well-rounded Psion allocates his Psi to each of the six ECM Abilities. Someone who chooses to specialize can allocate the total points to one or two of the abilities.

At the end of the training session, the character is formally declared a **Third Stage Psion**.

## THE ECM BRANCH OF PSIONICS

<b>ECM</b>	Extra	The ability to
	Corporeal	manipulate
	Manipulation	without the use of the body.

To Move an Object

Range (nD) < Move +Direct/Self [-Remote] -Size^2

Cautious is possible (but not less than 1D).

Mod minus Speed^2 if greater than 1.

Mod minus Psi-Shield is possible.

[brackets show optional terms].

Slash shows first/second alternate choices (choose one).

To Teleport an Object

Range (nD) < Teleport +Direct/Self [-Remote] -Size^2

Cautious is possible (but not less than 1D).

Mod minus Psi-Shield is possible.

[brackets show optional terms].

Slash shows first/second alternate choices (choose one).

To EShift Energy into an Object

To EShift Energy out of an Object

Value (nD) < EShift [+Direct/Self] [-Remote] -Size^2 -Value^2

Cautious is possible (but not less than 1D).

Mod minus Psi-Shield is possible.

[brackets show optional terms].

Slash shows first/second alternate choices (choose one).

To Transfer a Characteristic

Value (nD) < EShift [+Direct/Self] [-Remote] -Value^2

Cautious is possible (but not less than 1D).

Mod minus Psi-Shield is possible.

[brackets show optional terms].

Slash shows first/second alternate choices (choose one)

### Characteristic Groups

Physical = C1 C2 C3

Mental = C4 C5 and Sanity (but not Psi)

Psi = Direct Self Remote

ESP = Vision Hearing Smell Touch Aware Percep

ECM = Move Teleport EShift Touch OOB Mentation

To Touch Heal

To Touch Hurt

Hits (nD) < Touch [+Direct/Self] [-Remote] -Hits^2

Cautious is possible (but not less than 1D).

Mod minus Psi-Shield is possible.

[brackets show optional terms].

Slash shows first/second alternate choices (choose one).

To Travel Out Of The Body

Range (nD) < OOB [+Direct/Self] [-Remote] -Mental Size^2

Cautious is possible (but not less than 1D).

Mod minus Psi-Shield is possible.

[brackets show optional terms].

Slash shows first/second alternate choices (choose one).

---

To Cloud Other Minds

Distance (nD) < **Mentation** [+Direct/Self] [-Remote] -MS<sup>2</sup>  
Cautious is possible (but not less than 1D).  
Mod minus Psi-Shield is possible.  
[brackets show optional terms].  
Slash shows first/second alternate choices (choose one).

---

To Read Other Mind

To Tell Other Mind

Distance (nD) < **Mentation** [+Direct/Self] [-Remote] -MS<sup>2</sup>  
Cautious is possible (but not less than 1D).  
Mod minus Psi-Shield is possible.  
[brackets show optional terms].  
Slash shows first/second alternate choices (choose one).

---

To Control Other Mind

Distance (nD) < **Mentation** [+Direct/Self] [-Remote] -MS<sup>2</sup>  
Cautious is possible (but not less than 1D).  
Mod minus Psi-Shield is possible.  
[brackets show optional terms].  
Slash shows first/second alternate choices (choose one).

---

### General Conditions

Unless restated in the description, the following apply

**Direct** applies the effect to an external Object (with a **Size**) with a touch. **Remote** applies at a distance between the User and the Object. **Self** applies the effect to the User.

**Speed** is number of Range Bands changed. **Size** is the physical Size of the Object. **Mental Size** is the sum of C4+C5 from C Life Process benchmarks table.

### MOVE

Move is the Ability to change the location of an Object (which may be a Thing, or a Person, or even the User).

**Technical Names.** Move is a physical location change (Psychokinesis if the operator is touching the object; Telekinesis if the operator is Remote) rather than Teleport. If an operator performs Move on himself, it is Levitation. It is possible for an operator to Ride on an Object being Moved if the Object is larger than the Rider.

### TELEPORT

Teleport is the Ability to move an Object (an Object may be the User) to a distant point without travelling across the intervening distance. Teleport is instantaneous.

**Destination Visualization.** Teleport requires seeing the destination; seeing it will suffice. Psi-Vision (or Awareness or Psi-Awareness) enables greater distance. Teleport ignores all intervening obstacles: it passes through walls, matter, energy differences, all barriers.

**Technical Names.** The action is usually Teleport. Applied to bulk items (water, soil, rock), the term is Matterport.

**Temperature Change.** If the Destination involves a change in Altitude, the Object experiences a temperature change: an Altitude R= increase inflicts Cold equal to R=; an Altitude decrease inflicts Hot equal to R=.

### ESHIFT OR ENERGY SHIFT

Energy Shift channels energy from the environment in

or out of an Object: it is equivalent to a heat pump.

Value (nD) is the change in Temperature expressed in Hits as Hot-N, Cold-N, or Speed-N where N is the Eshift Constant (N = actual points transferred, not Dice).

Energy Shift can be positive or negative. It can inflict damage on objects, or it can counteract or cancel damage inflicted on objects.

Value (ND) is the number of Points of Characteristic Change. Transfer are temporary, lasting 1D Days.

Transfer within the User is Self. Transfer within another is Direct. Transfer from Self to Another requires Self; Transfer from Another to Self requires Direct.

Any quantified Characteristic can be transferred within a relevant characteristic group. Over short periods of time, a User can change his own Psi Characteristics, but ultimately they revert to their base or original levels.

### The Touch

The Touch adds or subtracts Hits to biological processes. It may be Remote, Direct, or Self. Touch applied to Self is heal (or unusually, to hurt).

### OOB

Out Of The Body projects one's consciousness to a location apart from the body and without regard to barriers (except Psi-Barriers). The individual is equipped with his own senses and psionic senses in the remote location.

Direct applies the effect to a living Object (whose personality becomes the Operator). The Operator's consciousness (Personality) leaves the body and travels to the remote location; the body is in a trance (which does not count as sleep) for the duration of the activity. Travel time to the location is about one minute per Range Band. The operator may remain OOB as long as he desires, but when the body becomes Sleepy, the consciousness is drawn back to the body.

An operator in OOB observes with his physical and psionic senses from his OOB location, and can interact with Objects through his psionic abilities.

### MENTATION

Mentation is the more sophisticated expression of Cloud Other Mind.

**Cloud Other Mind.** At this level, the user applies Mentation rather than Psi with potentially much greater ability. It is possible to apply Cloud to self to hide thoughts from others.

**Read Other Mind.** The user can find and understand thoughts in another sophont's brain. If the user understands the Object's Language, then thoughts are understood based on the User's Language. If Language is a barrier, then only simple thoughts and actions can be understood.

**Tell Other Mind** sends thoughts to the Object based on the same standards.

**Control Other Mind.** The user takes control of the Object and operates its body.

**Technical Names.** Read Other Mind is also called Mind-Reading or Telepathy; Tell Other Mind is another form of Telepathy. Reading emotions from another mind is Telem-pathy. Control Other Mind is Mind Control (derogatorily called Peeping).

## THE FOURTH TRAINING SESSION

The character explores his abilities in Ethics.

A character attending his fourth training session finds that the focus has shifted. He already has a potentially wide array of abilities and has had the opportunity to use them in everyday life. The Fourth Session teaches no abilities; it instead deeply examines the personality of the individual and its disposition toward Ethics.

### The Stage Four Test

The character undergoes a simple but formal test under the supervision of a committee of advanced Psions. Their examination probes into the depths of the character's mind and personality and evaluates it.

Roll Flux for a value between +5 Moral and - 5 Immoral.  
Roll Flux for a value between +5 Order and - 5 Chaotic.  
In each case, 0= Neutral.

The Institute Committee (administered by the Referee) then discusses these results with the Character (the Player). Through a process of negotiation, they adjust the results to values which the character accepts as ideal. The process is entirely non-judgmental: no specific results are encouraged or nor are they discouraged. At the end of the session, the character is formally declared a **Fourth Stage Psion**.

## THE FIFTH STAGE

The Fifth Stage represents the beginning of self-instruction and self-directed improvement.... there is no formal instruction or training: a Sixth Stage Psionic is an individual who has received all training possible.

Some Fifth Stage Psionics make their abilities the focus of their lives; others pursue other activities and use Psionics as a supplement. Yet others organize their own Psionic Institutes.

### TECHNOLOGICAL ENHANCEMENTS

Psionic activity can be enhanced with technological devices, through Direction and Amplification. Technological psionic devices are analogs of weapons (whether personal or ship) but are identified as devices (Psi-Direction Device, Psi-Amplification Device). In operation, the device functions in the same manner as a weapon, with an operator identifying a target and firing the weapon.

The Psionic effect of the associated Psion, who is not necessarily the device operator, is then directed at the target and the Psionic Action is resolved.

**Not Necessarily Weapons.** Psionic devices, although built as weapon analogs, serve non-weapon as well as weapon functions: for example, sensors, medical equipment, and communicators.

## THE FOURTH STAGE TEST

		Chaos				Neutral			Order			
Flux		- 5	- 4	- 3	- 2	- 1	0	+1	+2	+3	+4	+5
Immoral	- 5	Chaotic Immoral				Neutral Immoral			Orderly Immoral			
	- 4											
	- 3											
	- 2											
Neutral	- 1	Chaotic Neutral				True Neutral			Orderly Neutral			
	0											
	+1											
Moral	+2	Chaotic Moral				Neutral Moral			Orderly Moral			
	+3											
	+4											
	+5											

### Psi-Direction Devices

A Psi-Direction focusses Psi in a specific direction, for some extending its effect beyond normal user range.

**Equivalent Weapon.** A Psi-Director is built as a Laser

### PSI-DIRECTORS and PSI-AMPLIFIERS

Personal Psi-Director	equivalent to Laser Designator-12 at TL+3 with 2x mass and 2x cost PDD-15 Psi-Direction Device -15 R=5 Cr4000 12 kg
PDD-15 Psi-Direction Device -15 R=5 Cr8000 24 kg	
Personal Psi-Amplifier	equivalent to Laser Designator-12 at TL+4 with 2x mass and 2x cost PAD-16 Psi-Amplification Device -16 R=5 Cr8000 24 kg
Ship-Based Psi-Director	equivalent to Std AR T1 Beam Laser-10 (10) at TL+5 with 2x cost Std AR T1 Psi-Director -15 (15)
Ship-Based Psi-Amplifier	equivalent to Std AR T1 Beam Laser-10 (10) at TL+6 with 2x cost Std AR T1 Psi-Amplifier -16 (15)

also Subject to TL Stage, QREBS, Wpn Range Effects

### THE PSIMACOPEIA

Drug	Effect	TL	KCr
PsiOne	x2 Psi-Ability D-S-(not R)	10	2
PsiTwo	x2 Psi-Shield	11	2
PsiThree	x2 ESP Abilities	12	2
PsiFour	x2 ECM Abilities	13	2
RestoreOne	Restores Fatigue to Optimal	8	2
RestoreTwo	Restores Sanity to Original	9	2

### RECORDING PSIONIC INFORMATION

Stage Three	= Psi x6 distributed to	Move	DS	Teleport	DS	EShift	DS	The Touch	DS	OoB	DS	Mentation	S
ECM Aptitude	Aptitude= <input type="text"/>												

Distribute ECM Aptitude Points to the six ECM abilities: Move-Teleport-EShift-The Touch-OoB-Mentation.

Designator at TL+1, double mass and double cost. Alternatively, a Psi-Director is built as a Beam Laser Turret at TL+4 with double cost.

**Equivalent Effects.** If the Psi-Director achieves a Hit on the target, the associated Psion then resolves the Psionic Action substituting 3D for any Range requirements.

### **Psi-Amplification Devices**

A Psi-Director can include Psi-Amplification capabilities at TL+1. A device capable of Psi-Amplification increases the power of the psionic effect produced by the associated Psion, while the Psion retains the ability to direct it.

**Amplification Effect.** The ESP or ECM ability value being used is multiplied by 10.

### **THE PSIMACOPOEIA (SDEI)**

Psionics may be enhanced with the use of drugs.

The Psimacopoeia is a list of drugs used in support of Psionic activity (and which may have uses in other activities. This particular Psimacopoeia is suitable for Sophonts with genetic SDEI; other Psimacopoeia apply with potentially different effects, TLs, and costs to other genetic structures.

**PsiDrug Effects.** The set of PsiDrugs exhibit their effects until the user falls asleep (aside from momentary unconsciousness induced by fatigue and less than an hour in duration). Upon awakening, the affected abilities return to their normal values.

Each use of PsiDrug requires Check Sanity upon awakening. Because the player may not know the Character's Sanity, the referee records and checks the value.

**RestoreOne Effects.** RestoreOne returns the User's Attention Level to Optimal. Repeated uses are possible. Its

effects continue until the user falls asleep (aside from momentary unconsciousness induced by fatigue and less than an hour in duration). Each use builds a sleep deficit which is repaid when the user finally does fall asleep. Use of four RestoreOne doses creates a need for four consecutive sleep periods.

**RestoreTwo Effects.** RestoreTwo returns a character's Sanity to its original level and remains in effect for one month, or until after the next required Check Sanity.

### **PSIONICS ABILITY IN COMPUTERS AND BRAINS**

Non-organic (electronic, fluidic, magnetic, mechanical, photonic, positronic) brains are incapable of psionics. Psionics is intimately intertwined with consciousness and life: machines are incapable of psionic activity.

On the other hand, a semi-organic brain with psionic ability is capable of psionics and may even be enhanced by its non-organic computing power.

Organic personalities with psionic ability retain that ability but cannot use it while in purely electronic form. If overlaid or implanted on an organic or semi-organic brain, the psionic abilities of the personality again become usable.

### **PSIONICS AND AWARENESS AND PERCEPTION**

The sensory capabilities of Awareness and Perception may be confused with similar Psionic capabilities. The clear difference is that Awareness and Perception can be duplicated with mechanisms while Psionics cannot.

Nevertheless, many in society confuse the three and some react with alarm or distaste when they encounter unfamiliar behavior.



## PSIONICS AMONG THE ZHODANI

Unlike most regions of the Imperium, psionics is a natural and accepted part of Zhodani society. The Zhodani equivalent of the Psi Test is a pass/fail event administered by the authorities shortly after birth. Ambitious non-psionic or low-psionic parents eagerly await the results in hopes that their child can rise in society; yet their ambition is bittersweet, because if their infant passes the test, he or she will be raised in the Intendant Boarding Schools rather than at home. On the other hand, high-ranking psionic-enabled parents dread the thought that their child will not measure up.

**Testing.** Create a child's Psionic Potential with 2D +3 - Life Stage. Children with Psi-10 or greater are inducted into the ranks of the Intendant class, awarded Social Standing 10, and naturally receive Psionic Training as part of their education.

Infants testing with less than Psi-10 have not passed the Psi Test (as is true for the majority of the population); they receive a standard education, which includes a knowledge of Psionics and a respect for the powers and responsibilities it brings, but no formal training.

**Stage One- Basic Aptitude** is administered in early, along with fundamental ethical training in the proper use of these powers, in the equivalent of pre-school. By age 9 (the end of Life Stage 1), the student has **six times** Psi in points available to allocate to Direct, Self, and Remote. It is possible to allocate zero points to an Ability.

**Stage Two- ESP and Stage Three- ECM** are taught during Life Stage 2.

By age 13, the student has **six times** Psi in points available to allocate to the six Psionic Senses: Vision, Hearing, Touch, Smell, Awareness, and Perception. It is possible to allocate zero points to a Sense. The standard practice is to allocate points equal to Psi to each of the six senses (even though Humans do not have Awareness and Perception).

By age 17, the student has **six times** Psi in points available to allocate to the six Psionic ECM Abilities: Move, Teleport, EShift, The Touch, OOB, and Mentation. It is possible to allocate zero points to an Ability. The points allocated to the ECM Ability become the Constant in the use of the Ability. The standard practice is to allocate points equal to Psi to each of the ECM Abilities.

Those children in Zhodani society who receive Psionics Training are the equivalent of **Third Stage Psions** when they reach age 18.

**Ethics in Zhodani Society.** The process of elementary and secondary education (as well as common medical practices) includes considerations of mental and psionic ethics.

Any student provided with Psionic Training through public education (initial testing of Psi-10 or greater) consults the Stage Four Test with two Good Flux rolls.

Any student with a private education has the choice of taking the test with two Good Flux rolls, or with two Flux rolls.

**Psionics Among The Proles.** The non-psionics class (Soc 9 or less) in Zhodani society receives no formal Psionics Training. The testing process ensures that by age 18, the range of Psi in the general untrained population is 2 through 9 with an average of about 6; by age 42 (Life Stage 6) the range is 0 to 6 with an average of about 3.

Some babies test with a false negative and their potential is wasted. Some proles come to believe that they were false negatives and pursue Psionics as a hobby; the thought police usually tolerate such activities as harmless and merely monitor it for abnormal behavior.

**The Thought Police.** Zhodani society has over time established a dedicated civic organization committed to scanning the minds of all citizens specifically to detect mental diseases: depression, bipolar, dissatisfaction, unhappiness, deviation from the norm, and to remedy it with careful stimulus and counselling. Citizens understand this important part of society and embrace it; police is a misleading term which does not fully convey the positive and uplifting aspects of the function.

## Psionics In Other Societies

Any sophont society which embraces Psionics has somehow institutionalized the process of testing and training. There may be brotherhoods, siblinghoods, fraternities, monastic orders, corporate divisions, educational institutions, guilds, or sport teams devoted to understanding and exploiting Psionics in society.



# THE PSIONIC SENSE ACTIONS

**pV =VISION** Human Constant **16**

Sense ID Psionic Vision

Band1 Band2 Band3

Constant

**V - 00 - B B B**

Human= 16 R G B

**pT =TOUCH** Human Constant **06**

Sense ID Psionic Touch

Sensitivity

Constant

**T - 00 - S**

Human= 06 2

**nD** To Notice an Object  
 < Constant + Benchmark + Mod + Mod

**2D** To Notice an Texture  
 < Constant + Benchmark + Mod + Mod

**pH =HEARING** Human Constant **16**

Sense ID Psionic Hearing

Freq Span Voice Range

Constant

**H - 00 - F S V R**

Human= 16 9 3 8 2

**pA =AWARENESS** Human Constant **X**

Sense ID Psi Awareness

Acuity

Constant

**A - 00 - A**

Human= (not applicable to Humans)

**nD** To Notice an Sound  
 < Constant + Benchmark + Mod + Mod

**nD** To Notice an Field  
 < Constant + Benchmark + Mod + Mod

**pS =SMELL** Human Constant **10**

Sense ID Psionic Smell

Sharpness

Constant

**S - 00 - S**

Human= 10 2

**pP =PERCEPTION** Human Constant **X**

Sense ID Psi Perception

Tone Poice

Constant

**P - 00 - T P**

Human= (not applicable to Humans)

**2D** To Notice an Scent  
 < Constant + Benchmark + Mod + Mod

**nD** To Notice an Aura  
 < Constant + Benchmark + Mod + Mod

## BENCHMARK RANGES

Range	0	1	2	3	4	5	6	Horizon	7	8	9
Contact		Vshort	Short	Medium	Long	Vlong	Distant		VDistant	Orbit	Far Orbit
Distance		5 m	50 m	150 m	500 m	1000 m	5000 m		50 km	500 km	5000 km



# THE PSIONIC SENSE BENCHMARKS

## VISION BENCHMARKS

	Contact	Reading	Talking	Vshort	Short	Medium	Long	Vlong	Distant	Vdistant
Range	<b>0</b>	<b>R</b>	<b>T</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
Distance				5 m	50 m	150 m	500 m	1000 m	5 km	50 km

## HEARING BENCHMARKS

	Contact	Reading	Talking	Vshort	Short	Medium	Long	Vlong	Distant	Vdistant
Range	<b>0</b>	<b>R</b>	<b>T</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
Distance				5 m	50 m	150 m	500 m	1000 m	5 km	50 km

## AWARENESS BENCHMARKS

	Contact	Reading	Talking	Vshort	Short	Medium	Long	Vlong	Distant	Vdistant
Mass										
Electric										
Magnetic										
Range	<b>0</b>	<b>R</b>	<b>T</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
Distance				5 m	50 m	150 m	500 m	1000 m	5 km	50 km

## PERCEPTION BENCHMARKS

	Contact	Vshort	Short	Medium	Long	Vlong	Distant	Vdistant	Orbit	Far Orbit
Thought										
Life										
Range	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>
Distance		5 m	50 m	150 m	500 m	1000 m	5 km	50 km	500 km	5000 km





# PSI

## THE THREE BRANCHES OF PSIONICS

- ESP Extra Sensory Perception
- ECM Extra Corporeal Manipulation
- Intuitions Insight, Curiosity, and Luck

## THE 5 STAGES OF PSIONICS

- 1 Basic Aptitude
- 2 ESP Extra Sensory Perception
- 3 ECM Extra Corporeal Manipulation
- 4 Ethics
- 5 Intuitions
- 6 The search for knowledge and power

## LIFE PROCESSES BENCHMARKS

Life- Physical Size		Thought / Emotion- Mental Size	
Describe	Describe	C4+C5	
0 Inert	Inert		
1 Tiny	7mm Simple Life		
2 VSmall	75mm Compex Life	1D 1-	6
3 Small	20 cm Simple Thoughts	2D 7-	12
4 Typical	75 cm Complex Thoughts	3D 13-	18
5 Large	1.5 m Intelligence	4D 19-	24
6 Vlarge	7.5 m High Intelligence	5D 25-	30
7 Gigantic	75 m Extreme Intell	6D 31-	36
8 Colossal	750 m		
9 Vcolossal	7500 m		

**Physical:** Most sophonts are Size-5.

**Mental:** if C4+C5 is known, use that even if if fewer dice.

## THE PSIMACOEPIA

Drug	Effect	TL	KCr
PsiOne	x2 Psi-Ability D-S-(not R)	10	2
PsiTwo	x2 Psi-Shield	11	2
PsiThree	x2 ESP Abilities	12	2
PsiFour	x2 ECM Abilities	13	2
RestoreOne	Restores Fatigue to Optimal	8	2
RestoreTwo	Restores Sanity to Original	9	2

## Attention Level (See Personal Day)

**Optimal** Hasty Mod +1, Cautious Mod +1

**Ordinary** No Mods

**Tired** Hasty Mod - 1, Cautious Mod - 1

**Sleepy** Check Endurance before any task  
or Check Half-Stamina or Half-Vigor.

\* Failure = Character falls asleep for

1D minutes in first instance;

1D hours in second instance.

**Required** = Personal Day /3 hours returns to **Optimal**

**Rest or** = Personal Day /4 hours restores to **Ordinary\***

**Sleep** = Personal Day /6 hours restores to **Tired\***

\* not available to Vigor.

## RECORDING PSIONIC INFORMATION

Initial Discovery	Characteristic: Roll 2D +3 - Life Stage										
Testing	Psi= <input type="text"/>										
Stage One	= Psi x6 distributed to		Direct	Self	Remote	Max=Psi	Psi-Shield				
Basic Aptitude	Aptitude= <input type="text"/>		D=	S=	R=	Shield=					
Stage Two	= Psi x6 distributed to		Vision DS	Hearing DS	Smell DS	Touch DS	Aware DS	Percep DS			
ESP Aptitude	Aptitude= <input type="text"/>		V=	H=	S=	T=	A=	P=			
Stage Three	= Psi x6 distributed to		Move DS	Teleport DS	EShift DS	The Touch DS	OOB DS	Mentation S			
ECM Aptitude	Aptitude= <input type="text"/>										

## THE PSIONICS ACTIONS

To Cloud Other Minds (reflex)	Distance (nD)	< Psi	+Direct/Self	[-Remote]	-MS^2	- [Psi-Shield]
To Move an Object	Range (nD)	< Move	+Direct/Self	[-Remote]	-Size^2	- [Psi-Shield]
To Teleport an Object	Range (nD)	< Teleport	+Direct/Self	[-Remote]	-Size^2	- [Psi-Shield]
To EShift Energy into an Object	Value (nD)	< EShift	+Direct/Self	[-Remote]	-Size^2	- [Psi-Shield]
To EShift Energy out of an Object	Value (nD)	< EShift	+Direct/Self	[-Remote]	-Size^2	- [Psi-Shield]
To Transfer a Characteristic	Value (nD)	< EShift	+Direct/Self	[-Remote]	-Value^2	- [Psi-Shield]
To Touch Heal	Hits (nD)	< Touch	+Direct/Self	[-Remote]	-Hits^2	- [Psi-Shield]
To Touch Hurt	Hits (nD)	< Touch	+Direct/Self	[-Remote]	-Hits^2	- [Psi-Shield]
To Travel Out Of The Body	Range (nD)	< OOB	+Direct/Self	[-Remote]	-MS^2	- [Psi-Shield]
To Cloud Other Minds (v2)	Distance (nD)	< Mentation	+Direct/Self	[-Remote]	-MS^2	- [Psi-Shield]
To Read Other Mind	Distance (nD)	< Mentation	+Direct/Self	[-Remote]	-MS^2	- [Psi-Shield]
To Tell Other Mind	Distance (nD)	< Mentation	+Direct/Self	[-Remote]	-MS^2	- [Psi-Shield]
To Control Other Mind	Distance (nD)	< Mentation	+Direct/Self	[-Remote]	-MS^2	- [Psi-Shield]

Cautious is possible (but not less than 1D). Hasty is possible. Duration, if Important, is about 10 minutes.

Slash shows first/second alternate choices (choose one). [Brackets show optional terms]. MS= Mental Size



## A IMPACT DAMAGE BENCHMARKS

	Speed	kph	Hits	Descriptors	Descriptors
Subsonic	0	0	0	Still	
	1	5	1	Creep	
	2	10	4	Xslow	
	3	20	9	Slow	
	4	30	16	Standard	
	5	50	25	Cruise	
	6	100	36	Fast	
	7	300	49	Vfast	
	8	500	64	Sonic	
Supersonic	9	700	81	Supersonic	
	10	1000	100	Hypersonic	
	11	2000	121		
	12	3000	144		
	13	5000	169		
	14	10,000	196		
	15	20,000	225		
	16	30,000	256	Meteoric	
	17		289		
	18		324		
	19		361		
	20		400		

$$\text{Hits} = V^2$$

Hits upon impact (V= Speed):

Multiply by Tons (or fractional Tons) of impacting object.

Use displacement Tons rather than mass.

## C Characteristic Groups

(Applies to EShift)

Physical = C1= Str C2= Dex Agi Gra C= End Vig Sta  
 Mental = C4= Int C5= Edu Tra Ins and Sanity (not Psi)  
 Psi = Direct Self Remote  
 ESP = Vision Hearing Smell Touch Aware Percep  
 ECM = Move Teleport EShift Touch OOB Mentation

## PSIONICS ACTIONS UNITS

Cloud Other Minds	Distance (nD)	R= Range Band
Move	Range (nD)	R= Range Band
Teleport	Range (nD)	R= Range Band
EShift Energy in	Value (nD)	Speed. Temperature
EShift Energy out	Value (nD)	Speed. Temperature
Transfer Characteristic	Value (nD)	Characteristic.
Touch Heal	Hits (nD)	Characteristic.
Touch Hurt	Hits (nD)	Characteristic.
Travel OOB	Range (nD)	R= Range Band.
Cloud Other Minds	Distance (nD)	R= Range Band.
Read Other Mind	Distance (nD)	R= Range Band.
Tell Other Mind	Distance (nD)	R= Range Band.
Control Other Mind	Distance (nD)	R= Range Band.

## B HOT AND COLD BENCHMARKS

Temp	K	C	Hits	Descriptors	
-12	0	-273	144	Absolute Zero	40D
-11	25	-250	121	Hydrogen Ice	35D
-10	50	-225	100	Oxygen Ice	30D
-9	75	-200	81	Nitrogen Ice	25D
-8	100	-175	64		20D
-7	125	-150	49		15D
-6	150	-125	36		10D
-5	175	-100	25		7D
-4	200	-75	16	Radon Ice	4D
-3	225	-50	9		3D
-2	250	-25	4		2D
-1	275	0	1	Cold	1D
+0	300	25	0	Human Temperate Environ	
+1	325	50	1	Hot	1D
+2	350	75	4		2D
+3	375	100	9	Water boils	3D
+4	400	125	16	Sulfur melts	4D
+5	425	150	25		7D
+6	450	175	36		10D
+7	475	200	49		15D
+8	500	225	64	Tin melts	20D
+9	525	250	81	Fire	25D
+10	550	275	100		30D
+11	575	300	121		35D
+12	600	325	144		40D
+13	700	425	350	Lead melts	100D
+14	800	525	400		115D
+15	900	625	450	Aluminum melts	130D
+16	1000	725	500		140D
+17	2000	1725	1000	Titanium melts	300D
+18	3000	2725	1500	Spectral M Star surface	
+19	4000	3725	2000	Spectral K Star surface	

Hot Cold

Hits per Round (= 1 minute)

Above 600 Kelvin (K= Kelvins): **Hits= K / 2**

K= Kelvin (0 K= Absolute Zero).

C= Celsius (0 C= Freezing Point of Water= 273 K).

## PSI-DIRECTORS and PSI-AMPLIFIERS

Personal Psi-Director	equivalent to Laser Designator-12 at TL+3 with 2x mass and 2x cost
Personal Psi-Amplifier	equivalent to Laser Designator-12 at TL+4 with 2x mass and 2x cost
Ship-Based Psi-Director	equivalent to Std AR T1 Beam Laser-10 (10) at TL+5 with 2x cost
Ship-Based Psi-Amplifier	equivalent to Std AR T1 Beam Laser-10 (10) at TL+6 with 2x cost

also Subject to TL Stage, QREBS, Wpn Range Effects



## THE PSIONIC ADVENTURES OF ENAJ

Enaj Shlataliak 77777A Psi=7 Psi-Shield-7  
D-R-S=18-17-7. ESP 7-7-7-7-7. ECM 7-7-7-7-7

Enaj (we saw him earlier as a student) is a truly well-rounded Zhodani citizen, a psionic jack of all trades but master of none. His psionic abilities serve him well.

He is assigned exploration duty on a new world far beyond the borders of the Zhodani Consulate. Having landed his ship in a clear spot, he begins.

He is following a natural rock ledge path when he encounters an obstructing boulder Size-7. He needs to move it.

To Move an Object

Distance (nD) < Move [+Direct/Self] [-Remote] -Size^2

It only needs to move a short distance R=1. Difficulty=1D. He can apply Move=7 +Direct=18 minus Remote-1 minus Size^2=49 =25 -50 =-25 He needs to roll minus 25 on 1D. He cannot do it; he realizes it, and so doesn't even try.

Perhaps he can shift energy (in the form of Speed) to the Boulder, but, no, that would be much the same, with an additional subtraction of Speed^2. Instead, he uses his walking stick to lever it away.

Somewhat later, he encounters a gap in the path ledge about 50 meters wide (R=2) and greater than he can leap. He considers levitating around it.

To Move an Object

Distance (nD) < Move [+Direct/Self] [-Remote] -Size^2

He is going to move himself about 50 meters R=2. Difficulty=2D. He is Size-5. He can apply Move=7 +Self=17 minus Size-5^2=25 =24 -25. He needs to roll minus 1 on 2D. This won't work. Perhaps teleportation?

To Teleport an Object

Distance (nD) < Teleport [+Direct/Self][-Remote]-Size^2

He is going to teleport himself about 50 meters R=2. Difficulty=2D. He is Size-5. He can apply Teleport-7 +Self-17 minus Size5^2= 25. This won't work either.

Wait. Cautious might work. Difficulty=1D. He can apply Teleport-7 +Self-17 minus Size5^2= 25. 7+17=24-25=-1. It still won't work. He needs to backtrack and find another path.

Note that, at this point, Enaj has not actually performed any Psionics.

As he makes his way back, he finds his path blocked by a snowcat, the sort of cold environ predator that explorers encounter. Distance R=2. Snowcat Size-4. Mental Size-3 (Simple Thoughts). He reflexively reaches out to touch its mind, the sort of reaction he has had since he first learned this technique as a schoolboy.

To cloud other minds

Distance (nD) < Psi [+Direct/Self] [-Remote] -Mental Size^2 -[Psi-Shield]

R=2. Difficulty= 2D. Psi=7 +Direct18 -Remote-2 -Mental Size-3^2=9. He must roll 7+18 -2 -9= 14 on 2D, which is automatic. Because the result is automatic, he does not need to Check Endurance.

The animal is momentarily dazed. Enaj walks to the animal. He sees that the beast has an injured paw, which in turn has made it difficult for it to hunt prey. Enaj decides to help.

First, the beast is cold and needs to be warmed up.

To EShift Energy into an Object

Value (nD) < EShift +Direct/Self [-Remote] -Size^2- Value^2

The beast is cold Temp= -1, and needs warming to 0. Difficulty=1D. The beast is Size-4. The hits inflicted by a temperature rise from -1 to 0 is Hits-1. Enaj can apply EShift-7 +Direct-17 minus Hits^2=1 minus Size^2=16 = 7+17-1-16= 24-17= 7. He needs to roll 7 or less on 1D. He reaches out and touches the beast: it stops shivering.

He has performed a Psi Action. Check Endurance (2D). He has End-7; he rolls 9 and feels a wave of fatigue. He slumps down unconscious for 1D minutes. He rouses, his head on the beast's furry side. His attention level has declined from Optimal to Ordinary.

Now to the injured paw. The injury (from BTSD) is Common= 3D or about 10 Hits. He can see Wound Severity; he can ignore Wound Diagnosis. This will take some effort.

The Healing/Hurting Touch

Hits (nD) < Touch +Direct/Self [-Remote] -Hits^2

He needs to heal 10 Hits which calls for 10D. He can apply 7+17 -100 = -76, but he didn't bring his Psi-Amplifier with him. He'll need to break this task down.

He begins with 4 Hits making the task Difficulty=4D. He can apply Healing Touch-7 +Direct-18 minus Hits^2= -16. He needs to roll 25-16= 9 or less on 4D. He tries and fails.

He has performed a Psi Action. Check Endurance (2D). He has End-7; he rolls 6 and is unaffected.

He's going to have to do this more cautiously. He works on 3 Hits. Difficulty=3D. He can apply Healing Touch-7 +Direct-18 minus Hits^2= -9. He needs to roll 25-9= 16 or less on 3D. He applies Caution, which is 16 or less on 2D, which is automatic. He heals 3 Hits.

[Why didn't he do this to begin with?

He repeats this twice more and the animal is nearly restored to health. Each effort took about ten minutes, so a little under an hour has past.

As he finishes up, Enaj happens to brush his belt with his hand and realizes he could have used PsiDrug from his belt pouch. (Alternative: he takes a PsiOne tablet, and his Direct and Self double to 36 and 34).

The beast starts to rouse, and he again clouds its mind, leaving it sleeping but back to full health. The effort is automatic; no Check Endurance is required.

Moving toward his ship by a roundabout path, Enaj comes upon stream he needs to cross: actually to ford. It is



shallow and can be waded. At about the middle, he feels a tug at his ankle, then a bite: it's a small water-beast making a sudden attack. Size-3. Mental Size-2.

He reflexively reacts Cloud Other Mind. He is in Contact. R=0. Difficulty=1D.

Distance (nD) < Psi [+Direct/Self] [-Remote] -Mental Size^2 -[Psi-Shield]

He can apply 7+17- MS^2=4 -Psi-Shield-30 = 24-30=-6. He fails (he reacted as a reflex without thinking; that Psi-Shield was a surprise). Check Endurance 7 or 2D. He fails, and falls into unconsciousness for 1D=4 hours.

He awakens at Attention Level= Tired. He has Hours=Endurance=7 until he will need to sleep. He finds can't see and he can't move: he is encased in a strong trapper web; immobilized. The water beast seems to be saving him to eat later and so carried him away from the water.

Where is the water-beast? Enaj considers reaching out.

To Read Other Mind (v2)

Distance (nD) < Mentation +Direct/Self[-Remote] -MS^2- [Psi-Shield]

He can't just randomly try Read Other Minds; if he fails, he'll end up asleep for hours. He can't move; not even enough to reach a RestoreOne pill from his belt. Where is that water-beast?

His ship is about 5 kilometers away R=6. He can envision that in his mind.

To Teleport an Object

Range (nD) < Teleport +Direct/Self [-Remote] -Size^2

Difficulty is 6D. He has 7+17-25=-1. If only he had his Psi-Amplification Device, then it would be 7+170-25=automatic. Or if he could reach his PsiOne tablet, it would be 7+34-25=20 on 6D.

The Referee prompts him: Check Intelligence. He rolls 9 and fails. [What? Nothing, the referee replies, not suggesting teleporting the PsiOne table to his own mouth R=0 Difficulty =1D. 7+18-Size^2=1 =25-1=24 which would be automatic].

But Enaj has an idea.

To Travel Out Of The Body

Range (nD) < OOB +Direct/Self [-Remote]

Let's assume the water-beast is not too far away. R=5. He has 7+17 -Remote5 =24-5=19 on 5D (or about 69% chance of success). The Referee interjects here: Check Intelligence: roll 7 or less on 2D. Enaj's player rolls and succeeds. The Referee advises: make the action Cautious.

Enaj faces 7+17-Remote-5 -Cautious minus 1 (for Attention Level=Tired) = 18 on 4D (about 90% chance of success). Enaj tries and succeeds.

His body falls into a trance. Enaj's consciousness moves out of the body, passing through each Range Band in about

a minute. At R=1 he sees a dimly-lit chamber littered with stick and bones. At R=2 he sees a warren of tunnels, some flooded; sothers dry. At R=3 he sees the surface and the edge of the stream he recently crossed. At R=4 he sees the stream itself, and the water-beast lurking at the ford. At R=5 he sees the snowcat resting comfortably in its den.

Enaj begins his retreat to his body; as he draws nearer, he sees the chamber he missed before: swarming over an immobilized carcass are dozens of water-beast young, feasting on the meat its mother has carefully left for them.

If only, Enaj thinks, he had concentrated in Mentation. If he had all his ability in Mentation =7x6=42, he could take on the water-beast.

To Control Other Mind

Distance (nD) < Mentation +Direct/Self [-Remote] -MS^2- [Psi-Shield]

The water-beast is at R=4. Difficulty is 4D. Mentation=42. Direct=18. Remote=4. MS-2^2=4. Psi-Shield=30. He needs to roll 42+18-4-4-30= 60-38= 22 on 4D, which is automatic. But he only has Mentation-7, which is 35 less than that.

What about the snowcat? An operator in OOB cannot interact with physical objects except through Psionic abilities.

To Control Other Mind

Distance (nD) < Mentation +Direct/Self [-Remote] -MS^2- [Psi-Shield]

He returns to the snowcat. R=0. Difficulty=1D. Mentation-7. Direct-18. Remote-0. Snowcat Mental Size-3.

He has 7+18-0-3^2=9 = 25-9=16. Rolling on 1D is automatic. Enaj controls the snowcat's mind while accompanying it OOB. He directs the snowcat to the water-beast: attacks it and kills it. He then directs the snowcat to the burrow, where it digs into the tunnel, widening it to fit. When the snowcat reaches Enaj's immobilized body, it slashes the wrappings (clumsily perhaps, but no matter) freeing him.

Enaj collapses the OOB and returns to his own body; he immediately fishes out a RestoreOne tab and swallows it, eliminating Fatigue and restoring him to Attention Level=Optimal. He is alert, with a slightly confused snowcat standing over him. He reaches out reflexively and Clouds its mind. He gets up, drags the snowcat out behind him, and glories in returning to the warm rays of the setting starsun.

Enaj learned long ago to give value for value received. He touches the head of the snowcat.

To Tell Other Mind

Distance (nD) < Mentation +Direct/Self[-Remote] -MS^2 - [Psi-Shield]

R=0. He has 7+18-0-9-0= 16 on 1D. He succeeds in planting glowing happy thoughts in the mind of the snowcat.

And now, back to the ship, to heal the claw scratches on his arms, and settle in for some well deserved rest.



---

## WISEMAN'S GUIDE TO SOPHONTS

### ISS, Encyclopediapolis, 1107

---

The preferred guide to the intelligent species of the Imperium (and beyond) is published by the Imperial Interstellar Scout Service as a continually updated database with a hardcopy option.

The following are standard concepts used by the Imperial Interstellar Scout Service for classification of sophonts.

**Sentient.** Endowed with feeling and unstructured consciousness; generally aware and capable of action and reaction, but guided more by instinct and desire than by structured thought or planning. Able to adapt effectively to the environment, either by making a change in oneself or by changing the environment or finding a new one. Sentience is often called animal intelligence. A tiger, a goat, and a gazelle are all sentient. From the Latin for feeling.

**Sapient.** Possessing intelligence: the mental ability to reason, think abstractly, comprehend ideas, and learn. Generally capable of being educated and achieving insights. Sapient and sophont are synonyms, but sapient generally has a lower threshold. The traditional usage: sapients are (still) bound to their original homeworld. Sapients are intelligent. From the Latin for wise.

**Sophont.** Possessing intelligence: the mental ability to reason, think abstractly, comprehend ideas, and learn. Generally capable of being educated and achieving insights. Sapient and sophont are synonyms, but sophont generally covers a broader range. The traditional usage: sophonts have traveled to the stars and have presences on other worlds. Sophonts are intelligent. From the Greek for wise.

---

---

## RATES OF NATIVE INTELLIGENT LIFE

There are four general rates of occurrence of NIL:

**Human Only.** The universe is home to only one intelligent species: the Humans of Terra. All intelligent life to be encountered is Human. Asimov's Foundation series envisions a galaxy spanning civilization composed entirely of humans.

**Everywhere NIL.** On every world on which Native Intelligent Life is possible, it has occurred (and is extinct) or has moved to a higher plane), has occurred (and is currently present), or will occur (perhaps with proto-sophonts currently in the biome)

By rough count, half of all worlds produce NIL.

**Rare NIL.** Although many worlds are possible homes to NIL, the actual rate is about 1 per sector.

**Reasonable Numbers.** NIL occurs on about one world per subsector, perhaps 15-20 per sector, with evidence of an equal number of vanished, extinct, or proto-sophonts.

---

## SCHROEDINGER'S NATIVES

Before the universe of the Imperium was fully explored, every habitable world was potentially inhabited: possibly the home to NIL Native Intelligent Life. As explorers reached out and each individual world was contacted, the probability waveforms collapsed and the one true Reality made itself known:

◆ On some of these worlds, there once **was** a NIL which developed and matured, but it has since become extinct.

◆ On others, there **is** a sort of proto-NIL with the potential to someday rise to join the ranks of the civilized sophonts.

◆ On a few, NIL simply **never will be**.

◆ On still others, there are signs that outsiders one time (or more) visited this world and stayed awhile.

◆ But on some (the precise rate of which is in dispute) NIL evolved on the world and can be encountered.

The **Traveller Sophont Creation System** stands ready to generate a true sophont species when the need arises.

---

The **Traveller** universe is filled with non-human sophonts. Many can be created using the **Traveller Sophont Creation System**. The result is a completed **SCS Sophont Creation Card**: by which a player can generate sophont characters (both player-characters and non-player characters).

Sophont creation is based on two far-reaching assumptions:

**Intelligent Non-Humans.** This system generates sophonts: intelligent races who exist in roughly the same planetary environments as humans. They breathe atmospheric gases (or water) normally found on human-inhabited worlds and they can live in roughly the same environments.

**In Interstellar Society.** Sophonts created by this system live within the greater social and economic structure of interstellar society; they compete with everyone else (including humans) for jobs and positions in that society. Members of the created race can pursue careers in the same way that any human character does. Members of the race can be player characters.

## THE PURPOSE OF THE SOPHONT CREATION SYSTEM

The purpose of the **Traveller Sophont Creation System** is to provide a variety of non-human characters to populate the **Traveller** universe. Explorers visiting a world find it populated with non-humans unlike those on neighboring worlds; merchants trading with a world encounter unique non-humans to deal with; passengers on a starship find a variety of strange and fascinating fellow passengers.

Each use of TSCS creates a unique intelligent race for **Traveller**. The results are recorded on a Sophont Creation Card (the process does not create a character: it records the information needed to later create one or more characters for this specific race).

TSCS is a dice-driven random process, but it can also be used as a deliberate system: the user can select elements to achieve specific results.

All of the details of Sophont Creation allow the creation of characters which use the same rules as apply to humans (more or less) in **Traveller**.

**Other Information.** This **Traveller Sophont Creation System** necessarily refers to other information, rules and charts from **Traveller**. Worlds are more fully created and defined elsewhere. Character generation is more fully detailed elsewhere. While this process strives to be complete, this chapter cannot contain all relevant information, and other chapters may need to be consulted.

## WHAT TSCS DOES NOT DO

The **Traveller Sophont Creations System TSCS** cannot create all possible sophonts or address all possible situations. Clearly, a referee can imagine an alien lifeform which falls outside the range of sophonts created here.

TSCS does not create non-physical bodies, fantasy creatures, beings suited for environments well outside the range tolerable to humans, or many other unusual circumstances that are beyond the scope of this work

## TERMINOLOGY

The following terms are commonly accepted.

**Species** is a biological classification of beings which share the same genetic and thus biological structures.

Dog (*Canis lupus*) is a species; Humanity (*homo sapiens*) is a species.

**Race** is a fuzzy term for intelligent species. Humanity is a race; the Solomani, Vilani, and Zhodani are variously considered independent races and subraces within Humanity. Aslan is a race; Vargr is a race. Less frequently, race refers to subdivisions within an intelligent species. For non-intelligent species, the equivalent term is breed or subspecies (poodle and spaniel are breeds within the species dog).

**Alien** (as expressed from the human point of view) is any non-human intelligent species. On the other hand, because non-humans think of humans as aliens, a less point-of-view term is required: we use the term *sophont*.

**Sophont** is any intelligent species. If the species has never ventured beyond its homeworld, the alternative Sapi-ent is often used.

## The Major Races

Interstellar society applies the term Major Race to sophont civilizations which have independently invented/developed/discovered jump drive. Because such civilizations also become prominent over large regions, Major Race also refers to the relative power or importance of the species.

**The Minor Races.** By default, any sophont civilization which is not Major is Minor. Minor races most likely do not venture far from their homeworld; they are typically encountered on their homeworlds, a few neighbor worlds, and in other systems within 10 parsecs of their homeworld.

## Native Status

The inhabitants of a world are classified by a variety of factors: some are true natives who originated and evolved on the specific world; others have arrived from other places.

**Corporate** (World Government = 1 [regardless of Popu-

lation]). The world is primarily occupied by a business enterprise. The local sophonts probably evolved on some other world; some locals may have been born elsewhere; many were probably born here.

**Colonists** (World Government = 6 [regardless of Population]). The world is a colony; its inhabitants are called colonists. The local sophonts evolved on some other world; depending on the age of the colony, some locals may have been born elsewhere; many were probably born here.

**Transients** (World Population = 1-2-3). Locals that live on this world originated elsewhere. Their reasons for being on the world may be mercantile, corporate, academic, investigatory, or military. The population may include many different sophont species all of which originated elsewhere.

**Settlers** (World Population = 4-5-6). Locals are individuals who have settled on the world but do not as yet meet the criteria for colonists. The population is dominated by one (possibly two) sophont species which originated elsewhere.

**Transplants** (World Atmosphere = 0-1; Population 7+). The sophonts of this world evolved elsewhere, but have lived

here long enough to establish a large, viable population.

**Natives** (World Population 0 or 7+; Atmosphere = 2+). Locals evolved on this world; they are not Settlers, Transients, Colonists. It is conceivable that Natives are not locally evolved; they may have arrived from afar evolutionary eons previous.

**Exotic Natives** (World Atmosphere = 9+). Natives on a world with Atmosphere 9+ are Exotic: local environment makes these sophonts incompatible with traditional human environments. When they travel beyond their world, they require specific environmental support for breathing gases.

**Extinct Natives** (World Population = 0; TL= 0). Sophonts evolved on this world but have since died out; very little is known about their society and culture. The term can also apply to Exotic Natives.

**Catastrophic Extinct Natives** (World Population = 0; TL= 1+). Sophonts evolved on this world but have since died out; there remains some evidence (roads, buildings, ruins, artifacts) of their civilization. The details of the catastrophe which brought about their extinction may or may not be known. The term can also apply to Exotic Natives.

**Vanished Transplants** (World Atmosphere = 0-1, Population= 0, TL= 1+). Settlers who evolved elsewhere settled this world many years ago, and have since died out; there remains some evidence of their presence.

NATIVE STATUS																	
		Vacuum	Trace	Vthin Tainted	Vthin	Thin Tainted	Thin	Standard	Standard Tainted	Dense	Dense Tainted	Dense High	Ellipsoid	Thin Low	Exotic	Corrosive	Insidious
Atm=		0	1	2	3	4	5	6	7	8	9	D	E	F	A	B	C
=Pop	0	Extinct Natives*													EXN		
	0	VT	Catastrophic Extinct Natives*													CEXN	
Lo	1	Transients															
	2																
	3																
Ni	4	Settlers															
	5																
	6																
Hi	7	Natives													Exotic Natives		
	8																
	9																
	A																
	B																
	C																
	D																
E																	
F	Transplants																

**HOW DO WE IDENTIFY A SOPHONT?**

It's easy to create a name for a race of Sophonts (really no more than a random word); the standard reference to any specific Sophont is the Sophont LongName: the species name of the Sophont accompanied by the homeworld name and its homestar and orbital data. For example,

- The Solomani of Terra (Sol 3 [G2 V])
- The Urdushkha of Irdi (Irluush 5 [F4 V])
- The Zhodani of Zhdant (Pliebr-2 [K0 V])
- The Geonee of Shiwonee (Alliana-5 [F7 V])
- The Humans of Terra (Sol-3 [G2 V])
- The Aslan of Kusyu (Tyeyo-3 [G4 V])
- The Hivers of Guaran (Primary- 2 [K1 V])
- The K'kree of Kirur (Gzang-5 [F1 V])
- The Vargr of Lair (Kneng-3 [G5 V])
- The Cassildan of Ambemsham (Krof-0 [M3 V])
- The Lllelweyloly of Junidy (Lhininin-5 [F7 V])
- The Bwaps of Maharaban (Glowl-2 [G4 V])
- The Virushi of Virshash (Thintle-6 [F9 V])

**Non-Natives.** Some worlds have a substantial population of non-native sophonts. Where they live as a group on a world, they are identified as "from" if they are not on their current homeworld. For example, there is a substantial Terran settlement on a world orbiting Vega: they are identified as

The Solomani from Terra (Sol 3 [G2 V])

\*TL=0. \*\* TL=1+.  
 VT= Vanished Transplants. EXN= Exotic Extinct Natives.  
 CEXN= Catastrophic Extinct Exotic Natives.  
 Gov=1 Corporate. Gov=6 Colonists.

## 01 THE SOPHONT CREATION CHECKLIST

The Sophont Creation Checklist supports the creation process. There is no requirement that every step be performed in order; the designer may address specific steps as needed.

## 02 THE SOPHONT CREATION CARD

Centralized record keeping for Sophont Creation is provided by the Sophont Creation Card (SCC). The two-sided card records the details of the Sophont, and contains the reference tables for creating sophont characters.

## 03 THE FILLFORM

The Fillform is a worksheet for Sophont creation to assist in making it a smooth process.

## 04 HOMEWORLDS

The Homeworlds Chart details the creation of the native star system and world for the Sophont.

**Pre-Existing Information.** If information on the homeworld and homestar is available, it may be used. It should conform in structure to the information generated here.

**Plausible Homeworlds.** A homeworld is plausible if it has Atmosphere 2 through 9 and a Population of 7+.

### Stars

Stars are identified by Spectral type and Size in the format G2 V, where G is the Spectral Type (in the sequence OBAFGKM), 2 is the Spectral Decimal (in the sequence 0123456789), and V is the Size (in the sequence Ia-Ib-II-III-IV-V-VI-D).

This creation page ignores multiple stars. If present, they are lesser than the HomeStar and of no real importance in the Sophont Creation process.

**Naming and Identifying Stars.** A star is typically named and identified. For example,

Sol [G2 V]

### Worlds and Orbits

The location of the homeworld in the system is important. Worlds may be planets (orbiting the star) OR satellites (orbiting a planet).

Worlds are identified by their name or by their starname and orbit. Planet orbits are numbered in the sequence 0-1-2-3-4-5-6-7-8-9-10-11-12. For example,

Terra (Sol 3)

Satellites are identified by their name, or by their starname plus the orbit of their planet and the satellite orbit. Satellite orbits are identified by alphabetic letters in the sequence: Ay-Bee-Cee-Dee-Ee-Eff-Gee-Aitch-Eye-Jay-Kay-El-Em-En-Oh-Pee-Que-Arr-Ess-Tee-Yu-Vee-Dub-Ex-Wye-Zee. For example,

Luna (Sol 3 Em)

**The Habitable Zone HZ.** The Habitable Zone Orbit

## AN OVERVIEW OF SOPHONT CREATION

The TSCS process proceeds through several pages of numbered charts:

**Introduction.** This text introduction is an overview of the TSCS **Traveller** Sophont Creation Process and its creation of intelligent species.

**01. The Sophont Creation Checklist** recapitulates the steps necessary to create a Sophont species, including references to the numbered charts. It serves as a guide to the process.

**02. The Sophont Creation Card** records the information needed to generate a **Traveller** character from the created species.

**03. The Sophont Creation FillForm** is a worksheet for recording and calculating in the details of a Sophont. Ultimately, this information is transferred to the Sophont Creation Card and supports creation of characters.

**04. Basics and Homeworld** creates a plausible homeworld and determines the environment in which the race evolved. Alternatively, more detailed information can be produced using the World Generation System, or an existing world can be used.

**05. Environment** selects the homeworld terrain and environmental conditions in which the sophont evolved.

**06. Characteristics** determines the personal characteristics for the species.

**07. Caste** (if the species has Caste as a characteristic) determines the details of the species caste structure. This page is skipped if the race does not have Caste.

**08. Gender** determines the species gender structure and its effects on sophont creation.

**09. Life Stages and Aging** determines the stages of life through which individuals of the species pass: from infancy to retirement. This information is used to determine the lifespan and the effects of aging.

**10. Senses** determines the specific senses the species has and how the senses function.

**11. Sophont Body Structure** determines the basic physical structure (symmetry, number of limb groups, location of the brain case, and location of the senses) of the race. It also determines details of appearance (armor, skin appearance, natural weapons, and body fluids) of the race. These details may or may not be of any use in most play. Many are for background detail.

**12. Special Abilities** determines the presence or absence of special abilities, with availability to the race as a whole, or to select genders or castes. This chart also contains the skill lists for Skill-based Caste.

**13. Manipulators** illustrates the abilities of the manipulators assigned under 11 Body Structure.

**14. Size** provides the ability to calculate the average or expected size for the sophont based on characteristics. For reference, the standard Size for Human = 72.

**15. Size and Bulk** provides charts for calculating approximate sophont height based on the Size charts.

**16. Uniques** suggests structures for those rare sophonts who have unique or non-standard abilities, or which are exceptions to this overall Sophont Creation System.



## CASTE EXAMPLE ROLLS

	02	03	04	05	06	07	08	09	10	11	12
Ay	0	0	0	0	0	x	0	0	0	0	x
Bee	-5	-4	-3	-2	-1	x	0	+1	+2	+3	x
Cee	+5	+4	+3	+2	+1	x	0	-1	-2	-3	x
Dee	0	+1	-1	+2	-2	x	+3	-3	+4	-4	x

This is a set of example rolls to help understand Caste Creation. Each row is a pregenerated set of Flux rolls used in the example. The first row [Ay] is a constant roll of zero [column 7 does not need a roll]. Bee starts at -5 and works its way up; Cee works its way down. Dee is random.)

The rolls create the results below:

### Specimen Caste for the Ay, Bee, Cee, and Dee

2D	F	Entry	Ay	Bee	Cee	Dee
2	1	K02	Muscle	Healer	Claw	Muscle
3	2	K03	Muscle	=Gender	=Special	Muscle
4	3	K04	Muscle	Antibody	Voice	Memory
5	4	K05	Muscle	Sensor	Muscle	Muscle
6	5	K06	Muscle	Memory	Muscle	Sensor
7	6	K07	Muscle*	Muscle*	Muscle*	Muscle*
8	5	K08	Muscle	Muscle	Muscle	Voice
9	4	K09	Muscle	Muscle	Memory	Antibody
10	3	K10	Muscle	Muscle	Sensor	=Special
11	2	K11	Muscle	Voice	Antibody	=Gender
12	1	K12	Brain*	Brain*	Brain*	Brain*

F= Frequency: the number of times this entry is expected to occur out of 36 rolls. \* Automatic Entry.

For example, in the process of creating four different Sophonts (call them the Ay, Bee, Cee, and Dee), each has Body Caste Structure. For each of the four, the creator rolls Flux for each entry. He will need nine rolls for each Sophont. The (example) rolls are shown in the table.

These tables are used in Character Generation; a player creating an individual sophont character for the Ay Bee Cee or Dee would use the corresponding table to determine the Caste for the character:

**Ay** caste characters are almost all Muscles. One in 36 is a Brain.

**Bee** caste characters have a one in 36 chance (entry 02) of being a Healer. They have a dedicated gender member at Die Roll=3.

**Cee** caste characters have a one in 36 chance of being a Claw (some sort of warrior) (entry 02). Note that they have Special caste at Die Roll=3 (which is then determined from the Special column).

**Dee** caste characters have a 12 in 36 (1 in 3) chance of being a Muscle (entries 02, 03, 05, 07). They have both a special and a gender entry.

Table shows the orbit number for the Habitable Zone, which is the orbital distance at which a typical world experiences temperatures and climate hospitable to humans and similar sophonts.

A world which is in the HZ (noted as HZ=0 or simply HZ) is Temperate. It has a range of temperatures, but the world is generally hospitable or habitable.

A world which is one orbit closer to the star (HZ= -1) is Hot; circumstances such as albedo and greenhouse effect lessen the heat effects to allow the world to be habitable,

although it is at the upper temperature limits of human habitability. A world closer than HZ= -1 is too hot for routine occupation (unless in Orbit 0 or 1 with a habitable Twilight Zone).

A world which is one orbit farther from the star (HZ= +1) is Cold; albedo and greenhouse effects may lessen cold effects to allow the world to be habitable, but it is at the lower temperature limits of human habitability. A world farther than HZ= +1 is too cold for routine occupation.

Satellites are classified for habitability based on the orbit their planet or gas giant occupies.

## Natives

If a world has Population 7 or higher and Atmosphere 2 through 9, it has a Native population and is suitable for Sophont Creation.

**Extinct Natives.** If a world has Atmosphere 2 through 9 and Population 0, then a Native Population can be created, but it is Extinct. There may be ruins (ranging from rare and faint to common and near-intact) of the extinct sophonts scattered about the world.

**Exotic Natives.** If a world has Atmosphere A+ and Population 7+, its Natives are Exotic. They breathe exotic atmospheric gases and require protective suits and breathing gases in human friendly environments.

**Special Cases.** There is also always the chance that the native population is in decline (less than Pop=7), or undiscovered (probably less than Pop=7) in remote terrain.

## Non-Natives

Sophonts of a world may be non-native, including Transients, Settlers, Colonists, Corporate, and Transplants.

# 05 NATIVE ENVIRONMENT

The Native Environment page details the evolutionary origins of the Sophonts: the terrain in which they evolved, and the type of locomotion they use, and the ecological niche their forebears occupied.

## Native Terrain and Locomotion

The native terrain for the Sophonts provides insights into the origins of the species, and influences the type of locomotion it uses.

**Terrain.** Eleven terrain types are specified. If the world has a Twilight Zone, special terrain types are allowed.

**Locomotion.** The system of movement for the Sophont is detailed, and it influences the physique of the Sophont.

## Ecological Niche

Ecological niche shows position in the food chain.

# 06 CHARACTERISTICS

Characteristics details assignment of Sophont physical, mental, and social characteristics. Determine separately the number of dice rolled for each Characteristic.

**Humans.** Human characteristics Str, Dex, End, Int, Edu, and Soc are rolled with 2D.

## Big Sophonts

If a characteristic is rolled with more than 2D, use 12 for

## ROLLING BIG SOPHONT

### CHARACTERISTICS

Ch	Roll	Range
2D	2D	2 - 12
3D	3D	3 - 18
4D	12 + 2D	14 - 24
5D	12 + 3D	15 - 30
6D	12 + 4D	16 - 36
7D	12 + 5D	17 - 42
8D	12 + 6D	18 - 48

IF the value is 4D 5D 6D 7D 8D, use base value 12 for the first 2D.

the first 2D instead. For example, for a sophont rolling Str = 4D, the actual roll is 12 + 2D.

## 07 CASTES

The Castes page details the structure of Castes for the sophont. If Characteristic C6 does not equal

Caste, this species does not have Caste, and this page is skipped.

**The Central Concept.** The Caste Creation process creates a Caste Generation Table with entries 02 through 12; when the SCC Sophont Creation Card is used to create individual characters, this table is used when determining individual Caste for a character.

### What Does Caste Mean?

The presence of Caste in a sophont species defines the variety of roles which casted individuals play with the greater society of the species. Castes are expressed or described as metaphors which define specific roles and provide guidance to referees and players).

For example, within the Body Caste, each caste role replicates a function within an organic body: muscles work; sensors acquire information, voices communicate with other groups, and brain directs and leaders. Under the Caste Table Creation chart, it is also possible for some of these functions to be absent.

**Caste Effects.** Within the context of this system the precise definition of what each caste role means is left to the players and referee.

However, the Caste-Based Differences table imposes some differences (in Characteristics) for each of the Caste roles within a sophont species.

## 08 GENDER

The Gender page details the structure of Genders for the sophont. Information about Gender is recorded on the back of the SCC. The term Gender conveys a combination of social, cultural, and reproductive concepts not fully conveyed by the term Sex.

**The Central Concept.** The Gender Creation process creates a Gender Generation Table with entries 02 through 12; when the SCC is used to create individual characters, the Gender Generation Table is used when determining individual Gender for a character.

**Many Possibilities For Gender.** The tables provide several standard structures for gender: Solitaire, Female-Male, Female-Male-Neuter, Egg Donor-Activator-Bearer.

In addition, the table provides structures labelled simply with numbers: One-Two-Three-Four-Five-Six. The process may produce a structure in which one or more of the numbers has dropped out (conceivably a situation with only genders Three and Five). The details of such gender structures remains to be defined only as needed.

## GENDER EXAMPLE ROLLS

	02	03	04	05	06	07	08	09	10	11	12
Ay	x	x	0	0	0	0	0	0	0	0	0
Bee	x	x	-5	-4	-3	-2	-1	0	+1	+2	+3
Cee	x	x	+5	+4	+3	+2	+1	0	-1	-2	-3
Dee	x	x	0	+1	-1	+2	-2	+3	-3	-4	-4

This is a set of example rolls to help understand Gender Creation. Each row is a pregenerated set of Flux rolls used in the example. The first row [Ay] is a constant roll of zero [column 7 does not need a roll]. Bee starts at -5 and works its way up; Cee works its way down. Dee is random.)

The rolls create the results below:

### Specimen Gender for the Ay, Bee, Cee, and Dee

2D	F	Entry	Ay	Bee	Cee	Dee
2	1	K02	Female*	Female*	Female*	Female*
3	2	K03	Male*	Male*	Male*	Male*
4	3	K04	Female	Female	Male	Female
5	4	K05	Female	Female	Female	Male
6	5	K06	Female	Female	Male	Male
7	6	K07	Female	Female	Male	Male
8	5	K08	Female	Male	Male	Female
9	4	K09	Female	Female	Female	Male
10	3	K10	Female	Male	Male	Female
11	2	K11	Female	Male	Female	Female
12	1	K12	Female	Male	Female	Female

F= Frequency: the number of times this entry is expected to occur out of 36 rolls. \* Automatic Entry.

For example, in the process of creating four different Sophonts (we'll call them the Ay, Bee, Cee, and Dee), each with Dual Gender Structure. For each, the creator rolls Flux for each entry. He will need nine rolls for each Sophont. The (example) rolls shown in the table

These tables are used in Character Generation; a player creating an individual sophont character for the Ay Bee Cee or Dee would use this table to determine the Gender for the character:

**Ay** gender characters are predominately Female (out of 36, 3= Male; 33= Female).

**Bee** gender characters are approximately 2:1 female to male (out of 36, Male= 13; Female= 23).

**Cee** gender characters are 2:1 male to female (out of 36, Male = 24; Female= 12 ).

**Dee** characters (out of 36, Male = 21; Female = 15).

For example, the Rem from Opaph ( Mio 0 [ K7 V ] ) have a gender structure 36145 (rough percentages= One: 13, Three: 50, Four: 11, Five: 11, Six: 13). Note that Gender Two has evolutionarily dropped out. The explanation for the remaining Genders could be extremely simple (or it could be extremely complex).

## 09 LIFE STAGES

The Life Stages page recounts the progressive developmental periods of life. Life Stages are reckoned in Terms (of 4 years).

**Humans** begin life with a 2-year infancy (half Term) followed by nine Life Stages of two Terms each (=74 years).

**Non-Humans** may have have Life Stages of different lengths. Each Life Stage (after Infancy) may be as short as

zero Terms (effectively skipped) and as long as four Terms.

For example, a very-long-lived (and statistically very rare) Sophont could have all Life Stages four Terms (16 years) long. After its two-year Infancy, nine 16-year Terms gives the Sophont a life expectancy of 146 years or more. On the other hand, the very-short-lived (and also statistically rare) Sophont could roll ones on the Life Stage Duration table: for a two-year infancy, a one Term childhood, and a one Term Peak: giving a Life Expectancy of a mere 10 years.

## 10 THE SENSES

The Senses page determines the possible senses and their parameters for the Sophont. The senses are more specifically detailed in the Sense chapter.

Senses are identified by Strings of applicable digits that control precisely how a sense works.

**Vision.** The vision string includes a constant that controls Vision Actions and the three specific wavelengths (sometimes called colors, and ranging from the ultra-violet to the infra-red) which can be seen.

**Hearing.** The Hearing String includes a constant that controls Hearing Actions. It also shows the central sound frequency (and what frequencies on either side) that can be heard; and the central sound frequency (and side frequencies) use by the voice.

**Smell.** The Smell String includes a constant that controls smelling, and evaluates its sharpness. The characteristic scent for the Sophont is also created.

**Touch.** The Touch String includes a constant that controls the sense of touch, and evaluates its sensitivity.

**Awareness.** The Awareness String includes a constant that controls Awareness, and evaluates its acuity.

**Perception.** The Perception String includes a constant that controls Perception, evaluates its acuity, and gives strength to the ability express oneself in Perception Voice.

### Language Medium or Type

The Language used by a Sophont is dependent on the senses available. The tables determine the primary Language form for the sophont.

## 11 BODY STRUCTURE

The Body Structure page determines the essential structure of the sophont, including the location of the brain and senses, the number and types of limbs, and a variety of body features.

The tables are descriptive rather than rigorously genetic. Thus, Humans have a front Limb Group Arms and a Rear Limb Group Legs. An Ape might have two Front Limb Groups Arms to properly describe both sets ending in manipulators, but no Rear Limb Group.

## 12 SPECIAL ABILITIES

The Special abilities page determines special abilities available to the race as a whole, or to members of genders or castes.

**Within Genders.** Roll once on the Specials Table.

A result of None indicates the Sophont Species has no special ability differentiation by Gender.

One Ability (or Two Abilities) indicates that each Gender has specific Abilities. Each Gender independently rolls on Specific Abilities for its common Special Abilities. It is possible for a Gender to receive No Special Abilities on this table.

One Roll (or Two Rolls) indicates that individuals consult the Special Abilities table during Character Generation.

**Within Castes.** Roll once on the Specials Table.

A result of None indicates the Sophont Species has no special ability differentiation by Caste.

One Ability (or Two Abilities) indicates that each Caste has specific Abilities. Each Caste independently rolls on Specific Abilities for its common Special Abilities. It is possible for a Caste to receive No Special Abilities on this table.

One Roll (or Two Rolls) indicates that individuals consult the Special Abilities table during Character Generation.

For example, the Plexxan have two Genders: One and Three (for reasons not necessary here). During definition of the species, the Referee rolls on Specials 6= Two Abilities.

Gender One rolls twice on Specific Abilities 2= Column 2 and -3= Hibernate, followed by 3= Column 3 and -3= Memorize. All members of the Plexxan Gender One have the talents Hibernate and Memorize.

Gender Two rolls twice on Specific Abilities 5= Column 5 and -3= Blind, followed by 4= Column 4 and 0= No Special Ability. The Plexxan Gender Two is Blind.

### Special Ability Details

Special Abilities are subject to several details.

**Senses.** If the Sophont already has the sense shown, increase its Sense Constant +1D.

**Table D2.** The Table D2 result calls for a roll on the Caste Skills Table D2 individually during Character Generation. Skill level received equals Int.

**Non-Viable.** Some Special Abilities may make some Genders or Castes non-viable as adventurers.

## 13 MANIPULATORS

Manipulators assigned by Body Structure are shown. They affect the use of various devices and mechanisms.

## 14 SIZE

The Size chart shows formulae for calculating body size (volume and mass) for the Sophonts.

### Determining Average Sophont Racial Size

Count the number of dice rolled for the physical characteristics C1 C2 C3 (count Agi Gra Vig as half; count Sta as double). For sophonts generated with Str =3D or less, multiply by 12 for the typical body volume in liters and weight in kilograms. If Str is 4D or greater, multiply all three dice by (number of Str Dice x 12).

For example, a human rolls 6D (= 6 x 12 = ) 72 liters = 72 kilograms. We reasonably expect a typical human to be approximately 72 kilograms (or about 160 pounds).

For example, a Virushi rolls Str= 7D Dex= 3D End= 2D for a total of 12D. Because Str is 4D or greater, the multiplier is (12 \* 84=) 1008 liters = 1008 kilograms (=a little more than a ton).

## 15 SIZE AND BULK CHARTS

The Sophont Size chart and the Sophont Bulk chart show pre-calculated values for the determination of various beings dimensions. It is possible to interpolate within the charts for more accurate values.

## 16 UNIQUES

In order to take into account non-standard or unusual abilities, body structures, or body processes, the Uniques chart shows several possible concepts.

**Tech Level Caps.** Some sophont species are constrained by a genetic technological level cap: a restriction on the maximum tech level the species can attain absent outside influences.

Just as some (non-sophont) species can use tools, or build nests or lodges, or knap flints, some intelligent species are incapable of progressing beyond some specific techno-

logical level. When they reach that level, further progress becomes incredibly difficult.

Upon reaching the species TL Cap, the sophont culture begins a Long Plateau of static non-advancement.

## 17 PSIONICS

Some sophonts may vary in their ability to use psionics: the differences can be governed by gender, caste, characteristic, or senses. The tables provide a wide range of differences.

## 18 TECH LEVEL CAPS

Some sophonts are restricted in their native ability to understand technology, both in terms of maximum attainable technology, and in the ability to achieve paradigm shifts.

### **Why Aren't These Races Called Aliens?**

Humans see non-humans as aliens; but then again non-humans see humans as aliens. We need a word that conveys the idea of an intelligent species and aliens doesn't work. Extra-terrestrial (besides being too long) excludes those who live on Terra and most humans don't live on Terra anyway. Xeno (Greek for stranger) is basically a synonym for alien.

The term **sophont** (originated by Karen Anderson, and appearing first in works by Poul Anderson about 1966) fits the requirements: "an intelligent being more-or-less equivalent in reasoning power with humans." Accepted usage excludes machines unless they have true artificial intelligence (and not just exceptional processing power).

## AN UNCONVENTIONAL OVERVIEW OF HUMANITY

Even experts differ on the precise classification and description of sophonts. It is possible to describe a Sophont in alternate ways, each of which has its own validity. Compare the two descriptions below (variant texts emphasized).

### From *Wiseman's Guide To Sophonts* (Solomani Rim edition).

The Solomani of Terra (Sol 3 [G2 V])

HomeWorld Profile: Terra A877B99-D  
Terra (Sol-3) is a temperate world of a G2 V primary.

#### System Details

The Sol system contains 4 worlds (plus minor planets and satellites), four gas giants, and one planetoid belt.

#### Body Structure

The Solomani are Plains Walkers: generally adapted to and most comfortable in plains terrain. These sophonts originally occupied the Omnivore Hunter/Gatherer ecological niche. Solomani breathe Air-8.

The genetic profile is SDEIES. The Solomani have an average life expectancy of 74 years. On the standard Imperial Size spectrum, the Solomani are size ranked 72 .

#### Gender Structure

The Solomani have a Dual (technically FM) gender structure. The reported gender census (IISS Survey Report: 420-892) is Female: 51%, Male: 49%.

**Gender Based Differences.** Observed differences between genders roles include: none significant.

#### Caste Structure

The Solomani have no apparent caste; any differences within the species appear to be cultural in nature.

#### Sensory Abilities

The Solomani have a range of senses which includes Vision, Hearing, Smell, and Touch.

#### Special Abilities. Talents.

There is no indication of special abilities or talents.

### From *Sophontology Rethought* (Solomani Rim edition).

The Solomani of Terra (Sol 3 [G2 V])

HomeWorld Profile: Terra A877B99-D  
Terra (Sol-3) is a temperate world of a G2 V primary.

#### System Details

The Sol system contains 4 worlds (plus minor planets and satellites), four gas giants, and one planetoid belt.

#### Body Structure

The Solomani are Plains Walkers: generally adapted to and most comfortable in plains terrain. These sophonts originally occupied the Omnivore Hunter/Gatherer ecological niche. Solomani breathe Air-8.

The genetic profile is SDEIES. The Solomani have an average life expectancy of 74 years. On the standard Imperial Size spectrum, the Solomani are size ranked 72 .

#### Gender Structure

The Solomani have Group (technically 1234) gender structure. Reported gender census (draft) is One: 46%, Two: 44%, Three: 5%, Four: 5%, Five: <1%. Six: <1%.

**Gender Based Differences.** Observed differences between genders roles include:

One (corresponds to Female) is the baseline.

Two (corresponds to Male) is generally slightly stronger; slightly less dexterous; slightly less enduring.

Three (corresponds to Neuter [non-breeding; Male pattern. Gay]) is generally equivalent to Male.

Four (corresponds to Neuter [non-breeding; Female pattern. Lesb]) is generally equivalent to Female.

Five (corresponds to Neuter [non-breeding; Male pattern. Trans1]) is generally equivalent to Female.

Six (corresponds to Neuter [non-breeding; Female pattern. Trans2]) is generally equivalent to Male.

#### Caste Structure

The Solomani have no apparent caste; any differences within the species appear to be cultural in nature.

#### Sensory Abilities

The Solomani range of senses includes Vision, Hearing, Smell, and Touch.

#### Special Abilities. Talents.

There are reports that individuals are capable of Psionics at low levels (approximately 10% of the population).

There are unsubstantiated reports of individuals capable of Perception.

Supporting materials are filed at Encyclopediopolis on Reference, and at AAB data repositories throughout the Imperium.`



## SOPHONT CREATION

The Sophont Creation Process completes a FillForm worksheet and a Sophont Creation Card SCC which are then used as the basis for basic character generation of the Sophont.

The steps and the charts involved are detailed here.

**01. Introduction and Checklist** is this overview of the **Traveller Sophont Creation Process**.

**02. Sophont Creation Card** records the information needed to generate a **Traveller** character who is a member of the created species.

A. Prepare a blank SCC.

**03. Blank Fillform** provides a worksheet for the process.

A. Prepare a blank Fillform.

**04. Homeworld** creates a plausible homeworld.

A. Create a Homestar.

1. Flux Spectral Type (Sp).

2. Roll Spectral Decimal 0-9.

3. Flux Spectral Size.

B. Determine Habitable Zone.

C. Create Mainworld Orbit, HZ Variance, and Climate.

D. Is Mainworld a Planet or Close or Far Satellite.

1. Satellite Close or Far?

2. Satellite Orbit Letter.

E. Create Homeworld SAHPG.

F. Note Climate and Orbit

G. Determine Native Status.

H. Name the Homeworld and the Species (this step may be deferred).

**05. Environment** determines the evolutionary environment and ecological niche.

A. Flux Native Terrain.

B. Roll Locomotion.

C. Flux Ecological Niche and SubNiche.

**06. Characteristics** determines the species' six personal characteristics.

A. Sophont Characteristics. Flux for characteristic names on columns C1-C2-C3-C4-C5-C6.

B. Characteristic Values. Flux for Dice for each Characteristic on columns C1-C2-C3-C4-C5-C6.

**07. Caste.** If the race has C6= Caste as its social characteristic, then determine the details of the racial caste structure. Skip if the species does not have Caste.

A. Caste Structure. Roll Caste Type.

B. Caste Table Creation. Starting with FillForm Entry 2, roll on the Structure column for the specific Caste Entry.

1. Entry 7 = Common is automatically Flux=0.

2. Entry 12 = Unique is automatically Flux= +5.

C. Skilled Caste Table Creation. If Skilled Caste, for each Caste Entry, consult the Caste Skills List Short or Caste Skills List Expanded on Chart 12.

D. Caste-Based Differences.

E. Caste Shift.

F. Caste Assignment.

**08. Gender.** Determine gender structure of the species.

A. Gender Components.

1. Flux Gender Structure.

2. For each Entry 2 to 12 on the Gender Generation Table, Flux specific Gender.

B. Gender-Based Differences.

C. Gender Assignment.

D. Gender Shift.

E. Caste-Gender Relation. If the species has Caste, determine the relation between Caste and Gender (if any).

**09. Life Stages and Aging.** Note stages of life through which species members pass.

A. Determine the length of each Life Stage.

1. Enter ½ for Life Stage 0.

2. For each Life Stage 1 to 9, determine duration (in 4-year Terms).

B. Determine Life Expectancy (the sum of years for Life Stages 0 through 9).

**10. The Senses.** Determine the senses for the species.

A. For each sense, Flux to determine if present.

B. For each Sense present, Flux on the appropriate columns to create the Sense String.

C. Language Medium.

C. Generate the Racial Scent.

**11. Sophont Body Structure.** Determine the species' basic physical structure.

A. Body Structure.

1. Flux Symmetry.

2. Flux Head and Torso.

3. Based on Locomotion Type,

a. Flux Front Limbs.

b. Flux Rear Limbs.

B. Body Features.

1. Flux Skeleton.

2. Flux Fluids.

3. Flux Skin

4. Flux Weapon.

5. Flux Manipulators.

**12. Sophont Special Abilities.**

A. Determine if Caste Gender Special Abilities.

B and B1. Determine specific Special Abilities and adjust as required.

C1 or C2. For the Skilled Caste, roll for skills on one of the indicated tables.

D. For Voice or Poice, roll for specific type.

**13. Manipulators.** Note details of the manipulator use.

**14. Sophont Size.** Calculate sophont size.

**15. Sophont Height and Bulk Charts.** The charts facilitate calculation of the values.

**16. Uniques.** As desired, implement unique details.

**17. Psionics.** As required, determine psionics.

**18. Tech Level Caps and Paradigm Shifts.** As required, determine details of the species tech level ability.



# S-02

## SOPHONT CREATION CARD

Record and preserve the details of creating a specific sophont using this Sophont Creation Card T5-004.

SOPHONT CREATION CARD				Size:		
Sophont Name		Sophont Long Name			StarName and Orbit	
HomeWorld		UWP and Trade Classifications			HomeStar	
Native Status		Environ Roll	Overview		Life Expectancy	
Niche and Subniche		Genders	Symmetry		0	
Native Environment and Locomotion		Castes	Head		1	
Breathes		Racial Scent	Torso		2	
Characteristics	Senses		LimbGroup1 and Manipulators		3 CharGen Start	
C1 Str	Energy	Vision String	LimbGroup2 and Manipulators		4	
C2 Dex Agi Gra	Vibration	Hearing String	LimbGroup3 (and Manipulators)		5 Physical Aging	
C3 End Vig Sta	Volatiles	Smell String	LimbGroup4 (and Manipulators)		6	
C Int	Contact	Touch String	Tail		7	
C5 Edu Tra Ins	Fields	Aware String	Skeleton		8	
C6 Soc Cha Cas	Auras	Percep String	Skin	Body Fluids	9 Mental Aging	

SCS Sophont Creation Card

T5-004

### SOPHONT CREATION CARD (BACK)

G1- 1FE	C1	C2	C3	C4	C5	1FE	<b>2</b>	K02	C1	C2	C3	C4	C5
G2- 2MA						2MA	<b>3</b>	K03					
G3- 3NB						3NB	<b>4</b>	K04					
G4-							<b>5</b>	K05					
G5-							<b>6</b>	K06					
G6-							<b>7</b>	K07 Common					
Caste Assignment							<b>8</b>	K08					
Caste Shift							<b>9</b>	K09					
Gender Assignment							<b>10</b>	K10					
Gender Shift							<b>11</b>	K11					
Caste-Gender Relation							<b>12</b>	K12 Unique					

SCS Sophont Creation Card

T5-004



Sophont	
Homeworld	

**Homeworld**

<b>04</b>	A	HomeStar	
	B	Habitable Zone Orbit	
	C	Mainworld Orbit	
	D	Satellite Orbit	
	E	Homeworld SAHPG	
	F	Climate	
	G	Native Status	

**Environment**

<b>05</b>	A	Native Terrain	
	B	Locomotion	
	C	Niche/ Subniche	
	C	Breathes	
		Species Spectra	

**Characteristics**

<b>06</b>	A	GP=	C1	D=
	A		C2	D=
	A		C3	D=
	A		C4	D=
	A		C5	D=
	A		C6	D=

**Gender and Caste**

<b>07</b> <b>08</b>	Gender	2D	Caste
		2	
		3	
		4	
		5	
		6	
		7	
		8	
		9	
		10	
		11	
		12	

**Caste Differences**

<b>07</b>		C1	C2	C3	C4	C5	C6
	K02						
	K03						
	K04						
	K05						
	K06						
	K07	0	0	0	0	0	0
	K08						
	K09						
	K10						
	K11						
	K12						

**Gender Differences**

<b>08</b>		C1	C2	C3	C4	C5	C6
	G01						
	G02						
	G03						
	G04						
	G05						
G06							

**Details**

<b>15</b>	Size	
	10	Scent
	12	Special
	07	Castes
	07	Caste Census
	08	Genders
	08	Gender Census

**Life Stages**

<b>09</b>	A	0	Infancy	Half	= 2 years
	A	1	Childhood		
	A	2	Adolescence		
	A	3	Young Adult		
	A	4	Adult		
	A	5	Peak		
	A	6	Mid-Life		
	A	7	Senior		
	A	8	Elder		
	A	9	Retirement		
A		Life Expectancy			

**Senses**

<b>10</b> <b>12</b>	AB	Vision	
	AB	Hearing	
	AB	Smell	
	AB	Touch	
	AB	Aware	
	AB	Percept	
	C	Language Medium	
		Voice	
		Poice	

**Body Structure**

<b>11</b>						
	A	A-	B-	C D	E F	-G
	A	Symmetry				
	A	Tail				
	B	Skeleton				
	B	Fluids				
	B	Skin				
	B	Weapons				
	B	Manipulators				

**Comments:**





# S-04

## SOPHONT HOMEWORLD

### SOPHONT HOMEWORLD

Each sophont species originally evolved on a homeworld with a specific environment.

**04. Homeworld** selects or creates a plausible homeworld.

A. Homestar. Determine Spectral Type (Sp), Spectral Decimal 0-9 and Flux Spectral Size.

B. Habitable Zone.

C. Mainworld Orbit, Habitable Zone Variance, and Climate.

D. Note Planet or Close or Far Satellite.

E. Create Homeworld SAHPG.

F. Note Climate and Orbit

G. Determine Native Status.

H. Name the Homeworld and the Species (this step may be deferred).

## B HABITABLE ZONE ORBITS

	la	lb	II	III	IV	V	VI	D
O	15	15	14	13	12	11	-	1
B	13	13	12	11	10	9	-	0
A	12	11	9	7	7	7	-	0
F	11	10	9	6	6	5	3	0
G	12	10	9	7	5	3	2	0
K	12	10	9	8	5	2	1	0
M	12	11	10	9		0	0	0

Habitable Zone (HZ) orbit number indicates a world surface environment hospitable to humans and similar. Orbit 0 or 1 is a Tz Twilight Zone World.

## A HOMESTAR

Flux	Sp	O	B	A	F	G	K	M
-6	O	la	la	la	II	II	II	II
-5	OB	la	la	la	II	II	II	II
-4	A	lb	lb	lb	III	III	III	II
-3	A	II	II	II	IV	IV	IV	II
-2	F	III	III	III	V	V	V	III
-1	F	III	III	IV	V	V	V	V
0	G	III	III	V	V	V	V	V
+1	K	V	III	V	V	V	V	V
+2	K	V	V	V	V	V	V	V
+3	M	V	V	V	V	V	V	V
+4	M	IV	IV	V	VI	VI	VI	VI
+5	M	D	D	D	D	D	D	D
+6	M	D	D	D	D	D	D	D

Size IV not possible for K5-K9, M0-M9.  
Size VI not possible for A0-A9, F0-F4  
If Size= D, ignore Spectral Decimal.

## C MAINWORLD ORBIT

Flux	HZ	Var	Climate	TC
-6	-2			
-5	-1		Hot. Tropic.	Tr
-4	-1		Hot. Tropic.	Tr
-3	-1		Hot. Tropic.	Tr
-2	0		Temperate	
-1	0		Temperate.	
0	0		Temperate.	
+1	0		Temperate.	
+2	0		Temperate.	
+3	+1		Cold. Tundra.	Tu
+4	+1		Cold. Tundra.	Tu
+5	+1		Cold. Tundra.	Tu
+6	+2		Frozen.	Fr

Place Mainworld in Table B Orbit Number plus or minus HZ Var.  
DM+2 if Spectral M.  
DM -2 if Spectral O or B.

## D SATELLITE?

Flux	Satellite	Close*	Far
-6		Ay	En
-5	Far Satellite	Bee	Oh
-4	Far Satellite	Cee	Pee
-3	Close Satellite	Dee	Que
-2	Planet	Ee	Arr
-1	Planet	Eff	Ess
0	Planet	Gee	Tee
+1	Planet	Aitch	Yu
+2	Planet	Eye	Vee
+3	Planet	Jay	Dub
+4	Planet	Kay	Ex
+5	Planet	Eil	Wye
+6		Em	Zee

Is Mainworld Planet or Close or Far Satellite? Note Satellite Orbit Letter.  
DM+2 if Planet. DM - 2 if Satellite.  
\*Close Satellite is Lk Locked.

## E HOMEWORLD

Create the SAHPG

(Size, Atmosphere, Hydrographics, Population, Government) of the UWP Universal World Profile.

**S. Size.** Planetary Size: 2D-2.

**A. Atmosphere.** Flux + Size.

If Size =0, Atmosphere =0.

**H. Hydrographics.** Flux+ Atm.

If Size =0-1, Hyd =0;

If Atm =0-1 or A+, Hyd DM - 4.

Maximum A.

**P. Population.** 2D-2.

**G. Government.** Flux +Pop.

Convert negative values to 0

Size IV not possible for K5-K9 M0-M9.

Size VI not possible for A0-A9 F0-F4

If Size= D, ignore Spectral Decimal.

## F CLIMATE

Note Climate TCs

**Temperate.** Normal Human temperature range.

**Tr Tropic. Hot.** Upper limits of human temperature endurance.

**Tu Tundra. Cold.** Lower limits of human endurance.

**Fr Frozen.** Unsurvivable with out technological assistance.

**Tz Twilight Zone.** Tidally locked with Twilight Zone, plus a Hot and Cold Hemispheres.

**Lk Locked.** Close satellite (orbits Ay through Em) Locked to the planet. No Twilight Zone; day length equals satellite orbit length.

## G NATIVE STATUS

Pop Atm TL Inhabitants

0	2-9 DEF	0	Extinct Natives
0	ABC	0	Extinct Exotic Natives
0	2-9 DEF	1+	Catastrophic XN
0	ABC	1+	Catastrophic EXN
1-2-3	(any)	1+	Transients
4-5-6	(any)	1+	Settlers
7+	0-1	1+	Transplants
0	0-1	1+	Vanished Transplants
7+	ABC	1+	Exotic Natives
7+	2-9 DEF	1+	Natives

Gov=1. Corporate. Gov=6. Colonists.

Sophonts evolved on the Homeworld are Natives. Native sophonts are identified as "of" a homeworld. All other sophonts are identified as "from" a different (native) homeworld.



### A NATIVE TERRAIN

- 5 Mountain**  
Steep dominating region.

---

- 4 Desert**  
Dry region with sparse vegetation

---

- 3 Exotic**  
Strange abnormal region

---

- 2 Rough Wood**  
High density vegetation region.

---

- 1 Rough**  
Uneven or broken surface region

---

- 0 Clear**  
Flat extended region.

---

- +1 Forest**  
Flat with high vegetation

---

- +2 Wetlands**  
Water-dominated marsh

---

- +3 Wetland Woods**  
Water-dominated swamp

---

- +4 Ocean**  
Interface of sea and atmosphere

---

- +5 Ocean Depths**  
subsurface ocean regions

\*Preserve this die roll as the Environ DM

- 1 Baked Lands**  
Hot region.

- 0 Twilight Zone**  
Temperate region

- +1 Frozen Lands**  
Cold region

Substitute these native terrain names if the Homeworld is Twilight Zone or Locked.

### NATIVE ENVIRONMENT

The details of evolutionary environment shape Physiology and physical structure, locomotion, and ecological niche.

**05. Environment** determines the evolutionary environment and ecological niche.

- A. Determine **Native Terrain**: the original evolutionary region for the species.
- B. Determine **Locomotion**: the natural system of movement used by the sophont.
- C. Determine **Ecological Niche**: the sophont position in the ecological hierarchy.

### B NATIVE TERRAIN AND LOCOMOTION

Flux	Native Terrain	Roll 1D						If	DM
		1	2	3	4	5	6		
- 5	Mountain	Walker	Walker	Walker	Walker	Walker	Flyer	Atm 8+	- 2
- 4	Desert	Walker	Walker	Walker	Walker	Walker	Flyer	Siz 5 -	- 1
- 3	Exotic	Amphib	Walker	Walker	Walker	Flyphib	Flyer	Hyd 6+	+1
- 2	Rough Wood	Amphib	Walker	Walker	Walker	Walker	Flyer	Hyd 9+	+1
- 1	Rough	Amphib	Walker	Walker	Walker	Walker	Flyer		
0	Clear	Walker	Walker	Walker	Walker	Walker	Walker	DMs are	
+1	Forest	Walker	Walker	Walker	Walker	Walker	Walker	cumulative.	
+2	Wetland	Amphib	Aquatic	Walker	Walker	Triphib	Flyer		
+3	Wetland Wood	Amphib	Walker	Walker	Walker	Triphib	Flyphib		
+4	Ocean	Flyphib	Swim	Swim	Swim	Aquatic	Diver		
+5	Ocean Depth	Aquatic	Diver	Diver	Diver	Diver	Diver		

Roll Flux for Native Terrain; then roll 1D on the determined Row for Locomotion

#### Sophont Movement

Type	Walks	Dives	Swims	Flies	Other	Breathes	Walks= Moves (walks, jumps, crawls) on land.
Walker	Walks	-	-	-	-	<Atm>	<b>Dives=</b> Moves in water depths.
Amphibian	Walks	-	Swims	-	-	<Atm> + Water	<b>Swims=</b> Moves in water, near surface.
Triphibian	Walks	-	Swims	Flies	-	<Atm>	<b>Flies=</b> Moves in atmosphere.
Aquatic	-	Dives	Swims	-	-	<Atm>	<b>Breathes=</b> <Atm>= Homeworld Atmosphere.
Diver	-	Dives	-	-	-	Water	
Flyer	Walks	-	-	Flies	-	<Atm>	
Flyphib	-	-	Swims	Flies	-	<Atm> + Water	
Swimmer	-	-	Swims	-	-	<Atm>	
Static*	-	-	-	Immobile	-	<Atm>	
Drifter*	-	-	-	-	Drifts	Water	

\* Producer only

### C ECOLOGICAL NICHE

Flux	Niche	Herbivore	Omnivore	Carnivore	Scavenger	Producer	
- 6	Producer	Grazer	Hunter	Pouncer	Carrion-Eater	Collector	
- 5	Producer	Grazer	Hunter	Pouncer	Carrion-Eater	Collector	
- 4	Herbivore	Grazer	Hunter	Pouncer	Carrion-Eater	Collector	Roll
- 3	Herbivore	Intermittent	Hunter	Pouncer	Hijacker	Collector	Flux for
- 2	Omnivore	Intermittent	Hunter	Pouncer	Hijacker	Collector	Niche;
- 1	Omnivore	Intermittent	Gatherer	Pouncer	Hijacker	Collector	then
0	Omnivore	Intermittent	H / G	Chaser	Intimidator	Basker	Flux
+1	Omnivore	Grazer	Gatherer	Chaser	Intimidator	Basker	in the
+2	Omnivore	Grazer	Gatherer	Chaser	Intimidator	Basker	appropriate
+3	Carnivore	Grazer	Gatherer	Chaser	Intimidator	Basker	column.
+4	Carnivore	Grazer	Gatherer	Trapper	Intimidator	Basker	
+5	Scavenger	Grazer	Gatherer	Siren	Reducer	Basker	
+6	Scavenger	Filter	Eater	Killer	Reducer	Basker	

H/G= Hunter/ Gatherer.

Environment Roll is Mod to appropriate columns (but not Basic Class).



# S-06

## SOPHONT CHARACTERISTICS

### THE CHARACTERISTICS

The sophont species has six characteristics, some may differ from Human standard.

**06. Characteristics** determines the species' six personal characteristics.

A. Sophont Characteristics. Flux for characteristic names C1-C2-C3-C4-C5-C6.

B. Characteristic Values. Flux for Dice for each Characteristic C1-C2-C3-C4-C5-C6.

### THE UPP UNIVERSAL PERSONALITY PROFILE

C-Code	C1	C2	C3	C4	C5	C6
Ehex	7	7	7	B	7	7
	Str	Dex Agility Grace	End Sta Vig	Int	Edu Tra Ins	Soc Cha Cas
Possible Characteristics						

### CHARACTERISTICS

Char Abb	Characteristic	H	Description	GP
C1 Str	Strength	H	physical power	S
C2 Dex	Dexterity	H	hand-eye co-ordination	D
C2 Agi	Agility	A	body co-ordination	A
C2 Gra	Grace	A	body-limb co-ordination	G
C3 End	Endurance	H	resistance to fatigue	E
C3 Sta	Stamina	A	long-term task persistence	S
C3 Vig	Vigor	A	short-term fatigue resistance	V
C4 Int	Intelligence	H	ability to think and reason	I
C5 Edu	Education	H	achievement level in school	E
C5 Tra	Training	A	based on cultural heritage	T
C5 Ins	Instinct	A	based on genetic heritage	I
C6 Soc	Social Standing	H	large group hierarchy	S
C6 Cha	Charisma	A	small group hierarchy	C
C6 Cas	Caste	A	genetic group hierarchy	K
CS San	Sanity	H	mental health and stability	S
CP Psi	Psionics	H	extra-sensory mental power	P

H= Human Characteristic (may be present in non-humans).

For a Character to be Human, all Characteristics must be H.

A= Analog (non-Human) Characteristic.

**C1.** All sophonts have Strength.

**C2.** Sophont may have Dexterity or analog: Grace or Agility.

**C3.** Sophont may have Endurance or analog: Stamina or Vigor.

**C4.** All sophonts have Intelligence.

**C5.** Sophont may have Education or analog: Training or Instinct.

**C6.** Sophont may have Social Standing or an analog: Charisma or Caste.

A Characteristic can be usually be used as its analog (usually with a penalty), but other restrictions may also apply.

**Genetic Profile GP.** The six initial letters of the characteristics for a species comprise the Genetic Profile. The letters in the GP have meaning dependent on position (for example, S in position 1 indicates Strength, and in position 3 indicates Stamina). Because two characteristics in position 6 have the initial letter C, use K for Caste. For example, Human is SDEIES (Strength, Dexterity, Endurance, Intelligence, Education, Social Standing).

**Non-Biological Elements.** It is possible for other characteristics to be present in artificial beings (and are not of importance here).

### A SOPHONT CHARACTERISTICS

Flux	C1	C2	C3	C4	C5	C6
-5	Str	Agi	Sta	Int	Ins	Cas
-4	Str	Agi	Sta	Int	Ins	Cas
-3	Str	Agi	Sta	Int	Ins	Cas
-2	Str	Agi	Sta	Int	Ins	Soc
-1	Str	Dex	End	Int	Edu	Soc
0	Str	Dex	End	Int	Edu	Soc
+1	Str	Dex	End	Int	Edu	Soc
+2	Str	Gra	Vig	Int	Tra	Cha
+3	Str	Gra	Vig	Int	Tra	Cha
+4	Str	Gra	Vig	Int	Tra	Cha
+5	Str	Gra	Vig	Int	Tra	Cha

All Characters have C1 Str and C4 Int (there is no need to roll). For characteristics C2 C3 C5 C6, roll Flux to determine each specific characteristic.

If Flyer, DM -2 against C2 C3 C5 (Flyers are more likely to have Agi, Sta, and Ins). If Swimmer or Diver, DM +2 against C2 C3 C5 (Swimmers / Divers are more likely to have Gra, Vig, and Tra).

### B CHARACTERISTIC VALUES

Flux						
	C1	C2	C3	C4	C5	C6
		Agi	Sta		Ins	Cas
		Gra	Vig		Tra	Cha
Flux	Str	Dex	End	Int	Edu	Soc
-5	1D	1D	1D	1D	1D	1D
-4	1D	1D	1D	1D	1D	1D
-3	2D	2D	2D	2D	2D	2D
-2	2D	2D	2D	2D	2D	2D
-1	2D	2D	2D	2D	2D	2D
0	2D	2D	2D	2D	2D	2D
+1	3D	2D	2D	2D	2D	2D
+2	4D	3D	3D	3D	2D	2D
+3	5D	3D	3D	3D	2D	2D
+4	6D	3D	3D	3D	3D	2D
+5	7D	3D	3D	3D	3D	2D
+6	8D	3D	3D	3D	3D	2D

Roll separately on the proper column for each characteristic. Rolls less than -5 use -5; rolls greater than 6+ use 6+.

**Physical:** Roll Flux, DM+ Environ Flux.

**C3:** If Chaser, DM +2. If Pouncer, DM -2.

**C5 (Ins):** Use this table; for Edu or Tra, use 2D.

**C6 (Cas):** See the Caste tables.

If the value is 4D 5D 6D 7D 8D, use base value= 12 for the first 2D (that is, 6D = 12+4D).

### The Unstated Characteristics

**Sanity.** The sophont species has Sanity 2D.

**Psi.** The sophont species has Psi 2D.



## CASTE

Caste rigidly assigns social and economic roles within the community unit. The specific differentiation of caste roles between species varies widely.

**07. Caste.** If the race has C6= Caste, determine racial caste structure. Skip if no Caste.

A. Caste Structure. Roll Caste Type.

B. Caste Table Creation. Starting with FillForm Entry 2, roll on Structure for the specific Caste Entry.

1. Entry 7 = Common is automatically Flux=0.

2. Entry 12 = Unique is automatic without a roll.

C. Skilled Caste Table. For each Caste Entry, consult Table D1 or D2 on Chart 12.

D. Caste-Based Differences.

E. Caste Shift.

F. Caste Assignment.

## THE SKILLED CASTE

For Caste Structure 6 (Skilled), each individual receives one Skill or Knowledge randomly from the Caste Skill List (Chart 12). The Skill becomes the Caste name. For example, Author.

The individual receives one level of the Caste Skill or Knowledge each year (beginning when Caste is assigned) until skill level equals the individual's C5.

Caste skill is in addition to any other skills obtained during character generation.

## A STRUCTURES

1D Caste Structure

1 **Body.** Caste roles recapitulate roles within the body.

2 **Economic.** Caste roles are economic.

3 **Family.** Caste roles are functions within the family unit.

4 **Military.** Caste roles establish military organization.

5 **Social.** Caste roles are elements of a social hierarchy.

6 **Skilled.** Caste dictates unique skills for each member.

Caste structures are metaphors for social or economic structures.

## B CASTE TABLE CREATION

Flux	1 Body	2 Economic	3 Family	4 Military	5 Social	6 Special
- 5	Healer	Innovator	Healer	Medic	Artist	DeMinimis
=Gender - 4	=Gender	=Gender	=Gender	=Gender	=Gender	Useless
- 3	Antibody	Guard	Defender	Aide	Enforcer	Advisor Minus
- 2	Sensor	Researcher	Caregiver	Scout	Drone	Instructor
- 1	Memory	Artisan	Caregiver	Specialist	Artist	Shaman
Common 0	Muscle	Laborer	Breadwinner	Soldier	Unit	Expendable
+1	Muscle	Craftsman	Breadwinner	Technician	Unit	Defective
+2	Muscle	Clerk	Breadwinner	Warrior	Unit	Valuable
+3	Voice	Manager	Uncle	Leader	Patron	Advisor Plus
=Special +4	=Special	=Special	=Special	=Special	=Special	Sport
+5	Claw	Entrepreneur	Leader	Staff	Entertainer	Vice-Leader
=Unique X	Brain	Director	Archon	General	Ruler	

**=Gender.** Caste is the Gender with the same roll on the parallel Gender Determination Table on the FillForm and Sophont Creation Card.

**=Common.** Automatically insert the Common Caste at Entry 7 on the SCS table.

**=Special.** Re-roll on the Special column.

**=Unique Caste.** Automatically insert the Unique Caste at Entry 12 on the SCS table.

**Skilled Caste Type.** Each individual member of the Skilled Caste rolls on the Skilled Caste table during Character Generation and receives that Skill with level ultimately equal to C5.

**Caste Digits:** The UPP Caste digit is the highest die roll on the Caste Table creating this Caste. It is possible for Caste roles with the same title to have distinct differences and abilities..

## C CASTE-BASED DIFFERENCES

Flux	C1	C2	C3	C4	C5
- 5	- 5	- 5	- 5	- 5	- 5
- 4	- 4	- 4	- 4	- 4	- 4
- 3	- 3	- 3	- 3	- 3	- 3
- 2	- 2	- 2	- 2	- 2	- 2
- 1	--	--	--	--	--
0	--	--	--	--	--
+ 1	--	--	--	--	--
+ 2	+2D	+ 2	+ 2	+ 2	+ 2
+ 3	+3D	+ 3	+ 3	+ 3	+ 3
+ 4	+4D	+ 4	+ 4	+ 4	+ 4
+ 5	+5D	+ 5	+ 5	+ 5	+ 5

All differences are from Common. Roll in each Caste Type (except Common) for each Characteristic.

Caste-Based Differences are imposed at Caste Assignment.

## D CASTE SHIFT

1D	Shift
1	No shift
2	No shift
3	No shift
4	No shift
5	Mid-Life Shift
6	Rotation

Caste may change during a lifetime.

**Mid-Life Shift.** Assign (reroll on the table) a new Caste at Life Stage 6.

**Rotation.** Advance Caste at the start of each Life Stage. Caste 12 promotes to Caste 2.

**If Caste Shifts,** Caste-Based Differences also shift. Existing Caste skills remain; and available new Caste skills are acquired one per year.

## E CASTE ASSIGNMENT

1D	Assignment	Life Stage
1	R (Assigned At Birth)	0
2	R (Assigned At Adolescence)	2
3	R (Assigned By Heredity)	0
4	R (Assigned By Community)	0
5	S (Family Choice)	2
6	S (Personal Choice)	2

**R= Random.** Use Caste Table on the Sophont Creation Card for a character being generated.

**S= Selected.** Player chooses Caste.

**Before Assignment,** an individual is Casteless.

**Inherited Caste** is subject to the genetics rules.



# S-08

## SOPHONT GENDER

### GENDER

Gender is the evolutionarily established reproductive role structure within a species.

#### THE GENDER GENERATION TABLE

The Gender Generation Table on the Sophont Creation Card is unique to the race being described; it determines genders of the race, and in what proportion they occur.

**08. Gender.** Create gender structure.

A. Gender Structure and Table.

Determine Structure.

Specific (Solo, Dual, FMN, EAB, Group)

column rolls complete FillForm and SCS.

B. Gender-Based Differences.

C. Gender Assignment.

D. Gender Shifts.

E. If Caste, note Caste-Gender Relation.

#### GENDER TYPES

Structure	Gender1	Gender2	Gender3	Gender4	Gender5	Gender6
Solitaire	Solo	--	--	--	--	--
Dual	Female	Male	--	--	--	--
FMN	Female	Male	Neuter	--	--	--
EAB	Egg Donor	Activator	Bearer	--	--	--
Group	One	Two	Three	Four	Five	Six

#### THE GENDERS

There are six genders and five gender structures.

**Solitaire.** Individuals reproduce without alternate gender mates.

**Dual.** Two individuals of different genders pair for reproduction.

**FMN.** Three distinct genders, but only two participate in reproduction.

**EAB.** Three distinct genders, all of which have roles in reproduction.

**Group.** Many genders exist and interact in a complex fashion.

### A GENDER COMPONENTS

Flux	Structure	Solitaire	Dual	EAB	FMN	Group
-5	Solitaire	Solo	Female	Egg	Female	Six
-4	Solitaire	Solo	Female	Egg	Female	Six
-3	EAB	Solo	Female	Egg	Female	Four
-2	EAB	Solo	Female	Activator	Male	Four
-1	Dual	Solo	Male	Egg	Female	Two
0	Dual	Solo	Female	Activator	Male	One
+1	Dual	Solo	Male	Bearer	Neuter	Three
+2	FMN	Solo	Male	Bearer	Neuter	Five
+3	FMN	Solo	Male	Bearer	Neuter	Five
+4	Group	Solo	Female	Activator	Male	Six
+5	Group	Solo	Male	Bearer	Neuter	Six

Create a Gender Determination Table on the FillForm.

Enter Gender 1 (Female, Egg, or One) on entry line 2.

If Dual, FMN, or EAB, enter Gender 2 (Male, Activator) on entry line 3.

Enter other Genders as necessary.

### B GENDER-BASED DIFFERENCES

Flux	C1	C2	C3	C4	C5
-5	-5	-5	-5	-5	-5
-4	-4	-4	-4	-4	-4
-3	-3	-3	-3	-3	-3
-2	-2	-2	-2	-2	-2
-1	--	--	--	--	--
0	--	--	--	--	--
+1	+1	--	--	--	--
+2	+2	+2	+2	+2	+2
+3	+3	+1D	+3	+3	+3
+4	+4	+2D	+4	+4	+4
+5	+5	+3D	+5	+5	+5

Roll once within each Gender for each Characteristic. C5 is Ins (not Edu or Tra).

The base Gender is 1 (or F, or E).

Roll each Gender Type other than 1FE

### C GENDER ASSIGNMENT

Flux	Assigned	Shifts?
-5	by Family	Progression
-4	at Life Stage 2	Progression
-3	at Life Stage 2	Fixed
-2	at Birth	Fixed
-1	at Birth	Fixed
0	at Birth	Fixed
-1	at Birth	Fixed
0	at Birth	Fixed
+1	at Birth	Fixed
+2	at Birth	Fixed
+3	at Life Stage 2	Fixed
+4	at Life Stage 2	Transformation
+5	by Individual	Transformation

If Gender is not assigned at birth, the individual's Gender prior to assignment is Neuter.

### D GENDERS MAY SHIFT

Note Gender Shift Circumstances

Initial Gender Assignment use the Gender Determination Table.

If Gender is not Fixed, it will shift under one of the following structures (Gender-Based Differences shift when Gender shifts):

**Progression.** Gender changes at the beginning of each Life Stage. The new gender is the next higher entry on the Gender Table on the Sophont Creation Card (which also means that Gender may remain the same).

**Transformation.** Gender changes to another (randomly determined) gender once at Life Stage 6. It is possible that the new gender may be the same as the old gender.

### E CASTE - GENDER RELATION

1D Relationship

- 1 Dependent
- 2 Dependent
- 3 Casted Breeder
- 4 Casted Breeder
- 5 Independent
- 6 Independent

**Dependent.** Caste determines Gender. Caste is always a specific Gender.

**Casted Breeder.** The first Gender (1FE) is always the breeder Caste and is identified by Gender name. Other Castes may be any

Gender. Otherwise Caste and Gender are independent.

**Independent.** Caste and Gender are determined independently. The Skilled Caste is Independent.



### LIFE STAGES

The Life Stages of a species determine the traditional lifespan of a Sophont: when an individual begins an adult career, begins to feel the effects of age, expects to retire.

### THE NINE STAGES OF LIFE

Every sophont's life is a succession of Life Stages, each with its own particular significance. Understanding the Life Stages for a Sophont helps understand the psychology which governs its members.

- A. Determine the duration of each Life Stage. For each Life Stage 1 through 9, roll Flux for the duration in Terms.
- B. Determine Life Expectancy (the sum of years for Life Stages 0 through 9).

### THE LIFE STAGES

No.	Life Stage	Description	Human Years=
0.	Infant.	A helpless infant under the care of an adult member of the family (automatic half-term= 2 years)	0 - 1
1.	Child.	An immature individual receiving basic education.	2 - 9
2.	Teen.	A gender mature individual not yet fully responsible in society. Gender and Caste maturity.	10 -17
3.	Young Adult.	A physically mature individual with full responsibilities in society. Career Resolution begins.	18 -25
4.	Adult.	A full member of society.	26 -33
5.	Peak.	An individual at the height of physical and mental abilities. Physical aging begins.	34 -41
6.	Mid-Life.	An individual approximately half way through a typical life span.	42 -49
7.	Senior.	An experienced individual.	50 -57
8.	Elder.	An individual at the greatest levels of personal achievement.	58 -65
9.	Retirement.	An individual is living on the fruits of his prior labors. Mental aging begins.	66 -74

**Life Expectancy** (or traditional lifespan) is the sum of the lengths of the Life Stages.

For example, Humans have a 2-year infancy and nine stages of 8 years each, producing a traditional lifespan of 74 years.

### A LIFE STAGE DURATION

Flux	Stage=0	1	2	3	4	5	6	7	8	9
-5	1/2	1	0	0	0	1	0	0	0	1
-4	1/2	1	1	1	1	1	1	1	1	1
-3	1/2	1	1	1	1	1	1	1	1	1
-2	1/2	1	1	1	1	1	1	1	1	1
-1	1/2	2	2	2	2	2	2	2	2	2
0	1/2	2	2	2	2	2	2	2	2	2
+1	1/2	2	2	2	2	2	2	2	2	2
+2	1/2	3	3	3	3	3	3	3	3	3
+3	1/2	3	3	3	3	3	3	3	3	3
+4	1/2	4	4	4	4	4	4	4	4	4
+5	1/2	6	6	6	6	6	6	6	6	6

Duration in 4-year Terms (1 = 1 term of 4 years).

### B LIFE EXPECTANCY

Calculate Typical Value

Life Expectancy equals total years for Life Stages 0 through 9.

Life Stages for a sophont species may vary in length. This chart indicates the 4-year Terms the sophont spends in each Life Stage.

**Beginning with Life Stage 1**, roll Flux for each Stage and record the number of terms for each on the FillForm and Sophont Creation Card. Terms=0 indicates that the particular Life Stage is skipped (or has an extremely short duration of perhaps a few weeks).

**Life Stage 2.** The first two years of 2-Teen is the period of Gender maturity, and (if the Race has Caste) of Caste maturity.

**Cadet** characters start play at the beginning of year 3 of Teen.

### NORMAL AGING

Sophont Physical Aging affects the Physical Characteristics C1 Strength, C2 Dexterity Agility Grace, and C3 Endurance Stamina Vigor. It begins at the beginning of Life Stage 5- Peak) and is resolved as an Aging Check.

Sophont Mental Aging affects Intelligence and Instinct (if present). It begins at the start of Life Stage 9- Retirement and is resolved as an Aging Check.

### THE AGING CHECK

The Aging Check determines if a characteristic is reduced by aging. **Every Four Years.** The Aging Check is resolved every four years on the character's birthday. The Crisis is rolled for each applicable Characteristic.

To Feel Age Effects (The Aging Check)

2D < Life Stage

Success inflicts the effects of age on the character.

(A character wants to FAIL this action).

If the Aging Check imposes an effect, the characteristic is reduced -1.

If **one** Characteristic is reduced to 0, reset it to 1.

If **two** Characteristics are reduced to 0, the character suffers a serious illness (1D weeks in recuperation). Reset both to 1.

If **three** Characteristics are reduced to 0, the character suffers a major illness (1D months in recuperation). Reset all three characteristics to 1. The second time three characteristics are reduced to 0, the character dies.

There always remains the possibility that a dead character can be resurrected..



# S-10

## SOPHONT SENSES

### CREATING THE SENSES

The six possible senses are Vision, Hearing, Smell, Touch, Awareness, and Perception. All Sophonts have Touch, possibly one or more others. Senses are defined using Human as the baseline. Other senses are possible, but too minor or exotic for this system to handle.

#### SENSE STRINGS

Sense	String	Elements
Vision	V-00-RGB	V- Constant- Band1 Band2 Band3
Hearing	H-00-FSVR	H- Constant- Freq Span Voice Range
Smell	S-00-S	S- Constant- Sharpness
Touch	T-00-S	T- Constant- Sensitivity
Awareness	A-00-A	A- Constant- Acuity
Perception	P-00-AV	P- Constant- Acuity Poice

Sense use is defined by the elements of the Sense String

### A THE SENSES

Flux	Constant	Vision	Hearing	Smell	Touch	Aware	Percep
-5	06	Blind	Deaf	Anosmic	Touch	Unaware	Oblivious
-4	08	Blind	Deaf	Anosmic	Touch	Unaware	Oblivious
-3	10	Blind	Deaf	Anosmic	Touch	Unaware	Oblivious
-2	12	Vision	Deaf	Anosmic	Touch	Unaware	Oblivious
-1	14	Vision	Hearing	Anosmic	Touch	Unaware	Oblivious
0	16	Vision	Hearing	Smell	Touch	Unaware	Oblivious
+1	18	Vision	Hearing	Smell	Touch	Aware	Oblivious
+2	20	Vision	Hearing	Smell	Touch	Aware	Percept
+3	22	Vision	Hearing	Smell	Touch	Aware	Percept
+4	24	Vision	Hearing	Smell	Touch	Aware	Percept
+5	26	Vision	Hearing	Smell	Touch	Aware	Percept

For each Sense: Roll the Constant, and then Roll the Elements.  
The specific characteristics of each sense may be specified instead.

- 10. The Senses.** Determine the senses.
- A. Flux for each sense.
  - B. For each Sense present, Flux on the appropriate columns for the Sense String.
  - C. Language Medium.
  - D. Generate the Racial Scent.

#### IF SOME SENSES ABSENT

- Blind**= No Vision.
- Deaf**= No Hearing.
- Anosmic**= No Smell.
- Unaware**= No Awareness.
- Oblivious** = No Perception.

### B

Flux	VISION				HEARING					SMELL		TOUCH		AWARE		PERCEPTION			
	C	Band	Star		C	Freq	Span	Voice	R=	C	Sharp	C	Sensi	C	Acuity	C	Tone	Poice	
-6	04	DHV	B0-B3	04	1	0	1	0	04	0	04	0	04	0	04	0	04	0	0
-5	06	UDH	B5-B8	06	1	0	1	0	06	1	06	1	06	1	06	1	06	1	1
-4	08	SUD	B9-A1	08	2	1	2	0	08	1	08	1	08	1	08	1	08	1	1
-3	10	PSU	A2-A8	10	3	1	3	0	10	1	10	2	10	2	10	2	10	2	2
-2	12	BPS	A9-F6	12	4	2	4	0	12	1	12	2	12	2	12	2	12	2	2
-1	14	GBP	F7-G1	14	5	2	5	1	14	2	14	3	14	3	14	3	14	3	3
0	16	RGB	G2-K0	16	6	3	6	2	16	3	16	3	16	3	16	3	16	3	3
+1	18	CRG	K1-K3	18	7	4	7	3	18	4	18	3	18	3	18	3	18	3	3
+2	20	ACR	K4-K6	20	8	4	8	3	20	5	20	4	20	4	20	4	20	4	4
+3	22	NAC	K7-K9	22	9	5	9	3	22	5	22	4	22	4	22	4	22	4	4
+4	24	INA	M0-M1	24	A	5	A	4	24	6	24	5	24	5	24	5	24	5	5
+5	26	FIN	M2-M4	26	B	6	B	4	26	6	26	5	26	5	26	5	26	5	5
+6	28	XFI	M5-L8	28	C	6	C	4	28	6	28	6	28	6	28	6	28	6	6
+7	30	ZXF	L9+	30	D	7	D	4	30	6	30	6	30	6	30	6	30	6	6

C= Constant. V= Voice. R= Range. Vision: Constant is determined by Flux; the native star determines vision bands.

### C LANGUAGE MEDIUM

Sophonts communicate using a language based on available senses under the following priorities:

If The Sense Combination is	Then
Hearing=	Verbal Language
Perception, Deaf=	Perceptual Language
Aware, Blind=	Awareness Language
Vision, Deaf, Oblivious=	Visual Sign Language
Touch, Deaf, Oblivious, Blind=	Tactile Sign Language

### D RACIAL SCENT

1D	1	2	3	4	5	6
1	1	2	3	4	5	6
2	A	B	C	D	E	F
3	G	H	I	J	K	L
4	M	N	O	P	Q	R
5	S	T	U	V	W	X
6	Y	Z	7	8	9	0
Human is HUM						



### BODY STRUCTURE

Sophont physical appearance is determined by body symmetry, number of limb groups, location of the braincase and senses, armor status of the body, natural weaponry, and other details.

### CREATE BODY STRUCTURE

Determine sophont appearance.

#### A. Body Structure Elements

**Symmetry.** Bilateral=paired; Trilateral=tripleds; Radial=1D limbs per group. Asymmetrical= 1D limbs per group (roll each limb group).

DM +2 if Flyer. - 2 if Swimmer or Diver.

**Head- Torso-Senses.** One roll determines all three. If [+S], then senses are in the Limbs (or Tail or Snout). Brain is not necessarily located in the Head, but there is only one Brain.

**Limb Group Structure.** Roll for Front limbs and for Rear limbs. Front Limbs end in Manipulators; Rear Limbs do not have Manipulators.

**Tails.** Roll for the presence of a Tail. Manipulator is a prehensile tail. Proboscis is technically not a tail; it is a Trunk emanating from the Head (if no head, from the front of the Torso).

#### B. Body Features.

Determine Skeleton, Fluids, Skin, Weapons, Manipulators, Armor.

### BODY STRUCTURE OVERVIEW

Body Structure Overview shows details of head, torso, limbs, and tail in the format:

Head (with or without Brain and Senses),	Torso (with or without Brain and Senses)	Front Limbs (with Manipulators)	Rear Limbs	Tail / Proboscis
<b>A- B- CD- EF- G</b>				
for example: H-TBS-WL-LN-N, N-TB-ANS-LN-T				

### A BODY STRUCTURE

Flux	Symmetry	Head-Torso-Senses			Flyer		Walker		Aquatic		Diver		Triphib		Tail
		Front	Rear	Senses	Front	Rear	Front	Rear	Front	Rear	Front	Rear	Front	Rear	
-5	Asymmetrical	H	+TBS		WW	WW	AA	LL	AA	FF	AA	FF	FF	FF	P
-4	Asymmetrical	H	+TB	[+S]	WW	WM	AA	LL	AA	LF	AA	LF	WW	FM	V
-3	Asymmetrical	HS	+TB		WA	WL	AN	LN	AF	LL	AF	LL	WA	FL	T
-2	Bilateral	HB	+TS		WN	WN	AN	LN	AN	LN	AF	LN	WA	FN	T
-1	Bilateral	HBS	+T		WL	WN	LL	LN	AL	FN	AL	FN	WL	FF	N
0	Bilateral	HBS	+T		WL	LN	LL	LN	AL	FN	AL	FN	WL	FN	N
+1	Bilateral	HBS	+T		WL	LN	LL	LN	AL	LN	AL	LN	WL	FN	N
+2	Trilateral	HB	+T	[+S]	WN	LN	LN	LN	AW	WL	FF	FF	WN	FN	N
+3	Trilateral	N	+TBS		AN	LM	AL	LM	AF	WF	AF	FF	FN	FN	N
+4	Radial	N	+TB	[+S]	AN	MM	AL	MM	AF	FM	AF	FM	FN	FM	M
+5	Radial	N	+TBS		AA	NN	AN	NN	AN	MM	AN	MM	FF	NN	A

**Head And Torso:** HS= Head with Senses. HBS= Head with Brain and Senses. N= No Head. H= Head without Brain. T= Torso. TB= Torso with Brain. TBS= Torso with Brain and Senses. [+S]=Senses are in Limbs.

**Limb Groups:** A= Arms. F= Flippers. L= Legs. M= Multiple Leg Groups. N= No Limbs. W= Wings.

**Tail/Snout** A= Antennae. M= Manipulator. N= No Tail. T= Tail. V= Vestigial Tail. P= Proboscis/Extended Snout.

DM -2 if Grace. +2 if Agility. +2 if Swimmer or Diver.

### B BODY FEATURES

Flux	Skeleton	Fluids	Skin	Weapon	Manipulators
- 6	Fluid Interior Sacs	Foam	Feathery Pelt		Tentacles
-5	Fluid Interior Sacs	Foam	Feathery Pelt		Tentacles
-4	Fluid Interior Sacs	Lymph	Furry Pelt	Tusks	Tentacles
-3	Cartilage Interior	Hemolymph	Hairy Pelt	Fangs	Grippers
-2	Cartilage Interior	Ichor	Leather	Teeth	Grippers
-1	Bony Interior	Blood	Skin	-	Hands
0	Bony Interior	Blood	Skin	-	Hands
+1	Bony Interior	Blood	Skin	-	Paws
+2	Exoskeleton	Gore	Fine Scales	Claws	Paws
+3	Exoskeleton	Slime	Scales	Hooves	Graspers
+4	Segmented Shell	Scum	Spines	Spikes	Graspers
+5	Segmented Shell	Humours	Plates	Sting	Sockets
+6	Segmented Shell	Humours	Plates	Sting	Sockets

DM +1 if Swimmer DM - 1 if Flyer.

### Body Feature Terms

**Skeleton.** Interior support structure.

**Fluids.** Typical body fluids.

**Skin.** Description of body covering.

**Armor.** Natural armor (value = 2D-2)

**Weapon.** Natural weapon.

**Manipulators.** Front Limbs have Manipulators (Rear Limbs not). Manipulators on Legs are dual use as Peds).

If otherwise no Manipulators, assume Mouth is Manipulator.

**Stance.** A sophont with NO rear limb groups is horizontal (with Length rather than Height). All others are Vertical and have Height (not Length).





# S-12

## SOPHONT SPECIAL ABILITIES

### SPECIAL ABILITIES

A. Roll once for Gender and once if Caste. If None, no Special Ability.  
 B and B1. Ability is the same ability

for all members of the Group; Roll is a specific Ability rolled during CharGen on Table B. Adjust Special Abilities as required.

C1 or C2. For the Skilled Caste, roll for caste skills.

D. For Voice or Poice, roll for specific type.

### A SPECIALS

1D	Ability
1	One Ability
2	One Roll
3	None
4	None
5	Two Rolls
6	Two Abilities

### B SPECIAL ABILITIES

Flux	1 The Arts	2 Talents	3 Talents	4 Senses	5 Disability	6 Trades
-5	Actor	Insight	Math	Touch	-	Table D2
-4	Actor	Empath	Math	Touch	Stench	Biologics
-3	Dancer	Hibernate	Memorize	Vision	Blind	Mechanics
-2	Artist	Hypno	SoundMimic	Hearing	Deaf	Mechanics
-1	-	-	-	-	-	-
0	-	-	-	-	-	-
+1	-	-	-	-	-	-
+2	Music	Intuition	Mem <->	Awareness	Unaware	Craftsman
+3	Artist	Rage	Mem <->	Perception	Oblivious	Craftsman
+4	Osmance	ReGen	Mem <->	Smell	Anosmic	Electronic
+5	Osmance	Curiosity	Mem <->	Smell	Anosmic	Table D2

It is entirely possible that a sophont may have no special ability.

If a Special Ability is present, the individual generated character receives = 1D.

Roll 1D for the column, followed by Flux for the row which applies.

### D TYPES OF VOICE AND POICE

Flux	1D	Voice Descriptor	Poice Descriptor
-5	1	Whistles	
-4	2	Whistle	
-3	3	Vowels	
-2	4	Musical	
-1	5	Standard	
0	6	Standard	Faint
+1	7	Standard	Vague
+2	8	Guttural	Common
+3	9	Consonantal	Firm
+4	A	Clicks, Pops	Strong
+5	B	Mimic	Powerful

For Poice, use Good Flux

### C2 CASTE SKILLS SHORT

A	B	1	2
1	1	Biologics	Actor
1	2	Craftsman	Artist
1	3	Electronics	Author
1	4	Fluidics	Chef
1	5	Gravitics	Dancer
1	6	Magnetics	Musician
2	1	Mechanic	Fighter
2	2	Photonics	Forward Obs
2	3	Polymers	Heavy Wpns
2	4	Programmer	Navigator
2	5	Craftsman	Recon
2	6	Athlete	Sapper
3	1	Archeology	Medic
3	2	Biology	Counsellor
3	3	Chemistry	Advocate
3	4	History	Leader
3	5	Linguistics	Liaison
3	6	Philosophy	Diplomat
4	1	Physics	Broker
4	2	Planetology	Trader
4	3	Psychohistory	Teacher
4	4	Psionics	Survey
4	5	Psychology	Survival
4	6	Sophontology	Designer
5	1	Automotive	Driver
5	2	Aquanautic	Seafarer
5	3	Aeronautic	Flyer
5	4	Animals	Rider
5	5	Animals	Teamster
5	6	Animals	Trainer
6	1	Biologics	Mechanic
6	2	Craftsman	Photonics
6	3	Electronics	Polymers
6	4	Fluidics	Programmer
6	5	Gravitics	Craftsman
6	6	Magnetics	Athlete

Roll two dice for a specific Skill or Knowledge: Roll Die A, then Die B, and finally Die C (reroll if >3).

### B1 Special Abilities Adjustments

**Music:** If Deaf and Oblivious, reroll.

**Smell:** If Anosmic, reroll.

**Mem <->** Roll for associated Sense. 1= Vision. 2= Audio. 3= Scent. 4= reroll. 5= Aware. 6= Percep. For absent sense, reroll.

**Disability:** If the sense is already absent, there is no effect.

**SoundMimic:** If Deaf, reroll.

**Senses:** If the sense is currently absent, the recipient Gender or Caste acquires the sense. Create its String. If the sense is present, increase the Constant for the recipient Gender or Caste by +2.

**Morph:** If Internal Structure= not Fluid Filled Sac, change to Fluid Filled Sac for this Gender or Caste.

### C1 CASTE SKILLS AND KNOWLEDGES

A	B	1	2	3	4	5	6
1	1	ACV	Comms	High-G	Steward	Ordnance	Naval Arch
1	2	JOT	Rider	Sensors	Fwd Obs	Survival	Streetwise
1	3	LTA	Spines	Flapper	Seafarer	No Skill	Astrogator
1	4	WMD	Leader	Tracked	Engineer	Computer	Navigation
1	5	Chef	Survey	Animals	Fluidics	Bay Wpns	Explosives
1	6	Mole	Dancer	Tactics	Launcher	Magnetics	Jump Drive
2	1	Grav	Artist	Turrets	Teamster	Photonics	Counsellor
2	2	Boat	Legged	Teacher	Designer	Vacc Suit	Submersible
2	3	Ship	Sapper	Unarmed	Engineer	Artillery	Aeronautics
2	4	Wing	Driver	Exotics	Language	Craftsman	Aquanautics
2	5	Recon	Gunner	Stealth	Musician	Gravitics	BattleDress
2	6	Actor	Blades	Trainer	Strategy	Forensics	Electronics
3	1	Flyer	Zero-G	Animals	Maneuver	Biologics	Hostile Env
3	2	Pilot	Author	Liaison	Polymers	Ortillery	Power System
3	3	Rotor	Broker	Athlete	Advocate	Automotive	Life Support
3	4	Admin	Trader	Fighter	Computer	Bureaucrat	Slug Thrower
3	5	Beams	Sprays	Wheeled	Diplomat	Heavy Wpns	Fleet Tactics
3	6	Medic	Gambler	Screens	Mechanic	Programmer	Spacecraft

Roll three dice for a specific Skill or Knowledge: Roll A (reroll if >3), then roll

B, and finally top row C (reroll if >3).



### MANIPULATORS

Sophonts need to manipulate their environment; most do so with hands or hand-like manipulators. The common forms of manipulators are hands, paws, tentacles, gripper, graspers, and sockets.



**Hand**

Two opposed groups of one or more moderately flexible digits, capable of holding an object.



**Paw**

Several unopposed moderately flexible digits which can grasp and hold an object.



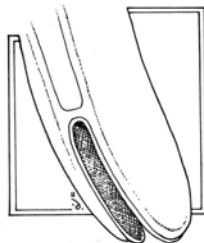
**Tentacle**

One or more flexible digits capable of entwining or coiling together or in opposition.



**Grasper**

Three or more mutually opposed flaps or digits capable of clamping an object between them.



**Gripper**

Two opposed groups of relatively inflexible flaps or digits capable of clamping an object between them.



**Socket**

A hollow rimmed with muscle capable of holding an object within it, with or without an internal digit.

### USING MANIPULATORS

Manipulators determine precisely how a sophont handles objects and operates mechanisms.

**Grip.** Grip is the strength which a manipulator adds (or doesn't add) when holding an object. Grip is a mod for tasks using Strength and involving manipulators.

### USING CONTROLS WITH MANIPULATORS

Controls are the interface between a sophont and an object. They range from simple handles to keypad inputs.

### CONTROLS

	Grip	Preferred	Optimized	Alien	Touch
Hand	0	0	0	-1	0
Paw	-2	0	-1	-3	-1
Tentacle	+1	0	0	-1	0
Grasper	0	0	0	-2	-2
Gripper	+2	0	-1	-3	-1
Socket	-1	0	0	-2	-3

Mod applies for the Control Type and Manipulator shown. Touch (Mod) is used with the Touch Sense Action.

### Typical Controls

The grip or handle and trigger mechanism on a weapon.  
The adjusting knobs on a communicator.  
The operating levers and mechanism on a vehicle.  
The input devices on computers and equipment.

**Preferred Controls** are adapted to a specific manipulator (for example, Paw Controls, Tentacle Controls). Properly used Preferred Controls have no mods.

**Optimized Controls** are specifically designed to be used by all possible manipulators. Optimized Controls have fewer disadvantageous mods. Many vehicles have Optimized Controls.

**Alien Controls** are non-optimized controls not adapted for the manipulator being used (for example Paw controls being used by Hands). Alien Controls are subject to disadvantageous mods.

**Configurable Controls.** Controls capable of being adjusted to Preferred Controls. Configuration time varies, as does the actual effectiveness of the configured format.



# S-14

## SOPHONT SIZE AND WEIGHT

### SOPHONT SIZE

Size is the volume of a sophont in liters (1000 liters to a cubic meter). Size is also approximate mass in kg.

### Size Benchmark is Human = 72

Average Sophont Size is based on the three physical characteristics C1 C2 C3 using the Calculating Size Table.

Total the dice used to generate the Physical Characteristics (half-Grace, half-Agility, and half-Vigor; double-Stamina). Multiply the total by 12 (based on an average 3.5 per die and approximately 3.4 kg of flesh per Physical Characteristic point  $3.5 \times 3.4 = 12$ ). The result is typical size for the sophont.

### CALCULATING SIZE

Characteristic	Dice	Comment
C1 Strength	Dice	if 4D+ see Bulk (below)
C2 Dexterity	Dice	
C2 Grace	Dice / 2	makes it lighter or smaller
C2 Agility	Dice / 2	makes it lighter or smaller
C3 Endurance	Dice	
C3 Stamina	Dice * 2	makes it heavier or larger
C3 Vigor	Dice / 2	makes it lighter or smaller

Dice= Characteristic Dice (if Str = 2D, Dice = 2).

Total = C1 + C2 + C3

Typical Size = Total \* 12

For example, Human SDEIES rolls 6D (2D +2D +2D) for C1 C2 C3 physical characteristics. Size =  $6 * 12 = 72$ . A Human is size 72 (=about 72 liters volume and 72 kg weight).

### BULK

Some sophonts have disproportionate Size (called Bulk)

Str	Size=	Size Range
1D	(C1 Dice + C2 Dice + C3 Dice) * 12	24- 120
2D	(C1 Dice + C2 Dice + C3 Dice) * 12	36- 132
3D	(C1 Dice + C2 Dice + C3 Dice) * 12	48- 144
4D	(C1 Dice + C2 Dice + C3 Dice) * 48	240- 624
5D	(C1 Dice + C2 Dice + C3 Dice) * 60	360- 840
6D	(C1 Dice + C2 Dice + C3 Dice) * 72	504-1080
7D	(C1 Dice + C2 Dice + C3 Dice) * 84	672-1344
8D	(C1 Dice + C2 Dice + C3 Dice) * 96	864-1632

For example, a Pseudo-Ostrich SDSIIK rolls 12D (6D + 2D + [2D\*2 because Stamina]) for C1 C2 C3. Size =  $12 * 72 = 864$ . A Pseudo-Ostrich is Size 864 (864 kilograms).

For example, a Hexaphant SDEIES rolls 12D (5D + 2D + 5D) for C1 C2 C3. Size =  $12 * 60 = 720$ . A Hexaphant is Size 720 (=720 kilograms).

A Quintaphant SDSIES rolls 16D (7D + 3D + [3D\*2 because Stamina]) for C1 C2 C3. Size =  $16 * 84 = 1,344$ . It is Size 1344 (=1344 kilograms).

SMALL, STANDARD, OVERSIZE, AND TITAN	
Sophonts have four Size classes:	
<b>Small.</b> About 1 meter tall and 36 kg.	C1+C2+C3 = 3D.
<b>Standard.</b> 1.5 to 2 meters tall. 72 kg.	C1+C2+C3 = 6D.
<b>Oversize.</b> 2 to 3 meters tall. 144 kg.	C1+C2+C3 = 12D.
<b>Titan.</b> More than 3 meters tall.	C1+C2+C3 = 14D+.

### BODY FORM PROFILE

BFP	Width	Depth	Descriptor
1	L/1	L/1	Cubic. Max volume.
1.4	L/1.4	L/1.4	Globular. Ball. Orb.
2	L / 2	L / 2	
3	L / 3	L / 3	Tortoise
4	L / 4	L / 4	
5	L / 5	L / 5	Hippo, Bison
6	L / 6	L / 6	Primate
7	L / 7	L / 7	Vthick. Obese Human
8	L / 8	L / 8	Thick. Heavy Human
9	L / 9	L / 9	Typical Human
10	L/10	L/10	Thin Human
11	L/11	L/11	Vthin. Ostrich
12	L/12	L/12	
13	L/13	L/13	
14	L/14	L/14	Crocodile.
15	L/15	L/15	
16	L/16	L/16	T Rex
20	L/20	L/20	Shark
25	L/24	L/24	Anaconda
75	L/75	L/75	Snake. Pterosaur.
100	L.	L/100	Sheet. Leaf. Film.

BFP= Body Form Profile Divisor.

L= Length. W= Width. D= Depth. Note that Width and Depth are average over body length rather than maximum.

### CALCULATING SIZE

Physical height and weight of a character can be determined from the physical characteristics C1 C2 C3.

**Body Form Profile BFP** equates known animal structures with a uniform cylinder allowing calculation of volume, mass, and hit points (and UPP characteristic points) based on Length. BFP=1 is a cube. BFP=1.4 is a sphere.

BFP= 9 approximates a Human figure.

L W D can be transposed after calculation: adopt Depth as Height and Length as Depth. A Hexaphant could be 0.5 m tall, and wide, and 2.6 m long: a sort of long mini-elephant.

**Using The BFP Table for Volume and Mass.** For a stated L Length (the maximum Length, or the Height if upright) in meters, W Width (= L / BFP) and D Depth (= L / BFP). Multiply L x W x D for the volume in m3. Multiply by 1000 for volume in liters and mass in kilograms.

For example, a 1.8 meter (6 foot) tall human (BFP=9) is  $L=1.8, W= 1.8 / 9 = 0.2, D= 1.8 / 9 = 0.2$   $L \times W \times D = 1.8 \times 0.2 \times 0.2 = 0.072$  m3 = 72 liters = 72 kilograms= Size 72.

**Using The BFP Table for Length.** Using Sophont Size and BFP, find L Length in meters. Convert Size ( /1000) to Volume in m3. Multiply Volume by BFP squared and find the cube root.

A 72 kilogram Human (BFP=9) is Size=72. Convert Size to Volume (=72/1000 = ) 0.072. Multiply by BFP Squared (=0.072\* 9\*9=) 5.8. Find the cube root = 1.79 meters tall. The Human is about 1.8 meters tall.

A Size=1000 BFP=14 sophont is about 6 meters tall (or long), and 0.4 m wide and deep.



### CALCULATING SOPHONT HEIGHT

Calculate the Height or Length of a Sophont based on its Size or Bulk.

Columns are labelled with Body Form Profile. Using the Size (or Bulk) row, find the Body Form Profile column. The intersection provides Sophont Height or Length in meters.

SOPHONT HEIGHT			BFP Body Form Profile														
Dice	Size	m3	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
3	36	0.036	0.3	0.5	0.7	0.8	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0
4	48	0.048	0.4	0.6	0.8	0.9	1.1	1.2	1.3	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2
5	60	0.06	0.4	0.6	0.8	1.0	1.1	1.3	1.4	1.6	1.7	1.8	1.9	2.1	2.2	2.3	2.4
6	72	0.072	0.4	0.7	0.9	1.0	1.2	1.4	1.5	1.7	1.8	1.9	2.1	2.2	2.3	2.4	2.5
7	84	0.084	0.4	0.7	0.9	1.1	1.3	1.4	1.6	1.8	1.9	2.0	2.2	2.3	2.4	2.5	2.7
8	96	0.096	0.5	0.7	1.0	1.2	1.3	1.5	1.7	1.8	2.0	2.1	2.3	2.4	2.5	2.7	2.8
9	108	0.108	0.5	0.8	1.0	1.2	1.4	1.6	1.7	1.9	2.1	2.2	2.4	2.5	2.6	2.8	2.9
10	120	0.12	0.5	0.8	1.0	1.2	1.4	1.6	1.8	2.0	2.1	2.3	2.4	2.6	2.7	2.9	3.0
11	132	0.132	0.5	0.8	1.1	1.3	1.5	1.7	1.9	2.0	2.2	2.4	2.5	2.7	2.8	3.0	3.1
12	144	0.144	0.5	0.8	1.1	1.3	1.5	1.7	1.9	2.1	2.3	2.4	2.6	2.7	2.9	3.0	3.2
13	156	0.156	0.5	0.9	1.1	1.4	1.6	1.8	2.0	2.2	2.3	2.5	2.7	2.8	3.0	3.1	3.3
15	180	0.18	0.6	0.9	1.2	1.4	1.7	1.9	2.1	2.3	2.4	2.6	2.8	3.0	3.1	3.3	3.4

**Dice:** The number of Dice for Physical Characteristics C1 C2 C3 (and assumed C1 is 3D or less). A Size=72 Human Body Form Profile=9 is L=1.8 meters tall. Calculate Width = L/BFP (about 0.2 m) and Depth= L=/BFP (also about 0.2 m).

SOPHONT BULK			BFP Body Form Profile														
Bulk	m3		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
240	0.24		0.6	1.0	1.3	1.6	1.8	2.1	2.3	2.5	2.7	2.9	3.1	3.3	3.4	3.6	3.8
300	0.3		0.7	1.1	1.4	1.7	2.0	2.2	2.4	2.7	2.9	3.1	3.3	3.5	3.7	3.9	4.1
360	0.36		0.7	1.1	1.5	1.8	2.1	2.3	2.6	2.8	3.1	3.3	3.5	3.7	3.9	4.1	4.3
420	0.42		0.7	1.2	1.6	1.9	2.2	2.5	2.7	3.0	3.2	3.5	3.7	3.9	4.1	4.4	4.6
480	0.48		0.8	1.2	1.6	2.0	2.3	2.6	2.9	3.1	3.4	3.6	3.9	4.1	4.3	4.5	4.8
540	0.54		0.8	1.3	1.7	2.1	2.4	2.7	3.0	3.3	3.5	3.8	4.0	4.3	4.5	4.7	5.0
600	0.6		0.8	1.3	1.8	2.1	2.5	2.8	3.1	3.4	3.6	3.9	4.2	4.4	4.7	4.9	5.1
660	0.66		0.9	1.4	1.8	2.2	2.5	2.9	3.2	3.5	3.8	4.0	4.3	4.6	4.8	5.1	5.3
720	0.72		0.9	1.4	1.9	2.3	2.6	3.0	3.3	3.6	3.9	4.2	4.4	4.7	5.0	5.2	5.5
780	0.78		0.9	1.5	1.9	2.3	2.7	3.0	3.4	3.7	4.0	4.3	4.6	4.8	5.1	5.3	5.6
840	0.84		0.9	1.5	2.0	2.4	2.8	3.1	3.5	3.8	4.1	4.4	4.7	4.9	5.2	5.5	5.7
900	0.9		1.0	1.5	2.0	2.4	2.8	3.2	3.5	3.9	4.2	4.5	4.8	5.1	5.3	5.6	5.9
960	0.96		1.0	1.6	2.1	2.5	2.9	3.3	3.6	3.9	4.3	4.6	4.9	5.2	5.5	5.7	6.0
1020	1.02		1.0	1.6	2.1	2.5	2.9	3.3	3.7	4.0	4.4	4.7	5.0	5.3	5.6	5.8	6.1
1080	1.08		1.0	1.6	2.1	2.6	3.0	3.4	3.8	4.1	4.4	4.8	5.1	5.4	5.7	6.0	6.2
1140	1.14		1.0	1.7	2.2	2.6	3.1	3.4	3.8	4.2	4.5	4.8	5.2	5.5	5.8	6.1	6.4
1200	1.2		1.1	1.7	2.2	2.7	3.1	3.5	3.9	4.3	4.6	4.9	5.3	5.6	5.9	6.2	6.5
1800	1.8		1.2	1.9	2.5	3.1	3.6	4.0	4.5	4.9	5.3	5.6	6.0	6.4	6.7	7.1	7.4

### Using The Sophont Height and Sophont Bulk Tables

Assume a typical human BFP=9 and 200 cm (2 meters) tall. On the Height table in Column 9, locate 2.0 and read the row identifier for Size= 96. Such an individual is generated with 8D and so probably has Str=3D and Dex or End =3D.

Assume a sophont roughly ball-shaped BFP= 1.4 and 1,000 kilograms in mass. On the Bulk table, locate the row corresponding to 1,000 kg (=1020) and the column corresponding to 1.4 (midway between columns 1 and 2. The sophont has a height (diameter) roughly 1.3 meters.

The Virushi weighs about a ton. Based on an image, it is about 3 meters long. Interpolation on the Sophont Bulk table indicates BFP=5, which confirms the image.

<b>Pseudo-Ostrich.</b> 850 kilogram (thus Size=850) BFP=11 (Ostrich) is about 4.7 meters tall. Width and Depth= L/11= 0.43 m.	<b>Hexaphant.</b> Size and Bulk 720 BFP=5 (similar to Hippo or Elephant) is about 2.6 meters long, (2.6/5=) 0.52 meters wide and high.	<b>Quintaphant.</b> Size 1344 BFP=4 (similar to Hippo or Elephant but more compact) is about (interpolated) 2.8m long, (2.8/4=) 0.7 m wide and high.
---	--	--



# S-16

## SOPHONT UNIQUES

### UNIQUES

Sophonts may have unusual, unique, or non-standard physical or life cycle structures. These uniques may be implemented for specific sophonts are desired or appropriate. This list is not exhaustive.

This system cannot cover every possible situation (indeed, no system can). Where necessary, or where desired, truly unique elements of the Sophont structure can be inserted. Uniques may change, supplement, complement, or supersede any of the other sophont information.

**Reasons.** Uniques are best imposed when they have a game-play or background reason supporting the specific concept. The Tinroa of Shvireeyiyi experience an aging crisis at Life Stage 5. The Intferhi of Beta Hydrae have two heads.

### SYMBIONTS

Symbionts live in paired relationships (Carrier and Rider) with each other organisms (both are not necessarily sophonts). The Carrier is the base or foundation providing the physical body for the Rider. The Rider is an attached or interior sophont.

**Dominated Carrier.** A sophont or beast Carrier is dominated by and controlled by a Rider. This implies (but is not certain) that the Rider has greater Intelligence.

**Assisted Carrier.** A sophont Carrier is paired with a sophont Rider (the Assistant). Both Carrier and Assistant are intelligent and interact to process information.

**Transfers.** Assistants or Dominants can be transferred from Carrier to Carrier, casually, or when the Carrier is impaired.

### WORLD CONDITIONS

Homeworld conditions may have an effect of the abilities of the sophont. Sophonts from worlds with extreme Hot, Cold, Light, or Radiation have a natural threshold immunity or protection against such damage.

**Hot or Tropic Worlds.** Sophont ignores Hot-2 or less.

**Cold, Tundra, or Frozen Worlds.** Sophonts ignore Cold-2 or less.

### HIBERNATION

The sophont passes some period of time in a state of total suspended animation. The sophont culture often makes provision for the care of, and protection of, the individual during the hibernation period.

### METAMORPHOSIS

Metamorphosis is an abrupt and dramatic change in the sophont's physical structure.

**Life Stages.** Metamorphosis occurs when it advances from one Life Stage to the next.

**Simple Metamorphosis.** The sophont metamorphoses once: at some point (randomly select a Life Stage) the sophont changes from its First Form to its Ultimate Form.

**Complex Metamorphosis.** Metamorphoses occurs several times: randomly select the specific Life Stages. Number the successive forms First, Second, Third, (and beyond).

**The Changes.** Upon metamorphoses, it takes on a new physical structure: create a NEW Sophont Creation card to be the next stage: the new form will exhibit any number of changes; and may be totally different (think butterfly from caterpillar).

### Available Metamorphic Forms

**First.** The initial form for the Sophont.

**Ultimate.** The final form the Sophont achieves.

**Intervening Forms.** If there are more than two Forms, those intervening between First and Ultimate are numbered: Second, Third, Fourth, and beyond.

### MOLT

The sophont sheds its outer covering in an abrupt process at the end of a Life Stage. When Molt is complete (usually a matter of a day or two) the subject emerges with a fresh outer covering (perhaps with changed markings and color) and may have changes in physical and even mental characteristics. Multiple Molts are possible (Second Molt, Third Molt, Fourth Molt and beyond).

**Incremental.** One or more of the Physical [and Mental] Characteristics increments higher.

**Random.** One or more of the [and Mental] Physical Characteristics changes higher or lower.

### DIFFERENTIATED CHANGES

Metamorphosis, Molt, and other effects may have uniform effects on all forms (castes and genders), or they may be isolated to specific forms.

A Muscle Caste may metamorphosize into a dramatically different physical form, or simply molt into a larger physical form; a Brain Caste may metamorphosize into a physically similar but dramatically smarter form. An Egg Donor Gender may transform into a very different, specialized form.

An Assisted Carrier symbiosis may only be viable for a specific gender or caste.



### PSIONICS

Although the statistical expectation is that Psionics is universal among sophonts, the truth lies in a word somewhat less than universal.

**Standard Roll (at time of test)=**  
2D plus 3 minus LifeStage.

### For the Sophont Species:

- A. Roll Flux four times.
  1. **For Variation by Gender.** Consult Table B.
  2. **For Variation by Caste.** Consult Table C.
  3. **For Variation by Characteristic.** Randomly determine Characteristic.
  4. **For Variation by Senses.** Determine the affected Sense.

## A NON-STANDARD PSIONICS

Flux	1 Gender	2 Caste	3 Characteristic	4 Senses
-5	One	One	= CX	Percep
-4	One	One	= CX	Percep
-3	One	One	= CX	Smell
-2	One	One	Sanity1	Vision
-1		standard		
0		standard		
+1		standard		
+2	Table B	Table C	Sanity2	Hearing
+3	Table B	Table C	=12 -CX	Touch
+4	Table B	Table C	=12 -CX	Aware
+5	Table B	Table C	=12 -CX	Aware

A standard Sophont creates Psi-based on 2D +3 -Life Stage.

In some species, the native ability varies by Gender, Caste, Characteristic, or Sense. For a Species, roll Flux for each of the four possibilities. Four Flux rolls may produce up to four conditions applying to the species.

### FOR THE SPECIES

**One.** Only one random Gender (or Caste) has Psionics; the others have Psi= 0.

**=CX.** For one random Characteristic, sophont Psi equals that Characteristic.

**=12- CX.** For one random Characteristic, sophont Psi equals 12 minus Characteristic.

**S1. Sanity1- Sanity-Based Psionics.** Psionics= 4D minus Sanity.

**S2. Sanity-2 Psionics-based Sanity.** Sanity= 4D minus Psionics.

### The Senses

The table shows 4=**Sense-Associated Psionics**: those with Psionic Ability lose the indicated Sense. Roll 2D for 7+ to convert it to **Sense-Loss Psionics**: those with Psionic Ability also cannot learn or use the Psionic equivalent.

## BC GENDER-BASED AND CASTE-BASED PSIONICS

Flux	Gender		Female		Egg Donor		Male		Neuter		Activator		Bearer		One		Two		Three		Four		Five		Six			
	S	F	E	M	N	A	B	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6			
-5	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	Z	T	
-4	CX	CX	Z	3x	3x	3x	CX	5	10	15	20	25	30	T													T	
-3	CX	CX	Z	2x	2x	2x	CX	10	20	30	40	50	60	T													T	
-2	Gender or Caste cannot have Psionics																											
-1	Gender or Caste cannot have Psionics																											
0	CX	CX	CX	CX	CX	CX	CX	CX	CX	CX	CX	CX	CX	CX	CX	CX	CX	CX	CX	CX	CX	CX	CX	CX	CX	CX	CX	A
+1	1D	2D	3D	4D	3D	2D	1D	+5	+5	+5	+5	+5	+5	+5	+5	+5	+5	+5	+5	+5	+5	+5	+5	+5	+5	+5	+5	C
+2	2D	3D	4D	5D	4D	3D	2D	+7	+7	+7	+7	+7	+7	+7	+7	+7	+7	+7	+7	+7	+7	+7	+7	+7	+7	+7	+7	1R
+3	3D	4D	5D	6D	5D	4D	3D	+9	+9	+9	+9	+9	+9	+9	+9	+9	+9	+9	+9	+9	+9	+9	+9	+9	+9	+9	+9	2R
+4	S2	S2	S2	S2	S2	S2	S2	S2	S2	S2	S2	S2	S2	S2	S2	S2	S2	S2	S2	S2	S2	S2	S2	S2	S2	S2	S2	3R
+5	S1	S1	S1	S1	S1	S1	S1	S2	S2	S2	S2	S2	S2	S2	S2	S2	S2	S2	S2	S2	S2	S2	S2	S2	S2	S2	S2	3R
Flux	2		3		4		5		6		7		8		9		10		11		12		S		S			

## C

Caste	Gender=	Common=	Special=	Skill=
-------	---------	---------	----------	--------

Default sophont creates Psi-based on 2D +3 -Life Stage.

For a Species with Gender-Based Psionics, roll for each Gender for the modifier to Psionics.

For a Species with Caste-Based Psionics, roll for each Caste for the modifier to Psionics.

(any number)= Members have Psi=(number) at birth.

(+number)= Increase rolled Psi by (+number).

1D 2D 3D 4D 5D= Psi at birth equals die roll.

2x 3x 4x= Multiply standard Psi at birth by this value.

CX= For one random Characteristic, Psi equals that characteristic.

Z= Psionic ability does not decline with age.

S1. Sanity1- Sanity-Based Psionics. Psionics= 4D minus Sanity.

S2. Sanity-2 Psionics-based Sanity. Sanity= 4D minus Psionics.

### Skilled Caste:

L= Leader skill includes Psionic ability. T= Trades have Psionic ability.

A= Arts skills have Psionic Ability. C= Counsellor has Psionic ability.

1R 2R 3R 4R= One, two, three, or four random skills from S-12-C1 are accompanied by Psionic ability.

The tables potentially provide for a great variation in the distribution of Psionic ability: within a species, Psionics can be common or rare; weak or powerful; saddled with weaknesses; reserved to a very few; may even verge on insanity.



# S-18

## SOPHONT SPECIES TECH LEVEL CAP

### SPECIES TECHNOLOGICAL RESTRICTIONS

- Determine the native limits on species technology achievements
- A. Paradigm Shift Restrictions.
  - B. Sophont Species TL Cap..

### TECHNOLOGICAL LEVEL RESTRICTIONS ON A SPECIES

Some sophont societies face intrinsic restrictions hard-wired into the very genetics of their biological structure. Depending on the specifics of their structure, the species is literally saddled with of one or more of the following restrictions:

**Tech Level Cap.** The species faces a restriction in the Tech Level to which it can naturally rise. There may ultimately be circumstances within the Tech Level Progress of Sophont species which can remove the TL Cap.

**Gravitics Incapable.** The species cannot independently invent Gravitics technology. The restriction is removed if examples of Gravitics become available.

**Jump Incapable.** The species cannot independently invent Jump technology. The restriction is removed if examples of Jump become available.

**Fusion-Plus Incapable.** The species cannot independently invent Fusion Plus technology. The restriction is removed if examples of Fusion Plus become available.

**Reality-Manipulation Incapable.** The species cannot independently invent Reality Manipulation technology. The restriction is removed if examples of Reality Manipulation become available.

### Effects of the TL Restrictions

Incapable status literally retards technological development in specific fields (just as world without oceans is restricted in building ships; or a world without atmosphere is restricted in building airplanes).

## A PARADIGM SHIFT RESTRICTIONS

Roll at TL	The Known Paradigm Shifts				The Unknown Paradigm Shifts				Conceivable Advances IF Sophont Species Has Not Discovered Jump								
	G	F	R	J	K	Q	X	Z	H	S	L	B	V	6	7	8	9
	9	11	25	9					17	20	23	26					
Flux	Gravitics	Fusion-Plus	Event Branc Manipulation	Jump			Contact With Higher Plane	Hop	Skip	Leap	Bound	Vault	Six	Seven	Eight	Nine	
-5	19	21															
-4	18	20															
-3	17	19	33														
-2	16	18	32														
-1	15	17	31														
0	14	16	30														
+1	13	15	29	33													
+2	12	14	28	27				20	23	26	29	32	34	35			
+3	11	13	27	21				19	22	25	28	31	33	34	35		
+4	10	12	26	15				18	21	24	27	30	32	33	34	35	
+5	9	11	25	9				17	20	23	26	29	31	32	33	34	

Roll for a Sophont species uncontaminated by contact with the technology shown. Make each roll upon achieving the Roll At TL. If successful, the species determines that the technology is theoretically possible and they can build an Experimental stage version at the Flux-indicated TL. Success in one column does not necessarily produce success in another.

Results on this table do not override a Sophont Tech Level Cap.

### SOPHONT TECH LEVEL CAP

A Sophont species may be genetically disposed to limits in its ability to advance technologically.

Select the column corresponding to the Social Characteristic (if Instinct, select that column). Roll to determine the maximum Tech Level the sophont culture may achieve.

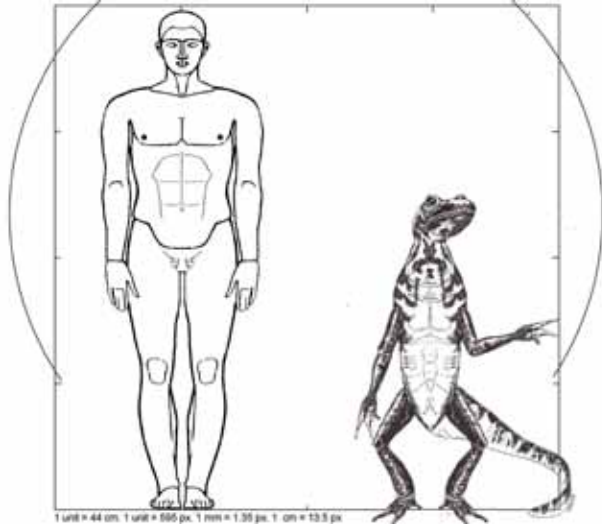
## B SOPHONT SPECIES TL CAP

D1	D2	Ins	Cha
		Cas	Soc
1	1	1	1
	2	1	2
	3	2	3
	4	2	4
	5	3	5
	6	3	6
2	1	4	7
	2	4	8
	3	5	9
	4	5	10
	5	6	11
	6	6	12
3	1	7	13
	2	7	14
	3	8	15
	4	8	16
	5	9	17
	6	9	18
4	1	10	33
	2	10	33
	3	11	33
	4	11	33
	5	12	33
	6	12	33
5	1	13	33
	2	13	33
	3	14	33
	4	14	33
	5	15	33
	6	15	33
6	1	33	33
	2	33	33
	3	33	33
	4	33	33
	5	33	33
	6	33	33

A sophont is restricted to maximum TL shown here.



### BWAPS

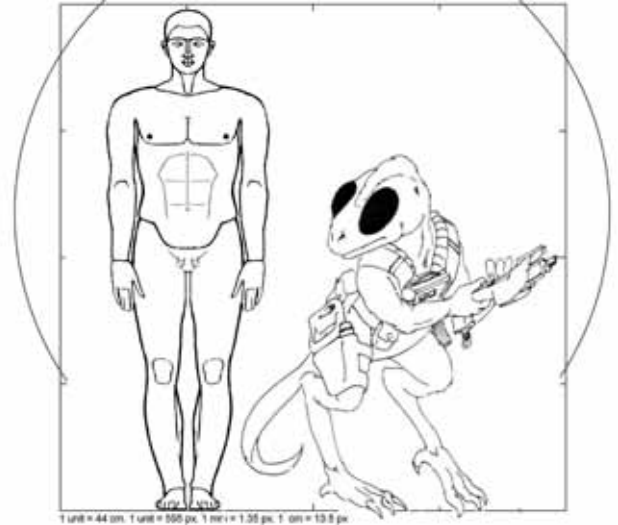


1 unit = 44 cm, 1 unit = 505 px, 1 mm = 1.35 px, 1 cm = 13.5 px

The Bwaps of Maharaban (Glowl-2 [G4 V] A4698AB-B)

Bwaps (often: Newts) have a world-view that everyone has a place in the greater structure of the universe.

### DROYNE

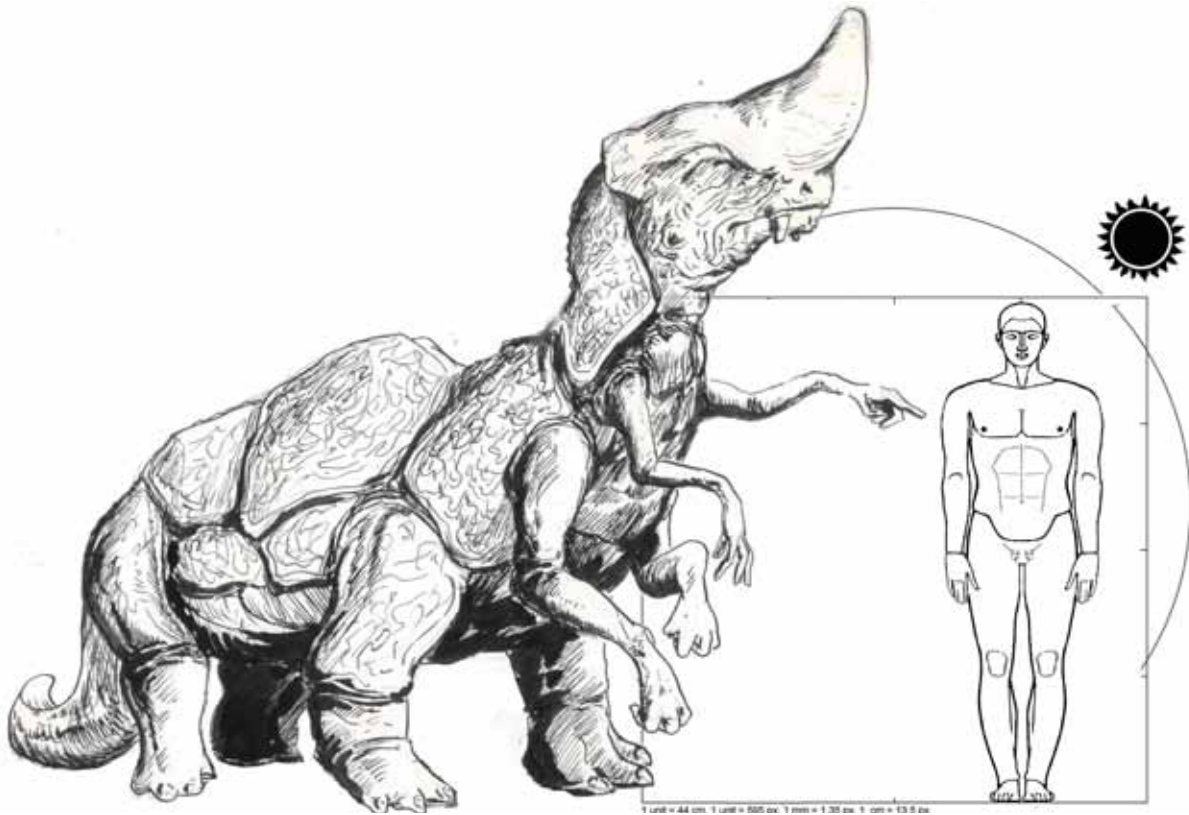


1 unit = 44 cm, 1 unit = 505 px, 1 mm = 1.35 px, 1 cm = 13.5 px

The Droyne of Droynia (original location unknown)

Droyne are the scattered remnants of the fantastic Ancients who swept through this spiral arm 300,000 years ago.

### VIRUSHI



1 unit = 44 cm, 1 unit = 505 px, 1 mm = 1.35 px, 1 cm = 13.5 px

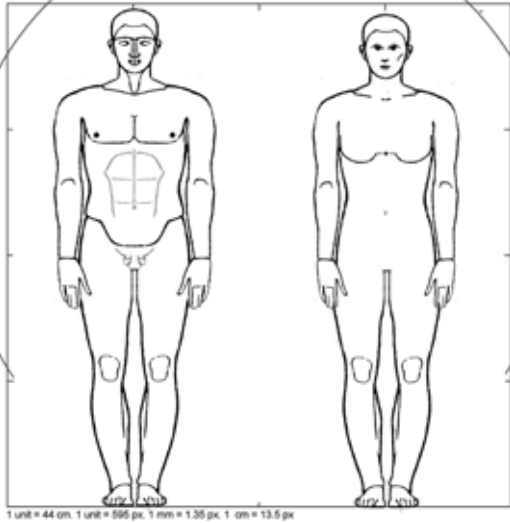
The Virushi of Virshash (Thintle-6 [F9 V] DA86954-6)

The Virushi are among the largest intelligent races encountered by Humaniti. Formidable in appearance, the truth is that they are confirmed pacifists with great abilities in the medical (or perhaps veterinary) field.





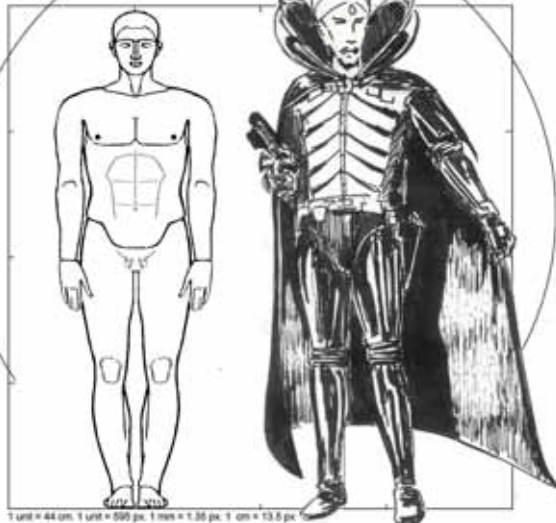
### SOLOMANI



The Humans of Terra (Sol-3 [G2 V] A877B99-D)

Genetic Humans originated on Terra as part of the natural evolutionary process, and now are the predominant sophont of the Third Imperium's ten thousand systems.

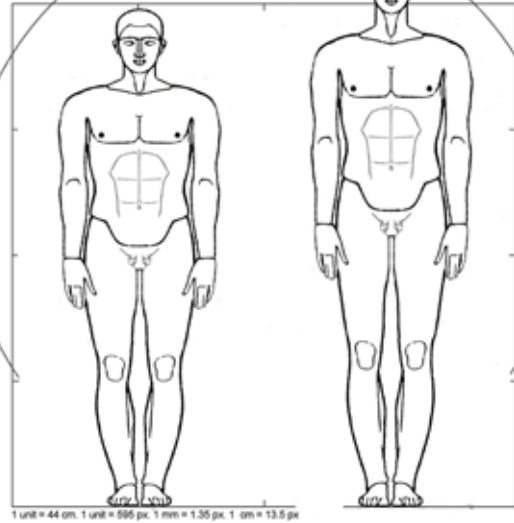
### ZHODANI



The Zhodani of Zhdant (Pliebr-2 [K0 V] A6549C8-F)

The Zhodani, a branch of Humanity, live spinward of the Imperium; their evolutionary path diverged long ago as they embraced psionics as an integral part of society.

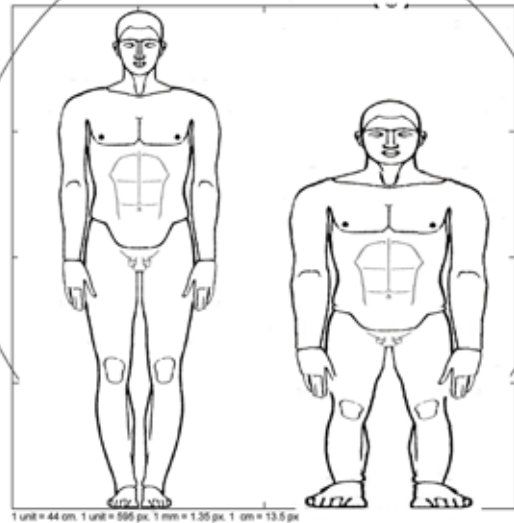
### CASSILDAN



The Cassildan of Ambemsham (Krof-0 [M3 V] A5457BC-B)

The Cassildan, a minor branch of Humanity, abandoned by one of Grandfather's Sons on a low gravity world in the aftermath of the Ancient War.

### GEONEE

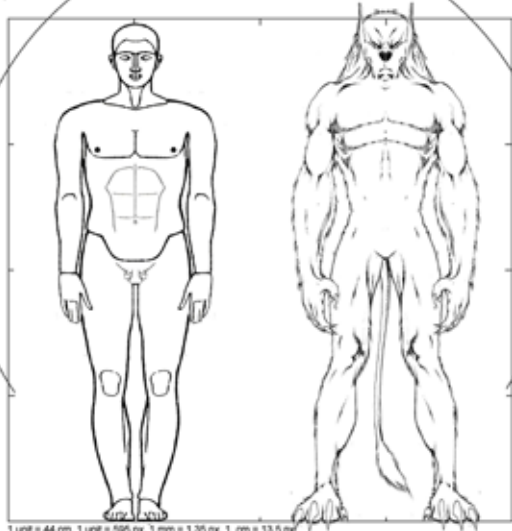


The Geonee of Shiwonee (Alliana-5 [F7 V] AA86831-C)

The Geonee, a minor branch branch of Humanity, are one of the oldest human interstellar cultures in charted space (behind only the Suerrat and Vilani).



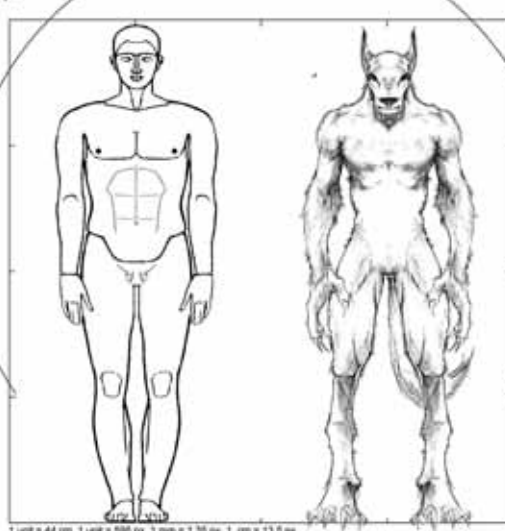
### ASLAN



The Aslan of Kusyu (Tyeyo-3 [G4 V] A876986-E)

The Aslan (in their language: Fteirle) are the dominant sophonts spinward of Terra: four-limbed, upright, bipedal, carnivore/pouncer felinoids.

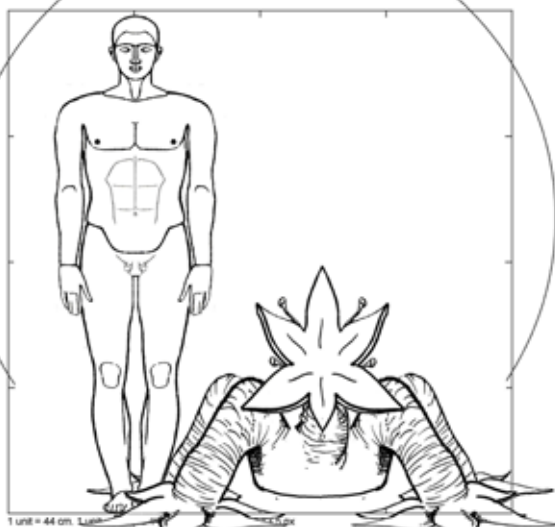
### VARGR



The Vargr of Lair (Kneng-3 [G5 V] A8859B9-F)

The Vargr live generally coreward of the Imperium: upright bipeds with a humanoid body plan, the result of some obscure Ancient genetic manipulations.

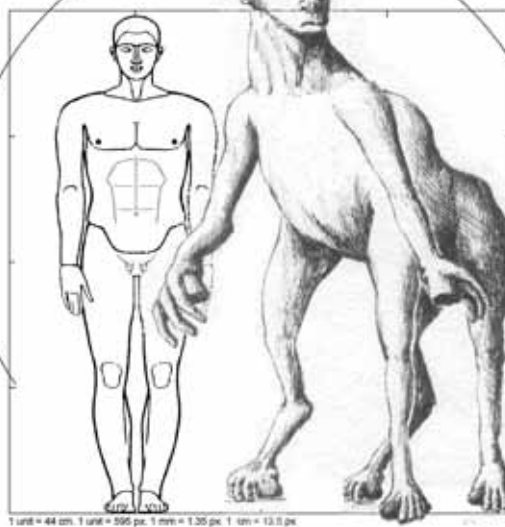
### HIVERS



The Hivers of Guaran (Primary- 2 [K1 V] A667800-F)

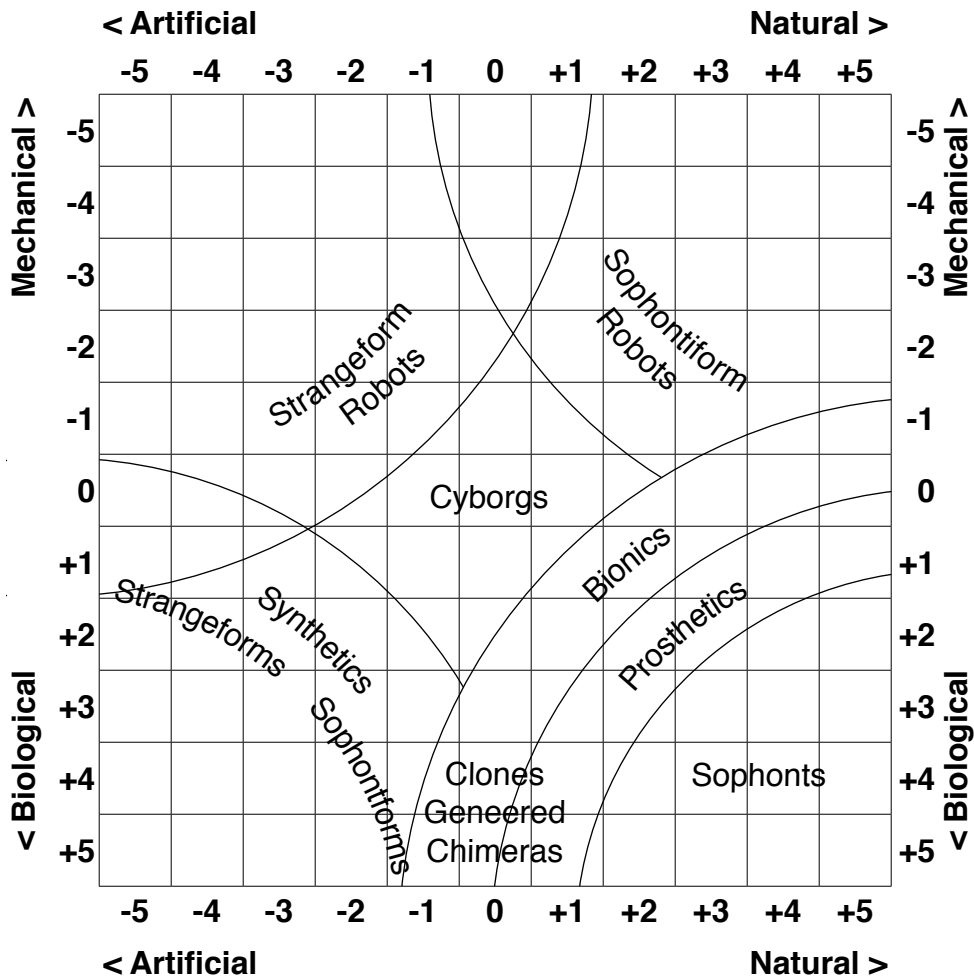
Hivers are best described as strange, giant, intelligent land-dwelling starfish. They are silent (they speak in a gesture language) geniuses with obscure motives.

### K'KREE



The K'kree of Kirur (Gzang-5 [F1 V] B863A03-F)

The K'kree are herd-oriented, aggressive vegetarians. The apostrophe in their name is a glottal stop: to many, their name is a strange choking sound.



- Sophontiform:** Taking or imitating the structure or appearance of a sophont species.
- Strangeform:** Taking a function-based structure and appearance.
- Synthetic:** Artificial or created (as opposed to natural) being.
- Clone:** A copy or duplicate of a natural genetic being.
- Chimera:** A genetically engineered being.
- Cyborg (Cybernetic Organism):** A being with a mix of organic and artificial parts.

A robot is a truly non-biological (typically mechanical) sophont. **Robots** are distinguishable from **clones** (created from existing genetic templates), **chimeras** (the result of genetic engineering), and **synthetics** (a blend of biological and non-biological processes). Robots may be sophontiform (imitating intelligent beings) or strangeform (with structure based on function).

The concept of robot is simple: an artificial being at the other end of the spectrum from a natural organic being. A robot is constructed of mechanical components with a minimum of organic content (the primary exception being that some robots have organic or semi-organic brains).

## ROBOT TYPES

A robot is a mechanical being capable of autonomous action and possessing some degree of intelligence.

There are two broad categories of robots:

### Strangeform Robot

Some robot designers cast off the constraints of imitation to construct robots with their form dictated by their function.

Strangeform robot vehicles look like vehicles; strangeform robot construction equipment looks like construction equipment; strangeform warbots look like tanks or artillery.

**QuickBuilding Strangeform Robots.** Because a strangeform emphasizes function over form, it is essentially a vehicle or (other mobile) device with a brain. To create one, select a vehicle and install in it a brain.

The potential is near infinite: robot taxis, robot buses, robot cars, robot airplanes, robot trains, robot streetsweepers, robot construction equipment, robot tanks, robot armored personnel carriers, robot ships, robot planes, robot artillery, robot missiles.

**Strangeform Robots Are (Often) Invisible.** On worlds where robots are common, strangeform robots are effectively invisible: there is little or no difference between ordinary driver driven vehicles and robot vehicles.

### Sophontiform Robot

Many robots are mechanical imitations of people. An entirely mechanical being constructed as an imitation of a sophont is a sophontiform. Those constructed as imitations of humans are more specifically **humaniform**.

## BUILDING SOPHONTIFORM ROBOTS

A robot designer can create a robot based on an existing sophont. Using the known physical structure of an intelligent species, the designer imitates outward appearance by specifying size, body structure, genetic profile. The details are filled out with appropriate mechanical structures (which may exactly duplicate the abilities of the sophont, or may diverge from them).

## The Brain

Select an appropriate brain for the robot.

A variety of brain types are available for robots:

**Organic Brain.** A living brain harvested from a sophont; origins range from merciful (ensuring the survival of a brain whose body has been destroyed) to nefarious (involuntary conversion for criminal activity or indebtedness).

**Organic Clone Brain.** A living brain is cloned from an existing sophont.

**Semi-Organic Clone Brain.** A living brain created through cloning from an animal (that is, a non-sophont). Through extensive development, training, and geneering, the brain has an intelligence approaching that of a sophont.

**Electronic (or Photonic or Fluidic) Brain.** A structure of electronic (less often fluidic or photonic) circuits operate as a logical data processor.

**Positronic Brain.** A structure of iridium sponge contains a raw pattern of neural pathways for a flow of positrons, producing a holographic intelligence pattern within the brain.

## Other Components

The rest of the robot is based on its function.

**The Senses.** An array of senses (some of which many not be in the pattern sophont) are selected and installed.

**Body Structure.** The designer selects a body structure which reflects the skeleton and muscles of the pattern.

**Enhancements.** The body of a robot may be improved with a variety of options.

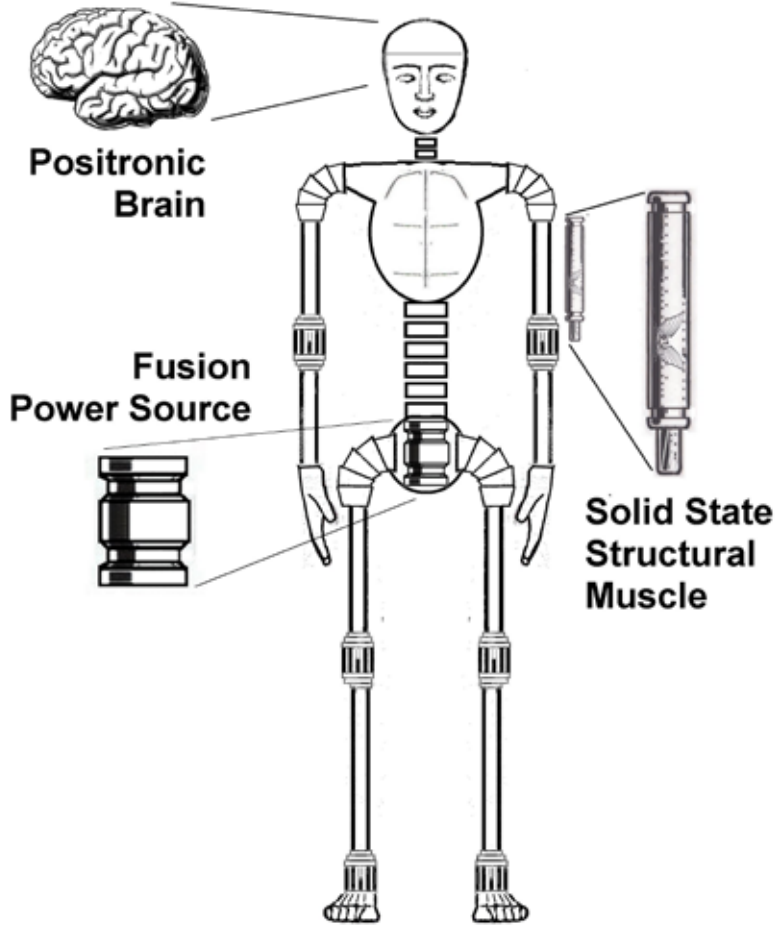
**Control Codes.** Active or passive safety controls protect sophonts from most possible harm by robots. **Passive Codes** are powerful ingrained responses which dominate the robots behavior at all times. **Active Codes** require a robot to respond to specific commands or stimuli.

## Characteristics

Robots are provided with characteristics based on the body structure and enhancements and on a variety of characteristic die rolls. The potential characteristics are created during the design process, but the actual characteristics are only rolled after the robot has been created.



# Robotics 101

<p><b>The Elements of the Practical Robot</b>          Autonomous / Self-Directing          Mobile (self-transporting)          Corporeal (has a physical body)</p>		<p><b>The Most Important Element:</b>          Capable of acting LIKE a sophont          (like = 10% to 90% similarity)</p>
<p><b>Course Syllabus:</b></p> <p>Introduction.</p> <p>Artificials- A Definition.          Brains for Artificials          Solid State Structural Muscles.          Power Sources.</p> <p>Sophontiform Patterns.          Sensors.          Manipulators.</p> <p>Strangeform Patterns.          Non-Standard Accessories.</p> <p>Robotic Design.          Manufacturing Techniques.          Positronic Brain Training.          Repair and Maintenance.</p> <p>Managing Robots.          Conditioning.          Obsolescence.          Aberrations.          Incentives and Discipline.</p> <p>Control Codes.</p> <p>Legal Status of Robots</p> <p>Final Project          Final Exam.</p>	 <p style="text-align: center;">Typical Sophontiform (in this case, Humaniform) Robot</p>	
<p><b>Positronic Brain</b>          Includes capabilities for          Creative thought, free will,          And the ability to learn.</p>	<p><b>Fusion Power Source</b>          Efficient power source          With low maintenance factor and          Uses commonly available fuel.</p>	<p><b>Solid State Structural Muscle</b>          Structural components          Provide powerful motion          With low power drain, and low fatigue factor.</p>
<p><b>Other Features</b>          Self-repairing (through parts replacement). Viable in all environments (0 through C) with appropriate options.</p>		

Robotics 101. Introduction to Robotics. Instructional Handout. University of Regina, Regina. 114-1104.



R- 01
ROBOTS CHECKLIST

### ROBOTS ARE CONSTRUCTED

Robots are designed by players or the referee as the need arises. Specific Robots are then constructed and can be used as player- and non-player- characters.

### SOPHONTIFORMS: The Vilani Method

A specific sophont is designated as a pattern and the robot is designed to emulate the abilities of the sophont. From this basic design, various abilities are added or removed. The result is an imitation of the Sophont in general structure and capability.

### STRANGIFORMS: The Suerrat Method

Some robotic engineers prefer the more free form Suerrat method of robot creation: the designer determines a basic robotic purpose and then selects a variety of components and abilities that enable the robot to accomplish that purpose. The final design may or may not be similar to an existing sophont.

---

### ROBOT DESIGN CHECKLIST

#### For Sophontiforms:

1. Select Sophont Pattern.
  - A. Select a Brain.
  - B. Note Size, Body Structure, Genetic Profile.

---

#### Design Sequence

2. Create Blank FillForm.
  3. Select Brain.
  4. Select Basic Senses.
  5. Create Body Structure.
  6. Enhancements.
  7. Characteristics.
  8. Skills.
  9. Power Source.
  10. Control Codes
  11. Manufacturer / Model.
- 

---

### THE TECHNOLOGY OF ROBOTICS

TL	Robotics
12	Personality Recording And Editing
13	Robot Solid State Structural Muscle. Cloning. Forced Growth. Wafer Technology
14	Geneering.
15	
16	Artificial Intelligence

---

Robots can be designed (created; described) in two different ways; each with its own procedures.

### THE ROBOT FUNCTION

Robots are created for jobs which are:

- Menial.** Unchallenging, boring, repetitive jobs.
- Difficult.** Strenuous, arduous jobs.
- Dangerous.** Hazardous, potentially injurious jobs.
- Undesirable.** Offensive, repugnant jobs.
- Low-Paying.** Low value, marginal jobs.
- Other Jobs.** Because robots have a wide range of capabilities, there are also well qualified robots filling a variety of jobs throughout society.

### Can A Robot Pursue A Career?

Robots can apply for any available career available, and are subject to the same procedures.

### ROBOT SIZE

Size is a measure of the volume (and to some extent the weight) of a robot. Size is the total number of **units** available for the construction of a Sophontiform Robot roughly equivalent to the Pattern.

**Understanding Size.** Size is measured in units approximately equal to one liter (1000 liters to a cubic meter). For comparison, Size 72 corresponds to a typical human.

As a very rough measure, Size is also the mass of a person or sophont in kilograms. A Robot is more mechanical in nature: the mass of a robot is (Size \* 1.5) kilograms.

**Calculating Size.** Size for a sophont is based on the three physical characteristics C1 C2 C3 (and according to the Calculating Size Table).

#### Calculating Size

C1 Strength	Dice	
C2 Dexterity	Dice	
C2 Grace	Dice / 2	makes it lighter or smaller
C2 Agility	Dice / 2	makes it lighter or smaller
C3 Endurance	Dice	
C3 Stamina	Dice * 2	makes it heavier or larger
C3 Vigor	Dice	

Dice= Number of dice rolled for the characteristic (for example, if Str = 2D, Dice = 2).

Total= C1 + C2 + C3  
Typical Size = 12 \* Total

### Size of Sophontiform Components

Components for a Sophontiform are initially allocated:

- Torso.** A Torso is allocated half of the Size units (liters).
- Head.** Determined by the Brain and any enhancements.
- Limbs.** The remaining Size units are allocated to Limbs.

**Size of Strangeform Components.** Components for a Strangeform may be in any proportion.



# R-02

ROBOTS  
FILLFORM

<b>11</b>	Robot Model
	Manufacturer

Sophont Pattern=

Head	Torso	Front Limbs	Rear Limbs	Tail Probisc
<b>A</b>	<b>B</b>	<b>CD</b>	<b>EF</b>	<b>G</b>
[ ]	[ ]	[ ]	[ ]	[ ]

						Units	Cr	
<b>03</b>	<b>A</b>	Brain	C4=					
		Wafer Jack						
		Emotional						
<b>04</b>	<b>A</b>	Skeleton						
	<b>B</b>	Muscles						
	<b>C</b>	Limbs						
	<b>D</b>	Manipulators						
<b>05</b>	C							
	<b>V</b>	Vision	V					
	<b>H</b>	Hearing	H					
	<b>S</b>	Smell	S					
	<b>T</b>	Touch	T					
	<b>A</b>	Aware	A					
<b>06</b>	<b>A</b>	Enhancement						
	<b>B</b>	Connectors						
	<b>C</b>	Skin						
	<b>D</b>	Additions						
<b>07</b>	<b>A</b>	C1=	D=	x4	Mods=			
		C2=	D=	x4	Mods=			
		C3=	D=	x4	Mods=			
	<b>B</b>	C4=						
		C5=						
	<b>C</b>	C6=						
<b>08</b>	<b>A</b>	Primary						
		Secondary1						
		Secondary2						
		Skill Limit						
<b>09</b>	<b>A</b>	Power Source						
<b>10</b>	<b>A</b>	Control Code						
	<b>B</b>	Control Code						
Total=								



## SELECT A ROBOTIC BRAIN

- The robot requires a brain.  
A. Select Brain Type.  
B. Note Specific Details

### A BRAINS AND INTELLIGENCE

Basic Type	C4=Intelligence	KCr	Units	C4 Int	Theoretical Max	Cost KCr	Skills
Organic Brain.	From original.	30	3				native
Organic Clone Brain.	G	C4 * 10	1	1 - 6	6	60	
Organic Clone Brain.	G+D	C4 * 10	2	2 - 12 +Flux	17	120	
Organic Clone Brain.	G+DD	C4 * 10	3	3 - 18 +Flux +Flux	28	180	
Organic Clone Brain.	G+DDD	C4 * 10	4	4 - 24 +Flux +Flux +Flux	41	240	
Semi-Organic Clone Brain	0	10	1	0	0	10	none
Semi-Organic Clone Brain	0+D	C4 * 10	2	1 - 6 +Flux	11	60	
Semi-Organic Clone Brain	0+DD	C4 * 20	3	2 - 12 +Flux +Flux	22	120	
Electronic Brain.	D	C4 * 10	1	1 - 6 +Flux	11	60	
Electronic Brain.	DD	C4 * 20	2	2 - 12 +Flux +Flux	22	120	
Positronic Brain.	1	5	1	1	1	10	
Positronic Brain.	D	C4 * 5	2	1 - 6 +Flux	11	30	
Positronic Brain.	DD	C4 * 20	2	2 - 12 +Flux +Flux	22	240	
+ Wafer Jack		1	0				
+ Emotional Supplement.		C4*10	0				

G= Genetic Intelligence in original sophont brain (1-6).

0= Semi-Organic Brains have no genetic intelligence (thus their base = 0).

D= 1D6 (may be rolled, or may be specified).

A Brain D can have Intelligence equal to 1D (1-6). A Brain DD can have Intelligence equal to 2D (2-12).

A Brain G+D can have Intelligence equal to the C1 Gene (=1-6) plus 1D (1-6).

**Final Intelligence.** Brains are purchased based on their tested C4 Int as they leave the factory. Actual C4 Int gradually settles in over the course of the first year. At the one year anniversary of the robot construction, apply Flux to each D (but not G). Theoretically, a Positronic Brain D can ultimately have Int = 11; and Max Int = 18 (Max Int for G+DDD = 24).

**Units** = total space required in liters.

**Installed In A Console.** A Brain installed in a Console allows the Console to operate independently, regardless of its intelligence. If the Brain has C+S+K greater than Console TL, then that value may be used instead of TL.

### B BRAIN PARAMETERS

Type	Ages	Sleeps	Power	Wafers	Air	Temperature	Personality
Organic Brain	Yes	Yes	Nutrient	Yes	Air	Cold to Hot	Natural
Organic Brain Clone	Yes	Yes	Nutrient	Yes	Air	Cold to Hot	Clone Implant
Organic Brain	Yes	Yes	Anerobic Nutrient	Yes		Cold to Hot	Natural
Organic Brain Clone	Yes	Yes	Anerobic Nutrient	Yes		Cold to Hot	Clone Implant
Semi-Organic Brain	Yes	Yes	Hybrid	Yes	Air	Cold to Hot	Clone Implant
Semi-Organic Brain	Yes	Yes	Anerobic Hybrid	Yes		Cold to Hot	Clone Implant
Electronic Brain	No	No	Electric	No	No	Cold to Hot	Written
Positronic Brain	Yes	No	Self-Powered	No	No	Cold to Hot	Natura

**Ages.** Organic and Semi-Organic brains age at the same rate as their Patterns. Clones Brains are subject to Clone Aging. Positronic Brains are subject to Positronic Aging.

**Sleeps.** Organic and Semi-Organic Brains are subject to Waking Hours based on C3.

**Power.** Required Power Source for a Brain as shown; requirement is in addition to Robot Body power requirements.

**Wafers.** If Yes, the Brain can be fitted with a Wafer Jack.

**Requires.** If Air, the Brain requires an Air Processor. If necessary, a Water Processor can be substituted.

**Temperature.** The Brain can tolerate temperatures shown without additional protections.

**Personality.** The personality in the brain is of the type shown.



# R-04

## ROBOTS BODIES

### ROBOT BODY DETAILS

Select robot body details.

- A Skeleton
- B Muscles
- C Limb Sizes
- D Manipulators

### A SKELETONS

Variant	Basic Type	KCr	Unit
Lightweight.	Fluid Interior Sacs	10	6
Standard	Fluid Interior Sacs	20	8
Strong	Fluid Interior Sacs	30	16
Lightweight	Flexible Interior Skeleton	10	6
Standard	Flexible Interior Skeleton	20	10
Strong	Flexible Interior Skeleton	30	14
Lightweight	Bony Interior Skeleton	10	8
Standard	Bony Interior Skeleton	20	12
Strong	Bony Interior Skeleton	30	16
Lightweight	Exoskeleton	10	12
Standard	Exoskeleton	20	16
Strong	Exoskeleton	30	18
Lightweight	Exterior Shell	10	8
Standard	Exterior Shell	20	10
Strong	Exterior Shell	30	15
Agile	Skeleton (Agi +3)	20	+1
Very Agile	Skeleton (Agi +6)	30	+2

Preferred robot body skeleton is the same type present in the Pattern. Skeleton units are allocated to the Torso.

**Strong Skeleton** supports an ability to lift or carry heavier than normal loads; required with C1 Strength 3D+.

**Lightweight Skeleton** reduces the unit requirement for Skeleton. Available when C1 Strength =1D or 2D.

**Agile Skeleton** (option) has enhanced flexible joints; required with C2 Agility.

**Very Agile Skeleton** (option) has enhanced flexible joints; required with C2 Agility.

### B MUSCLES

Variant	Basic Type	KCr	Units
Standard	Muscles	10	0
Strong	Muscles (Str +3)	10	1
Stronger	Muscles (Str +6)	10	2
Graceful	Muscles (Gra +3)	10	+1
Very Graceful	Muscles (Gra +6)	10	+2
Burst Mode	Muscles (Vig 3+)	10	+1

Every robot body requires muscles. Muscle units are allocated to the torso.

**Strong Muscles** produce greater than normal C1 Strength; required if C1 Strength based on 3D+.

**Stronger Muscles** produce greater than normal C1 Strength; required if C1 Strength based on 3D+.

**Graceful Muscles** required for Robots with C2 Grace.

**Very Graceful Muscles** produce greater than normal Grace; required for Robots with C2 Grace.

**Burst Mode Muscle** provides double C1 Strength for two minutes, and is required for Robots with C3 Vigor.

### REQUIRED ROBOT COMPONENTS

If the Robot has:	then it Requires:
C1 Strength 3D+	Strong Skeleton
C1 Strength 3D+	Strong or Stronger Muscles
C2 Agility	Agile or Very Agile Skeleton
C2 Dexterity	Dextrous Manipulators
C2 Grace	Graceful or Very Graceful Muscles
C3 Endurance	Long Life Cell Charge (or FusionPlus)
C3 Stamina	Reserve Power Cell (or Fusion Plus)
C3 Vigor	Burst Mode Muscles

### C LIMB SIZES

Flux	Limb Size	Ar	Le	Wi	Flip	Tr	An	Tail	Feel
-5	XSmall	1	1	1	1	1	1	1	1
-4	VSmall	2	2	2	2	2	2	2	2
-3	Quite Small	3	4	6	3	3	3	3	3
-2	Small	4	6	8	4	4	4	4	4
-1	Slightly Smaller	5	8	10	5	5	5	5	5
0	Standard	6	9	12	6	6	6	6	6
+1	Slightly Larger	7	10	14	8	7	7	7	--
+2	Large	8	12	16	10	8	8	8	--
+3	Quite Large	9	14	18	12	9	9	9	--
+4	VLarge	10	15	20	14	10	10	10	--
+5	XLarge	12	18	22	16	11	11	11	--

**Abbreviations:** Ar= Arm. Le= Leg. Wi= Wing. Flip= Flipper. Tr= Trunk. An= Antennae. Tail= Tail. Feel= Feeler.

Limbs are identified with Limb Type and Size: Arm-3 is a Quite Small Arm; Flip-16 is an Extremely Large Flipper.

Limb Groups 1 and 2 have Manipulators.

Limb Groups 3 and 4 have no Manipulators.

Trunk and Tail are equivalent (at opposite ends of the Body); each may (but not necessarily) have a Manipulator.

**Volume** is Size in Liters. **Cost** is Size in KCr.

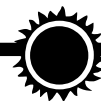
### D MANIPULATORS

Manipulator	KCr	Units
Hand	10	1 Naturally Dexterous
Paw	10	1
Dexterous Paw	20	1
Tentacle	20	1 Naturally Dexterous
Grasper	10	1
Dexterous Grasper	10	1
Gripper	5	1
Dexterous Gripper	20	1
Socket	10	1
Dexterous Socket	20	1
Fine Detail Manip	10	1
Heavy Duty+	10	2
Welder	10	2
Ped Option	5	+1

**C5 Training.** The default. Training cannot exceed C4.

Dexterous is required if C2= Dex.

Ped Option is required for each Leg in LG 1 or LG 2.



### CREATING SENSES FOR ROBOTS

For each desired sense, create a sense string and determine its

- A. Constant,
- B. Sense String,
- C. Body Location, and
- D. Costs.

### THE SENSE STRINGS

Sense Strings for sophonts use this table.

Senses (for sophonts and for robots) are described with Sense Strings. A robot may have a variant sense string (either better or worse than the sophont pattern).

**Duplicative or Redundant Senses.** It is possible to install multiple versions of the same sense (two sets of eyes, each set with a different constant and band set).

**Omitted Senses.** Some Robots may omit senses from the pattern (for example, its pattern may have the sense of Smell, but the robot does not).

### SENSE STRINGS

Sense	String	Elements
ision	V-00-RGB	V- Constant- Band1 Band2 Band3
Hearing	H-00-FSVR	H- Constant- Freq Span Voice Range
Smell	S-00-S	S- Constant- Sharpness
Touch	T-00-S	T- Constant- Sensitivity
Awareness	A-00-A	A- Constant- Acuity
Perception	P-00-AV	P- Constant- Acuity Poice

### A SENSE CONSTANTS

Flux	Constant	KCr
-5	06	60
-4	08	80
-3	10	100
-2	12	120
-1	14	140
0	16	160
+1	18	180
+2	20	200
+3	22	220
+4	24	240
+5	26	260

Select desired Constant.

### D SENSORY COSTS

The costs for senses are based on the specific sense constant and the various inputs they can sense.

Vision	Constant	* KCr 10
	Per Band	* KCr 10
	Telescopic	KCr 40
	Microscopic	KCr 40
Aware	Replay Module	KCr 20
	Vision Replay Screen	KCr 10
Aware	Constant	* KCr 10
	Acuity	*KCr 10
Smell	Constant	* KCr 10
	Scent Emitter-1	KCr 10
	Scent-Emitter-2	KCr100
Hearing	Scent-Emitter-3	KCr200
	Constant	* KCr 10
	Per Hearing Freq	* KCr 1
Hearing	Per Voice Freq	* KCr 1
	Amplified Voice	KCr 1
	Replay Module	KCr 20
Touch	Constant	* KCr 10
	Sensitivity	* KCr 10
	Per Manipulator	automatic
Percept	Body Overall	Units * KCr 1
	Constant	* KCr 10
	Tone	* KCr 10
	Poice Band	KCr 10

### C SENSE LOCATION ON ROBOTS

The Major Senses may be located in a cluster in the Head or the Torso.

A Sophont with Body Structure HS or HBS has its Major Senses in the Head; otherwise the Major Senses are in the Torso.

**The Major Senses.** Vision, Hearing, and Smell are located in a single cluster.

**The Other Senses.** Touch and Awareness are located throughout the Torso and Limbs. Perception is located in the Brain.

**Antennae.** If the Sophont has Antennae, select one of the Major Senses to be located at the end of the Antennae.

Flux	VISION			HEARING				SMELL		TOUCH		AWARE		PERCEPT			
	C	Band	Star	C	Freq	Span	Voice	R=	C	Sharp	C	Sensi	C	Acuity	C	Tone	Poice
-6	04	DHV	B0-B3	04	1	0	1	0	04	0	04	0	04	0	04	0	0
-5	06	UDH	B5-B8	06	1	0	1	0	06	1	06	1	06	1	06	1	1
-4	08	SUD	B9-A1	08	2	1	2	0	08	1	08	1	08	1	08	1	1
-3	10	PSU	A2-A8	10	3	1	3	0	10	1	10	2	10	2	10	2	2
-2	12	BPS	A9-F6	12	4	2	4	0	12	1	12	2	12	2	12	2	2
-1	14	GBP	F7-G1	14	5	2	5	1	14	2	14	3	14	3	14	3	3
0	16	RGB	G2-K0	16	6	3	6	2	16	3	16	3	16	3	16	3	3
+1	18	CRG	K1-K3	18	7	4	7	3	18	4	18	3	18	3	18	3	3
+2	20	ACR	K4-K6	20	8	4	8	3	20	5	20	4	20	4	20	4	4
+3	22	NAC	K7-K9	22	9	5	9	3	22	5	22	4	22	4	22	4	4
+4	24	INA	M0-M1	24	A	5	A	4	24	6	24	5	24	5	24	5	5
+5	26	FIN	M2-M4	26	B	6	B	4	26	6	26	5	26	5	26	5	5
+6	28	XFI	M5-L8	28	C	6	C	4	28	6	28	6	28	6	28	6	6
+7	30	ZXF	L9+	30	D	7	D	4	30	6	30	6	30	6	30	6	6

C= Constant. V= Voice. R= Range.

# R-06

## ROBOTS BASICS

### SELECT BASIC BODY ELEMENTS

The design process for a robot determines the specific components which give the robot the required and desired abilities.

- A. Body Enhancements.
- B. Connectors and Undercarriages
- C. Skins
- D. Body Additions.

### A BODY ENHANCEMENTS

Variant	Basic Type	KCr	Units
Hot Environ	Brain Insulation	10	1
Cold Environ	Brain Insulation	10	1
Radiation	Brain Shielding	10	1
Vacuum	Sealed Body	10	1
High Pressure	Sealed Body	10	1
Waterproof	Sealed Body	10	1
Corrosion Resistant	Sealed Body	10	1
Electric Shock	Torso Charge	10	1

**Hot Environ** operates in a Burning Environ (+5).

**Cold Environ** operates in a SubZero Environ (- 5).

**Radiation** operates in Lethal Radiation (-5).

**Vacuum Sealed Body** operates in Vacuum (-5).

**High Pressure Sealed Body** allows operation in a High Pressure Environ (+5).

**Waterproof Sealed Body** allows wet or submerged.

**Corrosion Resistant Sealed Body** allows Atmos B, C.

**Electric Shock Torso Charge** inflicts a disabling shock.

### B CONNECTORS AND UNDERCARRIAGES

Variant	Basic Type	KCr	Units
Mobile Lifter	Baseplate	20	30
Zero-G	Baseplate	30	4
Static Lifter	Baseplate	20	14
Connector	Baseplate	10	10
Universal Nexus		10	1

**Mobile Lifter Baseplate.** Stabilized limbless lifter platform replaces Limb Groups 3 and 4. Generates lift, motion.

**Zero-G Baseplate.** Stabilized mobile limbless lifter platform replaces Limb Groups 3 and 4. Generates thrust (through lifters and through pressurized gas vents).

**Static Lifter Baseplate.** An internal (part of the Torso) plate generating lift to counter excess weight of the Robot body. Required for Flyers, Swimmers, and Divers.

**Connector Baseplate.** A Connector allowing disconnection of Limb Groups 3 and 4 from the Torso.

Allows connecting Torso (and Head) to be connected to a different body, including a Strangeform.

**Universal Nexus (or Head Baseplate).** A connector allowing disconnection of a Head from a Torso. Allows Head to be connected to a different body, including a Strangeform. Not available for Robots with other than an HBS Head.

Available for Organic or Semi-Organic Brains if the new torso also includes a nutrient supply.

**Undercarriage.** Any vehicle may become an undercarriage for a robot equipped with Connector Baseplate. A similar Connector Baseplate must be installed in the vehicle (mounted on the outside, in driver compartment, or concealed within the vehicle).

### C SKINS

Variant	Basic Type	KCr	Units
No	Skin (Skeleton Visible)		
Standard	Skin	1	1
Sudo-Bio	Skin	5	1
Sudo-Bio Plus	Skin	10	1
Self-Healing	Skin Option	5	0
Gold Reflec	Skin Option (not with Sudo-Bio)	10	0
Reflec	Skin Option (not with Sudo-Bio)	5	0
Ablat	Skin Option (not with Sudo-Bio)	5	1
Armor	Skin Option (not with Sudo-Bio)	5	1
Double Armor	Skin Option (not with Sudo-Bio)	15	2

**No Skin** indicates no outer covering. Interior visible.

**Standard Skin** is an outer covering in plastic or metal.

**Sudo-Bio Skin** resembles the normal skin (including hair, fur, scales) of the Pattern. While flexible, Sudo-Bio is not muscle controlled and does not reflect emotion.

**Sudo-Bio Plus Skin** simulates normal skin including muscular control, allowing smiles and skin movement.

**Self-Healing Skin** self-repairs minor cuts and tears.

**Reflec Skin Option** provides Reflec armor capability.

**Gold Reflec Skin Option** provides Reflec armor capability and a shiny gold finish.

**Ablat Skin Option** provides Ablat armor capability.

**Armor Skin Option** provides equivalent of Armor-1.

**Double Armor Skin Option** equivalent of Armor-2.

### D BODY ADDITIONS

Variant	Basic Type	KCr	Units
Ballistic	Position Tracker	2	1
Satellite	Position Tracker	2	1
Beacon	Position Tracker	2	1
	Echolocator	2	1
Sonic	Emitter	2	1
Photonic	Emitter (Floodlight)	1	1
Networked	Datalink	2	1
Radio	Transceiver	1	1

**Radio Transceiver.** Various ranges.

**Ballistic Position Tracker.** Determines location in three dimensions relative to a previously specified waypoint.

**Satellite Position Tracker.** Determines location in three dimensions based on orbiting satellites.

**Beacon Position Tracker.** Determines location in three dimensions based on a beacon (usually a starship).

**Echolocator.** Specify Sound Frequency; Voice must include this Frequency.

**Sonic Emitter.** Provides sound source for Echolocator.

**Photonic Emitter (Floodlight).** In same Band as Vision.

**Networked Datalink.** Interact with DataCaster in range.

**Radio Transceiver.** Interacts with any Comm in range



### SELECT ROBOTIC CHARACTERISTICS

Determine the specific physical and mental characteristics.

- A. Physical.
- B. Mental.
- C. Social.
- D. Sanity.

## A ROBOT PHYSICAL CHARACTERISTICS

A Robot has **three** physical characteristics.

The Physical Characteristics are associated with the Torso and Limbs. When (if) the Head is detached, the Head alone cannot use C1 C2 C3

C1 Strength	4 * D	+ Str Mods
C2 Dexterity	4 * D	+ Dex Mods
C2 Grace	4 * D	+ Gra Mods
C2 Agility	4 * D	+ Agi Mods
C3 Endurance	4 * D	+ End Mods
C3 Stamina	4 * D	+ Sta Mods
C3 Vigor	4 * D	+ Vig Mods

D= Number of dice rolled (that is 1D, 2D, 3D, etc).

If the Pattern rolls 2D for Strength, then Robot Str = 4\*2 = 8 (plus any mods).

## C BRAIN SOCIAL CHARISMA CASTE

A Brain has **one** social characteristic.

C6 Social Standing	= not normally possible
C6 Charisma	= R default no cost
C6 Charisma	= 1D Cha * KCr10
C6 Charisma	= 2D Cha * KCr20
C6 Caste	= 0 if Pattern has Caste

**Robot Charisma** reflects a relative social relationship within a small group. A low Charisma individual will defer to and follow the leadership of a high Charisma individual.

**Charisma C6 = R.** The standard conditioning establishes C6 Charisma = R (for Robot even though in a Brain). The R value is equivalent to zero; the Brain defers to or obeys any organic sophont.

**Charisma C6 = 1D or 2D.** Some Brains are conditioned with C6 Charisma (1D = 1-6). Brains with Charisma assume supervisory roles over Brains with lower Charisma.

**Caste.** If the original pattern has Caste, then the Brain has Caste.

## D SANITY

The creation process creates Sanity; testing defines it.

CS Sanity -Organic Brain	DD	no cost
CS Sanity -Semi-Organic Brain	D	San * KCr10
CS Sanity -Semi-Organic Brain	DD	San * KCr20
CS Sanity -Electronic Brain	DD	San * KCr 1
CS Sanity -Positronic Brain	DD	San * KCr 1

**Sanity** of 5 or 6 is reasonable for a Brain rarely facing challenges or unusual circumstances. Although testing defines Sanity, true Sanity should be adjusted by Flux.

## B ROBOT BRAIN EDUCATION TRAINING INSTINCT

A Robot has **two** mental characteristics.

C4 Intelligence is determined by the Brain selected. If the Brain selected has Instinct, the Robot has C5 Ins. Otherwise, the designer selects C5 Education or Training..

C4 Intelligence	Based on selected Brain.	
C5 Education	= 2	KCr10
C5 Education	= 4	KCr40
C5 Education	= 6	KCr90
C5 Training	= 2	by default
C5 Instinct	= 6 * D	no cost. based on Pattern

**C5 Training.** The default. Training cannot exceed C4.

**C5 Education.** Education cannot exceed C4.

**C5 Instinct.** If the pattern has Instinct, use Instinct

Robots are conditioned (during the manufacturing process) to obey specific societal rules. One such set of rules is deference to and obedience of superiors.

**Robot Social Standing.** Most Robots do not participate in the Social Standing hierarchy. They acquire C6 = Social Standing only under limited circumstances.

**Prosthetic Bodies.** An Original Organic Sophont Brain in a Robot body faithful to the pattern is a prosthetic. It retains the C6 Social Standing of the original.

**Passing.** A Robot imitative of the appearance and abilities of the pattern can pass as a sophont. The Robot picks a value for Social Standing (not greater than C4 Int).

**Mistake.** A bureaucrat may mistakenly officially recognize a robot as a sophont (granting Social Standing as long as the mistake remains uncorrected).

## SKILLS

A robot brain can acquire skills= **C4 + C5**

If C5 = Instinct, limit is C4, plus 3 skills each equal to C5.

**One Primary:** equal to one-half C4 Intelligence.

**Two Secondaries:** each equal to one-quarter C4.

**One Hobby:** equal to one quarter C4.

**Other Skills.** If additional levels remain, select randomly.

A Brain with Instinct can allocate a Skills innumber equal to C4, each wil level equal to Instinct.

A Brain can increase skills though C5=Edu or Tra.



# R-08

## ROBOTS SKILLS

### SELECT ROBOTIC SKILLS

Determine the robot's primary and secondary skills.

A. Skills eligibility.

B. Random skill selection (as applicable).

### A SKILLS

A robot brain can acquire skills=

#### C4 + C5

If C5 = Instinct, the limit is C4, but it also receives three Instinctual skills each equal to C5.

**One Primary:** Select one Primary Skill equal to one-half C4 Intelligence.

**Two Secondaries:** Select two different Secondary Skills or Knowledges, each equal to one-quarter C4 Intelligence.

**One Hobby:** Select a random Hobby equal to one quarter C4.

**Other Skills.** If additional levels are available, select randomly.

A robot brain can increase skills though C5=Edu or Tra.

### B ROBOT SKILLS AND KNOWLEDGES

		C					
A	B	1	2	3	4	5	6
1	1	ACV	Comms	High-G	Steward	Ordnance	Naval Arch
	2	JOT	Rider	Sensors	Fwd Obs	Survival	Streetwise
	3	LTA	Spines	Flapper	Seafarer	No Skill	Astrogator
	4	WMD	Leader	Tracked	Engineer	Computer	Navigation
	5	Chef	Survey	Animals	Fluidics	Bay Wpns	Explosives
	6	Mole	Dancer	Tactics	Launcher	Magnetics	Jump Drive
2	1	Grav	Artist	Turrets	Teamster	Photonics	Counsellor
	2	Boat	Legged	Teacher	Designer	Vacc Suit	Submersible
	3	Ship	Sapper	Unarmed	Engineer	Artillery	Aeronautics
	4	Wing	Driver	Exotics	Language	Craftsman	Aquanautics
	5	Recon	Gunner	Stealth	Musician	Gravitics	BattleDress
	6	Actor	Blades	Trainer	Strategy	Forensics	Electronics
3	1	Flyer	Zero-G	Animals	Maneuver	Biologics	Hostile Env
	2	Pilot	Author	Liaison	Polymers	Ortillery	Power System
	3	Rotor	Broker	Athlete	Advocate	Automotive	Life Support
	4	Admin	Trader	Fighter	Computer	Bureaucrat	Slug Thrower
	5	Beams	Sprays	Wheeled	Diplomat	Heavy Wpns	Fleet Tactics
	6	Medic	Gambler	Screens	Mechanic	Programmer	Spacecraft

Roll three dice for a specific Skill or Knowledge:

Roll A (reroll if >3), then roll B, and finally top row C (reroll if >3).

### RANDOM SKILLS FOR RANDOM ROBOTS

When constructing random robots, select skills appropriate for their function.

If the robot is non-descript or its function is not readily identifiable, select skills randomly.

### INCREASING SKILLS FOR ROBOTS

A Robot can increase skills and levels.

**C5= Education.** If the Robot has C5= Edu, it can learn new skills and levels in the Education system.

**C5= Training.** If the Robot has C5= Tra, it can learn new skills and levels through Training.

**C5= Instinct.** If the Robot has C5= Ins, it has difficulty increasing its skills.

**Experience.** A Robot can increase skills and levels through Experience.

**Wafer Technology.** An Organic or Semi-Organic Brain can supplement its available skills with Wafer Technology.

**Download Skill Replacement.** An Electronic Brain can supplement its available skills for specific assignments

Every robot receives a basic understanding of proper behavior as a robot operating in society (this knowledge is partially implanted memories and partially conditioning).

Record this Knowledge as [Robot] Behavior with a level equal to Int.

### AVAILABLE SKILLS

A Robot may be given any available skills, knowledges, or talents.

**Talents.** Although a robot can receive a Talent, it cannot be implemented unless the Robot also has the ability to actually perform the activity.

**Skills For Organic Brains.** When an Organic Brain is used for a Robot, the brain retains its original skills.

### A VARIETY OF ROBOT OCCUPATIONS

This list is not complete.

Animal Handler	Cook	Explosives Disposal	Harvester	Nurse	Store Clerk
Animal Trainer	Courier	Farmer	Historian	Prospector	Teacher
Bodyguard	Dishwasher	Garbage Collector	Janitor	Repairbot	Tester
Cashier	Doorman	Gardener	Laborer	Rescue Worker	Traffic Director
Cleaner- Exterior	Driver-Cargo	Gatherer	Grounds-keeper	Researcher	Tutor
Cleaner- Interior	Driver-Cargo			Servant	Usher
Clerk	Driver-Passenger	Guard	Miner	Shepherd	Valet
Companion	EMT	Handybot	Museum Curator	Soldier	Waiter
Constructor	Enforcer	Handyman	Nanny	Stoop Labor	Warbot



# R- 09

## ROBOTS POWER SOURCES

### SELECT ROBOTIC POWER SOURCE

Determine the robot's power source.

### A POWER SOURCE COSTS

Description	Cost	Units	Comment	Max Units
Nutrient Plus Air.	KCr10	2	Permanent installed component.	100
Nutrient Plus Air Canister.	KCr10	4	Supports Organic and Semi-Organic brain for 7 days.	
Air Processor	KCr10	6	Required for Air Breathers using Plus Air systems.	100
Water Processor	KCr10	10	Required for Water Breathers using Plus Air systems.	100
Amphibian Air/Water Processor	KCr10	12	Processes Air or Water for use with Plus Air Systems	100
Anerobic Nutrient.	KCr10	3	Permanent installed component.	100
Anerobic Nutrient Canister.	KCr10	8	Supports Organic and Semi-Organic brain for 7 days.	
Electric (Daily Power Cell).	KCr10	4		100
Heavy Duty Electric (Daily Power Cell).	KCr10	7	Supports Size = 73 +.	200
Electric (Weekly Power Cell).	KCr10	12		100
Heavy Duty Electric (Weekly Power Cell).	KCr10	18	Supports Size = 73 +.	200
Long-Life Electric (Weekly Power Cell).	KCr10	12		100
Electric (Alcohol Fuel Cell).	KCr10	20		80
Digester	KCr10	15	Ferments organic matter into alcohol for Alcohol fuel cell.	80
Electric (Broadcast Receiver).	KCr10	4		100
Electric (FusionPlus).	KCr10	20	Supports Size = 73 +.	100

### POWER SOURCES

**Organic and Semi-Organic Brains** require nutrients to support their biological functions: metabolism and self-repair.

**Semi-Organic and Electronic Brains (and Photonic and Fluidic Brains)** require electric energy to operate their electronic circuitry.

**Positronic Brains** are self-energized and do not require outside energy (although their robotic bodies do).

**Reserve Power Cell.** A second or additional Power Source can be installed in a Robot as a Reserve.

**Multiple Power Sources.** Multiple units may be used to meet total power requirements.

#### Nutrient for Organic or Semi-Organic Brains

Organic and Semi-Organic Brains require Nutrient to nourish the brain. Liquid Nutrient is supplied in canisters sufficient for ten days and typically replaced weekly. Replacing the canister also removes any currently generated waste.

Nutrient is available from commercial food sources.

**Nutrient Plus Air.** The standard Nutrient formula also requires Air (Oxygen) from the environment. This breathing can be suspended for up to two days.

**Anerobic Nutrient.** The special nutrient formula is independent of environmental oxygen; canister is double size.

**Air Processor.** Air is drawn into the Robot Torso and joined with Nutrient to support Brain metabolic processes. Must be in operation one hour in five.

**Water Processor.** Water is drawn into the Robot Torso, where its dissolved oxygen is removed and joined with Nutrient to support Brain metabolic processes. Must be in operation one hour in five.

**Amphibian Air /Water Processor.** Combines the processes of both Air and Water processors.

#### Electric

Semi-Organic and Electronic Brains require electric power (independent of the power for the robot body).

**Electric (Daily Power Cell).** Power is supplied by a rechargeable power cell. A charge lasts 36 hours; the cell is usually recharged daily (takes two hours).

**Heavy Duty Electric (Daily Power Cell).** Electric power is supplied by a rechargeable power cell. A charge lasts 36 hours; the cell is usually recharged daily (takes two hours).

**Electric (Weekly Power Cell).** Electric power is supplied by a rechargeable and replaceable power cell. A charge lasts 8 days and is usually replaced weekly. A discharged cell can be recharged in about a day.

**Heavy Duty Electric (Weekly Power Cell).** Electric power is supplied by a rechargeable and replaceable power cell. A charge lasts 8 days and is usually replaced weekly. A discharged cell can be recharged in about a day.

**Long-Life Electric (Weekly Power Cell).** Electric power is supplied by a rechargeable and replaceable power cell. A charge lasts 15 days and is usually replaced bi-weekly. A discharged cell can be recharged in about a day.

**Electric (Alcohol Fuel Cell).** Electric power is supplied a fuel cell burning alcohol and air. 36 hours; the cell is usually recharged daily. Requires an air atmosphere. Suitable only for low power

**Digester.** Processes 2 units of organic matter to produce one unit of alcohol.

**Electric (Broadcast Power Receiver).** Electric power is supplied by a local broadcast power field. Backup power cells provide 2-12 minutes of operation if the field fails.

**Electric (FusionPlus).** Electric power is supplied by a minimally-sized fusionplus unit.



R-10
ROBOTS CONTROL CODES

### SELECT ROBOTIC CONTROL CODES

Determine the robot's Control Codes.

- A. Active Codes.
- B. Passive Codes.

### ROBOT AGING

Robot Brains age based on their structure.

**Electronic Brains** age based on wear and tear.

**Organic and Semi-Organic Brains** age at the same rate as their Patterns. At the appropriate stage, perform an Aging Check as Check Int. Success reduces San -1.

**Clones Brains** are subject to Clone Aging. At the appropriate stage, perform an Aging Check as Check Int. Success reduces San -1.

**Positronic Brains** are eventually degraded by the effects of positrons on the iridium substrate. This aging effect is the natural and inescapable consequence of positronic brain activity.

Positronic Brains begin Aging Checks after Int \* 2 years., and every four years thereafter. At the appropriate stage, perform an Aging Check as Check Int. Success reduces San -1 (Int is unaffected).

### ROBOT DISEASE AND ILLNESS

There are three major types of deterioration of Robots: Rust, Decon, and Onwee.

**Rust** has become the term for all forms of physical deterioration, including long-term wear and tear, failures due to age, and breakage (on or off the job).

Although employers are responsible for repair of breakage, severe damage more often leads to the scrap pile.

Robots are expected to resolve for themselves deterioration due to age or wear and tear.

**Decon (Robot Insanity).** After some period of years, native conditioning may break down, leaving the robot without its natural internal instructions to defer and obey. Decon (Deconditioning) frees the robot from its natural constraints: the robot goes slowly insane, culminating in a burst of berserker violence.

When a Robot's Sanity reaches zero, it suffers a total sanity breakdown, attacking in a rage everyone within range.

**Onwee (Robot Discontent).** Individual robots, as thinking intelligent beings, may suffer from feelings of weariness, boredom, and discontent. In organic sophonts, such feelings may be treated as mental illness. In robots, they lead to the scrap pile. Robots have a two-part reaction: they mask their true feelings and deliberately plan their departure.

Onwee begins with the first reduction in Sanity.

Onwee is distinct from Decon; it is a deliberate, intelligent rejection of conditioning, and the robot retains an ability to fake its constraints. At an appropriate time, the robot accumulates documentation and resources and flees its employment for an independent life.

## A ACTIVE CONTROL CODES

Variant	Basic Type	Specifies	KCr	Units
Prefix	Code Word		1	0
	Voice Recognition		1	0
	Clicker		1	0
Always On	Clicker		1	0

### Active Control Codes

A robot brain (but generally not an original Organic Sophont Brain) can be psychologically conditioned to include one or more of the following Active Control Codes:

**Code Words.** The robot is conditioned to unquestioningly obey commands preceded by a specific code word (typically Robot, or Bot, or a name) in a manner similar to Simon Says. For example, a robot may respond to "Fix me a beverage," but it will automatically and unquestioningly respond to "Bot, fix me a beverage."

**Voice Recognition.** The robot is conditioned to unquestioningly obey commands from a pre-programmed recognized voice.

**Clickers.** The robot is conditioned to unquestioningly obey commands preceded by, or accompanied by, a signal from a remote control device. The user states a command while depressing a button on a small ultrasonic, infrared, or electronic control. It is possible for one robot to use a clicker on another robot.

**Permanent Clickers.** A permanent clicker (perhaps an RFID) is always on, making all orders from the user immediate commands.

## B PASSIVE CONTROL CODES

Variant	Basic Type	Specifies	KCr	Units
Original	Three Laws	Humans	10	0
Variant-1	Three Laws	pattern sophonts	10	0
Universal	Three Laws	all sophonts	10	0
	No Touch		20	1
Conditioned	Subservience	Cha=R	30	1

### Conditioned Passive Control Codes

A robot brain (but generally not an original Organic Sophont Brain) can be psychologically conditioned to include one or more of the following Passive Control Codes:

**The Original Three Laws.** The *Asimovian* Three Laws of Robotics prohibit a robot from injuring a Human, requires it to obey orders from a Human, and requires it to protect its own existence.

**The Three Laws Variant.** The *Asimovian* Three Laws of Robotics are restated to protect the robot's pattern sophonts.

**The Three Laws Universal.** The *Asimovian* Three Laws of Robotics are restated to protect all sophonts.

**No Touch.** The robot is prohibited from physically touching a Sophont. The robot is immobilized (locks up) when it realizes it has touched a Sophont.

**Conditioned Subservience ( Charisma = R ).** The Robot has C6 Charisma = R (equivalent to 0) and defers to or obeys any sophont (and any Artificial with Charisma 1+).



<b>R- 11</b>
<b>ROBOTS MANUFACTURERS</b>

## 01 Local Sophontiform Robot Manufacturers

- | 1D | Manufacturer                               |
|----|--|
| 1  | <Industrial World> Robotics                |
| 2  | Global Robotics and Artificial <Sophont>s  |
| 3  | <Star> Robotics and Artificial <Sophont>s  |
| 4  | <Star> Artificial Labor Industries         |
| 5  | <Industrial World> Industries.             |
| 6  | <Star> Artificials and Robotics Industries |

## 02 Common Robot Model Numbers

- | 1D | Model  |
|----|--|
| 1  | Model -Number 3-digit                            |
| 2  | <Company>-<Short Sophont>-Number 4-digit         |
| 3  | <Company>-<Sophont>-<Genetic> -Number 2-digit    |
| 4  | <Company Initial>-<Short Sophont>-Number 4-digit |
| 5  | <Function> Model -Number 4-digit                 |
| 6  | <Company> Model <Sophont>-Number 3-digit         |

## 03 Well-Established Sophontiform Robot Manufacturers

- | 1D | Manufacturer                                       |
|----|--|
| 1  | <Star> Robotics, A <MegaCorporation> Company.      |
| 2  | <Industrial World> Robotics                        |
| 3  | Robots <MegaCorporation>                           |
| 4  | RUR, A Division of <MegaCorporation>.              |
| 5  | Artificials and Robots Division, <MegaCorporation> |
| 6  | <Letters> Robotics, A <MegaCorporation> Company    |

## 04 Military Robot Model Numbers

- | 1D | Model  |
|----|--|
| 1  | Fighting Robot, <Function>, Model <3-digit>      |
| 2  | Robot, <Function>, Model <3-digit>               |
| 3  | Robot, <Function>, <TL Stage> Model < 1-digit>   |
| 4  | Robot, <Skill>, <TL Stage> Model < 1-digit>      |
| 5  | Fighting Robot, <TL Stage> Model <3-digit> Mod 1 |
| 6  | Fighting Robot, Model A <TL Stage>               |

## 05 Other Sophontiform Robot Manufacturers

- | 1D | Manufacturer                                       |
|----|--|
| 1  | Tleктаowa. Official Robotics to the 29 Clans Aslan |
| 2  | Star Patterns Trading Hivers                       |
| 3  | Chiadle Warbots Zhodani                            |
| 4  | Eksaekfoer [often counterfeit] Vargr               |
| 5  | Panstellar Expert Construction Labor Solomani      |
| 6  | Spinward Specialties Couriers Imperial             |

## 06 Common Consoles

- | 1D | Description                                    |
|----|--|
| 1  | Standard Console-<TL>                          |
| 2  | Console, Control, Model-<TL>                   |
| 3  | Console, Operating, Model-<TL> <TL Stage>      |
| 4  | Console, General, Model-<TL>                   |
| 5  | Console, Combat Control, Model-<TL> <TL Stage> |
| 6  | Console, Autonomous, Model-<TL>                |

## 07 Common Strangeform Robot Manufacturers

- | 1D | Manufacturer                |
|----|-----------------------------|
| 1  | Klikooog's' Cleaning Robots |
| 2  | Naasirka                    |
| 3  | Neol Sibs                   |
| 4  | Engolia                     |
| 5  | Boron                       |
| 6  | Sharurshid                  |

## 08 Exotic Computer Models

- | 1D | Model                              |
|----|------------------------------------|
| 1  | Computer Model/<Number> Photonic   |
| 2  | Computer Model/<Number> Magnetic   |
| 3  | Computer Model/<Number> Gravitic   |
| 4  | Computer Model/<Number> Mechanical |
| 5  | Computer Model/<Number> Photonic   |
| 6  | Computer Model/<Number> Photonic   |

## 09 Well-Established Computer Manufacturers

- | 1D | Manufacturer                                |
|----|---|
| 1  | <MegaCorporation> Model/<Number>            |
| 2  | <World> Computics Model/<Number>            |
| 3  | <Industrial World> Computers Model/<Number> |
| 4  | <World> Industries Model/<Number>           |
| 5  | <Sector> Industries Model/<Number>          |
| 6  | <World>'s Best Model/<Number>               |

## 10 Brain (Semi-Organic)

- | 1D | Model                                       |
|----|---|
| 1  | Organic <Beast> Brain                       |
| 2  | Organic <Beast> Brain Model <Number>        |
| 3  | Organic <Beast> Brain Type <Letter>         |
| 4  | Organic <Beast> Brain Cloned Model <Number> |
| 5  | Organic <Beast> Brain Cloned Type <Letter>  |
| 6  | Organic <Beast> Brain Rehab Type <Letter>   |

## 11 Brain(Non-Organic)

- | 1D | Model                       |
|----|-----------------------------|
| 1  | Brain Electronic Model <C4> |
| 2  | Brain Photonic <TL>         |
| 3  | Brain Fluidic <TL>          |
| 4  | Brain Fiber Optic <TL>      |
| 5  | Brain Mechanical <TL>       |
| 6  | Brain Positronic <TL>       |

## 12 Brain (Organic)

- | 1D | Model   |
|----|---|
| 1  | Organic <Sophont> Brain                       |
| 2  | Organic <Sophont> Brain Model <Number>        |
| 3  | Organic <Sophont> Brain Type <Letter>         |
| 4  | Organic <Sophont> Brain Cloned Model <Number> |
| 5  | Organic <Sophont> Brain Cloned Type <Letter>  |
| 6  | Organic <Sophont> Brain Rehab Type <Letter>   |





# BeastMaker

Life abounds in the universe, and travelers encounter many different native life forms as they move from world to world. Animals [Beasts] in any ecological system interact with each other by forming food chains, obeying instincts, defending territory, and generally living out their lives. When adventurers enter such an ecological system, they naturally encounter the animals of the system.

Every Terrain Hex (recall that a Terrain Hex, with a diameter of 100 km, is part of a World Hex, and contains many Local Hexes) which can support animal life has an associated Beast Encounter Table. Adventurers consult the table when hunting, touring, researching, and sometimes when directed to by events or chance. Every world has a unique ecological system (or more than one such system), but those systems can be constructed by following a consistent set of rules.

**MOARN Make Only As Really Necessary.** Information about animals can be created quickly and easily; it is not necessary to build extensive Beast Encounter Tables in advance. Create tables only as required: if the referee knows a specific beast will be required, then it should be generated.

It may be useful to have several pre-generated encounter tables on hand for common terrain types. Even when BETs are pre-generated, special details can wait until absolutely needed.

**Animal or Beast?** In general, the terms are interchangeable (and are used interchangeably): an animal is a beast; a beast is an animal. Animal implies a mobile non-intelligent living creature; beast implies a degree of danger. Moreover, beast is used to within the text to include swimming and flying creatures.

## ENCOUNTERING BEASTS

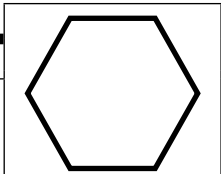
Animals in any ecological system interact with each other, forming food chains, obeying instincts, defending territory, and generally living out their lives. When people enter one of these ecological systems, they may encounter these beasts: sometimes merely seeing them in the distance; other times confronting them close up.

### Beast Encounter Tables (BET)

Beast encounters are governed by a series of BET Beast Encounter Tables. As players move through Terrain Hexes,

an encounter may occur. When it does, the Beast Encounter Table indicates what specific beast type is present. The table entry provides details about the specific animal (or animals) and how they react to the encounter.

**What Animals Are Encountered?** The Beast Encounter Tables concern themselves with important animals which provide challenges and (potentially) interesting encounters. They usually ignore small, inconsequential animals: mice and squirrels may inhabit the terrain hex, but unless they have some importance, they do not appear on the Animal Encounter Tables.

EXAMPLE ANIMAL ENCOUNTER TABLE								Worldname and UWP	
Terrain Type									
1D	Quantity	Size	SpeedC	Strength	Locomotion	Type	A	F	Comments
1	P						A_	F_	
2	H						F_	A_	
3	O						A_	F_	
4	C						A_	F_	
5	S						A_	F_	
6	E								
P= Producer. H= Herbivore. O= Omnivore. C= Carnivore. S= Scavenger. E= Event.									Armor. Weapon.

**One BET Per Terrain Type.** For most worlds, it is sufficient to have one BET per Terrain Type.

**Special BETs.** Some situations (extensive world-based adventures; scientific expeditions; safaris) call for different BETs for different Terrain Hexes of the same Terrain Type.

### The Table Description of the Beast

The Beast Encounter Table provides basic descriptions of several beasts. Obvious parts of the specific beast description can be read from the table.

*You see a single small amphibian.*

Continued observation (or an encounter) will provide more of the information.

*It's not moving; we can't tell how fast it is.*

*It just jumped on something. It looks like a pouncer.*

**Quantity** approximates the number of beasts present.

**Size** indicates a general notion of the size of the beasts. Beast size is expressed on the standard Size chart and typically ranges from 1 to 6. Some animals may be as large as 7 or 8. Some animals may be less than 1 (Size= T or Size= S). Because Size correlates to R= Ranges and the Senses, it automatically indicates the maximum distance at which it can be seen with normal vision.

For example, normal human vision cannot see a Size=3 beast beyond R=3 (about 150 meters).

**SpeedC** is the expected speed of the beast on the Vehicle Speed table. Speed for beast encounters is further differentiated.

Normal energy-conserving speed (equivalent to human walking) is **SpeedC** and is about one Range Band per turn. The Beastmaker process also assigns a Speed2 (from the Vehicle Speed table) as a descriptor and a speed in kph.

The speed when attacking (or fleeing) is **SpeedAF**; it is one Range Band or one Vehicle Speed greater than SpeedC. The beast's exceptional sprinting capability is **SpeedB**; it is two Range Bands or two Vehicle Speeds greater than SpeedC.

**Strength** indicates the relative strength of the beast. Strength is relative: a large weak beast (Str= 5 x 1D) is probably stronger than a tiny strong beast (Str= 1 x 4D).

**Movement** shows the type of movement to be expected. The beast may be a flyer or a swimmer, and these facts

### ANIMAL SPEEDS

	Range Bands	SpeedC	Endurance
SpeedC	One per Turn	Per Table	End x 1 hr
SpeedAF	SpeedC +1		End x 5 min
SpeedB	SpeedC +2		End x 30 sec

**SpeedAF (Attack/Flee).** Speed of attack and flight. An animal attacks (or when it flees) at this speed.

**SpeedC (Conservative).** Ordinary, energy-conserving speed. An animal, not attacking or fleeing, uses this speed.

**SpeedB (Burst).** Short term maximum speed, equivalent to sprinting.

**Endurance.** An animal is capable of maintaining speed based on its Animal Endurance.

will usually be evident from observation.

**Type** is the ecological niche (or position in the food chain) that the beast occupies.

The **Beast Encounter Table** also shows the expected reactions for the beast and any comments. These items are usually not revealed. The Beast Encounter Table is best used within a 100 km Terrain Hex.

### The Range Of The Encounter

The distance at which an beast encounter occurs is based on the size of the beast (and the quantity).

**Unaided.** To casual observers, unaided by vision technology, an encounter occurs at Range= Size; increase Range by one band if quantity is 2 or 3, increase Range by two bands of quantity is greater than 3.

**Aided.** Technology may affect the encounter distance.

### THE CONCEPT OF ECOLOGICAL NICHE

Beasts are identified (and classified) in terms of the ecological niches they occupy. Each beast occupies a specific position in the hierarchical food chain.

An beast that eats grass occupies a niche in the environment; an animal that eats grazers is higher in the food chain and occupies a different (and equally essential) niche.

Although each niche is usually filled by only one species, many different species are capable of filling that niche.

### LOCOMOTION

The manner in which an beast moves is fundamental to an understanding of its activities and behavior.

#### Types of Locomotion

There are several basic types of locomotion.

**Walks.** The beast moves (walks, jumps, crawls) on land. Walking also includes unusual methods of land movement including rolls, flows, hops, climbs, and slithers.

**Swims.** The beast moves in water at or near the surface. Swimmers may breathe air or water (or both). The beast may live in water and occasionally break the surface into atmosphere, or may live on the water surface and occasionally submerge. Swimming contrasts with Diving.

**Dives.** The beast moves in water, primarily in the depths. Diving beasts live entirely beneath the surface within a water environment.

**Flies.** The beast moves in the atmosphere. Flying may include gliding, lighter-than-atmosphere buoyancy, kiting,

### VEHICLE (AND ANIMAL) SPEEDS

Value	Speed2	kph	SpeedAF	kph	SpeedB	kph
1	Walk	5	Run	10	Sprint	20
2	Run	10	Sprint	20	Charge	30
3	Sprint	20	Charge	30	Fast	50
4	Charge	30	Fast	50	Vfast	100
5	Fast	50	Vfast	100	Xfast	300
6	Vfast	100	Xfast	300	Hfast	500

and other flight mechanisms.

**Drifts.** The beast is moved by outside forces such as air currents (including winds, storms, and convection), water currents (including streams and rivers, convection, or flooding), or natural movement of the environment.

**Static.** The beast does not normally move.

### Multiple Locomotion Types

An beast may be have multiple types of locomotion.

**Amphibian.** The beast is capable of moving on land and in water. It can walks and swim. For example, a frog or a crocodile.

**Aquatic.** The beast operates in a water environment. It can swim and dive. For example, a whale.

**Flyer.** Theoretically, flyer would apply to an beast which flies exclusively. In practice, a flyer is assumed to be able to walk and fly. For example, a locust, or a wren.

**Triphibian.** The beast can move on land, in water, and can fly. For example, a duck.

**Flyphib.** The beast moves in both water and atmosphere. It can swim and fly: a flying fish.

**Drifter.** The beast drifts (or moves based on environmental factors such as wind or current).

**Static.** The beast is immobile.

### Breathing

An beast may have multiple breathing abilities.

**Air- <Atm>.** Insert the UWP Atm value for the world (for example, Air-8, or Air-A). The beast is best adapted to worlds which have the stated Atm value. Animals transplanted from an environment with a different Atm value operate at lower efficiency, and may sicken or die.

**Water.** The beast breathes water (or Fluid).

**Air-<Atm> and Water.** The beast breathes air when out of water, and water when in water.

### Stance

A beast is horizontal (and has Length rather than Height) if it has NO rear limb groups, or more Rear limb groups than Front limb groups. All others are Vertical and have Height (not Length).

### BEAST TYPES

Beasts can be described by their ecological niche.

#### Herbivores

Beasts which eat unresisting food. While this is usually means plant-eaters, the definition here includes the eating of unresisting beasts as well. Herbivores are of three types:

**Grazers:** Beasts which devote most of their time to eating. They may be solitary or grouped in herds Their primary defense is flight, although such action may result in stampedes which could endanger adventurers who get in their path. When forced to fight, they will fight fiercely until killed or routed. Typical Terran grazers are the antelope and the moose. The whale (which scoops krill from the sea as it swims through it) is also a grazer.

**Intermittents:** Herbivores which do not devote full time to eating. They tend to be solitary. Intermittents usually



“freeze” when an encounter occurs, fleeing if attacked by a larger beast. Sometimes an intermittent will attack in order to protect territory or young. Typical Terran intermittents are the chipmunk and the elephant.

**Filters:** Herbivores which pass the environment through their bodies. Unlike grazers, which move to eat food, filters move a flow of water or air through themselves in order to acquire food. Generally, filters suck, trip, push, or pull anything (even beasts) at close range into a digestive sac. A filter can absorb an beast up to twice its own size. Filters are solitary and generally slow-moving if they move at all. Terran filters are generally aquatic, such as the barnacle. Filters attack differently than other beasts. They inflict automatic wounds of ID per each 150 kilograms of beast mass (wound alteration is ignored). They attack through reflex.

#### Omnivores

Beasts which eat food without regard to its resistance. The bear, which eats fruits and berries as readily as hunts for beasts, is an omnivore. Omnivores have three types.

**Gatherers:** Beasts which display a greater tendency toward herbivorous behavior. In most respects they are similar to herbivore intermittents. Typical Terran gatherers are the raccoon and the chimpanzee.

**Hunters:** Beasts which display a greater tendency toward carnivorous behavior. In most respects, they are similar to small or inefficient carnivore chasers. Typical Terran hunters are bears or humans.

**Hunter/Gatherer Hybrid.** Beasts which blend the characteristics of both hunter and gatherer.

**Eaters:** The true omnivore (in the sense that it will eat anything and everything) does not distinguish its food and consumes all that it confronts. Eaters present considerable danger since they do not avoid anything when encountered. A typical Terran eater is the army ant (when an entire swarm is considered to be one organism).

#### Carnivores

Beasts which prey on other beasts by attacking and killing them in the face of resistance are carnivores. Carnivores are of five types.

**Pouncers:** Beasts which kill their prey by attacking from hiding or by stalking and springing are pouncers. Because of the difficulty of coordinating such attacks, pouncers are usually solitary beasts. In an encounter, pouncers which have achieved surprise have succeeded in their basic aim and will attack regardless of range. If they do not have surprise, they will sometimes still attack. They will flee if they themselves are surprised. Typical Terran pouncers are cats.

**Chasers:** Beasts which kill their prey by attacking after a chase are termed chasers. They tend to be pack beasts. Typical Terran chasers are wolves.

**Trappers:** Beasts which passively allow their prey to enter a created trap wherein they are eaten. Trappers tend to be solitary and slow but will attack any beast which enters their trap. The trap itself does not wound or kill; it holds the victim in order for the trapper to attack. A typical Terran trapper is the spider.

**Sirens:** Distinct from the trapper (and its trap), a siren also creates a lure to draw prey to the trap. Otherwise treated as a trapper, the siren's lure merits additional consideration.

In most cases, the lure will be specific to some beast but will be unnoticed by humans. In rare cases (throw 11+), the lure will be universal, perhaps a smell or scent, or a mirage or a beautiful configuration, which will attract characters into a vulnerable position. Rarely, the lure is psionic. Typical Terran sirens are the angler fish (its mouth is the trap) and the Venus fly trap.

**Killers:** Certain carnivores devote much attention to killing, savoring the act itself as much as the search for food. Killers' reason (such as territorial defense) is replaced by a raw killing instinct. Killers generally disregard the defender's size as a factor. A typical Terran killer is the shark.

### Scavengers

Beasts which share or steal the prey of others or that take the remains of kills are classed as scavengers. Scavengers are of four types.

**Intimidators:** These are scavengers which establish their claim to food by frightening or threatening other beasts. Their standard procedure is to approach a kill and force other beasts away by appearing to be a threat. A typical Terran intimidator is the jackal.

**Hijackers:** These are scavengers which establish their claim to food by simply taking it. They rely on their superior strength or size to allow them to hijack food because the other beasts present cannot effectively object. A typical Terran hijacker is the lion or the Tyrannosaurus Rex.

**Carrion-Eaters:** These are scavengers which take



dead meat when it becomes available (often waiting patiently for all other threats to disperse before beginning). A typical Terran carrion-eater is the buzzard.

**Reducers:** These are scavengers which act constantly on all available food. They reduce the remains of food after all other scavengers are finished with it by consuming bone and other leavings. Terran reducers are all microscopic, such as bacteria.

### Producers

Organisms that produce food are producers. In most cases, producers are plants, but it is possible for producers to be beasts as well. There are two types of producers:

**Collectors.** A producer which actively acquires nutrients and energy. Collectors add an element of movement to their metabolic processes: they may move slowly to follow veins or currents of nutrients; they may move to face the sun, or to follow favorable environmental changes. An example of a collector is an ant; a marginal example is the sunflower.

**Baskers.** A producer which passively acquires nutrients and energy. Baskers are typically static or slow-moving; they benefit from the natural presence of nutrients. A tree.

### BEAST TRAINING

Some wild beasts may be susceptible to training. Each beast has a training potential based on three foundational tasks: Defer, Obey, and Learn Simple Task.

Domesticated beasts (raised by sophonts for at least three generations) are easier to train.

**Defer.** The beast accepts the trainer as a superior companion. It will not attack unless provoked. Defer is the first step in training an beast: breaking a horse, capturing an elephant, or establishing authority with a dog.

**Obey.** The beast accepts the trainer as its master. It will engage in training situations. The task is attempted at the beginning of each training session until obey becomes automatic for the beast.

**Learn Simple Task.** The beast learns a basic or simple task (sit, lie down, stay). Complex tasks and sophisticated responses are built on a series of simple tasks.

### Training Beasts

Many beasts are unable to respond to the three foundational tasks. Each species is different; each has a unique species response to the three tasks.

**Trainability.** When a trainer attempts to train an beast, determine the species response: from the Beast Training Difficulty Table, roll three times on this table to determine the training difficulty for the species. A trainable beast must have acceptable difficulty levels for all three tasks (at a minimum not NO in all three tasks).

**The Best Beast Available.** If species trainability is not NO, an individual specimen of the species has trainability equal to species trainability plus flux.

A trainer selects an individual beast from a group and evaluates it. Assume the candidate is the best beast in the herd, and that evaluating a group (perhaps a hundred beasts) takes a day.

**REACTIONS**

Beasts react to encounters with adventurers in three basic ways: they may attack, they may flee, or they may do nothing. Beast encounter entries provide codes which govern such reactions.

Reaction Rolls are individualized for each beast encounter table entry. Table 8 Reactions specifies the A and F rolls. For example, Attack = A – 1D. The Scavenger Intimidator A value = 12. Its table entry may have a value from 11 (12- 1) to 7 (12- 6).

Some beasts will attack **If Possible:** they attack if their weapon is in range of an individual.

Some beasts will attack **If [they have] Surprise:** they attack if an individual is within R=1.

Some beasts will flee **If [they are] Surprised:** they flee if an individual is within R=1.

**Attack and Flee Sequence.** Most beasts roll for Attack. If they do not Attack, they roll for Flee. If they do not Flee, they remain in place.

Herbivores roll for Flee first. If they do not Flee, they roll for Attack. If they do not Attack, they remain in place.

**A Attack**

The beast may Attack. The number is the 2D roll (or less for the beast to attack).

For example, A7 indicates that the beast, upon sensing the presence of danger (including the approach of characters), will attack on a roll of 7 or less.

**C ANIMAL ENDURANCE**

= time (in hours) animal can move at Speed=1

**End = 1D**

Grazer= 2D,  
Chaser= +2.  
Pouncer= - 2

**Beasts of Burden.** A domesticated animal used as a beast of burden can carry a load equal to one-third its body weight. It transports its load at Speed=C for End in Hours.

**Carts and Wagons.** A domesticated animal can pull a wheeled wagon or cart (and runners on ice) over level terrain equal to its body weight at Speed=1 for End in hours.

**Riding.** A trained beast of burden can carry one or more riders (the total load equal to one-third its body weight) at Speed = 1 for End in hours.

It is capable of maximum Speed for End in minutes every hour, or is capable of half maximum Speed for 3x End in minutes every hour.

**F Flee**

The beast may Flee. The number is the 2D roll (or less for the beast to flee).

For example, F7 indicates that the beast, upon sensing the presence of danger (including the approach of characters), will flee on a roll of 7 or less.

**S Speed**

The beast has a Speed at which it moves (whether attacking or fleeing). The number is the change in range it can perform in a turn.

The beast has a speed at which it moves (whether attacking or fleeing), for purposes of the encounter table. The number is the change in range it can perform in a turn. In general, beasts attack at SpeedAF, their “running” speed. Thus, SpeedAF is the speed shown in the table; SpeedC is inferred to be at least one range band less. Pouncers, especially avians and chasers, may increase to SpeedB during attacks.

**R Range**

Beasts encounters are at ranges corresponding to Size. For example, a Size= 4 beast is potentially encountered at R=4 modified by character-related factors of surprise, attention, and available sensory equipment.

**N Native World**

The native world UWP provides basic information about habitat for animals. Identify the world UWP.

**Local Gravity and Atmosphere**

Digit	Gravity	G=	Mod	Atmosphere	Mod	Taint?
0	Micro	0.00	+1	Vacuum	-	-
1	-	0.12	+1	Trace	-	-
2	Quarter	0.25	+1	Vthin Tainted	-	P
3	-	0.38	+1	Vthin	-	-
4	Half	0.50	+1	Thin Tainted	- 1	P
5	-	0.63	0	Thin	- 1	-
6	Light	0.75	0	Standard	-	-
7	-	0.88	0	Standard Tainted		P
8	Standard	1.00	0	Dense	+1	-
9	-	1.12	- 1	Dense Tainted	+1	P
A	High	1.25	- 1	Exotic	-	P
B	-	1.38	- 1	Corrosive	-	P
C	Vhigh	1.50	- 1	Insidious	-	P
D	-	1.63	- 2	Dense High	+1	-
E	Extreme	1.75	- 2	Ellipsoid	-	-
F	-	2.00	- 2	Thin Low	- 1	-

Local Gravity may affect the Size of animals.

Local Atmosphere may affect the abilities of animals.

Note the Gravity and Atmosphere Mods shown.

Mod is added to the Size Table 01-3, and subtracted from the Strength Table 01-4



## BUILDING BEASTS

Individual beasts can be created when a specific description is desired using the body structure.

### PONI

The poni appears on the insignia of the Imperial Interstellar Scout Service. It is a Vlarge Fast Strong Grazer.

Profile= +1 Thick. Size 6 = 7.5 m long. Average width and depth =  $7.5/8 = 0.93$ . Density = Standard= 1.0 (about the density of water; if the poni fills its lungs, it floats). Volume =  $7.5 \times 0.93 \times 0.93 = 6.59$  cubic meters = 6590 liters = 6,950 kilograms.

The poni is Fast: maximum speed = 50 kph.

The poni has Endurance (2D=) 11.

As a pack beast, the poni can be loaded with (body weight / 3 =) 2,000 kilograms and can carry it ponderously at Speed=1 for 11 hours.

As a wagon beast, the poni can pull a wagon filled with 6,000 kilograms over level terrain at Speed=1 for End= 11 hours. Two ponis hitched together can pull a wagon loaded with 12,000 kilograms. A wagon-hitched poni is capable of bursts of Speed=2 (technically 2.5, maybe even 3) for about 11 minutes.

As a riding beast, the poni can carry a rider (or several riders) at Speed= 1 for End= 11 hours. It can do bursts of Speed=2.5 for 33 minutes, and shorter bursts of Speed=5 for 11 minutes.

**Average Daily Speeds.** Speeds and speed bursts are the basis for average daily speeds.

The poni can carry a rider at Speed=5 = 50 kph for 11 minutes per hour, Speed= 2.5 = 15 kph for 33 minutes per hour, and (for the rest of the hour) Speed= 1 = 5 kph for 16 minutes per hour. At that pace, it can travel 18.75 km per hour.

### Appearance

Based on the image of the poni in the ISS insignia (and selecting appropriately from the Beast Body Structure tables, it appears to be a Bilateral HBS-T-LL-LL-T. It has a bony interior skeleton, ichor as an interior fluid, a skin of fine scales, and may use its hooves as weapons.



### IGGLE

The iggle (in symbolic form) appears on the regional crest of the Delphi Domain. It is a Large Vfast Strong Flying Pouncer.

Profile= -4 Vflat. Size= 6 = 7.5 meters long. Most of the iggle is wing, giving it a Vflat profile = width and depth =  $7.5/20 = 0.375$ . Density = Hollow = 0.5. Volume =  $7.5 \times .37 \times .37 = 1.02$  cubic meters = 1,020 liters = (but density 0.5 gives a weight of 510 kilograms).

The iggle is Vfast = 100 kph = Speed=6.

The iggle has Endurance (2D) = 8.

As a pack beast, the iggle can be loaded with (body weight / 3 =) (halved because the iggle is a flyer=) 85 kilograms and can carry it at Speed=5 for 8 hours.

As a riding beast, the iggle can carry a rider at Speed= 5 for End= 8 hours. It can do short bursts of Speed=6 for 8 minutes.

The iggle can carry a rider at Speed= 6 = 100 kph for 8 minutes per hour and the remaining 52 minutes of the hour at Speed= 5 = 50 kph. At that pace it can average about 54 kph.

### Computing Volume Using Profile and Size

Using Size as the greatest dimension (Length) for an object (or beast), divide Size by Divisor to determine average Width and average Depth. Multiply the three Length Width Depth to determine volume. Assuming an average density equal to water, divide the result for volume in liters and weight/ mass in kilograms.

Divisor produces "average" Width and Depth; use double that value for the probable dimensions of the core body. For example, a typical human 1.5 meters tall (Divisor= 9) has an average Depth and average Width = 0.16 meters. Maximum body Depth is closer to 0.33 meters (= 2x the average body Depth).

For example, a smallish human 1.5 meters tall (Divisor= 9) has a volume =  $1.5\text{m} \times 0.16\text{m} \times 0.16\text{m} = 0.0384$  cubic meters = 38 liters = 38 kilograms = 85 pounds.

For example a typical human 1.8 meters tall (Divisor= 9) has a volume =  $1.8\text{m} \times 0.2\text{m} \times 0.2\text{m} = 0.072$  cubic meters = 72 liters = 72 kg = 158 pounds. A fat human 1.8 meters tall (Divisor = 7) has a volume = 0.119 cubic meters = 119 liters = 119 kg = 262 pounds. An obese human 1.8 meters tall (Divisor=6) has a volume = 0.162 cubic meters = 162 liters = 162 kg = 356 pounds.

A Beast can be described by creating the entries for this text section by gathering information from the referenced charts.

# Describing Beasts 01

	<BEAST NAME>	
The <Beast Name> is inhabiting on <world name>.	<general description> <terrain> <size>	Descriptive text. Chart 00-A or 01-5 Native Terrain World Name
It is a	<speed2> <strength> <subniche>.	Chart 01-3 Size. Chart 01-6 Speed Chart 01-4 Strength Chart 01-1 Type
The <Beast Name> is a (classified and consisting of its weapons include	<symmetry> <number of feet> <body structure>), <structure>.	Chart 02-A-Body Structure-Symmetry. Chart 02-A-Body Structure- Note. Chart 02-Body Structure Overview. Chart 02-Expanded from Overview.
The body is characterized by covered by with an armor value of Interior body fluids are	<weapon> <skeleton> <skin> <AV> <fluids>.	Chart 01-7-Weapons. Chart 02-B-Body Features-Skeleton. Chart 02-B-Body Features-Skin. Chart 02-B-Body Features-AV. Chart 02-B-Body Features-Fluids.
The <Beast Name> is a <Terrain> Based on its Profile:	<Locomotion>. <profile>, : <density>	Chart 01-5 Native Terrain and Locomotion Chart 03-B-Body Profile. Chart 03-C-Density.
and the <Beast Name> is about long, cubic meters/liters, and Tons/kilograms/grams.	<size>, <length> <volume> <mass>	Chart 01-3 Size Chart 03-A-Animal Sizes (modified by Flux). Chart 03-D-Calculate Volume. Chart 03-D-Calculate Volume
The <Beast Name> is walking speed =	<speed>: <kph>.	Chart 01-6-Speed-2 Chart 01-6-kph.
The <Beast Name> has Endurance: Pack animal: the can be loaded with	<Endurance> <Beast Name> ( <body weight> / 3 = ) <load>	Chart 03-Animal Endurance. Chart 03-Animal Endurance.
kilograms and can carry it at Speed=1 for Wagon Beast: the can pull a wagon filled with over level terrain at Speed=1 for End= A pair can pull a wagon load= A wagon-hitched is capable of a burst of Speed= for about Riding Animal: the can carry a rider at Speed= 1 for End= It can do a burst of Speed= for about	<Endurance> hours. <Beast Name> <body weight> kg <endurance> hours. <body weight x 2> kg. <Beast Name> <maximum speed/2> <endurance> minutes <Beast Name> <endurance> hours. <maximum speed> <endurance> minutes.	Chart 03-Calculation Paragraph. Chart 03-Work Animals. Chart 03-Animal Endurance. Chart 03-Animal Endurance. Chart 03-Animal Endurance. Chart 03-Animal Endurance. Chart 03-Animal Endurance.
The Beast is Its taste is Its most edible parts are	<edibility> edible; <taste>. <alternative>.	Chart 03-Work Animals. Chart 03-Animal Endurance. Chart 03-Animal Endurance. Chart 04-Edibility Chart 04-Taste Chart 04-Potential Alternatives
The Beast's ability to Defer is The Beast's ability to Obey is The Beast's ability to learn Simple Tasks is	<defer>. <obey>. <learn-simple-tasks>.	Chart-04-Animal Training Defer Chart-04-Animal Training Obey Chart-04-Animal Training LST



# 00 Beast Environment

## BEAST ENVIRONMENT

The details of a beast's evolutionary environment shape its physiology and physical structure, locomotion, and ecological niche.

### NATIVE EVOLUTIONARY ORIGINS

A beast has evolved based on Terrain and Locomotion.

- A. Determine **Native Terrain**: the original evolutionary region for the species.
- B. Determine **Locomotion**: the natural system of movement used by the sophont.
- C. Determine **Ecological Niche**: the sophont position in the ecological hierarchy.

## B BEAST TERRAIN AND LOCOMOTION

Flux	Native Terrain	Roll 1D						If	DM
		1	2	3	4	5	6		
-5	Mountain	Walker	Walker	Walker	Walker	Walker	Flyer	Atm 8+	-2
-4	Desert	Walker	Walker	Walker	Walker	Walker	Flyer	Siz 5-	-1
-3	Exotic	Amphib	Walker	Walker	Walker	Flyphib	Flyer	Hyd 6+	+1
-2	Rough Wood	Amphib	Walker	Walker	Walker	Walker	Flyer	Hyd 9+	+1
-1	Rough	Amphib	Walker	Walker	Walker	Walker	Flyer		
0	Clear	Walker	Walker	Walker	Walker	Walker	Walker	DMs are	
+1	Forest	Walker	Walker	Walker	Walker	Walker	Walker	cumulative.	
+2	Wetland	Amphib	Aquatic	Walker	Walker	Triphib	Flyer		
+3	Wetland Wood	Amphib	Walker	Walker	Walker	Triphib	Flyphib		
+4	Ocean	Flyphib	Swim	Swim	Swim	Aquatic	Diver		
+5	Ocean Depth	Aquatic	Diver	Diver	Diver	Diver	Diver		

Roll Flux for Native Terrain; then roll 1D on the determined Row for Locomotion

### Beast Movement

Type	Walks	Dives	Swims	Flies	Other	Breathes	Walks= Moves
Walker	Walks	-	-	-	-	<Atm>	(walks, jumps, crawls) on land.
Amphibian	Walks	-	Swims	-	-	<Atm> + Water	<b>Dives=</b> Moves in water depths.
Triphibian	Walks	-	Swims	Flies	-	<Atm>	<b>Swims=</b> Moves in water, near surface.
Aquatic	-	Dives	Swims	-	-	<Atm>	<b>Flies=</b> Moves in atmosphere.
Diver	-	Dives	-	-	-	Water	<b>Breathes=</b>
Flyer	Walks	-	-	Flies	-	<Atm>	<Atm>= Homeworld Atmosphere.
Flyphib	-	-	Swims	Flies	-	<Atm> + Water	
Swimmer	-	-	Swims	-	-	<Atm>	
Static*	-	-	-	Immobile	-	<Atm>	
Drifter*	-	-	-	-	Drifts	Water	

\* Producer only

## C ECOLOGICAL NICHE

Flux	Niche	Herbivore	Omnivore	Carnivore	Scavenger	Producer
-6	Producer	Grazer	Hunter	Pouncer	Carrion-Eater	Collector
-5	Producer	Grazer	Hunter	Pouncer	Carrion-Eater	Collector
-4	Herbivore	Grazer	Hunter	Pouncer	Carrion-Eater	Collector Roll
-3	Herbivore	Intermittent	Hunter	Pouncer	Hijacker	Collector Flux for
-2	Omnivore	Intermittent	Hunter	Pouncer	Hijacker	Collector Niche;
-1	Omnivore	Intermittent	Gatherer	Pouncer	Hijacker	Collector then
0	Omnivore	Intermittent	H / G	Chaser	Intimidator	Basker Flux
+1	Omnivore	Grazer	Gatherer	Chaser	Intimidator	Basker in the
+2	Omnivore	Grazer	Gatherer	Chaser	Intimidator	Basker appropriate
+3	Carnivore	Grazer	Gatherer	Chaser	Intimidator	Basker column.
+4	Carnivore	Grazer	Gatherer	Trapper	Intimidator	Basker
+5	Scavenger	Grazer	Gatherer	Siren	Reducer	Basker
+6	Scavenger	Filter	Eater	Killer	Reducer	Basker

H/G= Hunter/ Gatherer.

Environment Roll is Mod to appropriate columns (but not Basic Class).

## A NATIVE TERRAIN

**- 5 Mountain**  
Steep dominating region.

**- 4 Desert**  
Dry region with sparse vegetation

**- 3 Exotic**  
Strange abnormal region

**- 2 Rough Wood**  
High density vegetation region.

**- 1 Rough**  
Uneven or broken surface region

**0 Clear**  
Flat extended region.

**+1 Forest**  
Flat with high vegetation

**+2 Wetlands**  
Water-dominated marsh

**+3 Wetland Woods**  
Water-dominated swamp

**+4 Ocean**  
Interface of sea and atmosphere

**+5 Ocean Depths**  
subsurface ocean regions

\*Preserve this die roll as the Environ DM

**- 1 Baked Lands**  
Hot region.

**0 Twilight Zone**  
Temperate region

**+1 Frozen Lands**  
Cold region

Substitute these native terrain names if the Homeworld is Twilight Zone or Locked.

# Basic Beast Information 01

## 0 NICHES

Code	Niche
P	Producer
H	Herbivore
O	Omnivore
C	Carnivore
S	Scavenger
E	Event

Create each individual beast for the BET Beast Encounter Table using tables 0 through 8.

## 1 TYPE

1D	Subniche
1	Collectors
2	Collectors
3	Collectors
4	Baskers
5	Baskers
6	Baskers
1	Filters
2	Grazers
3	Grazers
4	Grazers
5	Intermittents
6	Intermittents
1	Hunter
2	Hunter
3	HG Hybrid
4	Gatherer
5	Gatherer
6	Eater
1	Trapper
2	Siren
3	Chaser
4	Pouncer
5	Pouncer
6	Killer
1	Intimidator
2	Intimidator
3	Hijacker
4	Carrion-Eater
5	Carrion-Eater
6	Reducer

## 2 QUANTITY

1D	Quantity	Value
1	Lone	= 1
2	Pair	= 2
3	Triplet	= 3*
4	Some	= 2D
5	Several	= 1D+2
6	Many	= D xD

\*Quantity= 2 or 3, encounter range +1.

Quantity > 3, encounter range +2.

## 3 SIZE

Flux	Size	Descriptor	Value
- 5	R	Microscopic	1 mm
- 4	T	Miniscule	2 mm
- 3	1	Tiny	7 mm
- 2	2	Vsmall	75 mm
- 1	3	Small	20 cm
0	4	Typical	75 cm
+1	4	Typical	75 cm
+2	5	Large	1.5 m
+3	6	Vlarge	7.5 m
+4	7	Gigantic	75 m
+5	8	Colossal	750 m
+6	9	Vcolossal	7500 m

Size= Greatest dimension plus Grav DM.

Flux <-5= -5.Flux > +6 = +6.

## 4 STRENGTH

1D	Size	Descriptor	Value
0	Feeble		1D-3
1	Weak		Size * 1D
2	Typical		Size * 2D
3	Typical		Size * 3D
4	Strong		Size * 4D
5	Vstrong		Size * 5D
6	Formidable		Size * 6D
7	Herculean		Size * 7D

minus Grav DM.

## 5 BEAST TERRAIN AND LOCOMOTION

Native	Terrain	Roll 1D						If	DM
		1	2	3	4	5	6		
- 5	Mountain	W	W	W	W	F	S2	Atm 8+	- 2
- 4	Desert	W	W	W	W	F	S2	Siz 5 -	- 1
- 3	Exotic	A2	W	W	W	F	F2	Hyd 6+	+1
- 2	Rough Wood	A2	W	W	W	F	S2	Hyd 9+	+1
- 1	Rough	A2	W	W	W	F	S2		
0	Clear	W	W	W	W	F		DMs are	
+1	Forest	W	W	W	W	F	S2	cumulative.	
+2	Wetland	A2	A2	W	W	F	T		
+3	Wetland Wood	A2	W	W	W	T	F2		
+4	Ocean	F2	S	S	S2	A2	D		
+5	Ocean Depth	A2	D	D	D	D2	D2		

Roll Flux for Native Terrain; then roll 1D on the determined Row for Locomotion. A= Amphib. A2= Aquatic. D= Dive. D2= Drifter. F= Fly. F2= Flyphib. S= Swim. S2=Static. T= Triphib. W= Walk.

## 6 SPEED

1D	SpeedV	SpeedC	kph
0	Static	Immobile	0
1	Creep	Walk	5
2	Crawl	Run	10
3	Xslow	Sprint	20
4	Vslow	Charge	30
5	Slow	Fast	50
6	Standard	Vfast	100
7	Cruise	Xfast	300
8	Fast	Hfast	500

DM +2 for Flyers.

DM - 5 for Producers

## 7 WEAPON

Flux	Others	Carnivorous
- 5	Peds	Claws
- 4	Peds	Claws
- 3	Antlers	Tusks
- 2	Horns	Tusks
- 1	Horns	Teeth
0	Body	Teeth
+1	Body	Teeth
+2	Body	Teeth
+3	Quills	Teeth
+4	Spikes	Sting
+5	Sting	Sting
+6	Thag	Sting

## 8 REACTIONS

1D	Subniche	A	F
1	Collectors		
2	Collectors	No	No
3	Collectors		
4	Baskers		
5	Baskers	No	No
6	Baskers		
1	Filters	P	12
2	Grazers		
3	Grazers	10	10
4	Grazers		
5	Intermittents	11	11
6	Intermittents		
1	Hunter	14	10
2	Hunter		
3	HG Hybrid	12	11
4	Gatherer	11	12
5	Gatherer		
6	Eater	14	10
1	Trapper	S	12
2	Siren	S	12
3	Chaser	10	10
4	Pouncer		
5	Pouncer	S	S+
6	Killer	14	9
1	Intimidator	12	11
2	Intimidator		
3	Hijacker	13	11
4	Carrion-Eater	12	12
5	Carrion-Eater		
6	Reducer	12	12

P if Possible.

S If it has Surprise.

S+ If Surprised.

Beasts have individualized values To Attack and To Flee:

Attack= A - 1D

Flee= F - 1D

In an encounter situation, the beast Attacks on a roll of 2D= Attack or less;

If it does not Attack, it Flees on a roll of 2D= Flee or less.

If it does not Flee, it stays in its current location.

# 02 Beast Body Structure

Physical appearance is determined by body symmetry, number of limb groups, location of the braincase and senses, armor status of the body, natural weaponry, and other details.

## CREATE BODY STRUCTURE

Determine physical appearance.

### A. Body Structure Elements

**Symmetry.** Bilateral= paired; Trilateral= triplets; Radial = 1D limbs per group. Asymmetrical= 1D limbs per group (roll for each limb group).

DM +2 if Flyer. - 2 if Swimmer or Diver.

**Head and Torso.** One roll determines both Head and Torso. The Brain is not necessarily located in the Head, but there is only one Brain.

**Limb Group Structure.** Roll for Front limbs and Rear limbs. Front Limbs terminate in Manipulators; Rear Limbs do not have Manipulators.

**Tails.** Roll for the presence of a Tail. Manipulator is a prehensile tail. Proboscis is technically not a tail; it is a Trunk emanating from the Head (if no head, from the front of the Torso).

### B. Body Features.

Skeleton, Fluids, Skin, Weapons, Manipulators.

## BODY STRUCTURE OVERVIEW

Body Structure Overview shows details of head, torso, limbs, and tail in the format:

Head (with or without Brain and Senses),	Torso (with or without Brain and Senses)	Front Limbs (with Manipulators)	Rear Limbs	Tail / Proboscis
<b>A-</b>	<b>B-</b>	<b>CD-</b>	<b>EF-</b>	<b>G</b>

## A BODY STRUCTURE

Flux	Symmetry	Head and Torso		Flyer		Walker		Aquatic Amphibian		Diver Swimmer		Triphib Flyphib		Tail
		Front	Rear	Front	Rear	Front	Rear	Front	Rear	Front	Rear	Front	Rear	
-5	Asymmetrical	HS	+TB	WW	WW	AA	LL	AA	FF	AA	FF	FF	FF	P
-4	Asymmetrical	HS	+TB	WW	WM	AA	LL	AA	LF	AA	LF	WW	FM	V
-3	Asymmetrical	HS	+TB	WA	WL	AN	LN	AF	LL	AF	LL	WA	FL	T
-2	Bilateral	HBS	+T	WA	WN	AN	LN	AF	LN	AF	LN	WA	FN	T
-1	Bilateral	HBS	+T	WL	WN	LL	LN	AL	FN	AL	FN	WL	FF	N
0	Bilateral	HBS	+T	WL	LN	LL	LN	AL	FN	AL	FN	WL	FN	N
+1	Bilateral	HBS	+T	WL	LN	LL	LN	AL	LN	AL	LN	WL	FN	N
+2	Trilateral	HBS	+T	WN	LN	LN	LN	AW	WL	FF	FF	WN	FN	N
+3	Trilateral	N	+TBS	AN	LM	AL	LM	AF	WF	AF	FF	FN	FN	N
+4	Radial	N	+TBS	AN	MM	AL	MM	AF	FM	AF	FM	FN	FM	M
+5	Radial	N	+TBS	AA	NN	AN	NN	AN	MM	AN	MM	FF	NN	A

**Head And Torso:** HS= Head with Senses. HBS= Head with Brain and Senses. N= No Head. T= Torso. TB= Torso with Brain. TBS= Torso with Brain and Senses.

**Limb Groups:** A= Arms. F= Flippers. L= Legs. M= Multiple Leg Groups. N= No Limbs. W= Wings.

**Tail/Proboscis:** A= Antennae. M= Manipulator. N= No Tail. T= Tail. V= Vestigial Tail. P= Probosc.

DM - 2 if Swimmer or Diver. +2 if Flyer.

## B BODY FEATURES

Flux	Skeleton	Fluids	Skin	Manipulators
-6	Fluid Interior Sacs	Foam	Feathery Pelt	Tentacles
-5	Fluid Interior Sacs	Foam	Feathery Pelt	Tentacles
-4	Fluid Interior Sacs	Lymph	Furry Pelt	Tentacles
-3	Cartilage Interior	Hemolymph	Hairy Pelt	Grippers
-2	Cartilage Interior	Ichor	Leather	Grippers
-1	Bony Interior	Blood	Skin	Hands
0	Bony Interior	Blood	Skin	Hands
+1	Bony Interior	Blood	Skin	Paws
+2	Exoskeleton	Gore	Fine Scales	Paws
+3	Exoskeleton	Slime	Scales	Graspers
+4	Segmented Shell	Scum	Spines	Graspers
+5	Segmented Shell	Humours	Plates	Sockets
+6	Segmented Shell	Humours	Plates	Sockets

DM +1 if Swimmer DM - 1 if Flyer.

### Body Feature Terms

**Skeleton.** Interior support structure.

**Fluids.** Typical body fluids.

**Skin.** Description of body covering.

**Armor.** Natural armor (value = 2D-2)

**Weapon.** Natural weapon.

**Manipulators.** Front Limbs have Manipulators (Rear Limbs not). Manipulators on Legs are dual use as Peds).

If otherwise no Manipulators, assume Mouth is Manipulator.

**Stance.** A beast with NO rear limb groups is horizontal (with Length rather than Height). All others are Vertical and have Height (not Length).

Determine the details of the animal including size and general structure, power and endurance, and suitability as a beast of burden.

# Beast Size 03

## A ANIMAL SIZES

Flux	Vary	0	R	T	1	2	3	4	5	6	7
-5	0.5	--	0.5 mm	1.5 mm	4.5 mm	40 mm	14 cm	45 cm	110 cm	2.0 m	40 m
-4	0.6	--	0.6 mm	1.6 mm	5.0 mm	50 mm	15 cm	50 cm	120 cm	5.0 m	50 m
-3	0.7	--	0.7 mm	1.7 mm	5.5 mm	55 mm	16 cm	60 cm	130 cm	5.5 m	55 m
-2	0.8	--	0.8 mm	1.8 mm	6.0 mm	60 mm	18 cm	65 cm	135 cm	6.0 m	60 m
-1	0.9	--	0.9 mm	1.9 mm	6.5 mm	70 mm	19 cm	70 cm	140 cm	6.5 m	70 m
0	1.0	--	1.0 mm	2.0 mm	7 mm	75 mm	20 cm	75 cm	1.5 m	7.5 m	75 m
+1	1.2	0.2 mm	1.2 mm	3.0 mm	20 mm	10 cm	30 cm	90 cm	1.7 m	20 m	200 m
+2	1.4	0.4 mm	1.4 mm	4.0 mm	35 mm	12 cm	40 cm	105 cm	1.9 m	35 m	350 m
+3	1.6	0.6 mm	1.6 mm	5.0 mm	50 mm	15 cm	50 cm	120 cm	5.0 m	50 m	500 m
+4	1.8	0.8 mm	1.8 mm	6.0 mm	60 mm	18 cm	65 cm	135 cm	6.0 m	60 m	600 m
+5	2.0	1.0 mm	2.0 mm	7.0 mm	75 mm	20 cm	75 cm	150 cm	7.5 m	75 m	750 m

This table shows the largest dimension for the object. Size reflects the greatest dimension of an object or an animal. Profile determines its other dimensions: width and depth, and allows the computation of other information (such as weight / mass).

## B BEASTPOWER

Beastpower is a standardized measure of the power of animals and vehicles.

**ONE BEASTPOWER=**  
**BP = Tons x (Speed ^3)**

**Steady BP.** For long term work, Speed=1 (thus BP= mass tons).

**Peak BP.** Maximum (very short term) BP for an animal uses the formula

## C ANIMAL ENDURANCE

= time (in hours) animal can move at Speed=1

**End = 1D** Grazer= 2D, Chaser= +2. Pouncer= - 2

**Beasts of Burden** load = one-third body weight.  
**Carts and Wagons** load = animal body weight,  
**Riding load** = riders = one-third its body weight.

## B BODY PROFILE

Flux	Profile	Divisor	Volume
-5	Sheet	100	W=L. D= L/100
-4	Vflat	20	W= D = L/20
-3	Flat	12	W= D = L/12
-2	Vthin	11	W= D = L/11
-1	Thin	10	W= D = L/10
0	Typical	9	W= D = L/9
+1	Thick	8	W= D = L/8
+2	Fat	7	W= D = L/7
+3	Obese	6	W= D = L/6
+4	Globular	1.4	W= D = L/1.4
+5	Max	1	W= D = L

L= Length (= Size). W= Width. D= Depth. All values in meters. Flux <-5=-5. Flux > +5 = +5.

## E WHEN ANIMALS ATTACK

Speed	SpeedAF	kph	Dmg
0	Not Moving		
1	Creep	5	1 D
2	Crawl	10	4 D
3	Xslow	20	9 D
4	Vslow	30	16 D
5	Slow	50	25 D
6	Standard	100	36 D

Much of the force of an animal attack depends on its impact on its victim.

The first attack by an animal at Speed inflicts Damage at the level shown per ton. Damage is Blow.

## D CALCULATE VOLUME

Divide Length by Divisor to calculate Width and Depth.  
 Volume= L x W x D in cubic units.  
 Convert to liters (1000 L per m3).  
 Convert to kilograms. At standard density = 1, 1 liter = 1 kg or 1 cubic meter = 1000 kg.  
 Multiply by Density as necessary.

One Ton = 13.5 cubic meters.

For beasts, 1 ton (normally a measure of volume) = 1000 kg.

## C DENSITY

1D	Density	=kg times
1	Sac	0.1 Windborne
2	Hollow	0.5
3	Light	0.9 Floats
4	Standard	1.0 = Water
5	Dense	1.1 Sinks
6	Vdense	1.5

## W WORK ANIMALS

Work Type	Load***	Speed=1	Speed= Max/2	Speed= Max
Pack Animal.	= Body Wt/3	End hours	no	no
Wagons.	= Body Wt*	End hours	End minutes**	no
Riders.	= Body Wt/3	End hours	3x End minutes**	End minutes**

\* Ignore weight of wagon. 2x, 3x, 4x, 6x beasts hitched together are possible.

\*\* bursts allowed per hour. Values may be used to FOR average daily speeds.

\*\*\* Flyers carry half load; travel at Max minus 1.s Blow.

# 04 Beast Details

## FOOD FOR SURVIVAL

Animals may provide food for subsistence and survival.

**Personal Food Requirements.** An individual requires one kilogram of food per day (a quarter-pounder is 125 grams of meat and about 250 total grams of food; an active person require a minimum 4 of them per day).

**Animal Food Yield.** An **Edible Animal** provides food/meat= one-half total animal weight.

A **Marginal Edible Animal** provides food/meat= one-quarter total animal weight.

**Edible Organs** are included in the total edible animal. If independent, each is 2% of total animal weight (= 20 grams per kilogram of animal weight).

EDIBILITY		Potential
Flux	Edible?	Alternatives
- 5	No	Sensory Organs
- 4	No	Brain
- 3	No	Skeleton
- 2	No	Digestive Organs
- 1	No	Circulatory Organs
0	No.	Eggs and Reproductive Secretions
+1	Marginal.	Interior Fluids
+2	Marginal.	Respiratory Organs
+3	Yes.	Outer Coverings
+4	Yes.	Waste Process Organs
+5	Yes.	

**Edibility.** The animal may be suitable for consumption by humans. Marginal edibility provides limited nutrition, and may require some processing (treatment with chemicals, aging, trimming).

**Taste.** The taste to the typical human palate. Non-human sophonts may (and usually do) have different concepts of edibility and taste.

**Potential Alternatives.** In the event that the animal is inedible, the potential alternatives column may be consulted if Skill= Survival or Biologics, or Knowledge= World.

Allowed Rolls on Potential Alternatives Column= Skill or Knowledge Level. For each, consult Edible? And Taste.

**Non-Human Table Use.** Non-human compatible digestive systems roll independently on the table. Record the information for those non-humans currently involved.

## BEAST TRAINING

Some beasts may be susceptible to training based on three basic tasks: Defer, Obey, and Learn Simple Task.

**Defer.** The beast accepts the trainer as a superior companion. It will not attack unless provoked.

**Obey.** The beast accepts the trainer as its master. It will engage in training situations.

**Learn Simple Task.** The beast learns a basic or simple task (sit, lie down, stay). Complex tasks and sophisticated responses are built on a series of simple tasks.

### Training Beasts

Many beasts are unable to respond to the three basic tasks. Each species has its own response to the three tasks.

**Trainability.** On the Beast Training Difficulty Table, roll three times to determine the training difficulty for the species. To be trainable, the beast must have a minimum of not NO in all three tasks).

T BEAST TRAINING DIFFICULTY			
Flux	Defer	Obey	LST Trainable*
- 5	No	No	No
- 4	No	No	No
- 3	No	No	No
- 2	No	No	No
- 1	No	No	No
0	-----	8D Beyond -----	-----
+1	-----	7D Impossible -----	-----
+2	-----	6D Hopeless -----	-----
+3	-----	5D Staggering -----	-----
+4	-----	4D Formidable -----	-----
+5	-----	3D Difficult -----	-----

Roll three times on this table to determine the training difficulty for the species.

If species trainability is not NO, an individual specimen of the species has trainability equal to species trainability plus flux.

\*LST Trainable= Learn Simple Task.

For example, an ivory gazelle rolls Defer= No, Obey= 7D, LST= No. The animal cannot be trained.

For example, a horned goat rolls Defer= 8D, Obey= 7D, LST= 6D. The animal is trainable. The trainer evaluates the animals in the herd, selects one, and applies flux to its three tasks. Defer= (8D + flux -3= ) 5D, Obey= (7D + flux = 0 = ) 7D, and LST= (6D + flux = -1 = ) 5D.

### TRAINABLE ANIMALS (COMMON VALUES)

Animal	Defer	Obey	LST Trainable
Dog	Difficult	Difficult	Difficult
Cat	Staggering	Hopeless	Impossible
Horse	Difficult	Formidable	Formidable
Tiger	Hopeless	Hopeless	Staggering
Llama	Hopeless	Staggering	Staggering

Create individualized Beast Encounter Tables for specific terrain types on a world.

# Beast Encounter Tables 05

### ANIMAL ENCOUNTER TABLE CHECKLIST

Create a blank **Animal Encounter Table**.

Label with

World Name and UWP.

Terrain Type.

Mark Terrain Hex Symbol.

For each entry

- 1 Type (first!) Chart 01-1
- 2 Quantity Chart 01-2
- 3 Size Chart 01-3
- 4 Speed Chart 01-6
- 5 Strength Chart 01-5
- 6 Locomotion Chart 01-4
- 7 Reactions Chart 01-8

<b>EXAMPLE ANIMAL ENCOUNTER TABLE</b>									
Terrain Type					Worldname and UWP				
1D	Quantity	Size	SpeedC	Strength	Locomotion	Type	A	F	Comments
<b>1</b>	<b>P</b>	_____	_____	_____	_____	_____	A_	F_	_____
<b>2</b>	<b>H</b>	_____	_____	_____	_____	_____	F_	A_	_____
<b>3</b>	<b>O</b>	_____	_____	_____	_____	_____	A_	F_	_____
<b>4</b>	<b>C</b>	_____	_____	_____	_____	_____	A_	F_	_____
<b>5</b>	<b>S</b>	_____	_____	_____	_____	_____	A_	F_	_____
<b>6</b>	<b>E</b>	_____	_____	_____	_____	_____	A_	F_	_____
P= Producer. H= Herbivore. O= Omnivore. C= Carnivore. S= Scavenger. E= Event.									Armor. Weapons.

<b>EXAMPLE ANIMAL ENCOUNTER TABLE</b>									
Terrain Type					Worldname and UWP				
1D	Quantity	Size	SpeedC	Strength	Locomotion	Type	A	F	Comments
<b>1</b>	<b>P</b>	_____	_____	_____	_____	_____	A_	F_	_____
<b>2</b>	<b>H</b>	_____	_____	_____	_____	_____	F_	A_	_____
<b>3</b>	<b>O</b>	_____	_____	_____	_____	_____	A_	F_	_____
<b>4</b>	<b>C</b>	_____	_____	_____	_____	_____	A_	F_	_____
<b>5</b>	<b>S</b>	_____	_____	_____	_____	_____	A_	F_	_____
<b>6</b>	<b>E</b>	_____	_____	_____	_____	_____	A_	F_	_____
P= Producer. H= Herbivore. O= Omnivore. C= Carnivore. S= Scavenger. E= Event.									Armor. Weapon.

# BeastMaker Events

---

The unusual is always a challenge to travellers. The unforeseen or the extraordinary event can hinder or help any journey.

Events are an important part of encounter tables. They force detours and delays; they provide insights into local terrain, and they challenge the talents and resources of travelers.

An event is a non-animal encounter within a terrain type. Most events are temporary or transient effects which, when the terrain is revisited, may no longer be in present. Some events are permanent (and are reasonably called terrain features).

For example, a flooded path is an event; it is temporary and may not be encountered the next time the terrain is visited. A natural stone bridge is permanent terrain feature which will probably be present (absent erosion or a worldquake) when the terrain is next visited.

**Events Are Diversions and Challenges.** Events give an interesting dimension to travel through terrain; they are not a substitute for referee imposed activities directly related to play.

Events are not necessarily apparent or visible; they merely exist. It is entirely possible for adventurers to not notice an event and simply pass it by.

**Event Size.** An event is typically placed in a Single Hex within a Local Hex. Some events may extend to adjacent hexes or farther.

## EVENT LOCATION

An event (the center of the event, or its most visible part) should be placed within a Local Hex.

**Locate The Adventurers.** Determine the location of the adventurers in the Local Hex.

**Place the Event.** Determine the location of the event. If necessary, extend it to other hexes.

## EVENT CATEGORIES

Events can be identified by their origin within the environment.

**Meteorologic Events** reflect weather conditions, including storms, extremes of heat and cold, extremes of atmospheric turbulence, and deviations from normal or expected weather.

**Atmospheric Events** reflect the state of the atmosphere, including local variations in environmental gases (and their effects), visibility, and sound transmission.

**Planetologic (or Geologic) Events** reflect local features or anomalies of the world surface, including terrain features and barriers, and the presence or absence of minerals.

**Tectonic Events** reflect the influence of the world interior on the world surface, including volcanism, worldquakes, and magnetic and gravitic anomalies.

**Hydrologic Events** reflect local features and anomalies of water or environmental liquids, including floods, tides, rivers and bodies of water, and abundance or scarcity of liquids.

**Stellar Events** reflect the influence of the local star (or stars) on the world surface, including levels of heat, irregularities, flares, and eclipses.

**Flora Events** reflect unusual plant life which may have an impact on activity within the terrain.

**Fauna Events** reflect unusual animal life which may

have an impact on activity within the terrain.

**Special Events** reflect interesting, unusual, dangerous, or valuable items or effects within the terrain. They include unusual signs of intelligence, civilization, or settlement, whether current or past, and things or effects which may influence or direct the actions of those who visit the terrain.

## The Elements of the Event

An event can be described with a title (or descriptive name), a size (detailing the extent of its influence), and an effect (a short sentence or paragraph noting its activity and the effect it has on individuals and equipment).

Mud. Local Hex. Surface vehicles are hindered by an expanse of clinging wet soil. Speed is reduced to Crawl.

**Circling Flyers:** A number of flyers spot the party and circle above their heads. After about 10 minutes the party will be attacked by chasers. The animals are symbiotic: the flyers spot prey for the chasers and are allowed to share in the feast.

**Poisonous Pests:** While the party was stopped, tiny (one gram) creatures have crawled into concealed places within the party's equipment (packs, boots, etc.) They are poisonous, and they attack when encountered (when a character reaches into his pack, puts on his boots, etc.).

**Stampede:** A herd of grazers, frightened by carnivores, stampedes into the party. They can be turned by loud noises (gunshots, explosions) or laser bolts. Otherwise, they will run straight through the party.

**Animated Vines:** Ordinary looking vines grab and hold individuals in a constricting grip, inflicting 1D damage to Str-Dex-End per minute. Release requires cutting the vines.

**Hallucinogenic Pollen:** The party comes upon a field of flowers. The air is filled with their pollen, which will cause strong hallucinations if breathed. The hallucinations, which are threatening in nature, will continue for about 20 minutes after the party leaves the field

**Tanglewood:** The entire floor of the forest is covered with a low network of sticky, flexible roots. Running is impossible, and walking is difficult. Reduce speed to one-quarter

**Wirebushes:** The party comes to an area filled with low bushes whose branches are very tough. Bypassing the area with a vehicle will add 1 D x 5 kilometers to the travel distance.

#### **WEATHER**

Various types of weather may endanger a party or impede its progress.

**Cold Snap:** The ambient temperature falls rapidly. Individuals must obtain shelter or lose two points of Endurance per hour

**Dense Fog:** The party encounters a low area filled with

a dense fog. Visibility is reduced to a S=4, and full-speed vehicle travel without sensors becomes hazardous.

**Rainstorm:** A sudden rainstorm reduces visibility and turns the ground to thick mud. Ground travel is slowed to quarter speed for the day

**Sandstorm:** High winds fill the air with abrasive sand particles. Progress is impossible for 12 hours. Individuals will be buried, and windscreens on vehicles below tech level 12 will be abraded into translucence

**Tornado:** A tornado is heading toward the party. If it achieves surprise, or if the party does not act to avoid its path once it is sighted, it will destroy their vehicle and each member of the group is injured.

#### **NATURAL DISASTERS**

Local phenomena may also provide interesting events

**Avalanche:** Throw 8+ for a loud noise (vehicle, conversation, etc.) to precipitate an avalanche

**Prairie Fire:** A line of fire can be seen on the horizon. The fire is 20 kilometers across and must be detoured.



# Beastuary

Animals — beasts — abound in the universe. Every world presents new opportunities to encounter the near infinite variety of fauna shaped by specific world environments and conditions.

The following is a representative list of animals encountered in Charted Space. Some are common, some are uncommon, and some are exclusive to certain worlds.

## A LIST OF BEASTS

Name	Niche	Quantity	Size	Speed2	Strength	Moves	Type	Mass(kg)
Anola	O	Several	Typical	Xslow 3	Std (3)	Walk	Gatherer	2.9
Beaked Monkey	H	Triplet	Typical	Crawl 2	Std (2)	Walk	Intermittent	2.6
Bush Runner	O	Some	Large	Xslow 3	Std (3)	Walk	Hunter	58
Cave Trapper	C	Lone	Large	Crawl 2	Std (3)	Walk	Trapper	98
Chamax Hunter	O	Many	Large	Xslow 3	Weak	Walk	Hunter	47
Crested Trapper	C	Lone	Large	Creep 1	Std (4)	Walk	Trapper	222
Daghadasi	H	Many	Colossal	Xslow 3	Strong	Swim	Filter	3.0E+11
Elyosa	H	Pair	Large	Xslow 3	Strong	Walk	Grazer	400
Focaline Tree Rat	O	Triple	Typical	Crawl 2	Std (3)	Walk	Hunter	3.1
Groat	H	Many	Large	Xslow 3	Std (3)	Walk	Grazer	27
Kian	H	Many	Vlarge	Vslow 4	Strong	Walk	Grazer	790
Kudebeck's Gazelle	H	Several	Large	Slow 5	Std (3)	Walk	Grazer	72
Snowcat	C	Lone	Large	Xslow 3	Std (3)	Walk	Pouncer	98
Tree Kraken	C	Lone	Typical	Xslow 3	Std (2)	Walk	Pouncer	11
Dumb Puller	H	Several	Large	Slow 5	Strong	Walk	Grazer	5,000

Speed is the attacking/fleeing speed of the animal (Speed2) and is described in terms consistent with those on the Vehicle Speed Table at page 295. Thus, an Anola is indeed "XSlow" (1 band per turn) relative to an automobile. For ease, the referee may use the alternate terms (e.g. XSlow is also a Human "Sprint") and include the speed in bands per turn after the word. Pouncers should be marked with an asterisk as a reminder that its Pounce may occur at SpeedB



Anola

### Anola

Length: 0.75m. Volume: 2.9L. Burden: 1 kg. End: 6.

An arboreal omnivore native to Pysadi Spin 3008 C5766D8-5, occurring nowhere else in the wild or in captivity. Anolas are revered as holy by the Mother Church of Pysadi. Their export, capture, or study by any but those high in the religious hierarchy is banned. They are kept in special, heavily-guarded garden preserves and are cared for by specially appointed keepers. Killing one of these animals is a capital offense. Although anolas are occasionally encountered in the wild on Pysadi, those close to civilized areas have been taken into the preserves.

Anolas mass an average of 3 kilograms, and are usually between 50 and 75 centimeters in length, including their two prehensile tails. Since anolas were known only from poorly preserved pelts smuggled off-planet, for many years there were thought to be three species, but as more complete specimens became available, it was determined that the three different types were only different sexual phases of one species. Respiration is accomplished by paired lungs in the upper chest cavity. The circulatory system is closed, with

a pair of two chambered hearts moving the blood. Gas exchange is typical, making use of an iron-based hemoglobin. Details of the neuro-muscular system and the digestive system are not presently available. Anolas are now known to be hermaphroditic, and the three phases are stages in sexual development. Upon reaching maturity, an anola's male system becomes active, the female system remaining dormant. Under certain conditions, the male system degenerates, glands for the nourishment of the young develop, and the male becomes a neuter, or parental. Under specific alternate conditions, the female system of a parental will activate, and the individual becomes a female. Little is known for certain about the details of the reproductive cycle, but the following is currently the accepted sequence of events.

Anolas live in small groups. Five adults is the average size, one male, three parentals of varying ages and one female. Females mate soon after assuming the female phase, and soon bear a litter of three cubs. The birth process is hard, and she is quite weakened from the ordeal for about three months afterward. With each successive litter, the females become weaker, and few survive their third.

When the female dies, she no longer exudes a specific pheromone, prompting the oldest (or healthiest, or dominant) neuter to transform into a female over the course of several weeks. The change in proportion of the parental pheromones causes the male to become a parental. The group then seeks out a new male as rapidly as possible.

Each phase (male, female, and neuter) has its own distinct pattern of fur coloration, density, and length, caused by hormone changes associated with the shift in sex.

Several universities, zoos, and xenobiological institutes have offered substantial rewards for live anolas. Wealthy animal collectors are reported to offer as much as MCr7 (for a breeding group (five adults, as outlined above).

Anola vision (evolved under Pysadi's F9V sun) is in the INA (infrared) wavelengths; they have excellent night vision.

**Source:** The Traveller Adventure.

### **Beaked Monkey (Psittarhynchus fructophagii)**

Length: 0.75m. Volume: 2.9L. Burden: 0.9 kg. Endurance: 6.

Beakers (as they are often called) are common on many worlds, both in the wild and in captivity. In addition, they are found on many starships as pets. Their planet of origin is not known, but the animals can be documented as far back as far as 300 years pre-Imperial, with a range almost as widespread as at the present.

Beaked monkeys typically weigh from 2 to 3 kilograms, and measure 60 to 75 cm in length, half of which is generally tail (tails are sometimes bobbed on animals kept aboard spacecraft). Beakers are covered by a short fur, most commonly brown or gray. Black is rare, and white extremely so. The skeleton and musculature follow typical Terran vertebrate norms. Respiration is accomplished by the usual paired lung arrangement, the circulatory system is closed and the heart four-chambered, making the animal physically very similar to the Terran squirrel monkey.

The animal's most notable feature, the beak, is formed of two bony projections from the palate and mandible, covered



Beaker

by a horny substance resembling keratin. The lower third of the esophagus is extremely heavily muscled and lined with a number of toothlike grinding structures, which break swallowed food into fragments small enough to be digested readily. In the wild, the beaker is arboreal, and originally subsisted on a diet of hard-shelled nuts and seeds; specimens also eat insects and other small animals. In captivity, beakers thrive on almost any available type of human food.

The animals are quite popular as pets on starships because of their gregarious affection to almost all humans, their intelligence and their scrupulous cleanliness. Some individuals are rumored to act as a booster for certain psionic activities, but this last ability has not been proven to the satisfaction of most authorities.

**Source:** JTAS 3.

### **Bush Runner (Suffitifer andrewsii, et al)**

Length: 1.8m. Volume: 58L. Burden: 19 kg. End: 9.

Bush runners weigh approximately 50 kg and are between 1.4 and 1.5 meters in length. They physically resemble a cross between the Terran kangaroo and the Etan fruit lizard (Fructoraptor).

The skeleton is calciferous, internal, and differs from the typical Terran vertebrate only in minor details. Bush runners are bipedal, using a muscular pair of hind legs for locomotion, and a smaller pair of forearms for food acquisition and a long tail as a balancing organ during running, as a third leg when assuming an upright posture, and as a weapon when threatened.



Bush Runner

The head is a typical arrangement of brain surrounded by a bony cranium upon which are laterally paired sensory organs (eyes, nose and ears), as well as a ventrally located mouth. The teeth are arranged in common fashion for omnivores (dental formula 2-1-2-2) and are faced on their grinding surfaces with a silicate material rather than the calcium enamel of Terran vertebrates.

Respiration is the common O<sub>2</sub>/CO<sub>2</sub> exchange accomplished by paired lungs located in the upper body cavity. The circulatory system is closed, the heart is four-chambered and the blood gases are transported by a copper based hemoglobin, which make the blood blue in color.

Bush runners are omnivorous, eating fruit, nuts, grubs, and such small animals as they can catch. They inhabit the edges of forests, semi-forested savannahs, and areas such as bogs where fruit-bearing plants grow in profusion.

Bush runners congregate in family groups of two parents and from 7 to 12 juveniles in various stages of development. There are two genders, which pair for life, producing 2 to 3 young per season. Depending on the local year, bush runners will have from 1 to 3 litters per mating season.

Bush runners do not breed well in captivity. Their meat is quite succulent and a deep blue in color. Large quantities in a short period of time are poisonous, however, so the meat is usually used as a colorful garnish for certain gourmet dishes.

Adult bush runners produce a musk from certain glands located in the tail during mating season; this musk contains a compound called suffitoleum, used in the manufacture of expensive perfumes. The compound has resisted all attempts to synthesize it, and the musk of animals raised in captivity does not contain it. Therefore, on most planets which have bush runners, the animals are allowed to range free and are hunted (under strict licensing arrangements) for the 2 to 5 grams of suffitoleum that can be recovered from each adult.

**Source:** JTAS 1.

### Cave Trapper

Length: 2m. Volume: 98L. Burden: 33 kg. Endurance: 8.

The cave trapper is found on many worlds on the Spinward Main: a warm-blooded eight-legged vertebrate analogue of a spider, similar to most mammals of similar size and weight. It attacks when its nest or young are threatened, fighting fiercely until killed; if rendered unconscious, it will regain consciousness within five minutes and continue to fight until killed.

**Source:** Twilight's Peak.



Cave Trapper

---



Chamax Hunter

---

### Chamax Hunter

Length: 1.5m. Volume: 52L. Burden: 16 kg. End: 4.

A chamax hunter resembles a ten-legged tarantula about the size of a great dane ( 50kg). It will attack like a berserker, showing no fear and disregarding any danger to itself, and devour any non-chamax life-form it encounters. It will grab potential prey with its mandibles, bite, and then spit its highly corrosive digestive acid until the prey is dead or the hunter is pulled away. After devouring the prey, it returns to the chamax maternal.

**Source:** The Chamax Plague.

### Crested Trapper

Length: 2m. Volume: 220L. Burden: 74 kg. End: 7.

The crested trapper is a 200-kilogram carnivore which breeds exclusively in the Valley of Memories on 567-908 Spin 1031 E532000-0. Shaped somewhat like a spider with wings, the trapper arrays its multi-hued crests (which are wing-shaped) to both sides and waits. Sunlight filtering through the translucent panels of the crests attracts small animals which are caught when they move too close to the trapper's eight legs. Stingers on the forward leg pair kill the prey, and it is eaten at the trapper's leisure.

The crested trapper is approximately two meters in length and a half meter wide. Crestspread on a typical specimen is two to three meters.

**Source:** Safari Ship.

### Daghadasi

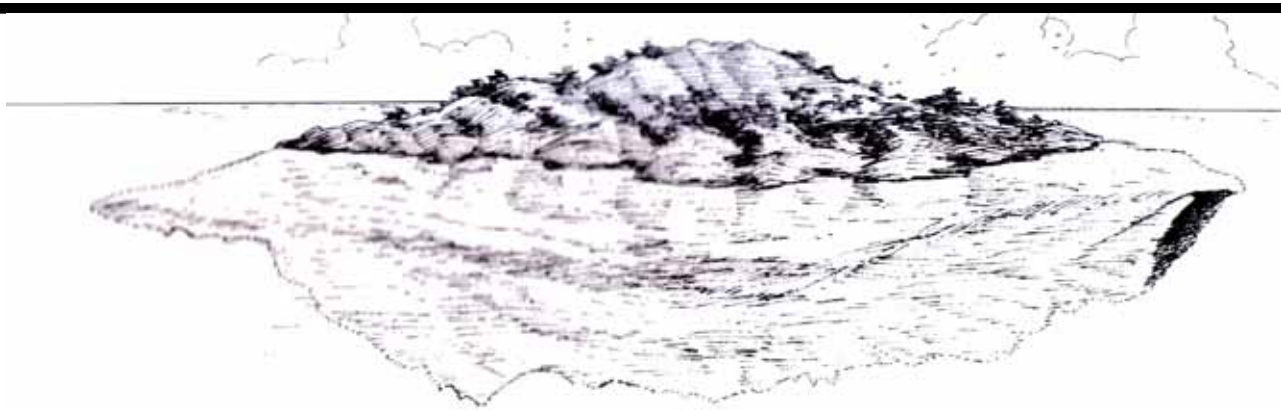
Length: 7500m.

A colossal leviathan inhabiting the seas of Bellerophon Solo 1519 A88A986-E ( Nouve 0-Ess [ M1 V ] ). The name, derived from a dialect of Solomani Turkish, means "mountain-island", and describes a gigantic beast that really does resemble a free-floating island, complete with its own local flora and fauna. The largest specimens, the so-called Great Daghadasi or daghadadedes, frequently exceed 2 km in length; unverified sightings claim lengths exceeding 10 km. Most are members of loosely-knit herds composed of at least one daghadadede and several dozen young.

The **Daghadasi** is a Sea Surface Swimmer. It inhabits Sea Surface terrain on Bellerophon.

It is a Vcolossal, Xslow, Strong, Filter.

The **Daghadasi** is a Bilateral No-ped (classified HBS-T-NF-FF-N). Its body structure consists of a head with brain and senses and a torso with three limbgroups. The body has



Daghadasi

three limbgroups. Limbgroup two has flippers with tentacles. Limbgroup three has flippers. Limbgroup four has flippers.

The body is characterized by Bony Interior covered by Skin; Interior body fluids are Gore.

Based on its Profile-Flat and Vcolossal Size, the **Daghadasi** is about 7500 m long, 2.4 billion cubic meters, and about and 2,300 megatons mass.

**Source:** Nomads of the World Ocean.

### Elyosa

Length: 7.5m. Volume: 400 L. Burden: 400 kg. Endurance: 10.

A herd animal originating on Helene Dark 1005 C665866-7 and exported to many worlds of the Aslan Hierate and rimward Imperium, Elyosa are warm-blooded, thickly furred hexapods. They can reach 400 kg (and more) at maturity, at least 60% of which will be lean meat. If allowed to run wild, they are self-sufficient and able to fight off most predators with ease. Within the Hierate, Aslan prefer to raise them as free-ranging herds and enjoy the thrill of the hunt when harvesting them. Outside the Hierate, Elyosa are pasture-raised; their branching horns and leg spurs removed to make fights between the males less damaging. While elyosa do feed their young with milk, they are rarely milked. The strong flavored cheese made from their milk is definitely an acquired taste. Elyosa fur can be woven into sturdy textiles.

Transporting Elyosa is a chore. They take up entire cargo holds (converted into a barn-like holding pen; each

requires ten times the life-support of humans).

Elyosa are valued (Cr3,400 average price) for their multiple uses. Their flesh is tasty and nutritious, and tinged with a mild alkaloid that encourages continued consumption by humans and aslan (240 kg typical yield per animal at Cr10 per kg = Cr 2,400). Elyosafur (leather pelts with the fur) has a luxurious feel, is available in a wide range of colors (all tinged with black), and with substantial water repellant qualities (2 square meters typical yield per animal at Cr500 per square meter = Cr1,000).

**Sources:** Knightfall (adapted).

### Focaline Tree Rat (Abdor var.)

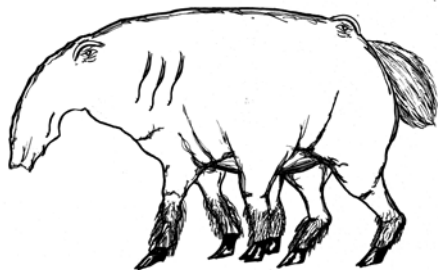
Length: 0.75m. Volume: 3.5 L. Burden: 1 kg. End: 3.

The Focaline Tree Rat is a small rodent-like creature native to Focaline Spin 2607 EA88544-7. It weighs 3-4 kilograms and measures 70-80 centimeters in length. Two-thirds of its length is tail.

Tree rats have a red-brown fur covering the entire body except for the soles of their paws. They adapt very quickly to temperature changes, and exposure to cold weather for more than one week grows a thicker and rougher coat. Compared to Terran rodents, tree rats have longer legs, feet adapted to grasping, and prehensile tail; all help them move about their arboreal habitats. The tail allows them to easily pick up small objects, and hang from tree limbs using their tail alone (most tree rats sleep suspended from their tails). In the wild, tree rats use their tails to carry food to treetop nests, to retrieve food dropped into areas that cannot otherwise be reached by paws, and in combat, either to free their other limbs for the fight or to grab a small opponent and dislodge it from its perch on a limb. They are omnivores; their very sharp teeth pierce thick fruit skins (or unwary fingers!). They are quite intelligent (about the same level as most small Terran monkeys) and have an elaborate social structure in natural environments.

People on Focaline view them with a mixture of dislike and appreciation. Their raiding of fruit trees is tolerated because they also prey on pests that do far more damage.

Focaline tree rats have an extremely well-developed olfactory system; much of their intra-species communication senses smells related to emotional states. When exposed to



Elyosa



human company for longer than a year, tree rats can sense emotions such as fear or anger in humans by smell. Some planetary police units track fugitives with tree rats because they can literally smell fear or anger.

Tree rats are popular working pets (they fill the feline pest-hunter niche more effectively than cats) especially on starships, which in turn has carried them to many of the worlds of the spinward Imperium. Their mammal-like physiology allows them to eat most human foods. They shed little, except when getting rid of a cold-weather coat, and are naturally clean, easily housebroken, animals. Tree rats have an average lifespan of 15 years, mate for life, and bear young once a year after age three, in litters of about four "ratlings".

Their major drawback as pets is their insatiable curiosity, which has led to their accidentally being locked in airlocks or food bins. They also like to collect bits of shiny or brightly colored material (like coins, keys, and credit cards), depositing them in a nest in their owner's cabin, a trait which has earned them the nickname "cinnamon thief". This can develop into a game the tree rat initiates by picking up a valuable item in its tail and then racing around the ship pursued with the item's owner in hot pursuit.

**Source:** JTAS 10.

### Groat

Length: 1.3m. Volume: 27 L. Burden: 9 kg. End: 6.

Grazer native to Fulacin Spin 2613 A674210-D and live mostly in large herds on upper mountain fields. Relatively innocuous as individuals, a goat herd is a dangerous encounter; goats find strength in numbers, attacking almost any perceived danger. They are capable fighters, using teeth and hooves. Their three-toed feet give them splendid footing in the mountains (although slowing them in the desert).

Goats have a secret weapon; a small gland under the tail can expel a noxious fluid to a distance of nearly 3m. Like pepper or tear gas, it makes a victim concentrate on flight rather than attack. Strangely, this fluid is ineffective against their most common predator: the leaping snowcat.

At irregular times, goats migrate from the mountain meadows to desert oases for mating and for the old ones to die. The males fight for control of the herd, after which the herd returns home.

Cloth made from the hair of goats is called groatle. At first, the shaggy goat hair seems ordinary, but if cleaned



Groat

and groomed has a softness and silkiness which rivals the finest synthetic. Groat hair has a high concentration of heavy metals in each strand (Fulacin's atmosphere is tainted with heavy metal dust) which provides two benefits. First, it is proof against most insects and mildew; fibers are poisonous to most off-world pests. Second, a simple chemical treatment can bring out an iridescent shimmering quality which is quite attractive. This cloth (and the raw material for such cloth) is in great demand in the Imperial Core.

**Source:** Twilight's Peak.

### Kian (*Pseudostruthio gigas*)

Length: 4m. Volume: 790 L. Burden: 263 kg. End: 5.

Large herbivorous grazers native to Prilissa Spin 3035 B985588-6. The kian (singular and plural) are large bipedal animals with long necks, short tails, and no other limbs. Their legs are powerfully muscled for fast movement over long distances. Hearing and eyesight are extremely good, reflecting their original predator-laden environment. Kian are thickly furred, their coats showing distinctive color patterns of brown, gold, lemon-yellow, and black.

A closed circulatory system and a high metabolic rate requires that kian eat 30-50 kilograms of vegetable matter daily. The digestive system consists of two stomachs, which allow the animal to break down the toughest plant life into digestible matter. A thick layer of fat insulates in cooler climates, and protects from venomous bites or stings of some small animals.

Kian are plains dwellers, travelling in herds of 10 to 60. When attacked or frightened, kian usually flee. If cornered, they can deliver deadly kicks with either hooved foot. The large claws projecting from the backs of the feet are present only in the male, and seem to be used solely for ritual com-



Kian

bat between males before mating.

Due to their hardy nature, kian were exported as beasts of burden, and are common in the coreward Imperium, both domesticated and in the wild. The sturdiness of their overall frames has made them a frequent choice for use as mounts and pack animals. Kian can carry up to 250kg comfortably, although they will refuse to move if overloaded. They cannot tolerate thin atmospheres, and require a special filter/muzzle (Cr50) for tainted atmospheres.

**Source:** JTAS 9.

#### **Kudebeck's Gazelle (*Rasura weberii*, *R. kudebeckii*)**

Length: 1.8m Volume: 72 L Burden: 32 kg Endurance: 7

Kudebeck's Gazelle (also called the kudie) is not native to Victoria Spin 1817 D6D7772-2, but is found only there and in certain Imperial zoos; its planet of origin is not known. Although externally mammalian, the kudie has an avian digestive system: a toothless mouth with two pairs of laterally opposed shearing structures and a long, prehensile tongue. The grasses and soft shrubs upon which the kudie feeds are cropped off and swallowed whole, as in Terran ruminants, but instead of being regurgitated and chewed at a later time, the food passes through a series of gizzards, where it is ground up by stones swallowed for the purpose.

The skeleton is a white ivory which (in both sexes) protrudes from the skin of the skull as paired horns. There are three pairs of legs, attached to a dorsal spinal column. Respiratory and circulatory systems follow Terran norms.

Adult kudies mass between 60 and 80 kilograms, depending upon exact species. Kudies congregate in herds of 7 or more individuals, including one top male-female pair, (usually the parents of the rest of the adult members of the herd) and several family groups of 2-5 individuals each. When threatened, kudies either flee, or when cornered, form a circle, young inside, and fight to the death.

There are two genders, male and female, which pair for a season or more and raise from 1-3 young per year. The young are born early in the year, capable of standing within a few minutes, and can run at full speed in an hour or two.

Kudies are hunted extensively by the inhabitants of Victoria, and their meat is a major source of protein and fat in the local's diet. The hides provide fur which is spun and woven into cloth, the hides are tanned and converted to leather. The "ivory" of the bones is prized over all other parts of the animal by the locals. It is light, strong, and can be readily carved to many shapes. On the mineral poor planet of Victoria, the bones of Kudebeck's gazelle are the only viable metal substitute. Without the kudies, complex mechanical devices such as the native dirigibles upon which planetary commerce depends, could not be constructed.

Kudies inhabit the upland valleys of Victoria, where the sufficient vegetation supports them; rough ground provides cover from predators. The six limbs give a slight advantage on rough slopes as they are able to use four legs for footing, and two for defense. The illustration is of a female in a typical fighting posture. Kudies are usually a dark grey color on the back and sides, fading to a lighter shade on the underside.

**Source:** JTAS 2.



Ivory Gazelle

#### **Snowcat**

Length: 2m Volume: 98 L. Burden: 33 kg. Endurance: 7.

The name snowcat is common throughout human space; it seems that any vaguely feline pouncer which shows any affinity to snow and cold is called a snowcat, much as arctic hunters are called polar bears.

Averaging 100 kilograms each, snowcats congregate in prides of three (rarely more) and hunt together for their food. Typical pouncers, they lie in ambush and attack with bursts of speed; striking from concealment, and waiting until at close or medium range, the strongest of the group pounces first, the others strike at about one minute intervals.

The snowcat is well-camouflaged; its dark coat with vertical light stripes serves to conceal it in tall grass, rocky outcroppings, and even in shadows on snowfields (allows DM+2 on surprise rolls).

Snowcats are most commonly found in the mountain and ice cap regions of Fulacin Spin 2613 A674210-D, where they make their lairs and hunt the shaggy goats of the hills. Less frequently, they are also found in other regions, especially the plains and deserts where they are in pursuit of migrating goat herds.

**Source:** Twilight's Peak.



Snowcat

### Tree Kraken (*Hexapoda strenii*, *H. silvans*)

Length: 0.9m. Volume: 11 L. Burden: 4 kg. End: 5.

Also known as the land squid, the tree kraken is a 6 kg pouncer native to Forboldn Spin 1808 D893614-5, but for various reasons has become distributed to many small, low gravity worlds in the Regina and neighboring subsectors of the Spinward Marches.

The adult tree kraken resembles in general body form the Terran octopus (q.v.), having a central body sensory cluster and six radiating tentacle-like arms. The internal skeleton is rudimentary, consisting of a cartilaginous stiffening of the body to permit the lung sacs to function, to serve as attachment points for the muscles, and to permit leverage for the three part mandible located at the base of the arms. This stiffening appears to be an adaption to a terrestrial lifestyle.

The arms of the kraken consist of a stiffened central support structure surrounded by a muscular sheath. The arms end in from 2 to 7 (depending on species) smaller appendages. The ventral surface of the arm, and the ends of these smaller appendages are equipped with a disk-shaped sucker-like organ covered with hundreds of small, razor-sharp tooth-like structures.

The eyes are paired, operate stereoscopically, and permit the kraken to detect the faintest movement at several hundred meters. Range judgment is extremely good.

Respiration is accomplished by 3 to 8 (varying with species) lung-sacs located in the body mass. Each sac has its own connection to the atmosphere. To function, the inner lining of each sac must be kept moist, requiring the kraken to remain in regions of high humidity, such as marshes, swamps, or jungles. Tree krakens have a closed circulatory system and are endothermic.

The kraken attacks its prey by leaping upon it from a height, usually a tree, but often a cliff and occasionally a roof. The arms wrap around the prey, immobilizing it and the disk-shaped structures abrade the skin and other tissue into small fragments which are then conveyed to the mouth.

After feeding, the tree kraken climbs to a high place for protection from other predators, and goes into a digestive torpor, from which it emerges several hours later.

Krakens are hermaphroditic, and reproduction is accomplished by budding. During the six week mating season, two krakens will meet, and exchange genetic material by means of two tube-like structures located above the eyes. After fertilization, these structures swell to several times their



Tree Kraken

normal size and grow arms, eventually (after eight to twelve weeks) becoming fully developed miniature krakens. When fully developed, the young detach themselves and go their own way. This is accomplished when the parent is in a state of torpor after feeding, otherwise the krakens would eat their own young.

Known tree kraken populations are at:

Menorb	Spin 1803	C652998-7
Kinorb	Spin 2202	A663659-8
Forboldn	Spin 1808	D893614-5
Jesedipere	Spin 3001	C775300-7
Aramanx	Spin 3005	B657974-7
Extolay	Spin 1711	B55589A-A
Dinomn	Spin 1912	B674632-9

It is rumored that the tree kraken's liver contains compounds useful in the manufacture of anagathics.

**Source:** The Kinunir.

### Tluugiir (*Aeromedusae Globosus Domesticus*)

Also known by a variety of colorful names - blimp, balloon-head, goodyear, drifter, floater, and gasbag --the Tluugiir is widespread in Charted Space. Domesticated by Vilani colonists in the early years of the First Imperium, the animal became a common and popular pet., It's original homeland is no longer known: probably a low-gravity, dense atmosphere world in Vland sector.

The Tluugiir is technically invertebrate, resembling the jellyfish, but its position on the evolutionary scale is much higher. The animal's home world may never have developed vertebrate structures.

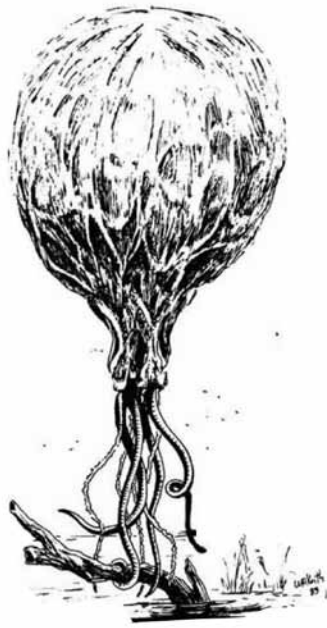
The Tluugiir nicknames reflect their nature: through a mechanism which continues to fascinate xenobiologists, these animals generate and store hydrogen gas in large bladders, turning themselves into organic balloons.

The Tluugiir spends a large portion of each day in or just above small bodies of water. Photosensitive dorsal surfaces use sunlight to drive an organic electrolysis which breaks water into hydrogen and oxygen. The hydrogen is stored in the creature's gasbag, giving it atmospheric buoyancy. The oxygen is similarly stored, and vented as necessary to provide lift, and when expelled under pressure gives it some control over its direction. For the most part, the floater just drifts with the wind. Four grasping tentacles "tether" the beast on convenient plants or rocks until it is ready to let go

Tluugiirs are filter-feeders: they harvest small flying creatures as they drift on the wind.

Tluugiirs have a natural defense against predators in the form of four specialized "stinger" tentacles. These inject a fast-acting poison which inhibits the involuntary muscle action of most animals. The poison causes respiratory failure, seizures, and death within 2-12 minutes for humans.

Pet Tluugiirs are collared and tethered to keep winds from blowing them away. They naturally catch and eat bothersome insects both indoors and outside. A popular Tluugiir chow consists of light, brightly colored confetti-flakes: a pinch thrown in the air prompts the Tluugiir to drift around the room filtering them from the air. Domesticated Tluugiirs usually have their poison sacs removed, in the same way as the scent sacs of a pet Terrestrial skunk are.



Floater

Tluugiirs can, with patience and caution, be trained to attack on command, and because they are attracted to motion, make excellent guard beasts for enclosed spaces.

Despite their Size (4 to 5) and Volume (Body Profile=1.4; Volume= 150 liters to 1200 liters), floaters are light (a kilogram or two) since most of their body is the gas bag. The body proper, with the vital organs, hangs below the gas bag where the eight tentacles come together.

Tluugiir are MF bisexual and oviparous. The mating flight of a pair of Tluugiirs is a spectacle of rare grace and beauty. They form a lasting pair-bond, hatching two young Tluugiirs each year.

Tluugiirs are about as intelligent as a housecat, and about as loyal as a dog. They are popular as pets; their excellent senses and characteristic moaning warning cry make them fine watchdogs.

Some Tluugiirs have returned to a wild state, and can be encountered on many worlds where the atmosphere is breathable and the competition from more efficient aerial forms is not severe. They are mildly dangerous, because of their stingers, but can be avoided by exercising a modicum of caution.

#### Remex Muta (Dumb Puller)

Length: 5m. Volume: 14 m3 (fat); 5 m3 (lean). Burden: 4500. Endurance: 6.

The early explorers of the Vilani Empire, despite their powerful interstellar drives, were handicapped with inefficient power supplies. Once they arrived at a planet, their vehicles were restricted by available fuel. Like so many frontiers before them, they turned to beasts of burden.

On Anzalits Vlan 2820 EA9A210-9 they found the near perfect beast of burden: remex muta, or the dumb puller.

The sixped amphibious remex was shaped by the un-

usual climate of Anzalits, where its seas shift in depth with the interactions of its twin moons: it is equally adapted to swimming in seas and slogging across vast tidal flats.

In addition to its strength, remex stores food reserves throughout its body and consumes them as required. In its fat stage, the beast is huge (and close to 15 cubic meters); after months of work without food or water, remex is reduced to skin and bones (and a third of its former volume and weight). The beast recharges itself on simple grasses and plants.

Finally, the remex homeworld has a violent storm season during which animals cannot feed; remex chooses to hibernate, its sleep being triggered by an increase in local pollen. Animal trainers administer the pollen before starship transport to keep remex quiet and manageable.

Remex is a Large Slow VStrong Intermittent.

Profile (fat)= 3. Size 5.6= 5 meters long. Average width and depth= 5/3= 1.66 meters. Density= Standard. Volume= 5 x 1.66 x 1.66 = 13.8 cubic meters = 13,800 liters = 13,800 kilograms.

Profile (thin)= 5. Size- 5.6 = 5 meters long. Average width and depth= 5/5= 1 meter. Density= Standard. Volume= 5x 1 x 1 = 5 cubic meters = 5,000 liters = 5,000 kilograms.

Remex is Slow: maximum speed= 10 kph.

Remex has Endurance (2D=) 12.

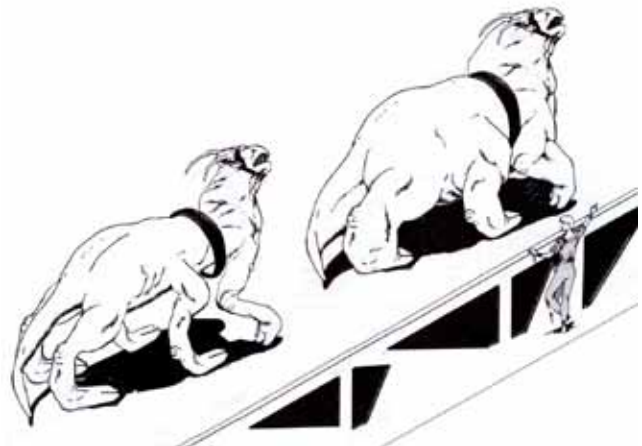
As a **pack animal**, remex can be loaded with (body weight / 3 =) 4,500 kilograms and can carry it ponderously at Speed=1 for 12 hours.

As a **wagon beast**, remex can pull a wagon filled with 13,000 kilograms over level terrain at Speed=1 for End= 12 hours. Two remex hitched together can pull a wagon loaded with 26,000 kilograms. A wagon-hitched remex is slow and incapable of bursts of speed.

As a **riding animal**, the remex can carry a rider (or several riders) at Speed= 1 for End= 12 hours. It cannot do bursts of speed.

**Average Daily Speeds.** Speeds and speed bursts are the basis for average daily speeds.

The remex can carry a rider at Speed=2 = 10 kph for 11 hours, Speed= 2.5 = 15 kph for 33 minutes per hour, and (for the rest of the hour) Speed= 1 = 5 kph for 16 minutes per hour. At that pace, it can travel 18.75 km per hour.



Dumb Puller



---

## **0 THINGMAKER CHECKLIST**

---

- 1 Function=
- 2 Base Tech Level=
- 3 Size=
- 4 Profile=
- 5 Density=
- 6 Construction=
- 7 Dimensions=
- 8 Volume=
- 9 Mass=
- 10 Protection=
- 11 Other User Defined
- 12 Cost=
- 13 Controls
- 14 Range Effects=
- 15 TL Stage Effects=
- 16 QREBS=
- 17 Power Supplies=
- 18 Signature=

---

Identify the object to be created in terms of its usefulness. Use the following Checklist to describe and define its details.

---

# ThingMaker

Whatever someone can imagine, someone else can build. ThingMaker is the creative tool used by players and referees to design and describe specific pieces of equipment: things.

A piece of equipment is a tool that enhances or enables actions by a character. Equipment enhances abilities, protects against the environment, enables or resolves tasks, and (sometimes) prevents or restricts tasks. Equipment includes objects that identify position in a culture or society, or represent (or simply are) value. Equipment often mimics or imitates a function or activity that already exists in nature. Often, activity is impossible without the proper equipment; sometimes, even the wrong equipment is better than no equipment at all.

**Terminology.** Equipment is the general term for anything a character can buy, make, find, or use to help in activities. A piece of equipment may be called an **object**, **device**, or **thing**, depending on the situation.

**ThingMaker.** Equipment can be described, designed, or created using the procedures of ThingMaker. A player or referee can select from the available options to describe existing things, or imagine and define new things.

**MOARN Make Only As Really Necessary.** There is no requirement that all possible items of equipment be available in a catalog, or a storefront, or a supply warehouse, or even on the local data network. Create individual items or select them from an available list and enhance them with features, and ultimately make one of them available to the characters.

## THE EQUIPMENT CONCEPT

Equipment includes the vast range of things that can help or support characters in their activities. However, specialized and regularly-used equipment (vehicles, weapons, starships) is more fully defined elsewhere.

**Equipment Lists** are a quick reference guide to commonly encountered things. An Equipment List is included in this chapter and is useful as a guide to describing and designing things.

## Generated Equipment

Thingmaker creates devices based on a specific function. The process produces reasonable and useful details about tech level, size, dimensions, and costs. The procedure provides consistent guidance about useful outcomes.

Thingmaker specifically outputs details for objects that players or referees imagine. A few simple steps create an object (a thing such as a smell sensor, a long range communicator, a protective suit for an Aslan, handcuffs, a portable shelter).

Moreover, two different designers can attempt to create the same object and different results reflect different approaches to the concept.

Functions	Basic Form	Added Detail
■ Enhancers	Base Tech Level	Cost
■ Protectors	Size	Controls
■ Enablers	Profile	Range Effects
■ Resolvers	Density	TL Stage Effects.
■ Entanglers	Construction	QREBS
■ Cultural Items	Dimensions	Power Supply
■ Value Items	Volume	Signature
■ Analogs	Mass (& Weight)	
	Protection	

## Variant Equipment

Thingmaker allows the creation of equipment variations (by range, tech level, power source, or construction). An existing item can be transformed by technology into more or less efficient or effective variants.

**GIGO.** The results of **ThingMaker** are dependent on the input and attention given by the player or referee. Because a totally comprehensive and detailed **ThingMaker** process would be unworkably complex, the essence of the procedure is reasonable inputs by the user.

## BASED ON FORM AND FUNCTION

Equipment is described by its function and its form. **Function** describes what the item does in both general and

### DESCRIBING A DEVICE

1 Function=	User Defined
2 Base Tech Level=	User Defined (TL Table)
3 Size=	User Defined (Size Table)
4 Profile=	User Defined
5 Density=	User Defined
6 Construction=	User Defined
7 Dimensions=	L= Size. W, H defined by Profile.
8 Volume=	L * W * H
9 Mass=	V * Density * Construction
10 Protection=	Density.
11 Other User Defined	As desired
12 Cost=	Base Value Table
13 Controls	User Defined
14 Range Effects=	As desired for variants
15 TL Stage Effects=	As desired for variants
16 QREBS=	As desired for variants
17 Power Supplies=	User Defined
18 Signature=	User Defined

specific terms. **Form** describes the appearance and physical details of the item: its size, performance, and constraints. Some descriptions detail the **function** of the equipment: they define the equipment's expected activity. Other descriptions detail the form of the equipment: they define the appearance and structure of the item. Describing both form and function helps players understand the equipment and how they can use it in their travels.

## CREATING EQUIPMENT

ThingMaker is a creative process intended to produce descriptions and details of objects based on real-world examples, and to produce variant objects based on technological level and other input.

### FUNCTION

Function is a simple statement of the expected benefit the object provides.

#### Defining The Benefit

The function of a piece of equipment is described by its expected benefit. Defining the benefit establishes the usefulness of the object within the framework of game rules.

For example, a cloth sack reduces Burden by half; a sniffer resolves Smell Sense actions; binox increases visible range for the Visible Sense action; cold weather clothing protects against Cold; a specialized computer resolves vehicle driving tasks.

Clearly stating the benefit gives the Thing a usefulness in game-terms.

#### Possible Benefits

Equipment provides a benefit by interacting with the user's abilities (characteristics, skills, knowledges, senses, attempts at tasks or actions, or his interactions with the environment or society). Benefit types include:

**Enhancers** increase or channel the use of characteristics, skills, or senses: a lever, a toolkit, a snooper sound sensor.

**Protectors** shield characteristics and senses from external forces: sanity drugs, anti-Flash goggles.

**Enablers** are key pieces of equipment which allow an activity to take place. An enabler makes possible an attempt to do something; the user is still required to make the attempt. For example, surgery tools allow an attempt at surgery; a violin enables a violinist.

**Resolvers** are sophisticated equipment which can independently complete tasks of actions independent of a user. A resolver operates independently and sometimes automatically to do something; the participation of a user is not required. For example, an automated sensor operates independently.

**Entanglers** inhibit, restrict, or prohibit an activity or an attempt (through negative Mods or DMs on the use of characteristics or skills). They may produce consequences (injuries, shocks, blockages) when they are encountered. For example, handcuffs, locks.

**Cultural** items are evidence or symbols of status within specific cultures and within society as a whole. A leather

jacket with insignia identifies a space fighter pilot; a distinctive sash is worn by a continental governor;

**Value Items** reflect intrinsic worth attributed to the wearer or user. A diamond necklace; a well-tailored suit; decorative engraving on a sidearm.

**Analogs** perform a same or similar function to some prototype or example. For example, a Sniffer is an odor detector, an analog of the nose; a microphone is a sound detector, an analog of the ear.

### FORM

Equipment can be described with details of its structure, performance, appearance, and manufacture.

#### Tech Level

The base Tech Level of an object is assigned based on the Technology charts and an evaluation by the creating player or referee. ThingMaker assumes a maximum TL=21; higher TLs are subject to different (and perhaps strange) constraints.

#### Size

Equipment is identified by Size. Size is a single digit from the Size Chart showing the object's largest dimension and is an approximate value.

**Decimal Size.** For greater detail, the designer may state Decimal Size, which is an exact value.

For example, a Size=3 object is approximately 20 cm in its greatest dimension (note the "approximately"). Exact size is shown as a decimal: Size=3.0 is very close to 20 cm in its greatest dimension. A Size=3.1 object is 25 cm in length.

**Interpolation.** Rarely, very specific values will be required for size. If absolutely required, a correspondence between Decimal Size and dimension can be interpolated.

#### Profile

Profile describes the object's shape and provides a general relationship between the dimensions LWH of the object. It is the basis for determining the approximate dimensions of the object.

Profile assumes Size= Length (the greatest dimension of the object) and provides the corresponding approximate (or average) Width and Height (or Thickness or Depth).

For example, Profile= Cube indicates Length = Width = Height.

For example, Profile= Sphere indicates average Width = Average Height = Length/ 1.4. Note that the dimensions are an average rather than the actual or exact.

For example, Profile= Cylinder indicates Width = Height = Length / 2. Cylinders can be longer or shorter.

For example, Profile= Typical approximates the average dimensions of a human or humanoid, although a person will be thicker or wider in some areas, and thinner or narrower in others; the end result, however, approximates the dimensions of a humanoid (Profile= Thin approximates an underweight Humanoid; Profile= Thick approximates an overweight Humanoid).

**Custom Profiles.** If the dimensions and volume for an object are known, a custom Profile can be created. Set

Width and Thickness to Volume divided by Length. The Profile Divisor equals Length divided by Width.

### Density

Density indicates the mass of an object by specifying its predominant materials. Density is based on water (Density =1.0). Objects with greater density sink in water; those with lower density float.

The Density table provides suggested descriptive terms for an object's predominant materials, including elemental components and Ar= Armor types.

A specific density does not require the use of a specific descriptive. That is, Density= 8.0 does not require that the object is constructed of Steel; Density= 19.3 does not require that the object is made of Gold (although it is constructed so something very dense).

**Armor.** If the density selected is identified as Armor, that assigned Ar= is used in Protection.

### Construction

Construction describes the interior structure of the object, taking into account its purpose and function.

For example, Size=4 Profile= Rod Density= Steel Construction= Hollow is a pipe. Size=4 Profile=Slab Density= Wood Construction= Container is a crate.

**Coatings.** In addition to specifying a value for Construction, the device may have one or more Coatings (total Coatings may not exceed Size), which add to the Construction value and provide specific additional Protections.

Coatings are not necessarily applied paint or sealant; they may be understood as improved materials, specialized construction, or carefully fitted parts.

### Dimensions

The Dimensions for an object are determined from its Shape and Size. Dimensions state the objects Length and average Height and Width (or Thickness or Depth).

Dimensions are approximate and average; they do not take into account protrusions and depressions, or variances overall.

**Profile.** If the object has a Profile, L W H can be calculated from Size.

For example, a Size=5 crate is a cube 1.5 meters on a side.

For example, a Size=4 Profile= Rod has a Length of approximately 75 cm. The Profile Chart indicates that Width is Length /14 (= 5 cm) and Height (Depth) is the same as Width (= 5 cm). A Rod is about 75 cm long and 5 cm thick (= 30 inches by 2 inches).

Dimensions can still be varied when a character or the referee sees a purpose. Rods and Cylinders can longer or shorter; the width or height or thickness of an object can be specified as needed.

**Known Dimensions.** If the Dimensions of an object are known, they are used.

### Volume

The Volume for an object is based on its Dimensions L W H. By consistent use of meters as units of measure, Vol-

ume can be determined in cubic meters m<sup>3</sup>. Multiply by 1000 for a result in Liters, which is a more useful unit of measure.

For example, a Size=5.3 Profile= Typical (a typical human) is L=1.8 meters. W= 0.2 meters. H= 0.2 meters.

$$1.8 * 0.2 * 0.2 = 0.072 \text{ cubic meters} = 72 \text{ liters.}$$

(the volume of a typical human is 72 liters).

For example, a Size=3.4 Profile= Thick Sheet Density= Standard (a Laptop Computer) is:

$$L= 40 \text{ cm. W}= 40 \text{ cm. H}= 2 \text{ cm.}$$

$$0.4 * 0.4 * 0.03 = 0.0032 \text{ cubic meters} = 3.2 \text{ liters.}$$

### Mass

The Mass of an object (Weight depends on local gravity) is based on known Volume, Density, and Construction.

Density compares Mass to an equal volume of water. Construction establishes the portion of the object which is solid and free of voids.

For example, a Size=3.2 Profile= Thick Sheet Density= Standard Construction= Internal Mechanism (a Laptop Computer) is:

$$V= 3.2 \text{ liters. D}= 1.0. C= 0.8.$$

$$3.2 * 1.0 * 0.8 = 2.56 \text{ kilograms} (= 5.6 \text{ pounds}).$$

For example, a Size= 2 Profile=Slab Density= Gold Construction= Solid (an ingot of Gold) is:

$$L= 7.5 \text{ cm. W}= 1.5 \text{ cm. H}= 1.5 \text{ cm. D}= 19.0. C= 1.0.$$

$$0.075 * 0.015 * 0.015 = 0.0001687 \text{ m}^3 = 0.017 \text{ liters.}$$

$$0.017 * 19.0 * 1.0 = 0.32 \text{ kg} = 320 \text{ grams.}$$

The traditional gold price of Cr1000 per Troy ounce [31 grams] = Cr32 per gram. The ingot has a value of about (32 \* 320 = ) Cr10,000.

### Protection

Protection improves the ability of the object to withstand environmental, accidental, or combat damage.

An object has a base Protection equal to its Density.

#### Protection Types

Ar= Ca= Fl= Ra= So= Ps= In= Se=

An object has a minimum base Protection = 1.

**Armor Affect By Construction.** If the Density of the Object is specified as Armor, then the Ar= value is multiplied by Construction.

For example, an object has Construction= Solid Density= 2.5 Ceramic Ar=6 has a base Ar= 2 (based on Density 2.5) and an additional Ar=6 based on Solid Construction. Total Ar= 8.

For example, an object has Construction= Lightened Density= 2.5 Ceramic Ar=6 has a base Ar= 2 (based on Density 2.5) and an additional Ar=4 (= 0.7 \* 6) based on Foamed Construction. Total Ar= 6.

**Construction Protection.** Protection is influenced by Construction, which may change available values. The Added Protection Table provides the applicable effects.

**Coatings.** Each Coating applied to an object provides specific Protection and adds to Construction.

For example, a Crate Size=4 Profile=Slab Density=

Wood 0.6 Construction= Container 0.2 =  
L= 0.75 W= 0.15 H=0.15  
 $0.75 * 0.15 * 0.15 = 0.015 = 0.0168 * 1000 = 17$  liters.  
(the crate is 17 liters in volume).  
 $17 * 0.6 * 0.2 = 2.04$  liters = 2.04 kilograms  
(an empty wooden box would be 2 kilograms).

Se= Sealed resists water and waterproofs.  
 $17 * 0.6 * (0.2+0.1) = 3.06$  liters = 3 kilograms  
(a waterproof wooden box would be 3 kilograms)  
The box has Se= 9 (= D=0.6 + Se= +6).

**Applying Damage.** When an object is subject to an attack, or an environmental mishap, Damage (generic Hits, or specific weapon or environmental effects) is applied to the object.

If the Damage is less than the appropriate Protection, there is no effect. If the Damage is greater than the Protection, the object receives damage (as controlled by Injury and Damage).

### Cost

The cost or price of the object is governed by the Base Value table. Base value may be later modified by TL Stage Effects, Range Effects, Value Enhancements, and Supply and Demand.

**TL Stage Effects.** The object may be varied by TL which will influence its cost.

**Range Effects.** The Range at which the object can operate may be changed with an influence on its cost (and volume).

**Value Enhancements.** The object may be enhanced with craftsmanship, ornamentation, premium materials, precise tolerances, quality control, or brand identity with a consequent increase in price. Conversely, the object may be cheaper by reason by the lack of attention to detail or other factors.

Value enhancements are specifically added to an object. Poor quality, workmanship, and performance are governed by QREBS.

**Supply and Demand.** After creation, the cost of an object may be influenced by local supply and demand.

### Range Effects

Some objects operate at a distance and their activity is influenced by Range. Range Effects allow creation of a variant object adapted to a different Range.

**Portable Objects.** A device created with maximum Short Range R=2 may be varied for greater or lesser ranges. Volume is a multiple of the Volume at R=2. Cost is also a multiple of Cost at R=2.

Portable devices are world surface instruments operating on LOS Line Of Sight and can be carried by a typical character.

**Transportable.** A device created with maximum Very Distant Range R=7 may be adapted to different ranges. Volume is a multiple of the Volume at R=7. Cost is also a multiple of Cost at R=7.

Transportable devices operate using LOS Line Of Sight

to Orbit or adjacent satellites. They are too large to be Portable, but may be Vehicle Mounted.

**Installed.** A device created with maximum Space Attack Range R= 12 may be adapted to different ranges. Volume is a multiple of the Volume at R=12. Cost is also a multiple of Cost at R=12.

Installed devices are permanently emplaced in a structure, ship, or small craft.

For example, a Portable Detector is Short Range R=2, Volume= 1 liter, Cost= Cr1,000. A Medium Range Detector is Volume= 2 liters, Cost= Cr2,000. A Distant Range Detector is Volume = 5 liters, Cost= Cr5,000.

The interaction of Portable-Transportable-Installed Range Effects implies

VDistant R=7 Detector, Volume= 10 liters, Cr10,000.

Geo R=10 Detector, Volume= 40 liters, Cr40,000.

Space Attack R= 12 Detector, Volume= 100 liters, Cr100,000.

### Controls

Some devices include rudimentary adjustments: simple knobs to tighten or loosen, simple cables attach, simple indicators providing feedback.

More complex devices require sophisticated controls.

Portable Devices include integral controls, including keyboards, adjusting knobs, feedback readouts, and information displays. They also include a Data Port to allow attachment to a separate Controller.

Transportable Devices include a Control Panel and a Data Port to allow attachment to a separate Controller.

Installed Devices include a Control Panel and a Data Port, but are operated from a Control Console.

### TL Stage Effects

Any object can be varied by TL Stage Effects.

### QREBS

Any object can be modified by QREBS.

### Power Supplies

If an object requires power, it can be supported by Power Cells, Ambient panels, Fuel Cells, a Generator, Fusion Plus, or Plug In to the power grid.

A **Power Cell** of Size minus 1 at TL 10 is assumed to provide power for approximately one day. Greater duration is possible higher Tech Levels (= TL/10). Lower duration occurs at lower Tech Levels (= TL/10).

An **Ambient Panel** provides power as long as ambient light is available.

**Fuel Cells** and **Generators** are independent of the objects they power.

**Fusion Plus** is independent of the objects it supports.

### Signatures

Objects which use power or move produce a signature in one or more emissions. Signature may be in any (including more than one) form detectable by the senses, or by sensors, or by both.

For example,  
Flashes Size-2 in RGB when activated.  
Glowes Size-3 in Mag when in use.  
Heat signature Hot-4 when in use; cools -1 per 10 minutes until Hot-0.

### SPECIAL SITUATIONS AND DESIGN CONSTRAINTS

The following special circumstances apply.

**Certified.** The item has been inspected and adjusted to meet a minimum standard of usability (QREBS= 50000).

Certified is a feature of Military and Government Procurement Policies: it imposes a standard on the manufacturer to assure a minimum level. The process eliminates most deficiencies, but at the cost of preclusion of upper range benefits as well.

Certified cannot be applied to TL Stage Early, Prototype, or Experimental.

**Battlefield Override (or Emergency Override).** The item is equipped with a switch or activator which will (usually) force it to operate in spite of any other failure. The override forces the mechanism to function even if the result is the destruction of the device.

In the event of failure, activation of the Emergency Override forces to device to operate if Damage Severity is less than Hopeless.

After one use, Damage Severity increases +2. If Severity is greater than 6, the item is destroyed and unusable.

### Protective Cases

Additional Protection(s) can be added to an object by a Protective Case.

A Protective Case is a container for an object. Use Size + 0.1 and an identical Profile; determine Dimensions and Volume. Apply any Protections and Coatings. Finally, subtract the Volume of the object being protected.

If the Protective Case envelopes a Human (or a Sophont) it becomes specialized clothing. A permanent Protective Case around a device can provide Armor, Waterproofing, or other protections.

For example, for a human Size=5.3 Profile= Typical, create Cold Weather Clothing Size=5.4 Profile= Typical Density= Standard Construction= Textile Coating= Insulated.

Human =  $1.8 * 0.2 * 0.2 = 0.072 \text{ m}^3 = 72 \text{ liters}$ .

Clothing=  $1.9 * 0.21 * 0.21 = 0.084 \text{ m}^3 = 84 \text{ liters}$ .

The Clothing minus the Human who is inside =  $84 - 72 = 12 \text{ liters}$ .

Applying Textile and Insulation:

$12 * 1.0 * (0.3 + 0.1) = 4.8 \text{ liters} = 4.8 \text{ kilograms}$ .

Cold Weather Clothing is about 10 pounds and provides In= 7 (Density + Coating).

Very Cold Weather Clothing (Double In= Coating)

$12 * 1.0 * (0.3 + 0.1 + 0.1) = 6 \text{ liters} = 6 \text{ kilograms}$ .

In= 13 (Density + Coating + Coating).

Substitute Construction= Foamed for Textile

$12 * 0.8 * (0.3 + 0.1 + 0.1) = 4.8 \text{ liters} = 4.8 \text{ kilograms}$ .

In= 15 (Density \* 3 + Coating + Coating).

### NAMING EQUIPMENT

Equipment should have a simple name and a longer complete name.

**The Simple Name.** Assign a simple noun or noun phrase to identify the item and its use. For some items, the name used is not necessarily the commonly accepted one.

Camera, imager, fotocam, viewer.

**The Complete Name.** Add to the simple name applicable details about its form, structure, and tech level.

Ruggedized LR Imager-11.

**Military Nomenclature.** Standard military (or naval, or government) identification systems list the simple name followed by a variety of attributes, and finally by a model number.

Imager, LR, Ruggedized, TL-11, Model 7A1.

**Brandname.** Commercially available items incorporate parts of the complete name in advertising fluff and fanciful identifiers.

The All New Foto-Naasirka A-11 with a tiger-striped ruggedized housing and LR Image Capture Module (not standard; extra cost). Brandname is a Value Enhancement.

### EQUIPMENT CATALOG ENTRY

Descriptive entries in equipment lists can be as short or as long as necessary to suitably detail the equipment.

**Binox-5.** Image magnifiers. Cr100.

**Binox-5.** Vision magnification instrument allowing the user to use both eyes to see distant objects. Increases Object Size +1 for vision tasks. Size= 2. Functions in CRGBP.

Variants: Increases Object Size +2. Alternate vision colors.

See also: Trinox. Fournox.

The user identifies an object by function, base tech level, and size, guided by real-world experience to discard unusual or unworkable values, and adds details from the sequence as necessary.

### POWER CELLS

A **PowerCell** provides the needed energy for operation of a device while allowing it to be portable.

PowerCells may be disposable (and thus removable and replaceable).

PowerCells may be rechargeable (by cord, cable, or broadcast power).

**Special Purpose PowerCells** provide greater than normal power (that is, they are smaller than ordinarily required) in connection with a disadvantage: time restrictions, or extreme heat generation, or greater duration in connection with a disadvantage: heat generation, radiation, greater weight.

**Alternate Power Cells** furnish power other than electric energy. A Fluidic Power Cell provides power for a fluidic device (compressed gas or liquid). A Mechanical Power Cell provides power for a mechanical device (spring driven clockwork). A Gravitic Power Cell provides gravitational energy for processing or implementation by gravitic devices. A Mag-

netic Power Cell provides magnetic energy for processing or implementation by magnetic devices.

### **Ambient Panels**

An **Ambient Panel** absorbs energy in the local environment and provides it to the supported device. Most make use of visible light through a photoelectric cell (an antiquated and less general name is Solar Cell). Variants may use local heat or IR, varying air pressure, wind pressure, or temperature gradients.

A **Generator** is a power source which uses fuel (complete, or combusting in atmosphere) to produce energy for a device. A Fission Generator uses radioactives to produce power; a Fusion Generator uses light elements to produce power; an AM Generator uses anti-matter. A Chemical Generator uses fuel and oxygen from atmosphere. A specialized Chemical Generator may use oxygen and combust in a hydrogen or methane atmosphere.

### **Connectors**

A **Cord** conducts power in less-than-lethal amounts. Bypassed safeguards (frayed insulation) allows exposure to power and produces Stun-1. A Cord restricts the portability of a device while decreasing its cost and complexity.

A **Cable** conducts power in potentially lethal amounts. Bypassing safeguards allows exposure to power and produces Stun-1D (Stun 1-2-3-4-5-6). A Cable restricts the portability of a device while decreasing its cost and complexity.

### **Broadcast Power**

Civilized areas are equipped with Broadcast Power systems. The equipment provides a device with operating power without requiring a connector to a device. The device is portable as long as it remains within the effective range of the broadcast power source.

**Effective Range.** Broadcast Power is provided by power transmitter with an effective range. Although broadcast power is inefficient, energy itself is relatively cheap, which makes BP practical.

### **Fuels**

Several fuels are available.

Hydrogen is a common fuel supporting Fusion Generators and many Chemical Generators.

Radioactives support Fission Generators.

Antimatter supports AM Generators.

Chemical (excluding Fossil Chemical) is a synthesized chemical fuel supporting Chemical Generators.

Fossil Chemical is a mined or extracted fuel supporting Chemical Generators.

### **Creators**

Ships which venture beyond the bounds of civilization carry creators to process locally obtained materials into appropriate power supplies.

An **Anti-Matter Creator** channels available energy from a Power Plant through a process which transforms samples of matter into anti-matter and encapsulates it into usable AM

Slugs. It is usually a capability of an Anti-Matter Power System.

A **Transmutor** channels available energy from a Power Plant to fuse heavy metals into radioactives which can be used in fission devices. A Transmutor can, with proper raw materials, also create a broad range of elements.

### **Power Supplies**

If an object requires power, it can be supported by Power Cells, Ambient Panels, Fuel Cells, a Generator, Fusion Plus, or Plug In to the power grid.

A **Power Cell** of Size minus 1 at TL 10 is assumed to provide power for approximately one day. Greater duration is possible higher Tech Levels (= TL/10). Lower duration occurs at lower Tech Levels (= TL/10).

An **Ambient Panel** provides power as long as ambient light is available.

**Fuel Cells** and **Generators** are independent of the objects they power.

**Fusion Plus** is independent of the objects it supports.

# Types of Equipment

0



Equipment can be described in terms of its specific function, or in terms of its effect on activities. The Equipment Classification Table identifies a broad array of equipment types descriptively and by their activity effects. For general identification purposes, an eHex digit is also assigned to the general category.

## EQUIPMENT CLASSIFICATION CODES

No. Code Description

0	0	
1	1	
2	2	
3	3	
4	4	
5	5	
6	6	
7	7	
8	8	
9	9	
10	A	Protections, Safety (Armor, Clothing, Insulation, etc), Augments.
11	B	Breathing Gases. Specialized Mixtures.
12	C	Cables and Surface Gear.
13	D	Detectors (Sensors, Sensory aids, Signal amplifiers, etc).
14	E	Emitters (of signals capable of being sensed).
15	F	Food. Nutrients.
16	G	Non-Breathing gases.
17	H	
	I	(not used)
18	J	
19	K	Containers, Carriers, Cases, Backpacks, Holsters.
20	L	Liquids. Liquid Manipulating Equipment. Pumps.
21	M	Construction Materials, Structural Items.
22	N	Information, Software, Data, Apps, Programming. Computers.
	O	(not used)
23	P	Power. Power Supplies. Power Cells. Energy Sources.
24	Q	Small Craft.
25	R	Drugs (Rx) and Medical.
26	S	Structures, Shelters,
27	T	Tools. Toolkits. Basic Machines.
28	U	Uniques
29	V	Vehicles.
30	W	Weapons.
31	X	Explosives. Exothermic Chemicals.
32	Y	Robots, Automatons, Strangeforms.
33	Z	





ThingMaker

# Fx Thing Creation Form Example

Tablet Computer

Manufacturer	
Surface or Orbital?	TL

THING										
Chart	Item	Description								
1	Function	Task Enabler	Tablet computer / personal computing device capable of basic activity. Functions as Hand Controller; enables various tasks.							
2	Base TL	TL= 9	A tablet computer can be produced at Mid-Tech (TL 7-8-9). The referee's real-world experience helps him choose TL-9.							
3	Size	Siz= 3	Approximately Size=3 (20 cm; 8 inches). Size=4 (75 cm; 3 feet) is far too large; Size=3 is about the dimensions of a book							
4	Profile	BFP= Thick Sheet	The tablet computer approximates a thin book and is approximately square. The referee selects Profile= Thick Sheet.							
5	Density	D= Std 1.0	The referee considers the final object and concludes that, while light in weight, it probably would not float. He selects Density= Standard.							
6	Construction	Internal Mechanism 0.8	Electronic device. Construction= 0.8 Internal Mechanism.							
7	Dimensions	0.2 x 0.2 x 0.013	A Thick Sheet with L= 20 cm is 20 cm wide and about 1.3 cm thick.							
	Volume	0.52 liters	Volume of 0.00052 cubic meters * 1000 = 0.52 liters.							
	Mass	0.42 kg	Volume 0.52 liters * Standard Density 1.0 * Construction 0.8 = 0.42 kg							
8	Protection	Density 1.0 produces base 1.0 in all eight Protections	Ar=	Ca=	Fl=	Ra=	So=	Ps=	In=	Se=
9	Damage		1	1	1	1	1	1	1	1
	Other									
	Controls	Complex digital controls.								
10	Range Effects		There are no Range Effects.							
TL	TL Stage Effects		There are no TL Stage Effects.							
Q	QREBS	Standard QREBS	Q	R	E	B	S			
11	Power Supply	Power Cell Size=2	This is a Portable object. It uses a Power Cell at Size minus 1= 2.0							
		Duration= 22 hrs.	Power Cell Duration = TL/10 = 0.9 days = 22 hours.							
	Signature	EM Radio.	Signature=Electromagnetic (Radio).							
	Sensor Strength	Perceived Size=4.	Strength = Power Supply Size + Flux = 4.							
12	Cost	Cr	1,000	A reasonable Benchmark Value = 3 = Cr1,000.						

**BUILDING THINGS**

This Fillform allows an interactive design process which ultimately produces a final thing design.

Tech Level. Tech Level for a thing is the minimum level required for manufacture.

<b>ThingMaker</b>
<b>Thing Creation Form</b>
<b>F</b>



Manufacturer	
Surface or Orbital?	TL

<b>THING</b>												
Chart	Item	Description										
1	Function	Task Enabler										
2	Base TL	TL=										
3	Size	Siz=										
4	Profile	BFP=										
5	Density	D=										
6	Construction											
7	Dimensions											
	Volume											
	Mass											
					Ar=	Ca=	Fl=	Ra=	So=	Ps=	In=	Se=
8	Protection				1	1	1	1	1	1	1	1
9	Damage											
	Other											
	Controls											
10	Range Effects											
TL	TL Stage Effects											
Q	QREBS				Q	R	E	B	S			
11	Power Supply											
	Duration											
	Signature											
	Sensor Strength											
12	Cost	Cr										



# ThingMaker

# 01 Checklist Functions Tech Levels

## 0 THINGMAKER CHECKLIST

- 1 Function=
- 2 Base Tech Level=
- 3 Size=
- 4 Profile=
- 5 Density=
- 6 Construction=
- 7 Dimensions=
- 8 Volume=
- 9 Mass=
- 10 Protection=
- 11 Other User Defined
- 12 Cost=
- 13 Controls
- 14 Range Effects=
- 15 TL Stage Effects=
- 16 QREBS=
- 17 Power Supplies=
- 18 Signature=

Identify the object to be created in terms of its usefulness. Use the following Checklist to describe and define its details.

## 1 FUNCTIONS

Things have functions in relation to the activities of characters, their characteristics, and abilities.

Typical general functions include:

**Enhancers** increase or channel the use of characteristics, skills, or senses.

**Protectors** shield characteristics and senses.

**Enablers** allow an activity to take place. They allow an attempt at an activity.

**Resolvers** complete tasks or actions independent of a user. No user participation is required.

**Entanglers** inhibit, restrict, or prohibit an activity or an attempt. They produce negative Mods or DMs for characteristics or skills, or for task resolution. They may produce consequences (injuries, blockages).

**Cultural** items are evidence or symbols of status within cultures and within society as a whole.

**Value Items** reflect intrinsic worth attributable to the wearer or user.

**Analogs** perform a same or similar function as some prototype or example.

### TECH LEVEL

The specific base tech level for an object may also be guided by the comprehensive TL tables in Technology.

## 2 TECH LEVELS

	Era	Comment
Vlow Tech	0	Stone Age
	1	Bronze Age
	1.6	Middle Ages
	2	Age Of Sail
	3	Industrial Revolution
	3.3	1800 AD
Low	3.6	1850 AD
	4	Mechanization
	5	1930 AD
Mid	6	Nuclear Age
	7	1975 AD
	8	2000 AD
High	9	2020 AD
	10	2100 AD
	11	Imperial Year 0
Vhigh	12	Imperial Year 300
	13	Imperial Year 550
	14	Imperial Year 850
Xhigh	15	Imperial Year 1107
	16	Darrian Maximum
	17	Circa 1902
Uhigh	18	
	19	The Far Far Future
	20	
	21	
	22+	Fantastic Technology

## 3a DECIMAL SIZE

			R	T	1	2	3	4	5	6	7
Length	Vary	--	1.0 mm	2.0 mm	7 mm	7.5 cm	20 cm	75 cm	1.5 m	7.5 m	75 m
1	+ 0.1	.1 mm	1.1 mm	2.5 mm	15 mm	9 cm	25 cm	80 cm	1.6 m	15 m	150 m
2	+ 0.2	.2 mm	1.2 mm	3.0 mm	20 mm	10 cm	30 cm	90 cm	1.7 m	20 m	200 m
3	+ 0.3	.3 mm	1.3 mm	3.5 mm	30 mm	11 cm	35 cm	100 cm	1.8 m	30 m	300 m
4	+ 0.4	.4 mm	1.4 mm	4.0 mm	35 mm	12 cm	40 cm	105 cm	1.9 m	35 m	350 m
5	+ 0.5	.5 mm	1.5 mm	4.5 mm	40 mm	14 cm	45 cm	110 cm	2.0 m	40 m	400 m
6	+ 0.6	.6 mm	1.6 mm	5.0 mm	50 mm	15 cm	50 cm	120 cm	5.0 m	50 m	500 m
7	+ 0.7	.7 mm	1.7 mm	5.5 mm	55 mm	16 cm	60 cm	130 cm	5.5 m	55 m	550 m
8	+ 0.8	.8 mm	1.8 mm	6.0 mm	60 mm	18 cm	65 cm	135 cm	6.0 m	60 m	600 m
9	+ 0.9	.9 mm	1.9 mm	6.5 mm	70 mm	19 cm	70 cm	140 cm	6.5 m	70 m	700 m

## 3b RANDOM SIZE VARIATION

Flux	Vary	0	R	T	1	2	3	4	5	6	7
-5	0.5	--	0.5 mm	1.5 mm	4.5 mm	40 mm	14 cm	45 cm	110 cm	2.0 m	40 m
-4	0.6	--	0.6 mm	1.6 mm	5.0 mm	50 mm	15 cm	50 cm	120 cm	5.0 m	50 m
-3	0.7	--	0.7 mm	1.7 mm	5.5 mm	55 mm	16 cm	60 cm	130 cm	5.5 m	55 m
-2	0.8	--	0.8 mm	1.8 mm	6.0 mm	60 mm	18 cm	65 cm	135 cm	6.0 m	60 m
-1	0.9	--	0.9 mm	1.9 mm	6.5 mm	70 mm	19 cm	70 cm	140 cm	6.5 m	70 m
0	1.0	--	1.0 mm	2.0 mm	7 mm	75 mm	20 cm	75 cm	1.5 m	7.5 m	75 m
+1	1.2	0.2 mm	1.2 mm	3.0 mm	20 mm	10 cm	30 cm	90 cm	1.7 m	20 m	200 m
+2	1.4	0.4 mm	1.4 mm	4.0 mm	35 mm	12 cm	40 cm	105 cm	1.9 m	35 m	350 m
+3	1.6	0.6 mm	1.6 mm	5.0 mm	50 mm	15 cm	50 cm	120 cm	5.0 m	50 m	500 m
+4	1.8	0.8 mm	1.8 mm	6.0 mm	60 mm	18 cm	65 cm	135 cm	6.0 m	60 m	600 m
+5	2.0	1.0 mm	2.0 mm	7.0 mm	75 mm	20 cm	75 cm	150 cm	7.5 m	75 m	750 m

Size reflects the greatest dimension of an object. Determine Size based on its presumed portability and usefulness..



**4 PROFILE (BODY FORM PROFILE)**

Descriptor	BFP	Length	Width	Depth
Cube	1	Size	L/1	L/1
Sphere	1.4	Size	L/1.4	L/1.4
Cylinder	2	Size	L / 2	L / 2
Disk	10	Size	L /10	L /10
Rod	14	Size	L /14	L /14
Thick Sheet	20	Size	L /20	L /20
Slab	5	Size	L / 5	L / 5
Pyramid	6	Size	L / 6	L / 6
Vthick	7	Size	L / 7	L / 7
Thick	8	Size	L / 8	L / 8
Typical	9	Size	L / 9	L / 9
Thin	10	Size	L /10	L /10
Vthin	11	Size	L /11	L /11
Flat	12	Size	L /12	L /12
Vflat	20	Size	L /20	L /20
Sheet	50	Size	L /50	L /50
Hvy Fabric	100	Size	L /100	L /100
Fabric	300	Size	L /300	L /300
Light Fabric	1000	Size	L /1000	L /1000

L= Length (= Size). W= Width.  
H= Height (or Depth or Thickness)

**5 DENSITY**

Density	Descriptor
0.3	Specials
0.6	Wood
0.7	Silanes
0.8	Hydrocarbons. Synthetics. = Plastic
0.9	Light = Floats
1.0	Standard = Water
1.1	Dense = Sinks
1.5	Vdense
1.7	Magnesium
2.0	Dir. Earth.
2.5	Brick. Ceramic Ar= 6
3.0	Aluminum Lite Metal Ar= 9
4.0	Titanium Metal Ar= 12
6.0	Lanthanum Composite Ar= 14
8.0	Steel Crystaliron Ar= 16
10.5	Silver Dense Ar= 20
11.0	Lead DensePlus Ar= 25
19.3	Gold SuperDense Ar= 40
22.5	Iridium
10^ 7	Starstuff
10^15	Neutronium

**6 CONSTRUCTION**

Value	Type
0.1	Filmsy
0.2	Container
0.3	Textile
0.4	Foamed
0.5	Hollow
0.6	
0.7	Lightened
0.8	Internal Mechanism
0.9	
1.0	Solid Material

**Coatings**

Value	Type	Protection
+0.2	Ar= Coating	+3
+0.1	Ca= Coating	+6
+0.1	Fl= Coating	+6
+0.2	Ra= Coating	+3
+0.1	So= Coating	+6
+0.1	Ps= Coating	+6
+0.1	In= Coating	+6
+0.1	Se= Coating	+6

**7 DIMENSIONS**

**VOLUME=**

**V2 = W \* L \* H**

V2= Volume (in cubic meters).  
W= Width. L= Length.  
H= Height (or Depth or Thickness)  
V2\*1000 = V3 Volume (in liters)

**MASS=**

**M = V3 \* D \* C**

M= Mass (kilograms).  
V3= Volume (in liters). D= Density.  
C= Construction.

**PROTECTION=**

**P = D + Mods**

P= Protection.  
D= Density

W \*L \*H in meters = V in m3.

V2\*1000 = V3 (in liters).

D, C are dimensionless.

V3 in liters gives M in kg (times Density).

**BASIC PROTECTION**

The basic or standard protection for any object equals its Density Modified by Construction. Minimum protection= 1.

Example Cubic Size-4.4 Standard-Density Solid Thing has Volume V2 1m x 1m x 1m= 1 m3 = 1000 liters and 1000 kg. Protection is 1,000 hits.

Example Cylinder Size-2 Hollow Wood Thing has total Volume 75mm x 37mm x 37mm = 0.10 m3 = 100 liters. Hollow Construction is 0.5 and reduces total volume to 50 liters; Wood Density is 0.6 and reduces mass to 30 kg. Protection equals density in kilograms and is 30 hits.

**ADDING PROTECTION**

An object can be **encased** in Armor.

Create a Container Size +0.1 and subtract the Volume of the Object. Assign a Density and Construction to the Container and determine its Mass. The container Protection is equal to its Density modified by Construction.

**8 CONSTRUCTION PROTECTION**

Armor	Armor	Standard	Solid	Foam	Hollow	Coating
Ar=	Armored	=D	x1	/3	/3	+3
Ca=	EM-proof	=D	x1	x1	x1	+6
Fl=	Flashproof	=D	x1	x1	x1	+6
Ra=	Radproof	=D	x1	/2	x4	+3
So=	Soundproof	=D	x1	x3	x2	+6
Ps=	Psiproof	=D	x1	/3	/5	+6
In=	Insulated	=D	x1	x3	x5	+6
Se=	Sealed	=D	x1	x2	x2	+6



# 03 Object Damage Damage Effects Range

## 9 OBJECT DAMAGE

Armor	Armor	Code	Damage	Base damage for each
Ar=	Armored	ABCDFKMPWXY	Hit Cut	form of protection is its
Ca=	EM-proof	E	Fry Stun	mass in kilograms times
Fl=	Flashproof	U	Blind	Protection Mods.
Ra=	Radproof	R	Hit	The object is rendered
So=	Soundproof	NS	Deaf	unable when all avail-
Ps=	Psiproof	J	Stun	able Protection of one
In=	Insulated	HQ	Heat Freeze	type is destroyed.
Se=	Sealed	GIOPTVZ	Suff Hit Stun	

**Kg \*  
Mods**

### S DAMAGE SEVERITY

- 1D Difficulty
- 1 Easy 1D
- 2 Average 2D
- 3 Difficult 3D
- 4 Formidable 4D
- 5 Staggering 5D
- 6 Hopeless 6D
- 7 Impossible 7D
- 8 Beyond 8 D
- 9 Destroyed

### D DIAGNOSIS SEVERITY

- 1D Difficulty
- 1 Easy 1D
- 2 Average 2D
- 3 Difficult 3D
- 4 Formidable 4D
- 5 Staggering 5D
- 6 Hopeless 6D
- 7 Impossible 7D
- 8 Beyond 8 D
- 9 Destroyed

## 10 RANGE

Create objects based on a standard Range=  
R=2 Short Range,  
R=7 Vdistant Range,  
S=7 Space Attack Range.  
Apply Mods for increased or decreased range to Cost C= and Volume V=.

#### PORTABLE RANGE EFFECTS

R=	C= V=
R	R Reading 0.5 m /3
T	T Talking 1.5 m /2
1	Vs Vshort 5 m /2
>2	S Short 50 m =1
3	M Medium 150 m x2
4	L Long 500 m x3
5	VI Very Long 1000 x4
6	D Distant 5 km x5

World Surface. Line-of-Sight.

**Portable.** Carryable.

#### TRANSPORTABLE RANGE EFFECTS

R=	C= V=
4	L Long 500 m /3.3
5	VI Very Long 1000 m /2.5
6	D Distant 5 km /2
>7	Vd Vdistant 50 km =10
8	Or Orbit 500 km X2
9	Fo Far Orbit 5000 km X3
10	G Geo 50,000 km X4
11	Sa Satellite 250,000 X5

To Orbit or Satellite.

**Transportable.** Vehicle mounted.

#### INSTALLED RANGE EFFECTS

R= S=	C= V=
9	Fo Far Orbit 5000 km /3.3
10	G Geo 50,000 km /2.5
11	Sa Satellite 250,000 /2
12	7 Space Attack =100
13	8 2.5 million km x2
14	9 5 million km x3
15	10 50 million km x4
16	11 150 million km. x5

Interplanetary. In System.

**Installed.** In a ship or structure.

#### DAMAGE EFFECTS

Type	Effect	Ar=	Ca=	Fl=	Ra=	So=	Ps=	In=	Se=	Type	Damage to Objects
	A Corrode	▲								Hit	=Severity= Total/2
KD	B Bullet ▷	▲								Hit	=Severity= Total/2
	C Slash	▲								Cut	=Severity= Total/3.
KD	D Blast/Blow	▲								Hit	=Severity= Total/2
area	E EMP		□							Fry	=Electronics. Inop for Rds = Fry.
KD	F Frag	▲								Hit	=Severity= Total/2
area	G Gas								□	Suff	Depends...
area	H Hot								□	Heat	=Inoperable for Rounds = Heat.
	I Infection								▲	Hit	Contaminates
area	J Psi						□			Stun	-Depends...
	K Burn	▲								Hit	=Severity= Total/2
	L Elec								▲	Hit	=Severity= Total/2
area	M Magnetic									Stun	=Magnetics. Inop for Rds = Stun.
senses	N Bang					△				Deaf	Depends...
senses	O Stench								△	Stun	---No Effect
	P Pain	△							△	Stun	Ignore
area	Q Cold								□	Freeze	=Inop for Rds = Cold.
area	R Rad				□					Hit	=Yes. Inop for Rds = Fry.
area	S Sound					□				Stun	Depends...
	T Poison								▲	Hit	Contaminates
senses	U Flash			△						Blind	Depends...
area	V Vacc								□	Suff	Depends...
	W Wound	▲								Hit	---No Effect
KD	X Pen ▷	▲								Hit	=Severity= Total/2
area	Y Grav									Hit	=Gravitics. Inop for Rds= Hits.
	Z Tranq	△							△	Stun	Ignore

▲△□ = Attack may be stopped by this Armor or Protection. Otherwise, ignored.  
▲ = Hit Effect. △ = Other than Hit Effect. □ = Area Effect. Rad= Area Effect inflicting Hits.  
▷ = Blast Hit Effect doubled versus Armor for KD (but not for Damage).  
▷ = Pen Hit Effect doubled versus Armor for Penetration (but not for Damage).



# 11 POWER SUPPLIES

Some items of equipment require power. Equipment is usually powered by an internal PowerCell supplemented by available connectors for an Ambient Cell and a power Cord or Cable.

**MOARN Make Only As Really Necessary.** Internal detail is not always required; create it only when the situation makes it necessary.

**Corded.** Objects can be connected (**Plug In**) to a regional, ship, or vehicle power grid.

**Independent.** Attached power supplies (**Fuel Cells, Generators, Fusion Plus**) allow an object to be placed or installed.

**Portable. Power Cells and Ambient Panels** make a small object portable.

## Power Cells

An energy storage battery.

**Power Cell Size.** Subject to Minimum Size= 1, a Power Cell for an object is Size minus 1. For example, the power cell for a Size=4 object is Size=3.

**Base Cost.** Cr100 per kilogram.

**Standard Output= 1** (tailored for the device).

**Standard Duration= 1** (= one day, tailored for the device) at TL 10. Other durations available at TL10 / 10.

**Standard Recharge= 1** (= half day; tailored for device)

## Ambient Panel

A solar panel, ambient light cell, or starlight panel.

**Ambient Panel Profile.** = Sheet or Thick Sheet. Ambient Cells depend on surface area to absorb energy.

**Ambient Panel Size.** Subject to Minimum Size= 1, an Ambient Panel for a Powered Object of a Size has Volume = Size minus 1 and Length= overall object Size.

**Useful Wavelengths:** Specify three adjacent wavelengths which provide the power (for example, RGB).

**Base Cost.** Cr200 per kilogram.

**Standard Output= 1** (tailored to the device).

**Standard Duration=** continuous assuming ambient light. Non-functional in darkness.

## Fuel Cells And Generators

Air-breathing power supplies capable of supplying Plug In support for powered objects.

**Size= 3** supports light use: one object.

**Size= 4** supports moderate use: 2-5 objects.

**Size= 5** supports heavy use: 6-12 objects..

**Fuel.** Operates on a variety of fuel including fossil fuels (oil), renewable fuels (alcohol), and hydrogen.

## Fusion Plus

Standardized cold-fusion module providing support for heavy energy use.

**Size= 3.5** supports heavy use: 6-24 objects.

**Fuel.** Operates on water (any hydrogen compound is adequate).

## Signature

An object may have a **signature**: an emission detectable by one or more sensors or personal senses.

Assign appropriate signatures for the device based on the technology it uses.

Electric. Gravitic. Magnetic. Electromagnetic (Radio).  
Light (specify wavelength). Sound (specify frequency).  
Smell. Touch (vibration). Awareness. Perception.

**Signature Strength=** Power Supply Size +Flux. Sensors view the object as Size= Strength.

# 12 BASE VALUE

Estimate the base value of the object in Credits. This value may be modified by TL Stage Effects and Range Modifications.

Additional cost modifications are possible under Supply and Demand.

# 11 POWER SUPPLIES

Type	Profile	Density	Construction	Duration	Fuel	Minimum	Comment
Power Cells	Slab	10.0	1.0 Solid	5		Size= 1	Recharge at Plug In
Ambient Panel	Sheet	1.0	1.0 Solid	2	Light	Size= 1	Specify Light Wavelength.
Fuel Cell	Half Slab	2.0	1.0 Solid	fuel	H2	Size= 3	Requires Atm 3-9
Fusion Plus	Cylinder	2.0	0.5 Mechanism	fuel	Water	Size= 3.5	Standard Size.
Generator	Half Slab	8.0	0.5 Mechanism	fuel	H2	Size= 4	Requires Atm 3-9
Plug In	(connects to local or ship power grid).						



	Tech	Era
Vlow Tech	<b>0</b>	Primitive Stone Age
	<b>1</b>	Bronze Age 3500 BC
	<b>2</b>	Age Of Sail 1500 AD
Low Tech	<b>3</b>	Industrial Revolution 1700 AD
	<b>4</b>	Mechanization 1900 AD
	<b>5</b>	1930 AD
Mid Tech	<b>6</b>	Nuclear Age 1950 AD
	<b>7</b>	1975 AD
	<b>8</b>	2000 AD
High Tech	<b>9</b>	2020 AD
	<b>10</b>	2100 AD
	<b>11</b>	Imperial Average Circa Year Zero
Vhigh Tech	<b>12</b>	
	<b>13</b>	Imperial Maximum Circa 550
	<b>14</b>	
Xhigh Tech	<b>15</b>	Imperial Maximum Circa 1107
	<b>16</b>	Darrian Maximum
	<b>17</b>	
Uhigh Tech	<b>18</b>	
	<b>19</b>	The Far Far Future
	<b>20</b>	
	<b>21</b>	
	<b>22+</b>	Fantastic Tech

#### EQUIPMENT CLASSIFICATION CODES

No.	Code	Description
10	A	Protections, Safety (Armor, Clothing, Insulation, etc), Augments.
11	B	Breathing Gases. Specialized Mixtures.
12	C	Cables and Surface Gear.
13	D	Detectors (Sensors, Sensory aids, Signal amplifiers, etc).
14	E	Emitters (of signals capable of being sensed).
15	F	Food. Nutrients.
16	G	Non-Breathing gases.
17	H	
	I	(not used)
18	J	
19	K	Containers, Carriers, Cases, Backpacks, Holsters.
20	L	Liquids. Liquid Manipulating Equipment. Pumps.
21	M	Construction Materials, Structural Items.
22	N	Information, Software, Data, Apps, Programming. Computers.
	O	(not used)
23	P	Power. Power Supplies. Power Cells. Energy Sources.
24	Q	Small Craft.
25	R	Drugs (Rx) and Medical.
26	S	Structures, Shelters,
27	T	Tools. Toolkits. Basic Machines.
28	U	Uniques
29	V	Vehicles.
30	W	Weapons.
31	X	Explosives. Exothermic Chemicals.
32	Y	Robots, Automatons, Strangeforms.
33	Z	

# Equipment

Equipment is the vast array of technological items that every traveller has (or wishes he had) available during his journeys.

Every piece of equipment is a tool that enhances or enables actions by a character. Equipment enhances abilities, protects against the environment, enables or resolves tasks, and (sometimes) prevents or restricts tasks. Equipment includes objects that identify position in a culture or society, or represent (or simply are) value. Equipment often mimics or imitates a function or activity that already exists in nature. Often, activity is impossible without the proper equipment; sometimes, even the wrong equipment is better than no equipment at all.

**Terminology.** Equipment is the general term for anything a character can buy, make, find, or use to help in activities. A piece of equipment may be called an object, device, or thing, depending on the situation.

**ThingMaker.** Equipment can be described, designed, or created using the procedures of ThingMaker. A player or referee can select from the available options to describe existing things, or imagine and define new things.

**Stage Effects.** Objects can be varied by Tech Level Stage Effects.

**QREBS.** Objects can be further defined using QREBS.

**MOARN Make Only As Really Necessary.** There is no requirement that all possible items of equipment be available in a catalog, or a storefront, or a supply warehouse, or even on the local data network. Create individual items or select them from an available list and enhance them with features, and ultimately make one of them available to the characters.

## READING CATALOG ENTRIES

A catalog entry is intended to convey enough information that a user can decide (or not) to acquire an object and to understand how to put it to use.

Entries in [brackets] are optional and some descriptions omit them.

Entries in the overview tables are not necessarily repeated in the text descriptions, if there is no additional information.

### Name [-TL]

TL0, Size S, 00 kg, Cr 100.

Descriptive information about the object and its use or operation. Rules specific information should be included as applicable; there is no need to maintain a fiction that this description is a real-world text.

Elaboration, commentary, or discussion may be included as needed.

**Battlefield Override.** The item is equipped with a switch or activator which will (usually) force it to operate in spite of **any other failure.**

**Certified.** The item has been inspected and adjusted to meet minimum standards of usability (QREBS= 50000).

**Power.** Unless otherwise specified, equipment runs on an internal PowerCell, has a battery life of about 24 hours continual operation, and has hookups for an Ambient Panel which could both power the device and charge its cell. Equipment can also be hooked up by adapter cables to a starship or groundside power source for unlimited use.

**Vehicle Installation.** Any pieces of equipment may also be installed in powered armor, vehicles or robots, subject to various rules constraints not discussed here.

**Variations.** Equipment can be found in many variations based (at a minimum) Tech level Stage Effects and QREBS.

**High Tech Levels.** Equipment at tech levels beyond the Imperial maximum are artifacts generally encountered only in the course of adventures (although perhaps in the back of a thrift ship unrecognized for that they are).



## CATALOG EXAMPLE: COMMUNICATORS

For example, communicators can be expected to have some of these features.

### Modes

Unless otherwise specified, a comm can operate:

**Broadcast**, where the signal is emitted in all direction;

**Beamcast**, where the signal is directed securely on a tight line-of-sight beam;

**Burst**, where the signal is emitted in packet data bursts.

### Relays

Comms can communicate with other comms of the same type. For example, Communicators can talk with other Communicators, but cannot talk with wirelessly networked computers, Communication ranges, whether video, voice, or data, are bounded by the device with the longest range: for example, a hand comm with a range of 100 meters can still communicate with a large comm array installed in geosynchronous orbit. Moreover, long-ranged communications devices can serve as relays between shorter-ranged devices.

### Comm

#### COMMS

Item	TL	Size	Kg	Cr
Comm	8	2	0.2	1,000
Comm, Modified	A	2	0.2	500
Comm, Advanced	F	2	0.2	500
Comm, Installation	8	6	n/a	M Cr 1.5
Comm, Long Range	D	2	0.2	5,000
Comm, Luxury	B	2	0.175	5,000
Comm, Ruggedized	A	2	0.24	1,750
Comm, Vehicle	8	5	50	50,000
Radio	7	2	1.5	100
Radio, Experimental	4	4	15	1,000

---

TL 8, Size 2, 200g, Cr 1,000.

The standard communicator is a 0.2L handheld device with a 1000 km range (R=8.3). There are a near-infinite number of variations on the design.

#### Comm, Modified

TL A, Size 2, 200g, Cr 500.

A higher-tech version of the standard comm. Has Quality +1, Ease of Use +1, and Reliability +1.

#### Comm, Advanced

TL F, Size 2, 200g, Cr 500.

The best-quality communicator fabricated in the Imperium. Engineered to the same basic requirements as the standard model, this version is built to see years of heavy and rough use. Its "unfailing"-grade electronics are nestled within an unparalleled ergonomic case that conforms to the owner's hand by way of a mutable smart-surface. The case is tamper-proof, and its PowerCell has emergency internal breakers which will prevent shorting out under any circumstance which would not also kill the bearer.

#### Comm, Installation

TL 8, Size 6, MCr 1.5.

Large communications array with an interplanetary range (R=14 / S=9, 5mkm).

#### Comm, Long Range

TL D, Size 2, 200g, Cr 5,000.

Q+1, R+3, E+3, B-3, S+3. Superior version of the portable comm. Reliably extends range to 8.3; Carries as if it were 170g. Target number=16.

#### Comm, Luxury

TL B, Size 2, 175g, Cr 5,000.

Q+6, R+2, E+5, B-3, S+2.

This Comm has exceptional quality. It uses premier Naasirka electronics and software allowing the user an unparalleled productivity. An example of such a luxury item is the Naasirka CX-5700. The CX-5700 is known for its reliable hardware and excellent safety features.

The luxury Comm is amazingly light, shaving just over 25 grams off the mass of the standard Comm, and it feels lighter by far. Comms of this level show extreme amounts of customization such as natural materials and personalized agent software. Also included are custom security features such as sophisticated anti-intrusion programs and satellite locator functions.

#### Comm, Ruggedized

TL A, Size 2, 240g, Cr 1750.

Q+4, R+5, E=0, B+1, S+5.

AV 5. Protections are: EMCage 10, FlashProof 1, Rad-Proof 5, SoundProof 3, PsiShield 0, Insulated 5, Sealed 5.

The typical Ruggedized Comm is designed with hazardous duty in mind. They can judicious amounts of punishment and are expected to take a 10 meter fall and still function. They usually have excellent ambient noise cancellation and glare reduction and other optic hardening for any built in video or still cameras installed. Comms such as the T-Del C10r are often rated for brief exposure to vacuum as well as corrosive and insidious atmospheres.

#### Comm, Vehicle

TL 8, Size 5, Cr 50,000.

Vehicle-installed with an orbital range (R=8, 500km).

#### Radio

TL 7, Size 2, 1.5kg, Cr 100.

1.5L walkie-talkie or cell-based broadcast communicator with a 5km range (R=6). Incapable of beamcast mode.

#### Radio, Experimental

TL 4, Size 4, 15kg, Cr 1,000.

SCR-300 experimental man-portable broadcast communicator (15L) with a 5km range (R=6). Incapable of beamcast mode.

---

## A PROTECTIONS

Type	TL	Size	Kg	Cr
Ablat	9	5	3	375
Assault Armor, Heavy*	G	5	46	240,000
Battledress	D	5	100	200,000
Battledress, Heavy	F	5	143	440,000
Boarding Armor	B	5	36	80,000
Coat	1	5	2	100
Coat, Heavy	2	5	3	200
Cloth Armor	8	5	1	250
Combat Armor	B	5	60	80,000
Desert Cloak	3	5	1	200
Hostile Environ Suit	6	5	12	8,000
Jack	1	5	1	50
Mail	4	5	2	400
Mesh	7	5	1	150
Plate	6	5	1	900
Quilted Armor	9	5	1	600
Reflec	A	-	-	10
Shield	2	5	3	100
Shield, Advanced	8	5	2	400
Vacc Suits	varies	5 varies	(see entry)	

\* Item is typically a non-working artifact.

Items which divert, deflect, absorb, or lessen the effects of threats. Basic Personal Armor, Shields, and Head Protections are also listed in the Armor chapter.

### Ablat

TL 9, Size 5, 3 kg, Cr 375.

Ablat is a material which ablates (vaporizes) when hit by laser fire. The vaporized material carries away the energy of the laser, protecting the user. Ablat has a basic protective value against attacks and is doubled against K (Burn) attacks. AV 12, Insulated 8. Burden=+3.

### Assault Armor, Heavy

TL 16, Size 5, 46 kg, KCr 240.

Darrian pre-Maghiz suit of combat armor. AV 32. Protections are: EM Cage 26, FlashProof 26, RadProof 26, SoundProof 26, PsiShield 5, Insulated 51, Sealed 26.

### Battledress

TL 13, Size 5, 100 kg, KCr 200.

AV 45. Protections are: EMCage 30, FlashProof 30, RadProof 30, SoundProof 30, PsiShield 5, Insulated 30, Sealed 30.

### Battledress, Heavy

TL 15, Size 5, 143 kg, KCr 440.

AV 58. Protections are: EMCage 45, FlashProof 45, RadProof 45, SoundProof 45, PsiShield 5, Insulated 60, Sealed 45.

### Boarding Armor

TL B, Size 5, 36 kg, KCr 80.

AV 28. Protections are: EMCage 3, FlashProof 12, RadProof 3, SoundProof 6, PsiShield 1, Insulated 3, Sealed 9.

### Coat

TL 1, Size 5, 2 kg, Cr 100.

A basic cold weather clothing unit.. Insulated 5.

### Coat, Heavy

TL 2, Size 5, 3 kg, Cr 200.

An effective cold weather clothing unit. Insulated 10.

### Cloth Armor

TL 8, Size 5, 1 kg, Cr 250.

A heavy duty body suit tailored from ballistic cloth. AV 14, Insulated 6.

### Combat Armor

TL B, Size 5, 60 kg, KCr 80.

AV 28. Protections are: EMCage 12, FlashProof 12, RadProof 12, SoundProof 12, PsiShield 4, Insulated 12, Sealed 12.

### Desert Cloak

TL 3, Size 5, 1 kg, Cr 200.

A basic fabric article of clothing which provides a degree of protection against the desert environment. AV 1, FlashProof 5, Insulated 5.

### Hostile Environment Suit

TL 6, Size 5, 12 kg, KCr 8.

AV 16. Protections are: EMCage 1, FlashProof 1, RadProof 8, SoundProof 1, PsiShield 1, Insulated 8, Sealed 12.

### Jack

TL 1, Size 5, 1 kg, Cr 50.

A natural or synthetic leather jacket or body suit covering the torso and upper arms and legs. Jack is somewhat better than ordinary clothing in providing basic protection. AV 5, Insulated 4.

### Mail

TL 4, Size 5, 2 kg, Cr 400.

A flexible metal shirt providing basic protection against most attacks. AV 6.

### Mesh

TL 7, Size 5, 1 kg, Cr 150.

A jacket or body suit made of natural or synthetic leather and reinforced with a lining of flexible metal mesh, similar to chain mail but lighter and stronger. AV 10, Insulated 2.

### Plate

TL 6, Size 5, 1 kg, Cr 900.

A protective unit of personal body armor constructed of ceramic or metal plates (often articulated to allow movement or flexibility). AV 22. Burden=+2.

### Quilted Armor

TL 9, Cr 10.

An improved version of Cloth. AV 16, Insulated 9.

## Reflec

TL A, Size 5, 1 kg, Cr 150.

A flexible coating for personal armor which entirely deflects Laser. When worn as an outer protection, it increases visibility (Visibility Mod +2). It can be worn under clothing or other armor, but when hit by Laser, reduces the outer armor layer double the damage inflicted in penetrating it. AV 10, Insulated 2.

## Shield

TL 2, Size 5, 3 kg, Cr 100.

AV 12.

## Shield, Advanced

TL 8, Size 5, 2 kg, Cr 400.

AV 14, Flashproof 8.

## Vacc Suits

The vacc suit lets a person work in space and in near-vacuum environments. Typical models include an integral communicator, which can be upgraded by personnel with mechanical and electronics knowledge.

Vacc suits at Tech Level 9 and above are designed with special contact points to allow a med scanner to be used without requiring removal of the suit.

**Early Spacefaring Vacc Suit.** Used by primitive spacefaring societies, typically for no more than a few days per mission, and often to serve as backup life support due to the poor safety ratings of their spacecraft. Its default integral comm has range 6 (5km). TL 7, Size 5, 34 kg, KCr 24. AV 8. Protections are: EMCage 3, PsiShield 1, Insulated 3, Sealed 3.

**Insystem Vacc Suit.** Seen in relatively backwater systems which have populations scattered across multiple worlds. Its default integral comm has range 6 (5km). TL 8, Size 5, 17 kg, KCr 12. AV 8. Protections are: EMCage 3, PsiShield 1, Insulated 3, Sealed 3.

**Standard Vacc Suit.** Typical fare for the budget-minded interstellar traveller. Lighter and easier to use than earlier models, with better visibility and protection from hostile environments. Its default integral comm has range 6 (5km). TL 9, Size 5, 10 kg, KCr 10. AV 10. Protections are: EMCage 5, RadProof 1, SoundProof 1, PsiShield 1, Insulated 5, Sealed 5.

**Advanced Vacc Suit.** The safest vacc suit around. Its default integral comm has range 6 (5km). TL C, Size 5, 8 kg, KCr 20. AV 20. Protections are: EMCage 15, FlashProof 10, RadProof 11, SoundProof 11, PsiShield 4, Insulated 35, Sealed 15.

**Advanced Disposable Vacc Suit.** Just about the end of the development line for plain old vacc suits. A bit less durable than the Advanced Vacc Suit, but at half the cost. Its default integral comm has range 7 (50km). TL F, Size 5, 7 kg, KCr 10. AV 15. Protections are: EMCage 10, FlashProof 5, RadProof 6, SoundProof 6, PsiShield 4, Insulated 40, Sealed 10.

## VARIOUS SURVIVAL ITEMS

Type	TL	Size	Kg	Cr
Fire Shield	8	4	2	100
Fire Suppressor	7	4	3	10
Netting	5	4	2	100
Paint	5	3	4	10
Pestguard	7	1	0.1	1
Rescue Ball	A	6	200	9000
Restraints	3	3	0.3	25
Shimmercube*	U	2	2	100,000
Survival Bubble	9	6	3	600
Thermal Blanket	8	4	1	50
Wall Patches	A	2	4	150

\* Item is typically a nonworking artifact.

## Fire Shield

TL 8, Size 4, 2 kg, Cr 100.

An enhanced Thermal Blanket which also protects against fire. AV 2. Insulated 18, against KHQ only.

## Fire Suppressor

TL 7, Size 4, 3 kg, Cr 10.

Various types of fire extinguishers. Most often found as compressed gas tanks that operate either by spraying a heavy gas or a foaming agent. Higher TL versions may utilize more radical methods to extinguish a fire. It should also be noted that some classes of fire, such as electrical or chemical fires, require a specific type suppressant in order to extinguish them. Insulation protection = TL.

## Netting

TL 5, Size 4, 2 kg, Cr 100.

Used for camouflage, bug deflection, and other purposes. One bag contains enough netting to cover a 10-ton volume.

## Paint

TL 5, Size 3, 4 kg, Cr 10.

Artificial pigmentation in various application bases.

## Pestguard

TL 7, Size 1, 100g, Cr 1.

Various types of insect repellent, keyed to common nuisance creatures found on a particular world.

## Rescue Ball

TL A, Size 6, 200 kg, Cr 9000.

A collapsed protective structure providing shelter in emergency situations. The ball will hold and support four individuals for a week. When folded, the rescue ball is a cylinder 5 cm in diameter and 10 cm long. When deployed, it forms a sphere two meters in diameter which contains a PowerCell-3 operated air recycler sufficient to last four people for one day. Access to the interior is through a conforming plastic seal which functions similarly to an air lock. In the event of explosive decompression or other loss of air, a rescue ball allows individuals not in possession of a vacc suit to survive until aid arrives. The user pulls a lanyard, climbs inside and seals the zip closure. The ball is made of a metal

coated plastic film for ease of location by radar and contains two liters of water, a first aid kit, and a transparent window through which the occupant may observe conditions outside the ball. Rescue balls provide some protection from stellar radiation and corrosive and insidious atmospheres for up to one day. Additional occupants will stress the system.

AV 18, EMCage 18, FlashProof 18, RadProof 18, SoundProof 18, Insulated 18, Sealed 18.

#### Restraints

TL 3, Size 3, 0.3 kg, Cr 25.

Handcuffs, manipulator buffs, binders, or similar. Prevents use of hands/manipulators by a captive.

#### Shimmercube

TL U, Size 2, 2 kg, KCr 100.

Projects a close field around the holder. Offers protection from vacuum, pressure, and temperature. It has a one day rebreather capability, and has the properties of Reflec. AV = TL. Flashproof, Radproof, Soundproof, Insulated, and Sealed are rated at (TL-24) x 500. At TL U, each of these protections is 2000.

#### Survival Bubble

TL 9, Size 6, 3 kg, Cr 600.

A large (2m diameter) plastic sphere with alternating clear and opaque panels, and a small oxygen tank (capable of supporting one person for two hours) for inflation. Access to the interior is through a conforming plastic seal which functions similarly to an air lock. The bubble can be used for life support in a vacuum (it can be moved by walking on the inside, treadmill fashion), and it can also be used for protection against weather or as a lifeboat on a sea surface.

#### Thermal Blanket

TL 8, Size 4, 1 kg, Cr 50.

A basic reflective sheet which protects against Hot or Cold. Insulated 12.

#### Wall Patch

TL A, Size 2, 4 kg, Cr 150.

Steel-backed plastic patches faced with adhesive, activated by peeling off a backing and placing the patch over a hole or leak. These will serve for several days.

## B BREATHING GASES

Type	TL	Size	Kg	Cr
Air Tank-5	5	4	4	500
Air Tank-9	9	4	3	500
Air Tank-B	B	4	2	500
Air Tank IN / 374	7	5	100	1,600
Atmospheric Sponge *	H	5	1,000	500,000
Breather-7	7	3	2	200
Breather-8	8	3	2	400
Breather-A	A	3	1	600
Combination-5	5	3	1	150
Combination-8	8	3	1	300
Combination-A	A	3	1	500
Compressor	see Respirator			
Filter-3	3	3	1	10
Filter-8	8	3	1	40
Filter-A	A	3	0.1	80
Gill	B	3	4	4,000
Rebreather	A	3	1	200
Respirator-5	5	3	1	100
Respirator-8	8	3	1	100
Respirator-A	A	3	1	100
Surface Water Tank	8	3	4	1,000

\* Item is typically a nonworking artifact.

Items including, using, or related to gases for metabolism and life support. Includes liquids if used by sophonts for breathing. Masks and rebreathers are also in the Armor chapter.

#### Air Tanks

TL 5, Size 4, 4 kg, Cr 500.

TL 9, Size 4, 3 kg, Cr 500.

TL B, Size 4, 2 kg, Cr 500.

A complete set of air reservoirs and the appropriate breathing mask to allow independent breathing in smoke, dust, gas, or exotic atmospheres. The tanks are filled with 2 hours of the appropriate breathing gases (for example, Air-4, Air-8) for the user. This apparatus can be used underwater. Also enables compressed-air-driven tool usage. Storage unit is typically coded to the air stored; for example, Air-6 for standard O-CO<sub>2</sub>-N human-breathable air, Air-9 for sophonts who breathe dense, tainted air, and so on. The size and composition of the storage medium depends largely on the tech level: lower tech levels store air in glass or metallic bottles, while higher tech levels may store it in more compact ceramic sponges, and so on.

#### Air Tank, Industrial / 374

TL 7, Size 5, 100 kg, 374 L, Cr 2,000.

Stainless steel air receiver tank with carbon steel support. As the standard air tank, but contains 100 man-hours of compressed air.

#### Atmospheric Sponge

TL H, Size 5, 1000 kg, 1000 L, Cr 500,000.

The Atmospheric Sponge is a typical TL H life support component. Primarily sold on the starship and space station market, it also can be used in the housing, vehicle and terraforming industry.

It contains a nanofoam that scrubs the atmosphere of irritants, bacteria, most viruses, and harmful gases. The Atmospheric Sponge can be powered by any source of electrical energy. When connected to on board power they can run with only minimal expense. Each Sponge can support up to 100 tons of Life Support needs for one year before needing maintenance.

#### Breather

TL 7, Size 3, 2 kg. Cr 200. EMCage 4.

TL 8, Size 3, 2 kg. Cr 400. EMCage 8.

TL A, Size 3, 1 kg. Cr 600. EMCage 10.

An apparatus which removes waste gases and recycles breathing gases to the user. Its PowerCell-2 gives it a duration of one day, after which it also requires routine maintenance. Sealed 6.

#### Combination

TL 5, Size 3, 1 kg, Cr 150. EMCage 4.

TL 8, Size 3, 1 kg, Cr 300. EMCage 8.

TL A, Size 3, 1 kg, Cr 500. EMCage 10.

Breathing apparatus combining Filter and Respirator. It allows breathing Air-2 and Air-5. It is effective only against T (Poison). Sealed 12.

#### Filter

TL 3, Size 3, 1 kg, Cr 10.

TL 8, Size 3, 1 kg, Cr 40.

TL A, Size 3, 0.1 kg, Cr 80.

A breathing filter which protects against taint in Air-7 and Air-9. It is effective only against T (Poison). Sealed 6.

#### Gill

TL B, Size 3, 4 kg, Cr 4,000.

A breathing apparatus for air breathers which extracts oxygen from water. Sealed 18.

#### Rebreather

TL A, Size 3, 1 kg, Cr 200.

An improved version of the Breather for better performance and efficiency. EMCage 10, Sealed 12.

#### Respirator

TL 5, Size 3, 1 kg, Cr 100. EMCage 4.

TL 8, Size 3, 1 kg, Cr 100. EMCage 8.

TL A, Size 3, 1 kg, Cr 100. EMCage 10.

A small compressor allowing breathing in Air-3 (Vthin Atmosphere). An alternative name is Compressor. Sealed 12.

#### Surface Water Tank

TL 8. Size 3. 4 kg. Cr 1,000.

Similar in concept to air storage units, surface "water tanks" are for water-breathing sophonts, and may include pumps, circulators, air mixers, etc.

## CABLES AND SURFACE GEAR

Type	TL	Size	Kg	Cr
Boots, Climbing	4	3	1.5	50
Cable	9	see Rope		
Climbing Gear	var.	3	2	75
Grapnel	3	3	2	15
Grav Belt	A	4	25	100,000
Ice Gear	7	3	4	100
Inertial Navigator	7	2	0.15	200
Lift Plate	A	4	100	50,000
Machete	4	3	1	125
Mech. Wings (Droyne)	7	4	1	100
Rope	3	3	3	25
Snowshoes	1	3	1	60

#### Climbing Gear

TL 8, Size 3, 2 kg, Cr 75.

Mechanical equipment for climbing sheer surfaces. Includes sufficient lengths of cable (typically 25m), and typically supports 125 kg. TL 8+ varieties have battery-powered reel motors standard. TL 5-6 varieties are have a ratcheted rope gripper which can be moved up a rope, but will not regress down.

TL 4 (and lower) climbing gear consists of rope (typically 25m), rock shoes, a rock hammer, and pitons (more or less).

#### Grapnel

TL 3, Size 3, 2kg + rope, Cr 15.

A grapnel is a hook at the end of a line, which is used for attempting climbs up sheer pitches. Maximum range to throw a grapnel is about 30 meters, thus, seven separate climbs would complete a 200 meter pitch (planting the grapnel on a ledge or projection, climbing to it, then repeating). Grapnel climbing bypasses the procedure of sending up a lead climber; each climb is equivalent to a regular climb up emplaced ropes.

#### Grapnel Gun

TL 8, Size 3, 10 kg, Cr 100.

Doubles the range of a grapnel to 60 meters.

#### Grav Belt

TL A, Size 4, 25 kg, Cr 100,000. 25 Liters.

A single lift module configured in a 5-point climbing harness for individual use (it carries up to 200 kg). Powered by a Size 3 PowerCell, which provides one day of continuous operation, it can climb up to an altitude of 1 planetary diameter, or roughly 1 diameter from a gravity source. It can be used for limited mobility around the hull of a starship.

#### Ice Gear

TL 7, Size 3, 4 kg, Cr 100.

Gear for travelling through icy conditions. Includes crampons: Special spiked attachments strapped to boots to assist in climbs in icy conditions. Wearing crampons decreases the difficulty of crossing ice. Also includes an ice axe, which is

useful in making climbs in snow and ice.

### Inertial Navigator

TL 7, Size 2, 150 g, Cr 200.

A small (10cm x 6 cm x 1 cm) inertial navigation computer which allows the user to backtrack on his path by “remembering” movements and turns. Switched on at the point from which the user sets out, it will allow him to find his way back later from any distance. A simple math function can also allow the user to determine a straight line distance and direction to his starting point no matter where he is.

### Lift Plate

TL A, Size 4, 100 kg, Cr 50,000. 100 Liters.

A lifter-based floating plate that can slowly carry up to 1000 kg at an adjustable distance from the ground, from 10cm to 10m.

### Machete

TL 4, Size 3, 1 kg, Cr 125.

A strong blade used in cutting vegetation to clear paths, campsites, or vegetation. Equivalent to a cutlass.

### Mechanical Wings (Droyne)

TL 7, Size 4, 1 kg, Cr 100.

Simple, lightweight frameworks with fabric or plastic that will increase the wing span and surface area, which will allow flight on worlds up to two sizes larger than usual atmosphere-based limits (standard atmosphere, up to world size 7; dense atmosphere, upto world size 9).

Mechanical wings are restricted to gliding from a high altitude to a low one unless personal strength is 6+ and flying knowledge is 2+. With these prerequisites, the individual may fly normally. Mechanical wings must be individually tailored to a specific Droyne character.

### Rope

TL 3, Size 3, 3 kg, Cr25.

50 meter length. Rope is a versatile tool that has no real replacement even at higher tech levels. It is the single most important element of a climber’s equipment; it can be used to bind prisoners; it can add safety to water or ravine crossings. A variety of types and sizes are available; in general, however, they are all similar in reliability and price within any given tech level.

The TL 9 version of rope is a fine flexible plasteel cable, capable of supporting 250 kilograms. Early versions of cable are iron-based, 6 kg, and prone to rust in oxygen atmospheres.

### Snowshoes

TL 1, Size 3, 1 kg, Cr 60.

Large, somewhat awkward, but highly effective, snowshoes permit a character to increase speed over snow by 50 percent.

## D DETECTORS

Type	TL	Size	Kg	Cr
Activity Sensor (Neural)	B	4	4	800
Atmosphere Tester	9	2	1	800
Binox, Binocs	3	3	1	75
Biosniffer	A	2	1	800
Bug Detector	8	2	0.3	500
Compass	3	2	0.1	10
Camera	5	3	0.1	100
Deep Radar	9	4	4	800
Densitometer	A	4	4	800
EMS	C	5	50	50,000
Field Sensor	C	2	1	800
Gunsight, Electronic	9	2	0.1	2,000
Gunsight, Telescopic	6	2	0.1	200
HoloVisor MP*	J	4	5	10,000
Magnet, Industrial	5	1	0.01	20
Metal Detector	6	4	1	300
Motion Sensor	A	2	1	800
Neutrino Detector MP	C	4	5	10,000
Position Tracker	C	5	50	50,000
Pressure Gauge	6	2	0.1	10
Proximeter	A	2	1	800
Radar	9	5	50	50,000
Radiation Detector	6	2	1	800
Scanner*	K	5	50	50,000
Scope MP	9	4	5	10,000
Sentry Kit	A	3	1	1,000
Sound Sensor	8	2	1	800
Spectrum Goggles	9	3	1	2,400
Stealth Mask MP	C	4	5	10,000
Telescope	5	4	1	1,000
Video Recorder	7	3	1	500
Vision Goggles	9	3	1	600
Watch	4	1	-	25
Watch, Cool	5	1	-	100

\* Item is typically a nonworking artifact.

Includes sensors, aids to the use of the senses, and amplifiers of signals for sensors.

### (Neural) Activity Sensor

TL B, Size 4, 4 kg, Cr 800.

Range=2. Activity Sensors detect thought activity (based on the principles of Perception). Most of the device is carried via an ergonomic backback.

### Atmosphere Tester

TL 9, Size 2, 1 kg, Cr 800.

The Atmosphere Tester is a portable Analyzer/Sniffer, which detects volatiles in space and (more usually) in atmosphere. Contained in an ergonomic, handheld case, with a sling for carrying over the shoulder.

### Binox

TL 3, Size 3, 1 kg, Cr 75.

Improves vision by 1 range band. Also available in as Trinox, Quadnox, Quintnox for sophonts with more than two eyes.

**BioSniffer**

TL A, Size 2, 1 kg, Cr 800.

Range=3. A "BioSniffer" / Life Detector senses the presence of organisms (based on the principles of Perception). Contained in an ergonomic, handheld case, with a sling for carrying over the shoulder.

**Bug Detector.**

TL 8, Size 2, 300 g, Cr 500. Range=2.

**Camera**

TL 5, Size 3, 100g, Cr 100.

Records still images on analog or digital media.

**Compass**

TL 3, Size 2, 100g, Cr 10.

Indicates direction of magnetic north, if the world has magnetic poles. May be influenced and give false readings near large masses of iron.

**Deep Radar**

TL 9, Size 4, 4 kg, Cr 800.

Range=3. Deep Radar is a world sensor. Deep Radar can map underground density structures. It is a lower tech equivalent of Densitometer. Backpack design.

**Densitometer**

TL A, Size 4, 4 kg, Cr 800.

Range=3. Backpack design.

**EMS**

TL C, Size 5, 50 kg, Cr 50,000.

Range=6. EMS is a sophisticated form of Radar; its signals are aggressively computer analyzed for detailed information. Passive EMS senses existing EM radiation (including emissions by the target, reflected local energy, and occluded background energy). Active EMS projects radio pulses in sweeping scans of an area and interprets the returned signals (echoes) for information about an objects size, distance, and speed.

**Field Sensor**

TL C, Size 2, 1 kg, Cr 800.

Range=3. Field Sensors are multi-purpose detectors sensitive to electric and magnetic fields. They operate in much the way Awareness operates. Contained in an ergonomic, handheld case, with a sling for carrying over the shoulder.

**Gunsight**

Electronic. TL 9, Size 2, 100g, Cr 2,000.

Electronic sights with image enhancement and low-light capabilities are available to provide the capability to see and hit in the dark. Electronics are treated like telescopic sights for damage and reliability, and function similarly.

**Gunsight**

Telescopic. TL 6, Size 2, 100g, Cr 200.

Reliability=-1. Safety=+3.

High-quality telescopic sight for attachment to rifles and carbines, for increasing their accuracy, especially at longer ranges. A rifle equipped with such sights decreases apparent distance beyond Long Range by 1 band.

Telescopic sights are delicate, however, and may be jarred out of alignment by any violent action (such as being left untended in a moving truck, a close explosion, or being dropped). When the sights go out of adjustment, the fact should not be revealed to the firer, and he or she will always miss.

**HoloVisor MP.**

TL J, Size 4, 5 kg, Cr 10,000.

The HoloVisor is the ultimate vision screen system, using external light detectors and displaying them in 3D projection (computer enhancements fill in gaps, extrapolate unseen sides of objects, and maintain a complete image in memory).

**Magnet, Industrial**

TL 5, Size 1, 10g, Cr 20.

A small alnico (aluminum-nickel-cobalt alloy) horseshoe magnet capable of lifting 1kg against 1G.

**Metal Detector**

TL 6, Size 4, 1 kg, Cr 300.

Indicates presence of most metals, although degree of reaction depends on amount of metal present and proximity.

**Motion Sensor.**

See Proximeter.

**Neutrino Detector MP**

TL C, Size 4, 5 kg, Cr 10,000.

Range=4. Neutrino Detectors sense neutrinos, primarily as the byproduct of fusion reactions: positive readings reflect the presence of fusion reactors or nuclear activity. Because neutrinos are almost impossible to shield, Neutrino Detectors are effective in sensing ships through their Power Plants (although not APlants or Collectors). They can also detect Fusion+ modules. Ships can frustrate Neutrino Detectors by turning off the Power Plant.

**Position Tracker**

TL C, Size 5, 50 kg, Cr 50,000.

Range=6. A specialized form of EMS; its signals are aggressively computer analyzed for detailed information. Can be used as an inertial locator. These devices come in three basic forms:

**Ballistic Position Tracker.** Determines location in three dimensions relative to a previously specified waypoint. All information is scrambled if user travels in a grav vehicle or under the influences of inertial compensators.

**Satellite Position Tracker.** Determines location in three dimensions based on orbiting satellites. Dysfunctional underground or in large buildings.

**Beacon Position Tracker.** Determines location in three dimensions based on a beacon (usually a starship on the ground). Dysfunctional beyond the horizon.

### **Pressure Gauge**

TL 6, Size 2, 0.1 kg, Cr 10.

Handheld device for testing atmospheric air pressure. Includes an adapter for testing the pressure in various small containers such as tires.

### **Proximeter**

TL A, Size 2, 1 kg, Cr 800.

Range=3. A Proximeter senses objects close by. It serves as an accurate motion detector, closeup altimeter, depth gauge, and as an alert device when objects (people, aliens) approach. Contained in an ergonomic, handheld case, with a sling for carrying over the shoulder.

### **Radar**

TL 9, Size 5, 50 kg, Cr 50,000.

Range=6. Radar projects radio pulses in sweeping scans of an area and interprets the returned signals (echoes) for information about an objects size, distance, and speed.

### **Radiation Detector**

TL 6, Size 2, 1 kg, Cr 800.

Indicates presence and intensity of radioactivity. Can be preset to give a warning signal if levels of radioactivity rise to dangerous levels. It is a more limited, lower tech equivalent of a neutrino detector. Contained in an ergonomic, handheld case, with a sling for carrying over the shoulder.

### **Scanner**

TL K, Size 5, 50 kg, Cr 50,000.

Range=6. Scanner is an advanced form of Electromagnetic Sensor.

### **Scope MP**

TL 9, Size 4, 5 kg, Cr 10,000.

Range=4. Scope is vision screen with distance and enhancement capabilities. It acquires images and magnifies them for interaction, navigation, and analysis.

### **Sentry Kit**

TL A, Size 3, 1 kg, Cr 1,000.

Motion detectors and life form scanners for those more dangerous camp-outs (lets you sleep in moderate peace while it keeps watch). IFF capable: can be programmed to operate weapons having the "Remote" modifier, for automated defense.

### **Sound Sensor**

TL 8, Size 2, 1 kg, Cr 800.

Range=3. Also works as a sound recorder, echo sounder, or echo-locator. Contained in an ergonomic, handheld case, with a sling for carrying over the shoulder.

### **Spectrum Goggles**

TL 9, Size 3, 1 kg, KCr 2.4.

Allows PRGBC vision at constant=9.

### **Stealth Mask MP**

TL C, Size 4, 5 kg, Cr 10,000.

Range=4. Stealth Mask is a signal absorber. The device (actually an external coating) absorbs or diverts Active sensor signals. Stealth Mask can be switched On and Off. The value or effectiveness of Stealth mask is TL the sum of (TL + Mod - Range). Stealth Mask is a negative Mod on the attempting Active Sensor Task.

### **Telescope**

TL 5, Size 4, 1 kg, Cr 1,000.

Decreases apparent distance to target by 2 range bands.

### **Video Recorder**

TL 7, Size 3, 1 kg, Cr 500.

### **Vision Goggles**

TL 9, Size 3, 1 kg, Cr 600.

Intensifies ambient light, easing vision in low light. Adds +2 to one's natural vision constant.

### **Watch**

TL 4, Size 1, Cr 25.

Waterproof to Depth = TL minus 4. Comes in wristwatch or pocket watch varieties. TL 7+ models include chronograph, chronometer, alarm, calculator, and pedwatch. TL 9+ models include a small light source bright enough for reading by.

### **Watch, Cool**

TL 5, Size 1, Cr 100.

Non-military timepiece, with stats like the typical watch. If not already wearing Cool Sunglasses, wearing a Cool Watch improves perceived Social Standing or Charisma +1, and grants +1 on carousing tasks. Bonuses only apply on the world of manufacture.



## E MITTERS

Type	TL	Size	Kg	Cr
Beacon, Emergency	9	3	1	750
Beacon, IISS	9	5	50	500,000
Bug	9	0	0.01	100
Flare Gun	5	3	0.25	50
Jammer MP	8	4	5	10,000
Light (Portable)	4	3	0.5	10
Mirror	2	1	0.25	10
Emitter Psionic	E	4	5	2,500
Emitter ANIFX	2	R	.01	10
Emitter IR	5	R	.1	50
Emitter Lek	5	R	.1	50
Emitter Mag	8	R	.1	100
Emitter VHDUS	2	R	.01	100
Sound Amplifier	5	4	1	120
Spotlight	7	4	10	100
Wiretap		see Bug		

\* Item is typically a nonworking artifact.

### Beacon, Emergency.

TL 9, Size 3, 1 kg, Cr 750.

A combination long-range communicator and signal transponder, the commlink beacon is a very sophisticated emergency signaling device. The internal transponder monitors common emergency search-and-rescue channels (one at a time). When traffic is picked up on this channel, the device simultaneously emits a shrill warning tone to alert users to the possibility that help is at hand and transmits a coded distress signal under a traditional GK (Gashimeku Kalariin, the Vilani SOS). Some more expensive models have provision for auto-repeat voice, video, and/or data, instead of the automatic code signal. In either event, the commlink beacon serves as a means of establishing contact when there is any search being mounted within 500 kilometers, and then it serves to continue communications after that initial contact. With a size 2 Ambient Panel, it can operate indefinitely.

### Beacon, IISS

TL 9, Size 5, 50kg, Cr 500,000.

Vehicle transportable transponder capable of broadcasting voice, video, and/or data out to 250,000 km (R=11). Commonly used by the IISS for marking class E starports and designating landing locations. Volume approximately 0.5 tons.

### Bug.

TL 9, Size 0, 10 g, Cr 100. Range=5.

A tiny electronic device, camouflaged for covert surveillance. Earlier versions record audio only. Later versions can record video as well, and may also be able to transmit signals over EM waves. Variants include the Wiretap, which is a Bug attached to a telecommunications cable or RF channel.

**Bullhorn.** See Sound Amplifier.

### Flare Gun.

TL 5, Size 3, 250g, Cr 50.

Pistol-grip launcher for flares. A tube launcher Flare Rocket version is Size 4, 1 kg, and Cr 100. Flares weigh 100 grams and cost Cr1 each. They have an adjustable burn rate, for up to 2 hours.

Flares are visual marker and counter-measure devices, either using intense light (e.g. potassium), smoke, or heat. Flares may be ground-based, dropped from an aircraft, fired from a flare gun, or fired from a rocket. If aerial, flares will have a simple parachute to provide maximum effect over a large area.

### Jammer MP

TL 8, Size 4, 5 kg, Cr 10,000.

Range=4. Jammer is a man-portable (MP) anti-sensor. It registers as a Size-7 object to other sensors, but with insufficient specificity to allow targetting. Jammer operates in much the same manner as the ACS Jammer.

### Light Portable

TL 4, Size 3, 0.5 kg, Cr 10.

Items such as lamps or torches. TL1-3 versions burn (via oxidization of a fuel such as wax or oil) and therefore require an atmosphere, and may have reduced duration. TL7+ versions may either be chemical torches, which operate without electrical current, or high-efficiency lighting elements. Typical lamps spread light across a wide angle, and may have shields to direct the beam.

### Mirror

TL 2, Size 1, 250g, Cr10.

A simple hand-held mirror which can be used to reflect sunlight and thus catch the attention of a distant observer. Signal mirrors can be improvised out of any reflective material; specialty mirrors will include a small sighting hole that enables the signaler to direct the flashes of light from the mirror at a particular target such as a passing aircraft.

### Psionic Emitter

TL E, Size 4, 5 kg, Cr 2,500. Burden=+1.

A psionic beacon which can be detected by people trained in psionics.

### ANIFX Emitters

TL-2, Size R. 10 g. Cr10.

Objects which glow (or regularly or intermittently pulse) in the wavelengths ANIFX. Essentially naturally-occurring florescent gems which absorb ambient energy and re-emit it in the ANIFX wavelengths.

Pulsing objects command double cost.

### IR Emitters

TL-5. Size-R. 100 g. Cr50.

Devices which emit (glow, pulse, strobe) in the IR wavelengths ANIFX. Distinct from ANIFX Emitters in that they are tuned to specific individual wavelengths.

### Lek Emitters

TL-8. Size R. 100 g. Cr100.

Devices which emit (glow, pulse) in the Lek wavelength.

### Mag Emitters

TL-8. Size R. 100 g. Cr100.  
Devices which emit (glow, pulse) in the Mag wavelength.

### VHDUS Emitters

TL-2, Size R. 10 g. Cr10.  
Objects which glow (or regularly or intermittently pulse) in the wavelengths ANIFX. Essentially naturally-occurring florescent gems which absorb ambient energy and re-emit it in the VHDUS wavelengths.  
Pulsing objects command double cost.

### Sound Amplifier

TL 5, Size 4, 1 kg, Cr 120. Burden=+1.  
Amplifies voice to very long range. The TL5 version is a bullhorn. The most primitive form is a megaphone, while higher tech versions use electronics, first analog, then digital, with increasingly sophisticated transmission techniques and applications. Extras include line inputs for electronic signal generators, PA systems for example.

### Spotlight

TL7, Size 4, 10 kg, Cr 100.  
A lamp with a tightly focused beam. To blind a target: difficulty=range (2D minimum); target number is the lamp-holder's Dexterity (or Agility, or Grace). Duration is one combat round.



## F FOOD

Type	TL	Size	Kg	Cr
Energy Drink	A	2	0.1	1
Freezer, Flash	9	4	15	500
Galley (Micro)	9	6	500	2,000
Juice, Bottled	see section L, Liquids			
Rations	7	3	250	2
Stasis Drawer*	J	4	15	500
Water	see section L, Liquids			

\* Item is typically a nonworking artifact.

Items used or consumed in support of metabolism. Includes items related to the preparation of, presentation of, or preservation of food.

### Energy Drinks

TL A, Size 2, 100 g, Cr1.  
Mild stimulants. One serving extends the day length of a sophont by 25% (including downtime). Earlier TL versions have a terrible aftertaste and result in next-day fatigue.

### Flash Freezer

TL 9, Size 4, 15 kg, Cr 500.  
A unit which quickly freezes objects by subjecting them to cryogenic temperatures, avoiding damage to the cell membranes of stored food. Before TL 9, these units are Size 5, and mass 150 kg.

### Galley, Micro

TL 9, Size 6, 500 kg, Cr 2,000. (0.5 dtons)  
Includes: Sink; Dishwasher with various pots pans and dishes stored in it; a fast-cooking oven (at eye level); 1.0 meter x 0.5 meter counter top; pull/fold out table 1 meter x 0.5 meter, seats two; Folding chairs under counter; Apartment sized refrigerator for keeping certain beverages cold; under cabinet coffeepot (just below eye level) just add dried dehydrate beverage of choice (makes one liter at a time); cabinets for ready to grab dry goods; two burner induction stove; cleaner bot stowed under the cabinets.

### Rations

TL 7, Size 3, 250 g, Cr 2.  
Self-heating rations which provide convenient, efficient, proper nutrition at the expense of flavor, texture, style, presentation, or other factors. Lower TL versions are military-grade MREs, which are not heated, or Combat Rations;

Emergency rations also tend to not need heating. Standard rations usually include a heated portion and tend to have the best flavor. Very low TL versions include jerky and hard tack, and may tend to omit vital long-term nutrients but will prevent starvation.

**Stasis Drawer.**

TL J, Size 4, 15 kg, Cr 500.

A unit for storing items in stasis. Battery life is based on device Quality. Unsafe units may cause loss of limbs.

**G NON-BREATHING GASES**

Type	TL	Size	Kg	Cr
Elemental Gases	7	3	1	100
Fuel Gases	7	4	8	10
Military Gases, Lethal	8	3	1	1,000
Military Gases, Nonlethal	8	3	1	500
Noble Gases	7	3	1	200

\* Item is typically a nonworking artifact.

Items including, using, or related to gases used in military or industry. See the Breathing Gases section for storage medium notes.

**Elemental Gases**

TL 7, Size 3, 1 kg, Cr 100.

Container of Nitrogen, Oxygen, Ozone, Tritium, Deuterium, or Hydrogen (and so on).

**Fuel Gases**

TL 7, Size 4, 8 kg, Cr 10.

Small container of a natural, flammable gas or derivative: methane, propane, ethane, pentane, butane, etc.

**Military Gases, Lethal**

TL 8, Size 3, 1 kg, Cr 1,000.

Container of poison or nerve gas. Restricted availability.

**Military Gases, Nonlethal**

TL 8, Size 3, 1 kg, Cr 500.

Container of Smoke, Tear, Irritant, Choking, or Tranq Gas, etc. Restricted availability.

**Noble Gases**

TL 7, Size 3, 1 kg, Cr 200.

Container of Helium, Argon, Krypton, or Radon, etc.

**H NOT PRESENTLY USED**

Type	TL	Size	Kg	Cr

**I OMITTED**

Type	TL	Size	Kg	Cr

**J NOT PRESENTLY USED**

Type	TL	Size	Kg	Cr

## K CONTAINERS

Type	TL	Size	Kg	Cr
Attache Case	6	3	1	75
Backpack	3	4	3	45
Environmental Tank	9	5	1000	100,000
Gravitic Tank	9	5	1000	100,000
Safe	6	5	1000	10,000
Strongbox	6	4	400	1,000
Toolbag	5	3	1	10
Toolbox	5	4	10	100
Toolchest	5	5	100	1,000
Vault	6	6	2000	100,000

\* Item is typically a nonworking artifact.

Items intended to contain, enclose, protect, or consolidate other items. Includes items related to containers.

### Attache Case

TL 6, Size 3, 1 kg, Cr 75.

An aluminum or magnesium carrying case similar to that used by technicians to carry precision instruments.

### Backpack

TL 3, Size 4, 3 kg, Cr 45.

Rucksack, Duffel Bag. Increases carrying capacity.

### Environmental Tank

TL 9, Size 5, KCr 100.

Displaces one ton. A reinforced display container with full environmental controls for maintaining a conservatory, terrarium, aquarium, fluidium, trophy tank, etc. Larger tanks can be built custom-sized at KCr 100 per ton. Comes with one mini-airlock; extra airlocks cost KCr 100 each.

### Gravitic Tank

TL 9, Size 5, KCr 100.

Displaces one ton. An environmental tank with gravitic controls for simulating different gravities.

### Safe

TL 6, Size 5, Cr 10,000. Small Vault.

### Strongbox

TL 6, Size 4, Cr 1,000. Small, portable vault.

### Toolbag

TL 5, Size 3, Cr 10. Smaller version of Toolbox.

### Toolbox

TL 5, Size 4, Cr 100.

### Toolchest

TL 5, Size 5, Cr 1,000. Larger version of Toolbox.

### Vault

TL 6, Size 6, Cr 100,000.

A small, secure, heavily armored room for storage of valuables or volatiles.

## L LIQUIDS

Type	TL	Size	Kg	Cr
Bottle	3	3	0.4	1
Canteen	4	3	0.2	10
Flask	3	3	0.3	5
Juice, Bottled	8	3	0.2	2
Storage Tank	5	5	1000	500
Water	var.	3	0.2	1
Water Purification Tablets	7	1	0.1	2
Water Purifier	9	4	1	250
Waterskin	1	3	0.1	10

\* Item is typically a nonworking artifact.

Liquids and items related to the use, manipulation, purification, and storage of liquids.

### Bottle

TL 3, Size 3, 400g, Cr 1.

Bulky glass container. Holds up to 4 liters of liquid.

### Canteen

TL 4, Size 3, 200g, Cr 10.

Metal container holding up to 1 liter (1 quart) of liquid. Metals tend to react with liquids in unwanted ways; if corrosion is a problem, glass is a better choice.

### Flask

TL 3, Size 3, 300g, Cr 5.

Small metal or glass container. Holds up to half-liter.

### Juice, Bottled

TL 8, Size 3, 200g, Cr 2.

### Storage Tank

TL 5, Size 5, 1000kg, Cr500.

### Water

Size 3, 500g, Cr 1. A half-liter of water (by definition, a half liter of water IS about a half-kilogram).

TL-0. Pure local water.

TL-1. Local water – not so pure.

TL-4. Dirty local water. Do not drink.

TL-6. Bottled water.

TL-8. Carbonated water.

TL-A. Flavored water.

### Water Purification Tablets

TL 7, Size 1, 100g, Cr 2.

Purifies local water.

### Water Purifier

TL 9, Size 4, 1 kg, Cr 250.

Filters, distills, and purifies local water source.

### Waterskin

L 1, Size 3, 100g, Cr 10.

Primitive version of the canteen, made from the bladder or stomach of a native plant or animal.

## M CONSTRUCTION

Type	TL	Size	Kg	Cr
Construction Materials	all	5	varies	
Cutting Torch	8	3	20	6,000
Eternity Circuit Module*	R	5	1t	M Cr 100
Hatch	7	5	-	1,000
Hoist	8	4	25+	100+
Iris Valve	8	5	-	1,000
Lock	6	2	0.5	1,000
Matter Transporter*	M	4	32	100,000
Molecular Disassembler*	P	6	1t	M Cr 50
Planetary Core Tap*	P	8	-	T Cr 1
Polymer, Structural		see Construction Materials		
Portal, Cargo*	Q	6	5t	M Cr 10
Portal, Personal*	Q	5	50	M Cr 1
Portal, Ship*	Q	7	100t	M Cr 100
Portal Generator*	Q	8	-	T Cr 1
Slap Tape		see Tape		
Star Energy Tap*	S	8	-	T Cr 1
Tape	7	2	0.1	1
Teleport Platforms, Early*	P	4	20	400,000
Teleport Platforms*	R	4	10	200,000
Teleport Platforms, Adv*	T	4	5	400,000
Welding Torch	8	3	3	

\* Item is typically a nonworking artifact.

Items used for construction (of buildings, dwellings, and large scale structures). Includes tools and equipment used to manipulate such materials.

### Construction Materials.

TL 0+, Size 5, 2,000 kg, Cr 10,000.

Blocks of native stone, sheets of construction metal, leather hides, etc: durable protective material for constructing permanent buildings.

Price varies with quality.

## M Construction Materials

TL	AV	Material	Density
3	1	Leather	
3	2	Bone	
3	4	Wood	0.6
7	6	Fiberglass	
3	20	Block, stone	2.5
B	30	Block, ceramic	2.5
8	35	Aluminum	3.0
3	38	Copper	
3.5	41	Bronze	
4	50	Iron	
F	50	Structural polymer (self-healing)	
C	60	Structural metals	
8	70	Steel	8.0
9	80	Titanium	4.0
TL x 10		Starship armor AV	

Different materials have different armor values; standard TL and AV per centimeter depth are shown.

### Cutting Torch

TL 8, Size 3, 20 kg, Cr 6,000.

Ruggedly-built metal cutter, designed to work on materials of its own tech level or lower. TL 8 cutters are laser-based, and TL A cutters are plasma-based. Good for cutting holes in hulls and performing major repair. Typically good for 1 day of continuous use. 1 meter x 0.75 meters x 0.75 meters. Can be used at close range as a weapon, inflicting Heat-6 damage. For a lighter version, see the Welding Torch.

### Eternity Circuit Module.

TL R, Size 5, 1000kg, MCr100. Displaces one ton.

Descended from the Molecular Disassembler, the ECM is a specialized molecular fabrication unit which requires administrative access to the ship's computer. It performs three functions:

**Installation.** When installed, it studies the ship's systems from the ship's computer, using molecular analysis to record a genetic redundancy circuit for the ship's configuration.

**Scan.** Periodically scans the ship's systems for changes in state. New components are added to the overall configuration.

**Restore.** When a system is damaged, it uses the delta generated from the genetic circuit to gradually restore it to its original state, or as close as possible, via molecular fabrication.

Restoration time is measured by Quality, which maps to the number of damage levels the module can repair in a 1-ton (or less) item in one day.

For example, a 1 ton sensor with a damage severity of 1 can be repaired by a Quality 1 module in 1 day. If the sensor has a damage severity of 2, it could be repaired by a Quality 1 module in 2 days.

On the other hand, a 10 ton jump drive with a damage severity of 3 would be repaired by a Quality 1 module in 30 days, or a Quality 2 module in 15 days.

Access to raw materials is required for operation.

### Hatch

TL 7, Size 5, Cr 1,000.

Hatches protect the interior against positive pressure. Its design allows it to open only when the interior pressure is equal to or greater than the exterior pressure.

### Hoist

TL 7, Size 4, 25kg+, Cr 100+.

1000kg capacity typical. Used to haul heavy weights up sheer surfaces. Hoists below TL4 rely on beastpower (brute force) to operate.

### Iris Valve

TL 8, Size 5, Cr 1,000.

Iris valves control the discharge of atmosphere from a pressurized cabin. Its design allows it to close (and open) regardless of positive or negative pressure difference between both sides.

### **Lock. Air Lock (Collapsible)**

A plastic or polymer temporary air lock transported to location and assembled. TL9, Size-4, 10 kg. Cr100

### **Transporter**

TL 25, Size 4, 32 kg, Cr 100,000.

This artifact looks like a large, deep blue seashell of some sort and has an opening in one side. Extending vertically below the opening is a black, rubbery strip. You can push into the rubbery surface of the band with your finger. Seen from above, the object has a teardrop-like shape.

Any object placed into the opening will be transported within a few seconds out to the range and direction set by the operator.

The black rubber strip is used to set the transportation range the first push sets the range, and the second push sets the distance above or below the level of the device. The point of the teardrop is pointed in the transportation direction desired. After about 15 minutes, if the device has not been used, the settings revert to their default minimums (10 meters range and zero distance above or below the device-that is, on its same level).

Objects must be able to be completely placed inside the compartment for a transport to take place. If any part of an object extends outside of the compartment, it will not be transported.

This device is a transporter; rather than a teleporter. The object is converted to energy and transmitted to the desired location, where it is converted back to raw matter: a raw dust of element granules.

Some have reported success in making the device operate as a teleporter.

### **Molecular Disassembler.**

TLP, Size 6.

Construction equipment which also serves as a combat piece, this item creates a field of grey goo within the targeted range of the selected volume.

The basic Molecular Disassembler is a self contained 1 ton (Size 6) unit capable of disassembling, assembling or a combination of both up to a Size 6+ object depending on various factors.

It is composed of a 0.25 ton infrastructure which contains the Control Console with user friendly interface, which is used to program the system. The user with the assistance of an on-board Ultimate Model/4phoNN-21 Computer driven by an Improved AI-21 OS and extensive package of standard De/Construction Apps sets parameters or selects from a pre-set template a desired result. (Note: Weaponized versions carry a variety of Apps with exotic methods for offensive use.) Power for the system is provided by an Early AM Battery-23 (a 10 cm cube providing the equivalent of ACS EP 100) allowing for almost unlimited storage of the system.

The second part of the system is 0.70 ton of programmable De/Constructor Units held in suspension by the 0.05 ton containment vessel. Once the MD is powered up and programmed the EAMB-23 charges the D/C Units with enough power to begin executing the task they were given (such as convert this broken down Air/Raft into a small shel-

ter). After initialization the EAMB-23 is expended and is used along with the rest of the infrastructure as starting materials by the D/C Units.

If power for the containment vessel falls below acceptable levels the Computer will engage the failsafe rendering the system completely inert. Once the failsafe protocol has completed the system is basically usable only as raw materials for another Molecular Dissembler.

### **Portals**

TL Q.

A shimmering disk ranging from 2 to 200 meters in diameter, linked to a portal generator in a pocket universe. Capable of transporting a person to a mated portal up to 36 light-minutes away. Thoughtfully-designed portals are easy to configure, while more functional versions will have a low Ease of Use index, with confusing or badly-placed controls.

Does not work between two pocket universes. Does not allow teleport into a ship which is in jump space. Does not equalize pressure. Electronics connections are severed by a portal. Wire connections simply cease to function. Slows everything travelling at greater than 100m/sec to that speed. As a result, light cannot pass through a portal. Operating portals thus appear shiny. When turned off, or inoperative, the portal appears steel-grey.

Portals are vulnerable to high temperatures, acid, or physical damage, and if its metal frame is destroyed, the portal is destroyed. In addition, any portal which is taken more than 36 light minutes (Range S=12, Deep Space; about 4.32 AU) from the prime portal will become inactive and will not function; it can be reset by teleporting it through the prime portal.

Every portal network requires one "prime portal". The center of the pocket universe is firmly "attached" to the prime portal. In effect, the pocket universe follows this prime portal around. Other portals compute their range from it. If a portal is taken more than 36 light minutes (Range S=12, Deep Space; about 4.32 AU) from the prime it disconnects from the system and becomes inoperable. If the prime is taken more than 36 light minutes from another portal, the other portal disconnects. The prime portal is slightly larger than the other portals, and this is for a purpose: disconnected portals can be reset and made operable again by passing them through the prime portal.

Because portals beyond 36 light minutes from the prime disconnect, most users restrict themselves to that distance. If two portals are each 36 light minutes from the prime portal, then it is possible to teleport up to 72 light minutes (8.65 AU) – but the prime portal must be positioned midway between them.

### **Portal, Cargo**

TL Q, Size 6, 5,000 kg, Cr 10,000,000.

A 10m diameter portal, displacing 5 tons.

### **Portal, Personal**

TL Q, Size 5, 5 kg, Cr 1,000,000.

A 2m diameter portal, displacing 1 ton.

### Portal, Ship

TL Q, Size 7, Massive, Cr 100,000,000.  
A 200m diameter portal, displacing 100 tons.

### Tape

TL 7. Electrical, Pressure-Sensitive (Duct). Slap tape.

### Teleport Platforms, Early

TL23, Size 4, 20 kg each, Cr 400,000 total.

Range=5, Ease of Use=-1, Burden=+1, Safety=-3.

A pair of self-powered, metallic, grav platforms. Each has four handles around its circular rim and floats at a height of about 50 centimeters. They can be controlled by pulling or pushing and will carry up to 600 kilograms without effort (they resist gravity; inertia still provides resistance to movement).

Each also has a small resilient spot on the underside near one of the handles. Pressing that spot (which can occur accidentally [Ease of Use=-1]) converts the plate to a teleportation disk. Anything on the plate is transferred to the other plate, and anything on that plate is transferred to this plate. Range=5 (one kilometer), provided there is no height differential of greater than ten meters.

The standard TL 25 model has QREBS=0. The advanced TL 27 model has Range=6 and improved qualities.

### Welding Torch.

TL 8, Size 3, 3 kg, Cr 150.

A 300 mm long torch good for small repair jobs and spot welding. TL 5-7 versions are chemically-fueled (acetylene) torches fed by a liter tank of gas; TL 8 versions are laser-based; and TL A versions are plasma-based. The torch can be used continuously for 20 minutes (1 space combat round), give or take depending on the intensity setting. In combat, it can only be used at close range, inflicting Heat-3 damage, and has fuel for 10 attacks. Refills for TL 7 and lower versions cost Cr 50 each. For a heavy-duty version, see the Cutting Torch.

## INFORMATION SOFTWARE DATA COMPUTERS

Type	TL	Size	Kg	Cr
Data Display	A	3.5	2	100
Data Recorder/Relay	B	1	0.1	400
Databank	D	4	5	800,000
Datalink	8	1	0.01	25
Imperial ID	B	2	-	10
Inertial Nav System		* software *		
Inertial Locator		* software *		
Jump Tape	9	3	0.2	1,000
Map Box	B	3	1	2,500
Map Box Insert	B	1	-	150
Map Box Blank	B	1	-	30
Memclip	C	1	0.01	100
Portable Computer	9	3	0.4	1,000
Research Console	var.	6	var.	200,000
Starchart	B	2	0.1	1,000
Survey Data, Blank	C	1	0.01	10
Wafer Jack	C	2	0.1	10,000
Xmail Wafer	C	1.6	0.1	10

### Data Display

TL A, Size 3.5, 2 kg, Cr 100.

Visual.

Tactile.

Holo. TL D.

### Data Recorder/Relay

TL B. Size 1. 0.1 kg. Cr 400.

Range: Vdistant (50km). A miniaturized electronic device capable of receiving voice or radio input, recording it, and transmitting this information either on a given external signal or continuously. Reception and transmission is on standard voice/data communication bands. Thus, the device can listen for signals and then retransmit them, or it can continuously transmit a prerecorded message. 'Tape' length is 20 minutes; transmitter range is line of sight (it is blocked by buildings, mountains, and so on).

### Databank

TL D, Size 4, 5 kg, KCr 800.

A specialized Model/4 computer, designed as a data server. Used for local Library Data systems. Also used on Xboats for carrying a weekly informational update for every star system in the Imperium.

### Datalink

TL 8, Size 1, 10 g, Cr 25.

A short (R=2) range repeater/data relay device.

### Imperial ID

TL B, Size 2, Cr 10.

This represents not only the Imperial ID, but also identity or membership cards given out by various organizations such as TAS.

The front carries a hologram of both seal or logo of the issuing Ministry, agency or organization and of the sophont

to it was issued. In addition an unique identity number and the bearer's name, rank, titles, offices, etc. are found on the front. The back will on official Imperial ID show a still photograph, a signature, and some stern legal print.

On the inside is a dedicated, hardened, Datalink which holds all the sophont's vital data, such as career history, vital statistics, medical history, financial information and travel history. The card itself contains sophisticated anti-tampering hard, soft and possibly wetwares. Cracking an Imperial ID is a major crime and is Beyond Impossible (Uncertain) to actually achieve safely and without alerting the authorities. Altering the ImpID once it is cracked is a high Imperial crime by itself and carries hefty penalties. For the brave and foolish, the Task is Staggering (Uncertain) if attempted with the correct tools.

### **Jump Tape**

TL 9, Size 3, 200g, Cr 1,000.

An enclosed reel (or corresponding solid-, holo-, or crystalline-state device) containing specific jump coordinates within a set of given systems.

The Jump Tape is slotted into a special reader found on the Astrogator's Console. This Console is connected to the Jump Drive, Power Plant, and Main Computer, it then runs a calibration routine on the Coils (and Grid if installed), tests the Jump matrix three times against the results. It then compares the Jump solution if any offered by the Astrogator, if they match or the Astrogator merely lets the Computer run the Tape, it will then commence running the Jump Cycle culminating with the transition to Jumpspace and about one week later transition back to Normalspace.

A Jump Tape can only be safely used one time as they are charted on large computer arrays using the most current data. Reusing a Jump Tape increases the Difficulty of the Astrogation Task by 1D per Jump beyond the first it used. A Misjump is guaranteed by the sixth Jump of using the same Jump Tape.

### **Map Box**

TL B, Size 3, 1 kg, Cr 2,500.

Map Box Insert for a given world: Size 1, Cr 150.

Map Box Insert blank: Size 1, Cr 30.

Appearing at tech level 9 (though standard at TLB), the map box is a compact (250 x 250 x 10 mm, expanding to 1000 x 1000 x 10 mm when opened, weighing 1 kilogram) storage system for computer generated maps of a world. Scale may be adjusted. Most inhabited planets have insert chips available for Cr 150. When not available, two orbital sweeps of the world are required to obtain the necessary photographs to construct a map chip. Blank map chips are available for Cr 30.

### **Memclip**

TL C, Size 1, 1 gram, Cr 100 (Cr 10 blank).

Stores an app for managing one language. Pre-programmed memclips exist for most known languages, such as Anglic, Darrian, Gvegh, Oynprith, Trokh, Vilani, and Zhodani.

### **Portable Computer**

TL 9, Size 3, 400 g, Cr 1,000.

The tablet computer is a personal computing device capable of basic computer activity. It functions as a Hand Controller and enables various tasks for a user.

It contains a Size 2 PowerCell with a duration of about 1 day. It has a data communications range of 50 meters (R=2).

### **Research Console**

Size 6, KCr200.

Tech level varies. A specialized control console used for a single research purpose. A group of these installed in a dedicated volume is a Laboratory, functioning in the manner of an auxiliary ACS Bridge.

### **Starchart**

TL B, Size 2, Cr 1,000.

### **Survey Data**

TL C, Size 1, Cr 100.

A data container (essentially a re-purposed memclip) for carrying detailed survey information for one star system.

### **Wafer Jack**

TL C, Size 2, Cr 10,000.

A Wafer Jack is an implant allowing use of skill or personality wafers and direct access to computer systems.

### **Xmail Wafer**

TL C, Size 1.6, Cr 10.

A data container for carrying a single transaction or application across interstellar distances.



## **P** POWER SUPPLIES

Type	TL	Size	Kg	Cr
Ambient Array	B	6	1,000	100,000
Ambient Charger	A	3	4	2,000
Antimatter Battery*	R	2	2	MCr 20
FusionPlus	E	4	25	10,000
Generator	7	4	25	250
PowerCell	A	var.	var.	var.

\* Item is typically a nonworking artifact.

### **Ambient Array**

TL B, Size 6, 1,000 kg, Cr 100,000.

Large array of Ambient Panels that produce enough energy during the day to power a Size 5 item.

### **Ambient Charger**

TL A, Size 3, 4 kg, Cr 5,000.

A portable ambient Panel with short-range (R=0, contact) power transmission. Capable of powering and charging the equivalent of one Size 4 device, carried on one's person.

### **Antimatter Battery**

TL R, Size 2, 2 kg, MCr 20.

The antimatter battery is a small box finished in grey metal, with two gold colored contacts on its upper surface. It operates by a controlled flow of antimatter against an ordinary matter core. Flow is metered in response to demand, and very high levels of current are available. Its two contacts will provide the output of an ACS Power Plant-1 for up to 10 years.

Antimatter batteries are quite resistant to damage, but are not impervious. They have an Armor Value equal to their TL (for a standard antimatter battery, this is AV 25). Penetrating armor will fracture battery casing and the energy release will begin.

Antimatter batteries are constructed to bleed energy slowly if broken or cracked. In such a case, the battery will flash brightly for up to one space combat turn (20 minutes) with very bright light and intense heat. Anyone at close range (5m) is subject to Burn-1 per combat round, and Burn-3 at Contact range.

Antimatter batteries may be linked together to generate correspondingly greater power: nine batteries chained together provides the output of an ACS Power Plant-9. [ref: Twilight's Peak p39].

### **FusionPlus.**

TL E, Size 4, Heavy and Bulky, Cr 10,000.

17 liter sealed energy unit, with a 1-year internal fuel supply. Powers a Size 6 item for one year, or up to 3 Size 5 items for one year, or up to 10 Size 4 items for one year.

### **Generator**

TL 8, Size 4, 25 kg, Cr 250.

Low-tech power plant with a 1-day internal fuel supply. Powers a Size 5 item, or 3 Size 4 items, or 10 Size 3 items. TL 7 and below have few or no digital elements, and produce tainted air as a by-product. TL 9 and above are digital, and

use superior engineered fuels.

### **PowerCell**

TL A. Storage battery for operating devices independently. Typically, a PowerCell is one size smaller than the device it powers, lasts for 24 hours of continual use, and has negligible discharge during non-use. Cells support micro-induction power transfer, and are capable of powering items without direct connections. Quality maps to the operational life of a cell.

Ambient Panels are powercells which recharge themselves from ambient light. They have identical characteristics, but are more fragile (Quality=-2, Reliability=-2).

#0 PowerCell. TL A, Size 0, 0.1 gram, Cr1.  
5 mm pellet for a Size 1 device.

#1 PowerCell. TL A, Size 1, 1 gram, Cr 10.  
1 cm x 5 mm x 5 mm slab for a Size 2 device.

#2 PowerCell. TL A, Size 2, 200 grams, Cr 100.  
9 cm x 4 cm x 4 cm cylinder for a Size 3 device.

#3 PowerCell. TL A, Size 3, 2.3 kg, Cr 1,000.  
25 cm x 12 cm x 12 cm (3.6 liters) cylinder for a Size 4 device.

#4 PowerCell. TL A, Size 4, 50 kg, Cr 10,000.  
80 cm x 50 cm x 25 cm (100 liters) brick for a Size 5 device.

## Q SMALL CRAFT

Type	Tons
A Lifepod	10
B Ship's Boat	30
C Cutter	50
F Fighter	10
G Gig	20
L Launch	20
N Pinnace	40
P Pod	< 100
S Shuttle	95

Small Craft are less than 100 tons. Traditionally accepted small craft types (and suggested tonnages) are shown.

Small Craft are less than 100 tons. Traditionally accepted small craft types (and suggested tonnages) are:

**Pod (less than 100 tons).** Unpowered hull.

**Lifepod** (10 tons). Emergency escape and survival craft.

**Fighter** (10 tons). Armed (and possibly armored) combat craft.

**Gig** (20 tons). Utility craft for passenger and freight transfer between ships.

**Launch** (20 tons). Small multi-purpose craft capable of landing on worlds.

**Ship's Boat** (30 tons). Mid-sized utility craft assigned to a specific ship.

**Pinnace** (40 tons). Mid-sized utility craft capable of landing on worlds.

**Cutter** (50 tons). Mid-sized multi-purpose small craft.

**Shuttle** (90 tons). Large passenger and freight transporter capable of landing on worlds. Built to travel between two points (worlds; locations).

## R DRUGS (RX) AND MEDICAL

Type	TL	Size	Kg	Cr
Anagathic	G	1	0.1	1,000,000
Antibiotic	See Counteract			
Antidote	See Counteract			
Bandage	4	2	0.1	1
Cast	7	3.5	2	100
Combat Drug	A	1	-	750
Counteract	C	1	-	250
Fast Drug	A	1	-	200
First Aid Kit	See Medical Kit			
Limb Reattacher	C	5	100	1,000,000
Low Berths	B	5	500	50,000
Medical Capsule	See Low Berth.			
Med Scanner	9	3	1.5	1,500
Medical Kit	See T - Toolkit section.			
Nutrient	9	1	300g	1
Painkiller	7	1	-	10
Panacea	9	1	-	1,000
Psi Boost	9	1	-	1,000
Psi Double	A	1	-	2,000
Psi Special	B	1	-	10,000
Restorative	C	1	-	1,000
Sensory Drug	C	1	-	1,000
Skin Glue	9	1	-	100
Sling	See Cast			
Slow Drug	9	1	-	500
Splint	See Cast			
Stasis Capsule, Military *	J	6	2,000	100,000
Tranq	6	1	-	10
Truth Drug	9	1	-	20
Vaccine	A	1	-	20
Wound Dressing	See Bandage			

\* Item is typically a nonworking artifact.

Items related to treatment of disease and trauma. Includes drugs and anesthetics. A variety of pharmacological developments are available to travellers for medicinal (and other) purposes. Drug availability, reliability, and price vary considerably from world to world depending upon the local law and Tech Levels.

**Medical Drugs Notes:** Medical drugs can generally be obtained only from a physician or with a physician's prescription on worlds with high law levels, but they are generally available at retail on worlds with low law levels. Since they are dosed and administered in numerous ways, they must be given by a character with some skill in medicine.

### Anagathic.

TL G, 100g, MCr 1.

Drugs which counteract the aging process: supposedly, a regimen of regular monthly doses enables an individual to ignore the debilitating effects of advancing years. Because of the rarity and demand for anagathics, they are quite expensive and are often unavailable at any price.

### Low Berth

TL B, Size 5, 500 kg, KCr 50.

Displaces 0.5 ton. A berth for carrying one person in low passage; typically installed in a ship. Low berths also serve well in emergencies, in that they can provide suspended ani-

mation facilities for characters when medical care or rescue is not immediately available.

**Low Berth Efficiency.** A low berth is power efficient, and will keep its occupant in hibernation on its #4 PowerCell for a duration based on its Quality; typical quality (=5) is a six-month duration.

**Low Berth Sizes.** All low berths come in smaller and larger sizes than listed. Half-size berths accommodate sophonts up to Size 36, double-size berths accommodate sophonts up to Size 144, and so on. Price correspondingly scales (but with a minimum price of KCr 50).

**Low Berth Modifiers.** Modifiers may be combined; in some cases, the results may be greater than the sum of their parts. Typical modifiers include:

**Animal.** Tunes a low berth for animals, at one TL lower.

**Capsule.** Multiplies cost by 10, doubles the mass and volume, and has a larger power source, increasing the berth's maximum off-line battery duration by a factor equal to the capsule's TL.

**Emergency.** Doubles cost, mass, and volume, holds four times the number of individuals, and doubles the berth's maximum off-line battery duration. It is used for survival emergencies when medical care or rescue is not immediately available. Each holds four persons who share the same revival task roll.

**Medical.** Multiplies cost by 20, doubles the mass and volume, has a diagnostic computer, a variety of therapeutic medicines, and a database of medical procedures. Acts as a Doctor with C+S=TL.

### Medical Capsule

TL B, Size 6, 2,000 kg, MCr1. Displaces 2 tons. Aside from the standard Medical and Capsule modifications, also treats severe wounds or trauma; repairs, reattaches, or, if necessary, regrows a damaged or destroyed organ or limb, as a Doctor with C+S=TL. Each treatment puts the patient into suspended animation for 1D x 10 weeks, and injects the patient with tailored regrowth drugs and nutrients costing KCr100 (one dose per treatment).



### COMBAT DRUG

Combat Drug SE. Increases Strength and Endurance.

Combat Drug SS. Increases Strength and Stamina.

Combat Drug SV. Increases Strength and Vigor.

**Military.** Doubles cost, mass, volume, number of individuals held, and maximum off-line battery duration. Keeps reserve troops (the Frozen Watch) in storage until needed.

**Stasis.** This feature comes available at TL J+, places the patient in a stasis field, and increases the berth's maximum off-line battery duration by a factor of 10.

### Bandage

TL4, Size 2, 0.1 kg, Cr 1.

Light dressing and, with higher TL, contact medicines to mitigate injury, improve healing, and prevent local bacterial infection. Adds its TL to Medic skill.

### Cast

TL7, Size 3.5, 2 kg, Cr 100. Limb Immobilizer. Acts as a Bandage for the purpose of mending broken bones, exoskeleton, or the like. TL3 and earlier versions are called splints (for legs) and slings (for arms) and can be applied in the field. Adds TL to Medic skill.

### Counteract (type)

TL C, Cr 250. Daily (or QPR) antidote drugs which counteracts a specific targeted effect according to type, for instance a toxin, suffocation, the onset of a sickness or deprivation, Fast Drug and Slow Drug, anti-rejection, anti-septic, etc. Painkillers and antibiotics are available earlier, being standard at TL 9.

### Combat Drug SE

TL A, Cr 750. Taken by fighters (usually military personnel) prior to combat, this drug increases personal strength and endurance (adds 1D distributed between Strength and Endurance with a remainder preferenced to Endurance). The effect begins 30 seconds after being taken and lasts for about 10 minutes. When the effect wears off, the user suffers 1D in wounds.

**Non-Human Combat Drug SV and SS Variants.** Local producers may manufacture variants adapted to non-humans. SV affects Strength and Vigor, while SS affects Strength and Stamina. Costs remain roughly the same.

### Fast Drug.

TL A, Cr 200. So named because it makes the universe (to its user) appear to move much more quickly, the drug slows down personal metabolism at a ratio of approximately 60 to 1. Users are extremely vulnerable while living at such a slow rate, but physical aging is also slowed, and the need for consumable supplies is reduced which thus allows conservation of air and food. Fast drug takes effect immediately upon ingestion, one dose lasts for 60 days, making that time appear to be only one day.

### Limb Reattacher.

TL C, Size 5, 100 kg, MCr 1. Heals severe wounds or trauma on a limb. Reattaches severed limbs, encourages mending, and removes infection. Treatment induces an artificial coma for 1D days, and injects the patient with a cocktail of tailored regrowth drugs and nutrients costing KCr100 (one dose per treatment).

### Med Scanner

TL 9, Size 3, 1.5 kg, Cr 1,500. This larger, handheld version of the micro med scanner (below) differs from the pocket version in that this handheld model includes a diagnosis computer, which allows individuals with little or no medical skill to diagnose and treat illness and injury.

### Nutrient

TL 9, Cr 1. Basic nutritional replacement for a single meal, stored in a disposable container as a slurry of protein, carbohydrate, and fats in a cocktail of vitamins and glucose. Quality is low. High quality versions, with better flavor or more desirable ingredient origins, cost more.

### Painkiller

TL 7, Cr 10. Masks damage caused by injury from the patient for 1D hours. The damage is still there, but the patient can perform tasks as if damage were 0. When the painkiller wears off, the patient's internal clock advances to its "rest" period, and suffers fatigue until appropriate rest is taken.

### Panacea

TL 9, Cr 1,000.

Cures most known pathogenic illnesses and accelerates the body's healing process. Patient is fully recovered in one week's time.

### Psi Drugs

**Psi Booster.** TL 9. Adds 1D to the user's Psi rating for 1D hours. The basic psi-drug, booster is available in small one-dose pills. Booster increases an individual's available psionic strength. Additional doses have no effect if taken by a psionic within an hour. The drug-induced additional psionic strength will wane and disappear at the end of one hour.

**Psi Double.** TL A. Doubles Psi for 1D hours. A more potent form of the psi-drug, also available in small one-dose pills. Double increases psionic power by about double.

**Psi Special.** TL B. Increases Psi by 1 point per hour to a maximum of 15, and after 4 hours at 15, wanes by 1 point per hour until Psi reaches 0. The rarest of psidrugs, special is available only in liquid form and must be taken by injection.

### Restorative

TL C, Cr 1,000.

Returns the patient to its full original SAN.

### Sensory Drug

TL C, Cr 1,000. Drugs which enhance an existing sense constant by +Flux for 1D hours. Multiple doses provide additive effects, but does not extend duration.

Awareness Enhance.	TL C.
Hearing Enhance.	TL C.
Olfactory Enhance.	TL C.
Perception Enhance.	TL C.
Tactile Enhance.	TL C.
Vision Enhance.	TL C.
Vision Spectrum Enhance.	TL C.

### Skin Glue

TL 9, Cr 100.

Stops surface wounds and accelerates the healing process better than antibiotics and bandages. Ten doses.

### Slow Drug

TL 9, Cr 500.

So named because it makes the universe (from the user's viewpoint) appear to move more slowly, the drug achieves the effect by accelerating the user's metabolism. In effect, the user lives approximately twice as fast as normal.

Slow drug takes effect 45 seconds after ingestion and continues to function for about 10 minutes. At the end of its effect, the user receives 1D in wounds. The person is extremely fatigued, is treated as if all available combat swings have been taken, and must recover from that fatigue. A person under slow drug (because he or she is living at twice the normal rate) can make twice as many actions or move twice as far as normal.

The Medical Slow Drug version causes unconsciousness and the passage of thirty days equivalent recovery time in one day. During this period, ordinary healing takes place. No wounds are received from the use of medical slow drug, but the individual is unconscious or semi-conscious while under its influence.

### Stasis Capsule, Military

TL J, Size 6, MCr 1.

Displaces 2 tons. A berth for carrying one or two individuals in stasis for (typically) up to 90 years off-line, or indefinitely when connected to a reliable power source. See Low Berth for additional details. Note: The Ancient's military stasis capsules in Twilight's Peak is a TL Q version with a Quality of at least +5; they are theoretically capable of holding individuals in stasis on batteries for at least 200,000 years.

### Tranq.

TL 6, Cr 10.

Renders patient unconscious for 1D hours.

### Truth Drug.

TL 9, Cr 20.

Used to compel individuals to answer interrogation truthfully, one dose is sufficient to assure truthful answers for approximately two minutes, after which the user experiences one hour of unconsciousness, and suffers 2D in wounds.

### Vaccine

TL A, Cr 20.

Prevents illness, if administered once per year, by reducing both the chance of contracting a disease and the severity of any disease caught. Protects the patient from a family of similar diseases on the world where they occur. TL 9- versions only protect against one particular form of a disease.

## STRUCTURES, SHELTERS

Type	TL	Size	Cr
Advanced Base	8	6	50,000
Airlock	A	6	100,000
Foam Shelter	C	6	7,500
Hangar	8	7	20,000
Portable Airlock	8	5	1,000
Prefabricated Shelter	6	6	10,000
Pressure Tent	7	5	2,000
Tarpaulin	1	5	10
Tent	2	5	200
Undersea Habitat	9	6	5,000,000
Underwater Shelter	9	6	1,000,000

Items of sufficient size to contain one or more sophonts. Includes temporary shelters, movable shelters, and permanent structures.

### Advanced Base

TL 8, Size 6, Cr 50,000.

Displaces 6 tons. Model 317 modular pressurized quarters for 6 persons, with air lock, recycler, fresher, atmosphere recirculating system, and console. 2 by 6 by 6 meters. 800 man-days' worth of food. TL C+ versions are powered by an integral Fusion+ unit for up to one year; older units rely on PowerCells or more primitive generators. Can be carried in the hold of a starship.

AV = 100. All protections except Psi = 4 x TL.

### Airlock

TL A, Size 6, Cr 100,000.

Displaces 0.5 ton for human-sized sophonts.

A permanent metal structure suitable for long term use.

### Foam Shelter

TL C, Size 6, Cr 7,500.

An advanced shelter system. The base of the system is a binary metapolyfoam that comes in a tank, massing 25 Kg. When dispensed the foam creates an insulated, pressurized structure displacing up to 10 tons. Each tank has enough of the foaming agents to create up to ten "1 ton structures" which can be dispensed individually, in groups or all at once. While the foam creates the basic structure, it does not create Life Support, merely shelter. It comes standard with an additional 1 ton package which is contained in membranes and framing which are used after unpacking for airlock doors. Other contents include an advanced Life Support system and a small laser cutter for fine shaping (it does Pen-1 damage if used in combat). The system may be refilled at certified dealers for Cr 5500.

AV= TL= Cage, Flashproof, Radproof, Insulated, Sealed.

### Hangar

TL 8, Size 7, Cr 20,000

An open structure, made from standard construction materials, designed to shelter aircraft (sometimes very large) with plenty of access space to perform maintenance.

Temporary Hangars, Size 6, Cr 5,000, are designed to hold one aircraft with minimal space for maintenance. Typi-

cally 150m x 75m x 20m.

### Portable Airlock.

TL 8, Size 5, 6 kg, Cr 1,000.

An inflatable, portable chamber that can be attached to the vacuum side of a bulkhead, entered and pressurized, allowing a hole to be cut into a pressurized area without depressurization. It includes a patch held in place by pressure which seals the hole when the airlock is depressurized. The device includes a pressurized air cylinder and an automatic pump; the airlock is 500 cm x 20 cm x 200 cm deflated, and 1.5 m x 1.5 m x 2 m when inflated.

AV = TL. Radproof, Sealed = 3 x TL.

### Prefabricated Shelter

TL 6, Size 6, Cr 10,000.

Displaces 4 tons. Modular unpressurized quarters for 6 persons. 2 by 6 by 6 meters. Fits in the hold of a starship.

AV = 3 x TL = Flashproof, Soundproof, Insulated.

### Pressure Tent

TL 7, Size 5, 25 kg, Cr 2,000.

Basic shelter for two persons, providing standard atmosphere. There is no airlock: the tent must be depressurized to enter or leave.

AV = TL = Flashproof, Radproof, Insulated. Sealed = 4 x TL.

### Tarpaulin

TL 1, Size 5, 2 kg, Cr 10.

A canvas or waterproof cloth sheet used for temporary shelter. 2 by 4 meters.

Protections: AV = TL = Flashproof, Insulated.

### Tent

TL 2, Size 5, 3 kg, Cr 200.

Basic shelter for two persons. Larger, more elaborate tents weigh and cost more. Vehicle tents are at least Size 6, double the mass, and Cr 2,000.

AV = TL = Flashproof, Insulated.

### Undersea Habitat

TL 9, Size 6, MCr 5.

Displaces 120 tons, containing support structures for undersea operations. The habitat is modular, allowing several units to be joined together to form a larger habitat, and includes a moon pool, a 20-ton vehicle maintenance bay, and 100 extra tons for living space, lab space, etc.

AV = 500. Insulated = Sealed = 4 x TL.

### Underwater Shelter

TL 9, Size 6, MCr 1.

Displaces 8 tons. Modular, domed, pressurized quarters for 6 persons. Includes life support for 10 man-months. Four connected domes, each measuring roughly 3 by 3 meters and 3 meters tall at the center. Can be carried in the hold of a starship; folded up, it displaces 4 tons. The typical depth for this shelter is 150 meters or about the depth of typical

## TOOLKITS

Type	TL	Size	Kg	Cr
Portable Toolkit	3	2	-	150
Toolkit	4	10	-	1,500
Toolset / Toolchest	5	50	-	10,000
Station / Workbench	6	-	2 t	100,000

Tools help skills. Tools are grouped into kits or sets adapted around a specific skill or purpose.

continental shelves.

Protections: AV = 100. Insulated = Sealed = 4 x TL.

**Standard Toolkits.** The “standard” toolkit is size 4, corresponding to a backpack or carrying case, and can be worn or attached to another pack. It generally masses 10 kilograms and costs Cr 1,500.

**Portable kits.** A smaller version of the standard toolkit is size 3 (about the size of a book), and can be worn or attached to another pack. It generally masses 2 kilograms and costs Cr 150.

**Toolset or Toolchest .** The standard toolchest is size 5, masses 50 kilograms, and costs Cr 10,000.

**Station or Workbench.** The standard workbench is a size 6 (displaces 2 tons) environmentally-controlled room full of equipment. It costs Cr 100,000.

**Starship Skills Toolkits.** The starship skills toolkit is the console and its variations, as detailed in ACS.

### Craftsman Tools

TL3. Includes basic tools necessary to cut, shape, and build with wood, stone, metal, etc. May include construction, alteration, and repair of shelters, buildings, or furniture. Workstations include welding and shaping equipment.

### Survival Tools

TL 5. Contains a variety of items useful in survival situations, such as a canteen, compass, first aid kit, salt tablets, knife, signal mirror, and water purification tablets. Size 4+ toolkits also include a folding shovel, water trap, climbing gear (including rope), and sturdy all-terrain boots.

### Disguises

TL 7. Allows change of personal appearance on a temporary basis.

### Electronic Tools

TL 7. Necessary tools for basic assembly and repair of electronic devices such as communicators, detectors/sensors, and control instruments.

### Locksmith / Intrusion Set

TL 5. Allows access and repair of secure installations.

The TL 3 version is a set of crafted physical lockpicks (craftsmanship subject to quality), abrasive, files, and so on.

The TL 8+ versions include the Portable Access Station (PASS) for those who just hate to go in the front door. Includes lock and security defeats appropriate to tech level – e.g. a computer with intrusion software, electronic security overrides, and lockpicks.

A locksmith set of a given Tech Level cannot be used against types of locks of higher Tech Levels, but it may be used against a lock of a higher Tech Level if it is equipped to deal with that type of lock. For example, a TL 6 kit cannot be used against electronic locks since these begin to appear at TL 7. However, the same kit could be used against a TL 7 deadbolt lock, albeit at a slight disadvantage; the difference in Tech Levels could be used as a DM to the success roll.

### Medical Kit.

TL 7, Size 4, 10 kg, Cr 2,000.

Modern medical tools containing drugs, resuscitation equipment, surgical supplies, and diagnostic materials. The kit is sufficient for both minor and serious wounds, and it can be used for the treatment of animal injuries, radiation burns, chemical burns, poisoning, and drug overdoses. TL 9+ versions include Skin Glue, which stops surface wounds and accelerates the healing process better than antibiotics and bandages.

Med Scanner, Micro. All TL 9+ medical toolkits come with a size 2 pocket med scanner, an indispensable device in the satchel of any physician. Medical skill is not needed to operate the scanner, but the skill is necessary to properly interpret the readings. It includes several types of sensors (ultrasonic scanner, infrared, and electric field sensors), and a small processor to integrate data. In one setting, it is a diagnostic unit which can record vital signs of patients and correlate data. With a radio link to ship-board computers, it can evaluate symptoms and recommend treatments.

In a second setting, it can be used as a sort of life detector (Range=2), capable of distinguishing large creatures; range is halved if there are intervening obstacles.

## UNIQUES AND VALUATA

Type	TL	Size	Cr
Challenge Coin Imperial Navy	C	1	10
Challenge Coin, Marine	A	1	10
Cutlass, Marine	F	4	2,000
Dagger, Imperial Navy	F	3	1,700
Jinn *	R	3	250,000
Medal: MCFU	C	1.5	1D x 100
Shrine, Aslan	1	5	50,000
Shrine, Shugilii	B	5	5,000
Shrine, Solomani	6	5	1,000
Sylean Mint Plate Set	C	3	49

\* Item is typically a nonworking artifact.

Uniques include a wide range of found objects with special value based on their history or intrinsic value.

### Imperial Navy Challenge Coin

TL C, Size 1, Cr 10. An iridium-plated service coin.

### Marine Regiment Challenge Coin

TL A, Size 1, Cr10. A corrosion-resistant service coin carried by members of a specific Imperial Marine regiment.

### Imperial Marine Cutlass.

TL F, Size 4, Cr 2,000.

A ceremonial, iridium cutlass with gold and silver filigrees, worn by Imperial marine officers on formal occasions. Finely crafted and ornamented. Sharp to a frightening thinness. Stronger than steel (will cut TL4 cutlasses with ease). Individualized versions are made by a master craftsman, and are extremely rare. Typically presented as a commemorative item and inscribed with the owner's name, the date of presentation, and the event commemorated. Occasionally it will have slogans or comments engraved as well, e.g. "handle me well, for I was wielded by Emperor Arbellastra in the Year of our Third Imperium 620 when she beheaded the traitorous bastard Gustav."

### Dagger, Imperial Navy.

TL F, Size 3, 50 grams, Cr 1,700.

A ceremonial, jeweled, iridium dagger carried by Imperial naval officers on formal occasions. Balanced for throwing. Finely crafted and ornamented.

### Jinn

TL R, Size 3, 3 kg, Cr 250,000.

A small, portable container ("bottle") for a semi-organic brain. At TL R bottles have antimatter power and efficient life support systems, allowing a brain to survive for long periods of time before requiring a recharge. The most common Jinns have psionic brains installed (for example, with Teleport skill), which can act without requiring a body.

### Meritorious Conduct Under Fire.

TL C, Size 1.5, Mass: 50 grams, Cost: Cr 100 x 1D.

A recent, standard issue version of the MCFU awarded by the Imperium for acts of military valor. As it is fourth in the order of precedence they are more common than the MCG and both versions of the SEH which brings the market value

down.

It should be noted however that those issued for a famous battle, to a well known sophont, those issued during the early periods of the Third Imperium and of course those awarded during the First Imperium are generally priced in the thousands of credits. (The value of MCFUs awarded during the Second Imperium typically are very high in those areas where Solomani sympathies are strongest and practically worthless around Vland.)

In most cases a properly displayed MCFU can reduce Social Tasks Difficulty by 1D involving military matters. Though it is fourth in order it is the top five highest military awards of the Imperium and can open many doors. Characters should note that in rare cases possession or display of the MCFU can have the reverse effect generally due to jealousy or dislike of the military.

An example of a highly valued MCFU is Medal Number 400536 issued in 627 to Gunnery Sgt. Eleri Kuliigan by Arbellastra. Encased in vacuum sealing to preserve carbon scoring from the immediately subsequent battle culminating in the slaying of Gustus by Arbellastra's blade. Due to several factors (early Imperium, the Second Frontier War, the Civil War, and the personal awarding by the future Empress all add value) this specific MCFU if up for auction it could be expected to fetch a minimum of KCr 300 and could go for up to MCr 1. It is however held at Capital in the Imperial Museum of Military History and is not for sale.

### Shrines

TL varies. Size 5. Price varies.

Displaces one ton. A culturally-significant shrine or altar by which a sophont species may reflect. Examples include a TL 1 Aslan Shrine, a TL 6 Solomani war memorial, or a TL B Vilani Shugilii's Cross of the Spatula and Tongs.

### Sylean Mint Spinward Worlds Series

TL C, Size 3, New= Cr49.9

Collect them all! Indeed, all 436 worlds of the Spinward Marches are captured on the wonderful collectible plate series. Your first plate will be Regina, crown jewel of the Marches, featuring this beautiful world lit by the glow of Assiniboia and surrounded by cameos of: Duke Norris, Gratina the Ammindi, and a cityscape of Regina City. Then, every month, you will receive a new world from the Marches to hold in your hands and admire. These are beautiful works of art and a strictly limited edition, restricted to a mere 120 firing days per plate. Order now so you won't be disappointed. Each plate, Cr49 by auto-deduction, plus shipping. Order Now!

Values vary online at the Collector's Exchange. Also occasionally found in thrift stores = Cr5.

---

**V VEHICLES**

---

Type

A	ACV
B	Boat
B	Submarine
C	GroundCar
F	Winged Flyer
M	Military Flyer
R	Rotor Flyer
R	Air/Raft
T	Truck
W	ATV All Terrain Vehicle
T	Tank
T	Armored Fighting Vehicle
2	Trailer

---

---

---

**W WEAPONS (OMITTED)**

---

Type

TL Size Kg Cr

---

**X EXPLOSIVES (OMITTED)**

---

Type

TL Size Kg Cr

---

**Y ROBOTICS (OMITTED)**

---

Type

TL Size Kg Cr



# Adventures

---

Adventure is the term for activities undertaken by characters as they live their lives. Enjoyable adventures satisfy the needs of the players and transform the adventure's story into a unique experience with respect to specific characters and their players.

**Traveller** adventures span the entire range of experience that can be expected in the universe of the far future. The potential for adventure is endless, depending as it does on the situation and on the characters themselves. Nevertheless, each adventure can be classified in a number of different ways. These classification schemes can help any referee to produce his or her own adventures.

**Traveller** players are always in search of adventure. Some adventure comes from playing the game system, from designing starships, and from exploring worlds generated by the referee. More adventure comes from the scenarios that the referee supervises, and from participating in campaigns. The interaction of the characters involved, the imaginations of all the players, and the details of the game system make the entire game fun for hours on end.

## TYPES OF ADVENTURES

Adventures can be classified by their patrons and situations. They may have a variety of settings and catalysts.

### Patrons

are non-player characters who provide direction and guidance to the players. In many cases, they speak with the voice of the referee in providing their help.

A Patron Mission usually involves an Noun and a Verb. The noun is an object (construed liberally to include things, people, animals, and even information) and the verb is an action (which can include any conceivable activity). Adjectives are sprinkled liberally to add detail.

Some examples include:

Find Rare Animal. Recover Lost Book. Carry Important Message. Protect Vital Secret. Return Stolen Gem. Discover Important Fact. Locate Lost Starship. Guard Valuable Cargo.

With time and a growing knowledge of the universe, the players themselves will develop their own missions and become for a time, their own patrons.

**Rumors.** A Patron need not be a person: news items, encyclopedia entries, and even rumors may be enough to motivate the players to undertake a mission.

### Situations

indicate the actual nature of the adventure: the probable actions the players are expected to take. Situations include:

The **chase/pursuit** may involve characters on either side of the situation, and it is possible for events to turn the tables on the players, converting the pursuers to the pursued on a moment's notice.

**Assault/rescue** usually involves force or violence in overwhelming enemy characters or the forces of nature in order to obtain some goal. Characters may be on either side of the assault/rescue.

**Discover/exploration** puts the characters into an un-

known situation where they must find information about their environment either to ensure their own survival or as part of some interest they have.

**Enrichment** makes economic, social, intellectual, or other improvement the primary goal. Such adventures are mercenary (although not necessarily military) in nature.

The **enigma/mystery** presents a situation for the characters to solve. It may be a simple murder mystery, with clues all around, or it may be a puzzling alien structure about which the group is curious.

**Novelty** adventures place the characters in interesting situations and allow them to deal with them. A visit to an interstellar casino for a round of gambling is a novelty.

### Settings

are locations for adventures. The setting may remain the same, but because most adventures involve travel, they usually vary. Three basic settings for adventures are the ship, the outside location, and the enclosed location.

The **ship** covers any vessel, whether marine, interplanetary or interstellar, or other type; ships provide interesting movable settings with abundances of machinery and other equipment. The ship location also extends to many vehicles.

The **outside location** is geographic in nature: it is usually a world surface hex of some specific size.

The **enclosed location** indicates any building or natural feature and is usually indoors; it is often presented as a maze or labyrinth to be explored and conquered.

### Catalysts

provide interest in an adventure. They include danger (which forces action through threats), opportunity (which forces action through a promise of reward), and puzzles (which prompt action through curiosity). By assembling these aspects of adventures together, the referee can produce interesting and ever-changing adventures for the players.

## ADVENTURES COME IN MANY SIZES AND TYPES

**Traveller** scenarios come in many sizes and types. In ascending order by size, they are called patron encounters, casual encounters, amber zones, short adventures, adventures, and campaigns. Size also has a direct bearing on the completeness of detail presented and on the complexity of the situation. Compare adventures to video entertainment: each type corresponds to a form of television show, and each has its own appeal.

**Patron Encounters.** The smallest and easiest encounter is the **patron**. It should be possible for the player characters to encounter a patron after a short search. The patron will provide a purpose when hiring the adventurers, and may provide limited funds for the task.

Write a short paragraph for the players to read detailing the information available to them. Such information includes the location, a description of the patron, the task to be assigned, and the remuneration to be paid to the player characters. In addition, several details should be included to establish some opinions in the minds of the characters.

To complicate the situation, create a selection of six possible outcomes to the situation (for example: the patron is lying, the patron is crazy, has been himself swindled, is honest, dishonest, or is deviously pursuing some other, unstated goal). The referee selects the real situation and it influences the description of the encounter and the ensuing job.

**Casual Encounters** are more detailed situations. The patron is more fully detailed, which helps the adventurers determine his attitudes and motivations. The referee will already have established a single purpose, mission, or task for the patron, and will present it to the players.

The players must decide whether to accept the assignment, and then set about planning a course of action. Because the casual encounter patron is more clearly defined, the referee may be called upon to role-play the patron (taking care not to take over the action, or to provide too much guidance).

**Amber Zones.** The Travellers' Aid Society publishes warnings about dangerous (or puzzling) worlds: Amber Zones. The label has come to identify any dangerous situation (not necessarily on an Amber Zone world).

AZ situations present a problem, task, or predicament to the players and usually include a general outline for the referee to follow. The referee must provide deck plans or maps where called for, and he or she must be prepared to deal with problems in background or reactions when it becomes necessary.

**Short Adventures.** Complete situations presented to the players for their response are often short adventures.

## ADVENTURES IN MANY TYPES

Patron Encounters for quick action.  
 Casual Encounters for a diversion.  
 Amber Zones for exploring new worlds.  
 Short Adventures for interesting situations.  
 Full Adventures for extended activities.  
 Campaigns that string many adventures together.

Such short adventures include relatively complete maps or deck plans, plus descriptions, detailed situations, animal encounter tables, or other necessary information, and an overview to explain the situation to the referee. Short adventures are restricted only in their length, and often are confined to a single building, starport, or incident which must be dealt with by the players.

Short adventures focus mainly on a single interesting situation and provide relatively detailed background and data on that specific item.

**Adventures (or Full Adventures).** Large, detailed scenarios which deal completely with a single topic are called adventures. Although similar in nature to a short adventure, the larger adventure provides pre-generated non-player characters, crews for ships, details of starships to be encountered, background or library data, and other materials to flesh out the local portion of the universe. All of this embellishment is in addition to the basic situation which is to be dealt with. It serves to make the environment more realistic, more challenging, and more informative. In the course of dealing with the basic idea of the adventure, the players also deal with the background that makes the universe in this situation seem more real.

Adventures are also long enough and complex enough that the players will encounter several situations, often only different aspects of the same basic premise, while they play.

**Campaigns.** The campaign is a combination of all of the above types of situations into one continuous, intermeshing role-playing life. The background for a campaign remains constant and consistent, while individual adventures, short adventures, amber zones, casual encounters, and patron encounters unfold in it. The fact that the campaign maintains a constant background means that players who learn some fact about the universe in one adventure can often depend on that fact and use it later in another adventure.

Campaigns are almost always dependent on continuing characters. Once a character is generated, he or she continues (at least until death or retirement) to adventure within the same framework of history and background, gradually building up a knowledge of the universe that should help in dealing with adversaries or nature.

## COMPARE ADVENTURES TO TRADITIONAL ENTERTAINMENT

	Actors	Musicians	Dancers	Author	Chef
Patron Encounter					
Casual Encounter					
Amber Zone	Episode	Song	Number	Short Story	Snack
Short Adventure					
Full Adventure	Movie	Symphony	Performance	Novel	Meal
Big Adventure	Two-Part	Concert		Epic	Banquet
Campaign	Season	Series	Season	Series	Series

## STYLE AND TONE

**Traveller** is a hard-science game, which means that so far as possible, realism should be maintained. Objects and the setting itself should obey consistent physical laws. People and animals should also behave realistically. This does not mean that the fantastic has no place in **Traveller**. Far from it—it is this very grounding in the ordinary that makes the extraordinary so wondrous in **Traveller**. Some science fiction settings are so filled with the bizarre and unearthly that they dull the imagination. Not so **Traveller**. When a shadow falls over the characters and they look up to see an entire city floating overhead on grav modules, the event will have greater impact if the players understand that this really is an impressive achievement. Cities don't normally do that! If they do, the setting loses something.

Aliens, weird ecosystems and strange human societies should be tempered with a healthy dose of reality. "Psionics" or "Ancient Devices" can explain only so many bizarre occurrences. Similarly, however odd a society or ecosystem may be, it should still obey its own internal logic, even if it seems incomprehensible to the players.

Comedy is a difficult issue. All games benefit from light relief, but self-parody is a bad idea as pretty soon the whole game becomes a parody of itself and impossible to take seriously. The occasional "silly" adventure as a one-off is a reasonable idea, but care should be taken that events from the comedy game do not become in-jokes in the serious sessions. Better to avoid outright comedy altogether, or play an entirely different game for those silly sessions.

## Paradigm Shifts

Most advances in technology are built on previous advances, and they follow logically. There are a limited number of technological advances which do not follow logically; these paradigm shifts *have profound effects on interstellar society and on their discoverers*.

While sources inside the **Traveller** universe (scientists, historian, sophontologists, etc) disagree about the specifics of these paradigm shifts, technological advances such as electricity, computers, fusion, metaconductors, jump drive and FusionPlus have all been suggested as examples from the Third Imperium's past. Some have suggested that the harnessing of antimatter as a safe and reliable energy source is an example lying in the Imperium's future.

## THE PROTOTYPE ADVENTURE

Role-playing adventures follow a basic structure which emphasizes plot elements rather than character (the players themselves provide the character and character development). A referee should have this structure in his (or her) mind when designing an adventure, building each Scene to emphasize one of these six elements. These plot elements are called the basics, the gimmick, the pull, the push, the enigma, and the distraction.

### The Basics

Maybe the thought of the basics is obvious, but it gets overlooked. The rules for **Traveller** are presented in this book, but there are certain basic facts which the referee

must provide. First and foremost is the map and an idea of what lies within the map (and why). Consider any modern map: it may have place names scattered about, but even a grade school education enables a reader to see beyond the names: the center of South America is jungle; some countries are democracies or dictatorships; they may be rich or poor; they may be allies or enemies of their neighbors. The same background is required for a subsector map. The referee needs to give some critical thought to the political organization of the areas shown: is there an empire, a federation, an unsettled frontier? How does the government interact with its citizens: is it benevolent or oppressive, or is its presence even felt? These basics may well be sketched out ideas: rough maps where the holes can be filled in later. But these basics need to be there, or the players will later find themselves wandering into inconsistencies.

At a minimum, the basics should address the subsector map, interstellar government, and local technological levels. As needed, the referee may add more basics to the adventure, including animal encounter tables, local organizations of importance, world and local laws, history, and other foundations. With the basics available, it is possible to set any mundane adventure without further preparation. The only problem is that such adventures will be mundane; there is no real spirit of excitement behind them; the adventure needs something more.

### The Gimmick

An adventure can immediately appeal to players with gimmicks. Early in the adventure the value of the gimmick is its appeal to the players; as time passes, they discover that the gimmick supports their quest as well.

Gimmicks are objects which fascinate: an powerful or advantageous weapon; a powerful defensive device; a valuable modification to a ship's capabilities; a high-tech gadget; a map chip that leads to an abandoned military base; a letter of recommendation to the Third UnderSecretary of Interstellar Affairs.

Gimmicks are things that players want; they rank above money or ordinary things. They represent an advantage: special access; special abilities; high tech; special talents.

Gimmicks cannot be bought: they must be earned through hard work, clever planning, and good fortune. In the context of an adventure; gimmicks are acquired early and then serve the group for the rest of the adventure.

---

## UNIVERSAL ELEMENTS OF THE ADVENTURE

**The Basics.** Essential details about location, background, and history.

**The Gimmick.** A basic thing that intrigues (and ultimately help) the characters in their travels.

**The Pull.** The attraction of some goal for the group, or for individual characters.

**The Push.** The continuing motivation (or threat) that compels the characters to keep going during the adventure.

**The Enigma.** Some thing that is not understood, but ultimately becomes clear by the end of the story.

**The Distraction.** A seemingly important detail which ultimately proves to be meaningless.

---

### The Pull

The pull is a simple name for a goal that attracts adventurers, much like a magnet attracts iron. It can be as simple as a fabled mineral deposit on a distant world, or as complex as a secret formula that will keep the sun from going nova—to be found within a certain time limit.

Pulls must be tailored to players in the adventure. For an anthropologist, his pull can be the secret of some sophont species that disappeared millenia ago; for a soldier, the pull can be a long-sought bit of training from a military society, available only after he has proven his worth; for a craftsman, it may be that final piece of perfectly forged metal with which he can complete his latest masterpiece.

An adventure can have many pulls: one major and several minor. The major pull is the ultimate goal of the action, but the minor pulls continue to motivate the individual characters. Shifting emphasis can make the overall adventure realistic; a realistic course for the action is rarely a straightforward path directly to the adventurer's seeming goal.

### The Push

The push is the opposite of the pull. It is something the players dislike, or distrust, or fear, but it keeps making an appearance. The push can be relatively simple: a notation in the Imperial Navy's computers about a violation several worlds back; a long-standing rivalry with a large and powerful trading corporation; an unpaid debt. It can also be more complex: a secret society intent on eradicating an entire bloodline (including at least one of the characters); rebels determined to kill the group before it can unravel their data files and discover their secret plot.

Pushes benefit the referee: if the group is dawdling and the action should really move on, then over the hill comes a horde of barbarians, the same ones that have been following the group for weeks, and that everyone knows are bloodthirsty killers.

"Quick," the group says, "let's move on!"

### The Enigma

There is always something that the players will not understand. They may not realize that the Emperor who holds ultimate political power also controls (more subtly) the economic power of the major corporations in the region, or that some worlds are being slowly strangled by a major corporation. As clues are presented, the group learns more and more about a larger situation, which they can then deal with to their benefit, or to someone else's benefit. This enigma is, on a large scale, a secret of the universe; on a smaller scale, it is still a secret worth knowing.

Initially, the players aren't even aware of the enigma; as time passes, they encounter the hints and clues and come to realize the question, but not the answer. Still later, they may have all of the information (perhaps in the form of raw data still to be refined) and need to find an analyst to decode it. Finally, with the secret at their disposal, they will need to decide how to use this information. Properly paced, the unravelling of the enigma adds an extra dimension to the adventure and makes it an intense, interesting cliffhanger until the very end.



---

**Alexander Jamison  
and the crew of Free Trader Beowulf  
in  
Canicus Run**

with triple options Dream Sequence, Edited Narrative, and Full-Evening Adventure.

---

For the crew of *Free Trader Beowulf*, the day starts with bad news that just keeps getting worse: the [expensive] drive capacitor has burned out and needs to be replaced; the prize snowcat on consignment for the Marquis seems to be missing from its cage; the pilot console password doesn't seem to work; and the Quarantine Fleet arrives in six days to decide if they should scrub this world.

Maybe Engineer Gustav can fix the capacitor; maybe Freightmaster Lagash can find the snowcat before it kills someone; maybe Star Captain Jamison can remember where he put the password; and just maybe everyone will get off this world before it gets scrubbed.

And IF everyone succeeds, there will be a celebration on A Deck with fine Denebian wine, delicacies from a dozen worlds (perhaps snowcat steaks?), and the traditional trivia quiz judged by the Captain.

---

Wafer Experiences from Naasirka!

---

### The Distraction

Distractions distract: they produce detours or setbacks to an otherwise straightforward progression of plot. If an adventure has been too smooth for the players, the referee can use a distraction to slow down the pace of the adventure.

The distraction avoids player complacency: not every fact or event or encounter bears on the ultimate resolution of the adventure.

The dilemma is that the distraction can take over the adventure. The use of "red herrings" to interrupt an adventure on a rare occasion can provide an intense experience. An adventure in which the players never make progress because the referee is continually putting setbacks in their path will prove a frustrating experience for all concerned.

# EPIC Adventures

---

Adventures should be fun. Enjoyable adventures satisfy the needs of the players and transform the adventure's story into an experience unique for the specific characters and their players. Enjoyable adventures happen when everyone is familiar with the game rules, and rules resolution proceeds easily without interrupting the flow of events.

**Traveller** adventures can be a simple string of encounters and actions set against a pre-generated background as players fly from world to world, engaging in trade and speculation, seeking and finding patrons, taking on and solving problems, and generally wandering about the universe. Such adventures within the **Traveller** universe can be challenging and rewarding.

On the other hand, with a small bit of effort by the referee, an adventure can be taken to the next level of interest and excitement. The **EPIC Adventure System** makes use of the talents of the referee to conduct an adventure set against existing or provided background material.

<b>E</b>	<b>P</b>	<b>I</b>	<b>C</b>
<b>Easy:</b> Implemented with minimum effort by the Referee and no new playing techniques for the players.	<b>Playable:</b> Oriented to situations which reveal information and allow its use to move the game events forward.	<b>Interactive:</b> Responsive to the interests, goals, whims and needs of the Players and the Referee.	<b>Checklist:</b> Simple, easy to use Player and Referee record-keeping for all aspects of the Adventures.

The ultimate intended result is a structured adventure that is interesting, not necessarily predictable, and (above all) fun.

## THE EPIC ADVENTURE FORMAT

Adventures are best presented when they provide a structure within which the referee can direct player action. The EPIC format allows the referee to use any existing characters in a role-playing environment. Both the players and the referee have responsibilities in the development of an EPIC adventure.

An EPIC has a structure for strong, interesting adventure situations which can be adapted to a wide variety of player styles: It avoids linear structures (where Scene 2 rigidly follows Scene 1 and all situations inevitably lead to a specific conclusion). It respects the ability of the Referee to guide the players from important situation to important situation. It allows characters (and players) the ability to pursue their own interests without rigid direction from the Referee.

### Participant Responsibilities

Both the players and the referee have responsibilities in an EPIC.

**The Referee.** Most Referees are already comfortable making changes, adaptations, and enhancements to the adventures they administer. The EPIC System recruits the Referee's expertise to move the adventure along.

**The Players.** The EPIC System is transparent to the Player. Everything the player sees is presented through the

Game Master. Players know only that they are confronted with a situation and must react to it. Ultimately, their experiences present an opportunity for greater knowledge, reward, and resolution.

Players may know (and should know) the game rules, but their first interest is in pursuing and understanding the events of the adventure.

### The Components of the EPIC

An EPIC adventure is broken down into five parts:

**A Cast of Characters.** A description of major characters encountered in the course of the adventure, including suggested pre-generated player-characters.

The player-characters are provided by the players themselves.

**A Detailed Background.** The background provides the Referee with the information needed to understand the adventure situation, and lays the groundwork for introducing this adventure to the players.

**A Referee's Synopsis.** The synopsis provides an overview of the plot and its major points. A referee should not have to read the entire adventure to know its story.

**An Adventure Checklist.** The checklist details the division of the EPIC into Acts and Scenes. As the characters complete each Scene, the referee simply checks it off the

list. When every Scene in an Act has been played, that Act has been completed and the Referee may begin the first Scene in the next Act.

**Data Entries.** Each Event in the Referee Checklist has one or more Data Entries associated with it, providing solid information to the Referee about What, Why, Where, When, How, and Who (and possibly How Much, What Kind, and Which).

**Resources For Players.** The EPIC is supported by information for the players: Library Data, Rumors, Maps, Deck Plans, Star Charts, and Personalities. As required, the information is provided to the Players to assist them in their activities.

## THE EPIC CONCEPT

EPIC Adventures use a stage play concept as a format to maximize the use of available or existing game material and maximize the participation of the Referee.

The Adventure consists of (usually) four Acts, each of about (more or less) five Scenes, plus a climactic Finale.

### Four Acts

Dividing the adventure into four acts provides a comprehensive structure which is understandable by both the Referee and the players.

**Act 1** gives the characters a basic understanding of where they are, what they are doing, how they are doing it, and (to some degree) why. As Act 1 ends, the players should be comfortable with their situation and understand in their environment.

**Act 2** introduces the characters to the key non-player characters involved in the plot. They may meet some and hear about others, but by the end of the Act they know the key personalities in play.

**Act 3** unveils the challenges that the players face. Previous acts may provide various hints or clues, but in Act 3 the characters encounter a goal (or the details of a goal they received previously) and some indication of how to pursue it.

**Act 4** completes the accumulation of ideas, information, and equipment that they need to accomplish their goal, and makes the climactic finale possible.

### Five Scenes Per Act (More Or Less)

Most Acts are composed of five Scenes. In most cases, five scenes are sufficient to provide the information the act requires; some adventures may have more or fewer scenes.

A Scene provides the characters with an opportunity to interact with their environment and to accomplish some activity. It may allow the characters to meet an important Non Player Character, to explore a location, or to acquire an object or information. Each scene has a purpose, and it ends when the characters have succeeded or failed.

**Do Overs.** If the purpose of a Scene is not accomplished, the Referee must make it possible for the characters to make another attempt. The second attempt requires a new Scene (in a different location, or with different resources) and a new approach to the information.

**Scene Changes.** Although an Act specifies the Scenes which it must contain, the Act also includes the many scene changes required. Characters travel from Scene to Scene;

they take detours to make money, repair ships, and acquire other things they may need. The Referee supervises this activity and brings the group back to required scenes when possible.

**In Any Order.** Each Act occurs in sequence, but the Scenes within an Act can occur in any order. When all Scenes in an Act have been completed, the Scenes in the next act become available. When all Acts have been completed, the stage is set for the Climax, which resolves the situation.

**Not Necessarily A Place.** A Scene (for EPICs) is a process of resolving some need: meeting an important personality; discovering an important fact; finding answers to questions. The scene may require travel to some place or changing location. It ends only when its purpose has been achieved (or the attempt has failed).

### The Climactic Finale

At the end of the last Scene in Act 4, the characters have everything they need to resolve their mission: Play proceeds naturally to the endgame and to its resolution.

---

## THE TYPICAL EPIC

---

Four **Acts**, each advancing some part of the plot.

Five **Scenes** within each Act.

The **Climax**, bringing everything together.

---

### Who What Why Where When How

Scene 1

Scene 2

Scene 3

Scene 4

Scene 5

---

Act 1

### Meeting The Key Non-Players

Scene 1

Scene 2

Scene 3

Scene 4

Scene 5

---

Act 2

### Pursuing The Key Goal

Scene 1

Scene 2

Scene 3

Scene 4

Scene 5

---

Act 3

### Approaching Resolution

Scene 1

Scene 2

Scene 3

Scene 4

Scene 5

---

Act 4

### The Final Resolution

Scenes as necessary

Final resolution

---

Climax

## THE ADVANTAGES OF EPIC

The EPIC System allows the presentation of background or supplemental materials for a role-playing system without including plot material as narrative. Many adventures couple plot action with background material, often inextricably. Others present the entire adventure as a scripted narrative without significant variation being possible.

The EPIC System allows for the inclusion of facts, details, situations, and information that, when considered as a whole, detail out a story-line which involves the players.

Long after the EPIC has been played, the background material remains, usable for other situations and adventures.

### Character Type Independence

EPICs never require that players select specific character types. The Game Master provides the details that bring players to each Scene.

An EPIC with soldiers and marines is totally different from the same situation played by rogues or craftsmen.

Such character independence places a reasonable burden on the Referee: he or she must direct actions consistent with the characters involved.

The situation may require the characters travel to a specific world. Military characters are sent there under orders; merchant characters see a potentially profitable trading voyage; academics see an opportunity for research; a good referee can envision reasons for every character type to travel to specific locations.

### Simultaneous Threads

Each scene is independent. When a scene is complete, the next role-playing scene is not necessarily taken from this specific EPIC. It is possible to conduct two or more EPICs simultaneously, interweaving their Scenes (although the players do not need to know this particular fact).

### Hiatus

The EPIC can be suspended for any length of time. Scenes are introduced and resolved only when the proper opportunity arises.

### Rules System Independence

EPIC adventures minimize references to game rules: they describe situations and potential results. The referee administers the situations and resolves them using the game system at hand; it is the responsibility of the Game Master to administer the appropriate rules as needed.

**Traveller5.** Specific EPIC adventures are written for **Traveller5** and they unfold best against the broad sweep of comprehensive game rules in the system. Necessarily, if other game systems are used, the results may differ.

**Other Travellers.** On the other hand, other editions of **Traveller** can be used (perhaps because the referee or the players are comfortable with them). The referee may need to make up rules to some situations, but most referees can handle the challenge.

## COMMON PRESENTATION CONVENTIONS

Several presentation structures are useful in an EPIC.

**The Episode** enables the adventure to be suspended due to time or scheduling constraints. When available time expires and the session needs to end, the Referee can declare an Episode End (usually at a Star Port).

**The Wipe** shifts the characters from the end of a Scene to the beginning of a new scene without the intervening Scene Changes.

*Three scouts aboard the **Murphy** are suddenly given a sealed diplomatic pouch and told to deliver it to the Duke of Regina some forty parsecs away.*

The referee decides that their play time is limited, and everyone wants to get this episode finished so they can start fresh in the next session. He calculates twenty two-parsec jumps plus some quick refueling and very little planetside liberty is about 26 weeks.

He says, "It's 26 weeks later; everyone has cabin fever from the long journey, but you are now safely at Regina."

**The Flashback** transports the characters back in time to an earlier historical era in which they can acquire insights into their present day situations. It is a substitute for descriptive text by the referee. Rather than the referee explaining why some fact applies in the present, the players can relive the events that shaped current history.

*The steward on the Free Trader **Beowulf** receives a jeweled forehead bead that belonged to his great great grandmother. Soon, there are several attempts to steal it. He and the crew read some of the letters that came with the bead and its origins and importance unfolds.*

The referee administers the sequence as a **flashback**: the players assume new characters from the distant past, and they play out (and shape) the adventures in acquiring the forehead bead (as recounted in the letters). The players acquire personal knowledge on which they can then act in the current adventure.

**The Metaphor** translates an intricate or inexplicable alien situation into events understandable by the characters. Rather than create substantial new rules for an alien situation, the referee can provide it in understandable terms:

*Three characters' personalities have been transferred into the minds of Whisps-- plasma beings that live in the corona of a star; they must dive deep into the star to find and retrieve a stasis capsule.*

The referee administers the sequence as a **metaphor**:

---

### SPECIAL PRESENTATION CONVENTIONS

**Wipe.** Eliminates distracting or non-productive scene changes; disregards mundane intervening events.

**Flashback.** Transports characters to some previous historical event (in lieu of descriptive text).

**Metaphor.** Transforms alien or unusual situations into understandable events.

**The Story.** A stand-alone scripted adventure independent of the general flow of character actions.

---

the plasma beings see themselves as swimming in a vast sea that is their star. The characters resolve the situation as a sea-diving challenge as they strive against pressure and cold with only their base characteristics.

**The Story** presents a fully-scripted story to the participants as an independent entertainment module.

**Player:** Look! The latest SEH wafer. Let's run this adventure tonight!

Stories carry the characters through a well-scripted adventure with two advantages: Players can use characters independent of their normal careers. A star-drive salesman can be a soldier; a scholar can be a rogue.

The stories are fiction; regardless of the course of events, the next day everyone wakes up unharmed, and with memories of an exciting adventure.

### THEME

A Theme is a unifying subject or idea within an adventure. In literature, it is often expressed as a universally applicable idea or subject. The events, plot, and characters reflect this underlying theme.

Theme adds a new dimension to events; it is an inspiration and a guide to the referee as the events unfold: the referee considers events and (where possible and reasonable) adapts them to reflect the theme.

For example, Eneri Dinsha and his friends are traveling across a hemisphere to deliver a personal message to a family friend. Without a theme, the adventurers probably undertake their journey, perhaps suffering a vehicle breakdown or an animal encounter. They arrive, deliver their message, and return to the ship. Perhaps they found something useful along the way, or learned an important fact.

Or, they undertake the same adventure with a Theme.

**Theme: Confusion.** Wherever the opportunity presents itself, the referee finds reasons to confuse. Roads are poorly labeled; maps use a west-is-up convention; local customs are strange and not easily understood; the address of the friend is wrong; her name has changed; the people living at that address are expecting someone else, and welcome the adventurers by mistake; the group crosses the world date change line along the way.

**Theme: Cleanliness.** As the opportunities present themselves, the referee finds reason to address cleanliness (or lack of cleanliness). An abrupt season change turns roads to mud. The mud overwhelms the vision screen cleaning mechanism. Getting out to manually fix it means mud is tracked into the vehicle, repeatedly. The vehicle becomes mired in mud; slight mishaps turn to mud baths. Mud clogs the fresher drain and shower water overflows into the vehicle interior and ultimately damages some in-floor circuits. Bug eggs carried by the mud hatch and the vehicle becomes infested with stingers.

Theme doesn't resolve an adventure; it isn't part of the requirements. Theme adds a new dimension that may distract the players from their goal, may assist them in their efforts, or both. Theme also gives players insight into themselves through the reactions and attitudes they display.

**Theme Gives The Referee Permission.** Theme is

more than a source of inspiration: it gives the Referee authority or sanction to introduce otherwise strange, unusual, or uncalled-for details that do not necessarily advance the plot, but do provide entertainment.

### Administering Themes

The referee selects (often from suggestions) an underlying theme which guides him as he administers the EPIC adventure. An EPIC should provide a table of Themes by which the referee selects or determines the theme for the current adventure.

**Theme Is Not Announced.** Although the Referee knows the current theme, it should not be announced to the players; they will soon enough know, or think they know, what it is.

**Theme Transforms The Adventure.** The magic of Theme is its changing effect on the interaction of characters and events.

### FUNDAMENTAL ASSUMPTIONS

EPIC adventures are based on five basic assumptions:

**The Referee Knows How To Play The Game.** We assume the referee has the game rules and knows how to play. He or she is called upon to use the game rules as necessary and when appropriate.

There is no need for a situation which calls for space battles to add words like "resolve all space battles according the Space Combat chapter."

**Checklist Deviations Are Always Possible.** Each band of adventurers is different. Some may decide to make a side trip, pursue a false clue, or stop to explore a world. When they do, the Referee must deal with it until their path returns to this adventure.

**Most Events Can Occur In Any Order.** The adventure is building toward a climactic final scene in which all is resolved. Each event leading to that climax presents another piece of information to help the adventurers understand and deal with that final confrontation. Most of those events can occur in any order, and each change of order makes this particular adventure unique.

In some cases, some events will never happen or their significance will be missed; that also makes this specific adventure unique in the hands of each Referee.

**Players Provide The Characters.** Unlike passive forms of literature, the players provide the characters in this adventure. It is possible to play this adventure using characters who are smart (and the results tilt in one direction) or characters who are stupid (and the results tilt in another). Some characters prefer military solutions; others prefer puzzle solving. Character decisions are the essence of role-playing and EPIC adventures provide unique results for each presentation.

**Scene Changes Are Usually Played Out.** The events in the Checklist are scenes supported by the EPIC. The events between those scenes are **scene changes** (they may be travel, searching, recovery, recreation, or side trips) and they are played out as normal role-playing.





# Creating EPICS

## B ONCE UPON A TIME IN THE FUTURE

### 1 Waypoints In The Solar System

- Act 1 A Visit the Solar Power Fields of Mercury
- B Visit the Terraforming Satellite Orbiting Venus
- C Visit the Subarean Warrens below Olympus
- D Visit Prospector Central on Ceres
- E Visit the UN Outpost on Io

### 2 Encounters

- Act 2 A Encounter Professor Huerta
- B Encounter Space Patrol Captain John Jamison
- C Encounter the Mad Hermit of St. Helena
- D Encounter UN Functionary Frank Repczynsk
- E Encounter the Martian Ambassador

### 3 The Desperate Hours

- Act 3 A Mayday! Desperate Appeal for Help
- B Air Riots On Luna
- C Professor Huerta's Daughter In A Coma
- D Cast Adrift In The Asteroid Belt
- E Haven: The Clandestine Laboratory in the Belt

### 4 All Becomes Hazy

- Act 4 A The Computer Control Dilemma
- B The Energy Containment Problem
- C The Overclock Issue
- D A Mole In Their Midst
- E The Inspector From The UN

### 5 The Grand Finale

Climax In the hidden laboratory in the Belt, Professor Huerta is on the verge of a breakthrough (and a breakdown) while UN Enforcers are closing in to shut down his research. IF the professor's experimental drive can be finished, they can escape to the outer system, finish the daughter's treatment, and just maybe break Humanity free from the confines of the Solar System.

#### There's More...

Maps. Diagrams. Encyclopedia Entries. Starship Deck Plans. Background Data. Subsector star charts. Sophont Encounters. Beasts. Vehicles. Weapons. Armor. Equipment and Things. Trade Goods.

The Epic Creation Process is undertaken in six steps:  
**A. The Synopsis.** Create a full disclosure synopsis (for the referee) of what the adventure includes.

**B. Acts and Scenes.** Create short scene descriptions.

**C. Background.** Write one or more encyclopedic data entries supporting each Scene. Entries may include maps, diagrams, world or location data, and other information.

**D. Organize Data.** Organize the data entries. Cross reference each Scene with data entries. Create additional data entries (without direct connections to the Epic).

**E. Test, Proof, and Revise.** Analyze the Epic to ensure that it flows properly, makes sense when played, and provides sufficient interest to potential players.

**F. Create Final Checklist.** Create the final checklist with associated Synopsis and data entries.

## A Full Disclosure Synopsis

In the year 2086, Earth has reached the planets but not the stars, and it probably never will. The light-speed barrier forever precludes expansion beyond the Solar System.

**Foundations.** The Solar System is a place of contrasts... Terrorists routinely wreak havoc on high-rise buildings, transport systems, and cultural treasures. The unemployed poor regularly riot to protest perceived injustices. Unchecked diseases cripple even rich regions. And the ultra-rich live above it all in luxury orbital habitats.

On Earth, populations are divided into two strata: the technologically rich countries, busy exploiting the Earth and the planets, and the grievously poor nations whose populations are facing the fact that neither they nor their children's children will ever have even a chance of escaping poverty.

The United Nations is similarly divided: some agencies pursue research to relieve poverty; others seem committed to suppressing technology.

**The Solar System is an interesting place.** The Solar Power Fields of Mercury harness the power of the sun for a variety of high energy industrial processes. The Chinese Thousand-Year-Plan for Venus envisions a second Earth, some day. Four different nations are squabbling over Mars. Fiercely independent prospecting companies are exploiting the asteroids. And the gas giant moons are, as yet, home only to military bases.

**Confrontation.** On the far side of Luna, the Orion Foundation is researching teleportation, a concept that most reasonable academics believe is impossible beyond the quantum level (as indeed it is). But within the mechanisms that Orion is building is the potential for the Jump Drive--- the key in interstellar travel. If only Professor Huerta can solve the problems of energy storage, computer control, and field containment... and make the final leap of inspiration to tell him what he has discovered.

**The Participants.** The adventurers will be the primary catalyst for the answers.

# EPIC Themes



Theme is the unifying subject or idea within the adventure. It is often expressed as a generalization.

In literature, the author is driven by a universally applicable idea or subject. The events, plot, and characters reflect this underlying theme.

In an EPIC adventure, the referee administers the events, plot, and character encounters while considering the influence of the theme. The theme constantly guides and inspires the referee.

**Random Theme.** Before the adventure begins, the referee consults the table for the theme for the current session.

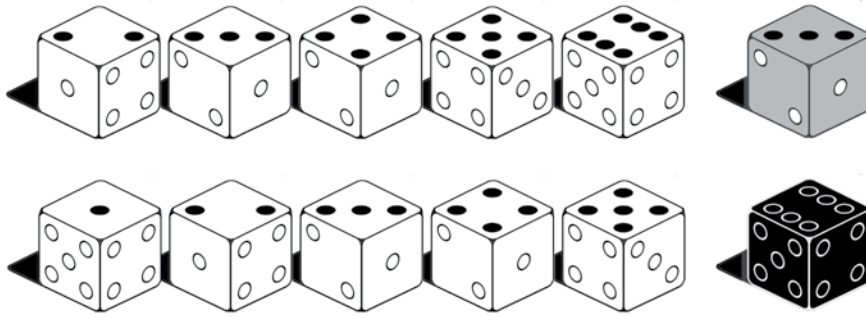
**A Thread of Themes.** For a series of adventures, a well-thought-out thread of themes can be used; the thread builds in importance as the series moves toward its conclusion.

## Th

1D	Theme1	Theme2	Theme3	Theme4	Theme5	Theme6	1D
1	Justice	Loyalty	Awe	Danger	Betrayal	GAEWK	1
2	Happiness	Cheerful	Human Frailty	Paranoia	Heroism	Disappointing	2
3	Kindness	Trustworthy	Brave	Pursuit	Escape	Unreliable	3
4	Honesty	Admiration	Bizarre	Revenge	Deception	Stupidity	4
5	Truthfulness	Friendly	Thrifty	Humiliation	Conformity	Confusion	5
6	Cleanliness	Novelty	Profitable	Improbable	Extremes	Chaos	6

\*GAEWK (pronounced Gawk!) Goes Against Everything We Know.

Other Themes	1	2	3	4	5	6	
1	Abandonment	Contagion	Flawless	Jobless	Patriotism	Tedious	1
2	Absurdity	Coordinated	Flimsy	Jumbled	Peaceful	Thirsty	2
3	Accidental	Courteous	Foolhardy	Knowledge	Perfidy	Tiresome	3
4	Adorable	Crabby	Fragile	Knowledgeable	Pricey	Traitorous	4
5	Agility	Craftsmanship	Frantic	Labored	Principle	Treason	5
6	Air	Cumbersome	Freezing	Lackadaisical	Puzzling	Ubiquitous	6
1	Ambiguous	Death	Frightening	Loud	Quaint	Unarmed	1
2	Arrogant	Defective	Fuzzy	Lucky	Quarrelsome	Unique	2
3	Art	Deranged	Gaudy	Ludicrous	Quiet	Unwieldy	3
4	Average	Deserted	Goofy	Macabre	Quirky	Utopian	4
5	Beautiful	Diligent	Graceful	Maddening	Red	Vagabond	5
6	Belligerent	Disagreeable	Grandiose	Majestic	Redundant	Valuable	6
1	Bewildered	Disgusting	Grieving	Makeshift	Repulsive	Vast	1
2	Big	Distraction	Gruesome	Materialistic	Resolute	Vigor	2
3	Blue	Duplicative	Hard-To-Find	Mediocrity	Responsibility	Violent	3
4	Boorish	Dystopian	Harsh	Mercy	Rotten	Voiceless	4
5	Boredom	Efficient	Hedonism	Military	Sacrifice	Wasteful	5
6	Brawn	Endurance	Hellish	Morality	Scary	Water	6
1	Breakable	Energetic	Helpful	Muddled	Science	Weak	1
2	Bully	Erratic	Helpless	Murky	Secretive	Weary	2
3	Calm	Extra-Large	Hissing	Mysterious	Shiny	Wet	3
4	Cautious	Extra-Small	Hope	Naive	Silent	Wholesale	4
5	Charity	Faded	Huge	Noisy	Slippery	Wild	5
6	Charming	Faithful	Icky	Obnoxious	Spring	Winter	6
1	Cheap	Faithless	Ignorant	Obsolete	Storms	Wisdom	1
2	Chivalrous	Fast	Impolite	Old	Strange	Wonderful	2
3	Clever	Fear	Incompetent	Ordinary	Strength	Worthless	3
4	Cluttered	Fierce	Intelligence	Pacifistic	Sudden	Wrong	4
5	Conspiracy	Filthy	Invincible	Painful	Summer	Young	5
6	Comfortable	Fire	Irate	Painstaking	Suspicious	Zany	6



### BE PREPARED

The referee and each player should have a pool of readily available six-sided dice in a variety of colors:

**Ten Six-Sided Dice** are available for standard die rolls. Actually, any of the dice shown here can be used for standard rolls. Ten dice is sufficient for the most extreme of rolls: 10D Double Hasty Beyond Impossible.

**Two Contrasting Color Dice** are used for Flux rolls. The lighter color is always positive; the darker is always negative.



### BE PREPARED

The referee and each player should have a pool of readily available six-sided dice in a variety of colors:

**Ten Six-Sided Dice** are available for standard die rolls. Actually, any of the dice shown here can be used for standard rolls. Ten dice is sufficient for the most extreme of rolls: 10D Double Hasty Beyond Impossible.

**Two Contrasting Color Dice** are used for Flux rolls. The lighter color is always positive; the darker is always negative.

### WHY IS THIS APPENDIX NECESSARY?

Dice and their ability to create random numbers are at the core of this (and of most) role-playing games. In the dawn of role-playing game systems, games used a variety of multi-sided dice; the types of dice were specified, and a variety of rolls were used in the course of the game. **Traveller**, on the other hand (and perhaps as a reaction), exclusively specified the common six-sided dice.

As role-playing game concepts matured, the role-playing media published a variety of articles analyzing the outcomes of dice mechanics and addressing how they translated into probabilities. Both players and referees who read those articles found that a better understanding led to a better playing experience. That alone should be enough to justify this chapter, but there's more.

This edition of **Traveller** introduces several new dice mechanics and formalizes several older ones. Prior editions often introduced mechanics in the middle of rules discussions, or simply left it to the referee to define a mechanic (for example, an adventure might say: select one thing from a group, or select a number from 1 to 10). This chapter brings all dice mechanics into one chapter, defines them, and then discusses them in terms of probabilities.

The **C+S Chart** gives any player an indication in percentages of success for specific tasks. He isn't required to guess about potential success, and he isn't required to make detailed calculations.

The **Dice Charts** give similar information about rolling one die, or ten dice, or any number in between. The tables show that there IS a chance of rolling 10 on 10D, but at 60,466,176 to 1, it is better to spend any possible good luck involved on the lottery than on a single role-playing die roll.

An understanding of the dice mechanics in **Traveller** makes players more aware of the nuances of the game system. That understanding also creates referees more capable of presenting interesting and challenging situations to the players.

# Dice Results Are Random But Understandable

**Traveller** is a continuing process of decision-making. Its rules for manipulating the universe of the future cover a variety of activities: tasks, random choices, personal combat, and character generation. Just as people make decisions based on the information they have and then see what happens, players in **Traveller** make decisions based on the game information they have and then see what happens.

To make the results of player decisions unpredictable (but still understandable), **Traveller** uses dice to produce random numbers, which in turn govern the outcomes of tasks, combat, or character generation. Without die rolls, players could make choices with perfect knowledge of the outcome.

Life rarely allows us to know for sure how a choice or an action will turn out. **Traveller** presents situations with many possible outcomes and imposes die rolls to determine the outcome. The rolls may be weighted toward some outcomes more than others, but there's always the chance that something could go wrong. Players make decisions throughout **Traveller**; the die rolls make those decisions interesting.

**Only Six Sided Dice.** Only D6 dice are used in **Traveller**. Sometimes, in order to remain true to the D6 concept, the system contorts D6 die rolls to achieve special results (for example, even distributions from 1 to 10 or 1 to 9). While purists may object, no one else will mind if you use an available D10 or D20.

## BASIC TERMS

The following basic terms apply to dice and die rolls:

### About Dice

**Traveller** consistently addresses dice.

**Dice.** The randomizers used in **Traveller** are ordinary six-sided cubic dice marked with sides marked 1 to 6 (as pips or numbers). Dice is plural; the singular is Die.

**Die Roll.** The result of rolling one or more dice.

**D.** Abbreviation for dice. In **Traveller**, this is always a six-sided die. Other game systems may use different dice.

**D6.** Another abbreviation for six-sided dice. A die with 3 sides is D3; a die with 10 sides is D10. This terminology reiterates that the dice used are six-sided.

### About Die Rolls

**Traveller** consistently addresses die rolls.

**Roll.** An instruction to roll dice. For example, Roll 2D.

**Throw:** An instruction to roll dice. Synonym: Roll.

**Check. Compare.** An instruction to roll dice and compare the result with some standard. Compare 2D versus distance in kilometers; if the result is less than (or equal to) the standard, the roll is successful. Check <Standard> instructs the user to roll 2D and compare it against some Standard.

**Check Characteristic.** Knowing a Characteristic in advance, roll 2D. If the result is equal to or less than the value, the Check is successful. Otherwise, the Check fails.

**Easy Check Characteristic** uses 1D (for Humans).

**Hard Check Characteristic** uses 3D (for Humans).

### About Modifiers

**Target, Target Number.** The number the player is trying to roll. Some uses of dice call for a specific number to be

rolled (Target=5). Others call for a number or less to be rolled (Target=5 or less). Still others call for a number or greater to be rolled (Target=5 or more). In each case, the focus is on a Target Number.

**Modifier. Mod.** A change to the Target Number. A Modifier increases or decreases the Target Number (in contrast to a DM which alters the actual Die Roll).

Mods are primarily used with Target Numbers.

**DM. Die Mod. Die Modifier. Dice Modifier.** A change to the Die Roll. A DM increases or decreases the result of the dice before it is compared to the Target Number (in contrast to a Mod which changes the Target Number itself).

DMs are primarily used on Tables.

## DICE INSTRUCTIONS

**Traveller** routinely calls for specific and sometimes complex die rolls. In charts especially, these instructions generally take the form 1D, 2D, or Flux.

D (Capital D) indicates that a standard six-sided die is used. The number in front of the die tells how many of these dice to roll, and any addition (or subtraction) after the D indicates how the die roll result is changed.

Typical instructions include:

**1D.** Roll one die, producing results 1 to 6.

**2D.** Roll two dice (or 8D: Roll eight dice).

**2D - 2.** Roll two dice and subtract 2; results 0 to 10.

**2D + 2.** Roll two dice and add 2; results 4 to 14.

**D/2.** Roll one die and divide by 2. The accepted practice is to always round in favor of the rolling player. This particular roll is also called a **half-dice**. Rarely used.

**2D - 7.** Roll two dice and subtract 7. This may produce negative numbers (results from + 5 to - 5).

**D - D (or + D - D).** Roll one die, then roll a second die

and subtract it from the first. The roll may produce negative numbers (this throw is identical in output to 2D - 7, or Flux).

**Flux.** Roll one die, then a second die and subtract it from the first. This roll is the same as D-D, but renamed for easier identification. For less confusion, use a light colored die and a dark die; always subtract dark from light.

**Good Flux.** Roll two dice: subtract the smaller from the larger value (if both dice are equal, the result is zero). This roll produces a range from 0 to + 5.

**Bad Flux.** Roll two dice: subtract the larger from the smaller value (if both dice are equal, the result is zero). This roll produced a range from 0 to - 5.

**(2D +3) x (3D -2).** Roll two dice and add three, then roll three dice and subtract two, and then multiply the two together. This one is probably not used very often.

## MODS VERSUS DMS

There is an important difference between Mods and DMs. The typical **Traveller** usage is **Roll Low**. Situations, challenges, and problems are usually defined as a Target which the player wants to roll equal to or less than.

### A Mod Changes The Target Number

Mod + 3 increases the Target Number by 3 and makes it **easier** to roll lower than the Target; positive Mods are beneficial. Mod-2 decreases the Target Number by 2 and makes it **harder** to roll lower than the Target; negative Mods are detrimental.

### A DM Changes The Die Roll

DM + 3 increases the Die Roll by 3 and makes it **harder** to roll lower than the Target; positive DMs are detrimental. DM-2 reduces the Die Roll by 2 and **makes** it easier to roll lower than the Target; negative DMs are beneficial.

Mods can be applied to a Target Number before the dice are rolled, producing a direct interaction between the Dice and the Target Number. Applying DMs to the Dice and then comparing with the Target Number is a longer process.

Some players prefer to convert DMs to Mods, creating a final Target number before rolling the dice. The conversion is simple:

A Positive DM is a Negative Mod.

A Negative DM is a Positive Mod.

For example, Don is confronted with a large beast blocking his way back to his ship. He needs to distract it. He has a backpack he can throw to one side, and a digital camera with a flash. The referee says:

---

### MOD VS DM (Roll Low)

---

+ Mod +	Increases Target	= More Success
- DM -	Decreases Die	= More Success
- Mod -	Decreases Target	= Less Success
+ DM +	Increases Die	= Less Success

---

A Mod is an Asset and an add to the Target Number.

A DM is a change to the Die Roll applied after the roll.

---

“You need to distract the beast. If you trigger the flash, your Target is 7 on 2D. If you throw the pack at the same time, Mod + 2 (but you can only do that once). If you can time either action with a gust of wind, DM-1.”

**The Step By Step Approach:** Don waits until the referee says there is a gust of wind, and rolls 2D= 8. That's higher than the Target. But wait! He has a Mod + 2, which makes the Target 9 (+ 2 added to 7), and DM -1 which makes the Die Roll=7. He succeeds!

**The Conversion Approach.** Don's Target is 7. Mod + 2 makes the Target=9. DM-1 is the equivalent of Mod + 1 which makes the Target=10. Don waits until the referee says there is a gust of wind and rolls 2D= 8. That is less than his Target=10, and he succeeds.

Conversion helps evaluate the situation. If Don's Target were 1, then Mod + 2 and DM-1 converts the Target to 4. The chance of rolling 4 or less on 2D is very small, prompting Don to look for other ways to distract the beast.

**Revisions.** If their roll is not a success, some players may argue that a particular Mod or DM was available and not used. The referee can (and should) allow reasonable Mods and DMs after an unsuccessful Die Roll. If they change the result to success, the result should be allowed. On the other hand, only rarely should the Die Roll itself be rerolled.

Revisions should be permitted only until the next die roll is made. There is no point in reaching back several situations to revise rolls.

## ROLLING MANY DICE

Some situations require rolling many dice to determine a result: nuclear strikes, meteor impacts, massive explosions, disasters, extremes of pressure or temperature. A direct hit by a Suitcase Nuke inflicts 30D hits as Blast, BFE, Burn, and Rad, totalling some 180D in damage of one sort or another. Rolling 180D is a long and tedious enterprise when compared to the near certain destruction it will inflict. Nevertheless, there may be situations where a low damage value (for example, under 500 hits, somewhat less than the probable 640 hits) could mean the difference between character life or death, or starship destruction or survival), and the players want to know an answer (and hope for an answer which promotes survival).

The Many Dice procedures attached to the tables allow a faster resolution (and perhaps a better resolution) than just rolling all those dice.

**Defining Many Dice:** For the Many Dice Option to be used, the number of dice involved must be more than the highest number of dice presented on the Dice Tables: that is, at least 11 Dice.

## SPECIAL THROWS

The **Special Throws Tables** show a variety of pre-defined special die rolls.

**Even Distributions** allow rolling equally probable ranges from 0 to 9 or 0 to 10.

**Randomly Determined Characteristics** allows selection of personal characteristics.

# The Dice Tables



0

The **Dice Tables** provide a basic reference for players and referees: to understand the probabilities of success and the potential for failure. The Tables cover the results of throwing 1D through 10D corresponding to the levels of task difficulty.

## Walking Through The Tables

Look at the Dice Tables and examine the entries.

**Title** shows the number of dice being rolled.

**Header** shows the number of possible outcomes for the specific combination of dice.

**Roll:** For each table entry, the actual die roll result.

**N:** The number of times the roll occurs if all possible rolls are each made once. N indicates the number of ways that the die roll can be achieved.

**%N (Percent N):** The percent chance of a specific roll.

**N- (N Minus).** The number of times that the roll or less occurs; the number of ways the die roll or less can be achieved.

**%N- (Percent N Minus).** The percentage chance that the roll or less will be made; the chance (on any one throw) that the result will be the roll stated on this line or less.

**N+ (N Plus).** The number of times that the roll or more occurs; the number of ways the die roll or greater can be achieved.

**%N+ (Percent N Plus).** The percentage chance that the roll or less will be made. Percent N Plus is the percentage chance (on any one throw) that the result will be the roll stated on this line or more.

DICE TABLES			
Page	Table	Difficulty	Abbrev
<b>0</b>		Walkthru	
		Examples	
<b>1</b>	1D	Easy	EAS
	2D	Average	AVE
	3D	Difficult	DIF
	4D	Formidable	FOR
	Flux	Flux	FLUX
<b>2</b>	5D	Staggering	STA
	6D	Hopeless	HOP
<b>3</b>	7D	Impossible	IMP
	8D	Beyond	BEY
<b>4</b>	9D	Hasty Beyond	HAS
	10D	Double Hasty Beyond	2H
<b>5</b>	C+S	Char + Skill	C+S
	Headers	Difficulty Headers	
<b>6</b>	R	Random	RAN
	S	Special	SPE
	0-9	Random 0-9	0-9
	1-9	Random 1-9	1-9
<b>7</b>	Many Dice	Many Dice 10	
		Many Dice 2D	
		Many Dice 3.5	
		Many Dice 3.5 Flux	
<b>8</b>	2D	2 Dice	2D
	2D-7	2 Dice Minus 7	2D-7
	Flux	Flux	Flux
	Flux+	Good Flux	Flux+
	Flux-	Bad Flux	Flux-

## TABLE 2D AS AN EXAMPLE

Using the Table 2D,

**Title** clearly labels the table as using two dice.

**Header** shows that rolling two dice can produce 6 squared= 6^2= 36 possible outcomes. The lowest possible roll is 2 (two ones) and the highest possible roll is 12 (two sixes). The table has entries for each possible roll from 2 to 12. Most tables are padded with entries one less than the minimum roll, and one more than the maximum roll.

There is one entry for each possible roll for 2D.

For a 2D Roll= 5,

**N** shows there are 4 (out of 36) ways to roll exactly 5.

**%N** shows exactly 5 occurs 11% (4/36) of the time.

**N-** shows there are 10 (out of 36) ways to roll 5 or less.

**%N-** shows 5 or less occurs 28% (10/36) of the time.

**N+** shows 5 or more occurs 30 ways out of 36.

**%N+** shows 5 or more can be rolled about 83% (30/36) of the time.

Each Dice Table can be used to assess risk (and reward). If the required die roll shows a probability near 100%, then the player may decide to make the attempt. If the required die roll shows a probability nearer 10%, then the player may decide to look for alternatives.

## THE C + S TABLE (CHANCE OF SUCCESS)

The Task system calls for die rolls equal to or less than a number created by adding a Characteristic (ranging from 1 to 15 or so) and a Skill level (also ranging from 1 to 15 or so). If the die roll is equal or less than this C + S (Characteristic Plus Skill), the attempt at the task succeeds. The Chance of Success Table shows the percentage chance that such a task will succeed. Skill-2 and Characteristic-2 (C +S=4) attempts a 2D task: he has a 17% chance of succeeding.

2D TWO DICE (6^2= 36 outcomes; range 2 - 12)						
Roll	N	N%	N -	N - %	N +	N + %
1	0	no	0	no	36	100%
2	1	3%	1	3%	36	100%
3	2	6%	3	8%	35	97%
4	3	8%	6	17%	33	92%
5	4	11%	10	28%	30	83%
6	5	14%	15	42%	26	72%
7	6	17%	21	58%	21	58%
8	5	14%	26	72%	15	42%
9	4	11%	30	83%	10	28%
10	3	8%	33	92%	6	17%
11	2	6%	35	97%	3	8%
12	1	3%	36	100%	1	3%
13	0	no	36	100%	0	no

There are 36 possible outcomes ranging from 2 to 12.



# 1D 2D 3D 4D Flux

## 1

**1D ONE DIE** (6^1= 6 outcomes; range 1 - 6)

Roll	N	N%	N -	N - %	N +	N + %
0	0		0		6	100%
1	1	17%	1	17%	6	100%
2	1	17%	2	33%	5	83%
3	1	17%	3	50%	4	67%
4	1	17%	4	67%	3	50%
5	1	17%	5	83%	2	33%
6	1	17%	6	100%	1	17%
7	0		6	100%	0	

There are 6 possible outcomes ranging from 1 to 6.  
All are equally probable at 17%.

**2D TWO DICE** (6^2= 36 outcomes; range 2 - 12)

Roll	N	N%	N -	N - %	N +	N + %
1	0		0		36	100%
2	1	3%	1	3%	36	100%
3	2	6%	3	8%	35	97%
4	3	8%	6	17%	33	92%
5	4	11%	10	28%	30	83%
6	5	14%	15	42%	26	72%
7	6	17%	21	58%	21	58%
8	5	14%	26	72%	15	42%
9	4	11%	30	83%	10	28%
10	3	8%	33	92%	6	17%
11	2	6%	35	97%	3	8%
12	1	3%	36	100%	1	3%
13	0		36	100%	0	

There are 36 possible outcomes ranging from 2 to 12.  
The most probable roll is 7 (17%).

**3D THREE DICE** (6^3= 216 outcomes; range 3 - 18)

Roll	N	N%	N -	N - %	N +	N + %
1	0		0		216	100%
2	0		0		216	100%
3	1	<1%	1	<1%	216	100%
4	3	1%	4	2%	215	>99%
5	6	3%	10	5%	212	98%
6	10	5%	20	9%	206	95%
7	15	7%	35	16%	196	91%
8	21	10%	56	26%	181	84%
9	25	12%	81	38%	160	74%
10	27	13%	108	50%	135	63%
11	27	13%	135	63%	108	50%
12	25	12%	160	74%	81	38%
13	21	10%	181	84%	56	26%
14	15	7%	196	91%	35	16%
15	10	5%	206	95%	20	9%
16	6	3%	212	98%	10	5%
17	3	1%	215	>99%	4	2%
18	1	<1%	216	100%	1	<1%
19	0		216		0	no

There are 216 possible outcomes ranging from 3 to 18.  
The most probable roll is 10 or 11 (equally at 13% each).

**4D FOUR DICE** (6^4= 1296 outcomes; range 4 - 24)

Roll	N	N%	N -	N - %	N +	N + %
0	0		0		1296	100%
1	0		0		1296	100%
2	0		0		1296	100%
3	0		0		1296	100%
4	1	<1%	1	<1%	1296	100%
5	4	<1%	5	<1%	1295	>99%
6	10	<1%	15	1%	1291	>99%
7	20	2%	35	3%	1281	99%
8	35	3%	70	5%	1261	97%
9	56	4%	126	10%	1226	95%
10	80	6%	206	16%	1170	90%
11	104	8%	310	24%	1090	84%
12	125	10%	435	34%	986	76%
13	140	11%	575	44%	861	66%
14	146	11%	721	56%	721	56%
15	140	11%	861	66%	575	44%
16	125	10%	986	76%	435	34%
17	104	8%	1090	84%	310	24%
18	80	6%	1170	90%	206	16%
19	56	4%	1226	95%	126	10%
20	35	3%	1261	97%	70	5%
21	20	2%	1281	99%	35	3%
22	10	<1%	1291	>99%	15	1%
23	4	<1%	1295	>99%	5	<1%
24	1	<1%	1296	100%	1	<1%
25	0		1296	100%	0	
26	0		1296	100%	0	
27	0		1296	100%	0	

There are 1296 possible outcomes ranging from 4 to 24.  
The most probable roll is 14 (11.3%).

**FLUX TWO DICE - 7** (6^2= 36 outcomes; - 5 to + 5)

Roll	N	N%	N -	N - %	N +	N + %
- 6	0		0		36	100%
- 5	1	3%	1	3%	36	100%
- 4	2	6%	3	8%	35	97%
- 3	3	8%	6	17%	33	92%
- 2	4	11%	10	28%	30	83%
- 1	5	14%	15	42%	26	72%
0	6	17%	21	58%	21	58%
+ 1	5	14%	26	72%	15	42%
+ 2	4	11%	30	83%	10	28%
+ 3	3	8%	33	92%	6	17%
+ 4	2	6%	35	97%	3	8%
+ 5	1	3%	36	100%	1	3%
+ 6	0		36	100%	0	

There are 36 possible outcomes ranging from - 5 to + 5.  
The most probable roll is 0 (17%).

**Flux** introduces additional variation into dice rolls. It offers the opportunity for a modification up to 5 points in the player's favor, but at the risk of instead up to 5 points against.



## 5D SIX DICE (6^5= 7776 outcomes; range 5 - 30)

Roll	N	N%	N -	N - %	N +	N + %
4	0		0	no	7776	100%
5	1	<1%	1	<1%	7776	100%
6	5	<1%	6	<1%	7775	>99%
7	15	<1%	21	<1%	7770	>99%
8	35	<1%	56	<1%	7755	>99%
9	70	<1%	126	2%	7720	>99%
10	126	2%	252	3%	7650	98%
11	205	3%	457	6%	7524	97%
12	305	4%	762	10%	7319	94%
13	420	5%	1182	15%	7014	90%
14	540	7%	1722	22%	6594	85%
15	651	8%	2373	31%	6054	78%
16	735	9%	3108	40%	5403	69%
17	780	10%	3888	50%	4668	60%
18	780	10%	4668	60%	3888	50%
19	735	9%	5403	69%	3108	40%
20	651	8%	6054	78%	2373	31%
21	540	7%	6594	85%	1722	22%
22	420	5%	7014	90%	1182	15%
23	305	4%	7319	94%	762	10%
24	205	3%	7524	97%	457	6%
25	126	2%	7650	98%	252	3%
26	70	<1%	7720	>99%	126	2%
27	35	<1%	7755	>99%	56	<1%
28	15	<1%	7770	>99%	21	<1%
29	5	<1%	7775	>99%	6	<1%
30	1	<1%	7776	100%	1	<1%
31	0		7776	100%	0	
32	0		7776	100%	0	
33	0		7776	100%	0	
34	0		7776	100%	0	
35	0		7776	100%	0	
36	0		7776	100%	0	
37	0		7776	100%	0	

There are 7776 possible outcomes ranging from 5 to 30.  
The most probable roll is 17 or 18 (equally at 10% each).

## 6D SIX DICE (6^6= 46,656 outcomes; range 6 - 36)

Roll	N	N%	N -	N - %	N +	N + %
4	0		0		46656	100%
5	0		0		46656	100%
6	1	<1%	1	<1%	46656	100%
7	6	<1%	7	<1%	46655	>99%
8	21	<1%	28	<1%	46649	>99%
9	56	<1%	84	<1%	46628	>99%
10	126	<1%	210	<1%	46572	>99%
11	252	<1%	462	<1%	46446	>99%
12	456	<1%	918	2%	46194	>99%
13	756	2%	1674	4%	45738	98%
14	1161	2%	2835	6%	44982	96%
15	1666	4%	4501	10%	43821	94%
16	2247	5%	6748	14%	42155	90%
17	2856	6%	9604	21%	39908	86%
18	3431	7%	13035	28%	37052	79%
19	3906	8%	16941	36%	33621	72%
20	4221	9%	21162	45%	29715	64%
21	4332	9%	25494	55%	25494	55%
22	4221	9%	29715	64%	21162	45%
23	3906	8%	33621	72%	16941	36%
24	3431	7%	37052	79%	13035	28%
25	2856	6%	39908	86%	9604	21%
26	2247	5%	42155	90%	6748	14%
27	1666	4%	43821	94%	4501	10%
28	1161	2%	44982	96%	2835	6%
29	756	2%	45738	98%	1674	4%
30	456	<1%	46194	>99%	918	2%
31	252	<1%	46446	>99%	462	<1%
32	126	<1%	46572	>99%	210	<1%
33	56	<1%	46628	>99%	84	<1%
34	21	<1%	46649	>99%	28	<1%
35	6	<1%	46655	>99%	7	<1%
36	1	<1%	46656	100%	1	<1%
37	0		46656	100%	0	

There are 46,656 possible outcomes from 6 to 36.  
The most probable roll is 21 (9.3%).

### The Table Entries

**Title:** The number of dice being rolled.

**Roll:** The actual numerical die roll result.

**N:** The number of times the roll occurs if all possible rolls are each made once. N is the number of ways that the die roll can be achieved (for example, on the 2D table, a roll of 11 can be achieved two different ways (5 + 6 or 6 + 5)).

**N% (Percent N):** The percentage chance that the specific roll will be made.

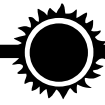
**N - (N Minus).** The number of times the roll or less occurs. N - is the number of ways the die roll or less can be achieved. For example, on the 2D table, a roll of 3 - (three or less) can be achieved three different ways (1 + 2, or 2 + 1, or 1 + 1).

**N - % (Percent N Minus).** The percentage chance of the specific roll or less: the probability (on any one throw) the result will be the roll stated on this line or less. The chance of rolling 7 or less on two dice is 58%.

**N + (N Plus).** The number of times the roll or more occurs. N + is the number of ways the die roll or greater can be achieved. On the 2D table, a roll of 3 + (three or more) can be achieved 35 different ways (every possible roll except 1 and 1).

**N + % (Percent N Plus).** The percentage chance of the specific roll or less: the probability (on any one throw) that the result will be the roll stated on this line or more. The chance of rolling 3 or more on two dice is 97%.





# 7D 8D

## 3

### 7D SEVEN DICE (6^7= 279,936 outcomes; 7 - 42)

Roll	N	N%	N -	N - %	N +	N + %
1	0		0		279936	100%
2	0		0		279936	100%
3	0		0		279936	100%
4	0		0		279936	100%
5	0		0		279936	100%
6	0		0		279936	100%
7	1	<1%	1	<1%	279936	100%
8	7	<1%	8	<1%	279935	>99%
9	28	<1%	36	<1%	279928	>99%
10	84	<1%	120	<1%	279900	>99%
11	210	<1%	330	<1%	279816	>99%
12	462	<1%	792	<1%	279606	>99%
13	917	<1%	1709	<1%	279144	>99%
14	1667	<1%	3376	1%	278227	>99%
15	2807	1%	6183	2%	276560	99%
16	4417	2%	10600	4%	273753	98%
17	6538	2%	17138	6%	269336	96%
18	9142	3%	26280	9%	262798	94%
19	12117	4%	38397	14%	253656	91%
20	15267	5%	53664	19%	241539	86%
21	18327	7%	71991	26%	226272	81%
22	20993	7%	92984	33%	207945	74%
23	22967	8%	115951	41%	186952	67%
24	24017	9%	139968	50%	163985	59%
25	24017	9%	163985	59%	139968	50%
26	22967	8%	186952	67%	115951	41%
27	20993	7%	207945	74%	92984	33%
28	18327	7%	226272	81%	71991	26%
29	15267	5%	241539	86%	53664	19%
30	12117	4%	253656	91%	38397	14%
31	9142	3%	262798	94%	26280	9%
32	6538	2%	269336	96%	17138	6%
33	4417	2%	273753	98%	10600	4%
34	2807	1%	276560	99%	6183	2%
35	1667	<1%	278227	>99%	3376	1%
36	917	<1%	279144	>99%	1709	<1%
37	462	<1%	279606	>99%	792	<1%
38	210	<1%	279816	>99%	330	<1%
39	84	<1%	279900	>99%	120	<1%
40	28	<1%	279928	>99%	36	<1%
41	7	<1%	279935	>99%	8	<1%
42	1	<1%	279936	100%	1	<1%
43	0		279936	100%	0	
44	0		279936	100%	0	
45	0		279936	100%	0	
46	0		279936	100%	0	
47	0		279936	100%	0	
48	0		279936	100%	0	
49	0		279936	100%	0	

There are 279,936 possible outcomes ranging from 7 to 42.  
The most probable roll is 24 or 25 (equally at 9% each).

### 8D EIGHT DICE (6^8= 1,679,616 outcomes; 8 - 48)

Roll	N	N%	N -	N - %	N +	N + %
1	0	no	0		1679616	100%
2	0	no	0		1679616	100%
3	0	no	0		1679616	100%
4	0	no	0		1679616	100%
5	0	no	0		1679616	100%
6	0	no	0		1679616	100%
7	0	no	0		1679616	100%
8	1	<1%	1	<1%	1679616	100%
9	8	<1%	9	<1%	1679615	>99%
10	36	<1%	45	<1%	1679607	>99%
11	120	<1%	165	<1%	1679571	>99%
12	330	<1%	495	<1%	1679451	>99%
13	792	<1%	1287	<1%	1679121	>99%
14	1708	<1%	2995	<1%	1678329	>99%
15	3368	<1%	6363	<1%	1676621	>99%
16	6147	<1%	12510	<1%	1673253	>99%
17	10480	1%	22990	1%	1667106	>99%
18	16808	1%	39798	2%	1656626	99%
19	25488	2%	65286	4%	1639818	98%
20	36688	2%	101974	6%	1614330	96%
21	50288	3%	152262	9%	1577642	94%
22	65808	4%	218070	13%	1527354	91%
23	82384	5%	300454	18%	1461546	87%
24	98813	6%	399267	24%	1379162	82%
25	113688	7%	512955	31%	1280349	76%
26	125588	7%	638543	38%	1166661	69%
27	133288	8%	771831	46%	1041073	62%
28	135954	8%	907785	54%	907785	54%
29	133288	8%	1041073	62%	771831	46%
30	125588	7%	1166661	69%	638543	38%
31	113688	7%	1280349	76%	512955	31%
32	98813	6%	1379162	82%	399267	24%
33	82384	5%	1461546	87%	300454	18%
34	65808	4%	1527354	91%	218070	13%
35	50288	3%	1577642	94%	152262	9%
36	36688	2%	1614330	96%	101974	6%
37	25488	2%	1639818	98%	65286	4%
38	16808	1%	1656626	99%	39798	2%
39	10480	<1%	1667106	>99%	22990	1%
40	6147	<1%	1673253	>99%	12510	<1%
41	3368	<1%	1676621	>99%	6363	<1%
42	1708	<1%	1678329	>99%	2995	<1%
43	792	<1%	1679121	>99%	1287	<1%
44	330	<1%	1679451	>99%	495	<1%
45	120	<1%	1679571	>99%	165	<1%
46	36	<1%	1679607	>99%	45	<1%
47	8	<1%	1679615	>99%	9	<1%
48	1	<1%	1679616	100%	1	<1%
49	0		1679616	100%	0	

There are 1,679,616 possible outcomes from 8 to 48.  
The most probable roll is 28 (8%).



## 9D NINE DICE

(6<sup>9</sup>= 10,077,696; range 9 - 54)

Roll	N	N%	N -	N - %	N +	N + %
6	0		0		10077696	100%
7	0		0		10077696	100%
8	0		0		10077696	100%
9	1	<1%	1	no	10077696	100%
10	9	<1%	10	no	10077695	100%
11	45	<1%	55	no	10077686	100%
12	165	<1%	220	no	10077641	100%
13	495	<1%	715	no	10077476	100%
14	1287	<1%	2002	no	10076981	100%
15	2994	<1%	4996	no	10075694	100%
16	6354	<1%	11350	no	10072700	100%
17	12465	<1%	23815	no	10066346	100%
18	22825	<1%	46640	no	10053881	100%
19	39303	<1%	85943	1%	10031056	100%
20	63999	1%	149942	1%	9991753	99%
21	98979	1%	248921	2%	9927754	99%
22	145899	1%	394820	4%	9828775	98%
23	205560	2%	600380	6%	9682876	96%
24	277464	3%	877844	9%	9477316	94%
25	359469	4%	1237313	12%	9199852	91%
26	447669	4%	1684982	17%	8840383	88%
27	536569	5%	2221551	22%	8392714	83%
28	619569	6%	2841120	28%	7856145	78%
29	689715	7%	3530835	35%	7236576	72%
30	740619	7%	4271454	42%	6546861	65%
31	767394	8%	5038848	50%	5806242	58%
32	767394	8%	5806242	58%	5038848	50%
33	740619	7%	6546861	65%	4271454	42%
34	689715	7%	7236576	72%	3530835	35%
35	619569	6%	7856145	78%	2841120	28%
36	536569	5%	8392714	83%	2221551	22%
37	447669	4%	8840383	88%	1684982	17%
38	359469	4%	9199852	91%	1237313	12%
39	277464	3%	9477316	94%	877844	9%
40	205560	2%	9682876	96%	600380	6%
41	145899	1%	9828775	98%	394820	4%
42	98979	1%	9927754	99%	248921	2%
43	63999	1%	9991753	99%	149942	1%
44	39303	<1%	10031056	100%	85943	1%
45	22825	<1%	10053881	100%	46640	<1%
46	12465	<1%	10066346	100%	23815	<1%
47	6354	<1%	10072700	100%	11350	<1%
48	2994	<1%	10075694	100%	4996	<1%
49	1287	<1%	10076981	100%	2002	<1%
50	495	<1%	10077476	100%	715	<1%
51	165	<1%	10077641	100%	220	<1%
52	45	<1%	10077686	100%	55	<1%
53	9	<1%	10077695	100%	10	<1%
54	1	<1%	10077696	100%	1	<1%
55	0		10077696	100%	0	no
56	0		10077696	100%	0	no

There are 10,077,696 possible outcomes from 9 to 54.  
The most probable roll is 31 or 32 (equally at 8% each).

## 10D TEN DICE

(6<sup>10</sup>= 60,466,176; range 10 - 60)

Roll	N	N%	N -	N - %	N +	N + %
10	1	<1%	1	<1%	60466176	100%
11	10	<1%	11	<1%	60466175	100%
12	55	<1%	66	<1%	60466165	100%
13	220	<1%	286	<1%	60466110	100%
14	715	<1%	1001	<1%	60465890	100%
15	2002	<1%	3003	<1%	60465175	100%
16	4995	<1%	7998	<1%	60463173	100%
17	11340	<1%	19338	<1%	60458178	100%
18	23760	<1%	43098	<1%	60446838	100%
19	46420	<1%	89518	<1%	60423078	100%
20	85228	<1%	174746	<1%	60376658	100%
21	147940	<1%	322686	1%	60291430	100%
22	243925	v	566611	1%	60143490	99%
23	383470	1%	950081	2%	59899565	99%
24	576565	1%	1526646	3%	59516095	98%
25	831204	1%	2357850	4%	58939530	97%
26	1151370	2%	3509220	6%	58108326	96%
27	1535040	3%	5044260	8%	56956956	94%
28	1972630	3%	7016890	12%	55421916	92%
29	2446300	4%	9463190	16%	53449286	88%
30	2930455	5%	12393645	20%	51002986	84%
31	3393610	6%	15787255	26%	48072531	80%
32	3801535	6%	19588790	32%	44678921	74%
33	4121260	7%	23710050	39%	40877386	68%
34	4325310	7%	28035360	46%	36756126	61%
35	4395456	7%	32430816	54%	32430816	54%
36	4325310	7%	36756126	61%	28035360	46%
37	4121260	7%	40877386	68%	23710050	39%
38	3801535	6%	44678921	74%	19588790	32%
39	3393610	6%	48072531	80%	15787255	26%
40	2930455	5%	51002986	84%	12393645	20%
41	2446300	4%	53449286	88%	9463190	16%
42	1972630	3%	55421916	92%	7016890	12%
43	1535040	3%	56956956	94%	5044260	8%
44	1151370	2%	58108326	96%	3509220	6%
45	831204	1%	58939530	97%	2357850	4%
46	576565	1%	59516095	98%	1526646	3%
47	383470	1%	59899565	99%	950081	2%
48	243925	<1%	60143490	99%	566611	1%
49	147940	<1%	60291430	100%	322686	1%
50	85228	<1%	60376658	100%	174746	<1%
51	46420	<1%	60423078	100%	89518	<1%
52	23760	<1%	60446838	100%	43098	<1%
53	11340	<1%	60458178	100%	19338	<1%
54	4995	<1%	60463173	100%	7998	<1%
55	2002	<1%	60465175	100%	3003	<1%
56	715	<1%	60465890	100%	1001	<1%
57	220	<1%	60466110	100%	286	<1%
58	55	<1%	60466165	100%	66	<1%
59	10	<1%	60466175	100%	11	<1%
60	1	<1%	60466176	100%	1	<1%

There are 60,466,176 possible outcomes from 10 to 60.  
The most probable roll is 35 (at about 7%).

## 5

### C + S ONE THROUGH EIGHT DICE

Hasty -	-	EAS	AVE	DIF	FOR	STA	HOP	IMP	
Cautious	EAS	AVE	DIF	FOR	STA	HOP	IMP	BEY	-
Task -	EAS	AVE	DIF	FOR	STA	HOP	IMP	BEY	
C + S	0D	1D	2D	3D	4D	5D	6D	7D	8D
0	100%	no	no	no	no	no	no	no	no
1	100%	17%	no	no	no	no	no	no	no
2	100%	33%	3%	no	no	no	no	no	no
3	100%	50%	8%	<1%	no	no	no	no	no
4	100%	67%	17%	2%	<1%	no	no	no	no
5	100%	83%	28%	5%	<1%	<1%	no	no	no
6	100%	100%	42%	9%	1%	<1%	<1%	no	no
7	100%	100%	58%	16%	3%	<1%	<1%	<1%	no
8	100%	100%	72%	26%	5%	<1%	<1%	<1%	<1%
9	100%	100%	83%	38%	10%	2%	<1%	<1%	<1%
10	100%	100%	92%	50%	16%	3%	<1%	<1%	<1%
11	100%	100%	97%	63%	24%	6%	<1%	<1%	<1%
12	100%	100%	100%	74%	34%	10%	2%	<1%	<1%
13	100%	100%	100%	84%	44%	15%	4%	<1%	<1%
14	100%	100%	100%	91%	56%	22%	6%	1%	<1%
15	100%	100%	100%	95%	66%	31%	10%	2%	<1%
16	100%	100%	100%	98%	76%	40%	14%	4%	<1%
17	100%	100%	100%	>99%	84%	50%	21%	6%	1%
18	100%	100%	100%	100%	90%	60%	28%	9%	2%
19	100%	100%	100%	100%	95%	69%	36%	14%	4%
20	100%	100%	100%	100%	97%	78%	45%	19%	6%
21	100%	100%	100%	100%	99%	85%	55%	26%	9%
22	100%	100%	100%	100%	>99%	90%	64%	33%	13%
23	100%	100%	100%	100%	>99%	94%	72%	41%	18%
24	100%	100%	100%	100%	100%	97%	79%	50%	24%
25	100%	100%	100%	100%	100%	98%	86%	59%	31%
26	100%	100%	100%	100%	100%	>99%	90%	67%	38%
27	100%	100%	100%	100%	100%	>99%	94%	74%	46%
28	100%	100%	100%	100%	100%	>99%	96%	81%	54%
29	100%	100%	100%	100%	100%	>99%	98%	86%	62%
30	100%	100%	100%	100%	100%	100%	>99%	91%	69%
31	100%	100%	100%	100%	100%	100%	>99%	94%	76%
32	100%	100%	100%	100%	100%	100%	>99%	96%	82%
33	100%	100%	100%	100%	100%	100%	>99%	98%	87%
34	100%	100%	100%	100%	100%	100%	>99%	99%	91%
35	100%	100%	100%	100%	100%	100%	>99%	>99%	94%
36	100%	100%	100%	100%	100%	100%	100%	>99%	96%
37	100%	100%	100%	100%	100%	100%	100%	>99%	98%
38	100%	100%	100%	100%	100%	100%	100%	>99%	99%
39	100%	100%	100%	100%	100%	100%	100%	>99%	>99%
40	100%	100%	100%	100%	100%	100%	100%	>99%	>99%
41	100%	100%	100%	100%	100%	100%	100%	>99%	>99%
42	100%	100%	100%	100%	100%	100%	100%	100%	>99%
43	100%	100%	100%	100%	100%	100%	100%	100%	>99%
44	100%	100%	100%	100%	100%	100%	100%	100%	>99%
C + S	0D	1D	2D	3D	4D	5D	6D	7D	8D
Task	-	EAS	AVE	DIF	FOR	STA	HOP	IMP	BEY

### READING THE C + S CHART

This table shows the chance of rolling less than the number C + S (Skill + Characteristic).

For example, if (in resolving a 3D Difficult task), the skill level is 4 and the characteristic is 7, then C + S= 11. The chance of rolling 11 or less on 3D is 63%.

**100%:** Automatic or 100% probable.

**No:** Not possible; zero percent probability.

**<1%.** Probability less than 1%. There is less than one chance in 100 that this result will occur.

**>99%:** Probability greater than 99%. There is less than one chance in 100 that this result will NOT occur.

### DIFFICULTY HEADERS

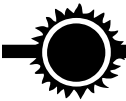
Diff	Description	Dice
EAS	Easy	1D
AVE	Average	2D
DIF	Difficult	3D
FOR	Formidable	4D
STA	Staggering	5D
HOP	Hopeless	6D
IMP	Impossible	7D
BEY	Beyond Impossible	8D

The column labels on the C + S Chart reflect typical difficulty for tasks and common strategies. Hasty and Cautious strategies for task use. For example,

AVE Average Task is 2D.

Hasty AVE Average Task is one level more difficult, which is 3D.

A Cautious AVE Average Task is one level easier, which is 1D.



## RANDOMLY SELECTED CHARACTERISTICS

There may arise (particularly in wounding or personal injury) a need to select specific characteristics for characters.

**Using The C-Code.** One of the Six Characteristics can be randomly selected by corresponding a 1D result with the C-Code (as detailed in Characteristics).

Sometimes a range of characteristics is stated (usually as an Injury as a result of Fighting or a Mishap). Roll 1D= the result is the position code for the selected characteristic. For example, to randomly select from C1 C2 C3, roll 1D (= 3 selects Characteristic C3). If the die roll does not match a characteristic in the range, reroll.

**Randomly Determined Characteristic.** When a characteristic must be selected (often without regard to those available). Roll 1D for the appropriate column.

For example, 1D= 3= Endurance.

For Human Characteristics, use Column 3 - 4. For non - Human Characteristics, add a 1D roll for column. For example, 1D= 2= Column 2= Stamina.

**Rows 0 and 7** are not normally accessible; the Referee may impose DM + 1 or DM - 1 when necessary.

## RANDOM QREBS

When a Thing fails, the cause may be QREBS related. Select a random QREBS value and Check Double Skill with the QREBS value for a Mod.

## SPECIAL THROWS

The Special Throws Tables show several different combinations of dice and their results.

**D + D.** The standard two dice throw. The range is 2 through 12 centered on 7. This is a variant way of describing 2D.

**+ D - D.** Roll light die and dark die. Subtract the dark from the light. The results range from - 5 to + 5 centered on 0 (in fact, 0 is most frequent: 6 out of 36 times, or about 17%). We call this roll Flux.

**2D - 7.** Roll two dice and subtract 7. The range and probabilities are the same as + D - D, but they are achieved somewhat differently. Although this throw is statistically equivalent to + D - D (and to Flux) it is somewhat faster and omits the drama.

**2D - 2.** Roll two dice and subtract 2. The results range from 0 to 10 centered on 5 (5 is most frequent: 6 out of 36 times). 2D - 2 is most commonly used in World Generation. Notice that this roll does not produce an even distribution of 0 - 10.

## EVEN DISTRIBUTIONS

Even Distributions are contrivances to contort D6 results to correspond to non - D6 (specifically decimal dice or D10) results. Even Distributions use six-sided dice to produce a range of numbers beyond 1 to 6 (specifically 1 - 9, or 0 - 9 or 1 - 10).

**Even Distribution 1 to 9.** Roll two dice and consult the Even Distribution From 1 to 9 Table.

This table is most commonly used in creating the Population Multiplier associated with the population exponent of worlds. Because the population multiplier modifies the exponent, a result of 0 or 10 is not applicable (zero creates a zero result; ten increases the value to the next order of magnitude).

**Even Distribution 0 to 9.** Roll two dice and consult the Even Distribution From 0 to 9 Table.

Even distribution between 0 and 9 creates the equivalent of a decimal die (D10).

**Even Distribution 1 to 10.** Roll two dice, consult the Even Distribution From 0 to 9 Table, and add + 1 to the result.

## R Random Characteristics

1D	C-Code	1	2	3	4	5	6
0	CP	Psi		Psi		Psi	
1	C1	Str		Str		Str	
2	C2	Agi		Dex		Gra	
3	C3	Sta		End		Vig	
4	C4	Int		Int		Int	
5	C5	Tra		Edu		Ins	
6	C6	Cha		Soc		Cas	
7	CS	San		San		San	

Randomly determine a specific Characteristic using 1D on this table.

To include non - Human Characteristics, first randomly determine Column 1 - 2 - 3 - 4 - 5 - 6 with 1D.

## R2 Random QREBS

1D	Code	Check
1	Q	Quality
2	R	Reliability
3	E	Ease Of Use
4	B	Burden
5	S	Safety
6	-	No Mod

Roll 1D for which QREBS value applies.

## S Special Throws

2D	Roll%	D + D	D - D	2D - 7	2D - 2
2	3%	2	- 5	- 5	0
3	6%	3	- 4	- 4	1
4	8%	4	- 3	- 3	2
5	11%	5	- 2	- 2	3
6	14%	6	- 1	- 1	4
7	17%	7	0	0	5
8	14%	8	+ 1	+ 1	6
9	11%	9	+ 2	+ 2	7
10	8%	10	+ 3	+ 3	8
11	6%	11	+ 4	+ 4	9
12	3%	12	+ 5	+ 5	10

$$= (7 + \text{Flux}) / 2$$

$$= 3.5 + (\text{Flux} \times 0.5)$$

## E Even Distribution 2D

	Even 1-9					Even 0-9 (or 1-10)							
	1	2	3	4	5	6	1	2	3	4	5	6	
1	1	2	3	1	2	3	1	0	0	0	1	1	1
2	4	5	6	4	5	6	2	2	2	2	3	3	3
3	7	8	9	7	8	9	3	4	4	4	5	5	5
4	1	2	3	1	2	3	4	6	6	6	7	7	7
5	4	5	6	4	5	6	5	8	8	8	9	9	9
6	7	8	9	7	8	9	6	rr	rr	rr	rr	rr	rr

Roll 1D for Row and 1D for Column (or 1-10, substitute 10 for 0).



# Many Dice

## 7

Some situations require rolling **many dice** to determine a result. For example, a direct hit by a Suitcase Nuke inflicts 30D hits as Blast, BFE, Burn, and Rad, totalling some 180D in damage of one sort or another. Rolling 180D is a long and tedious enterprise when compared to the near certain destruction it will inflict. Nevertheless, there may be situations where a low damage value (for example, under 500 hits, somewhat less than the probable 640 hits) could mean the difference between character life or death, or starship destruction or survival), and the players want to know an answer (and hope for an answer which promotes survival).

**Many Dice Defined:** For the options below to be used, the number of dice to be resolved must be more than the highest number of dice presented on the Dice Tables: at least 11 Dice.

### MANY DICE 10

Roll ten dice and reuse the rolls as needed. Reuse Die Roll 1 for Die Rolls 11, 21, 31 and later.

For example, to resolve 100D, roll ten D6 (= 1 2 3 1 2 3 1 2 3 1= 19) and reuse those rolls through 100D (= 190 hits).

**Many Dice 10** amplifies the random results of a set of ten rolls. It brings with it the chance of very low results which might be statistically eliminated if the entire result were rolled.

### MANY DICE 2D

Roll 2D for the number of dice to be rolled. Roll that number of dice and reuse the rolls as needed.

For example, to resolve rolling 100D, roll 2D= 5: use 5 Dice.

Roll 5D (=1 2 4 5 5=17) and reuse the rolls through 100D (= 17x20=340).

Or to resolve 75D, roll 2D= 2.

Roll 2D (=1 3). A series of 75 rolls 1 3 1 3 1 3 totals 149.

**Many Dice 2D** can work if the player rolls low early in the sequence

### MANY DICE 3.5

Multiply the required number of dice by 3.5 (which is the long-term expected average roll for a single die).

For example, to resolve 50D, multiply 50 by 3.5= 175.

**Many Dice 3.5** achieves strictly average results: it avoids the dangers of extreme negative rolls by foregoing the benefits of extremely positive rolls.

### MANY DICE 3.5 FLUX

Roll Flux against the Dice 3.5 Flux table below and multiply by the required number of dice.

For example, to resolve 100D, roll Flux on the Table and multiply by 100.

**Many Dice 3.5 Flux** is both consistent and relatively predictable. It offers high rewards at the risk of great losses.

DICE 3.5 FLUX		
Flux	Value	Probability
- 5	1	3%
- 4	1.5	6%
- 3	2	8%
- 2	2.5	11%
- 1	3	14%
0	3.5	17%
+ 1	4	14%
+ 2	4.5	11%
+ 3	5	8%
+ 4	5.5	6%
+ 5	6	3%

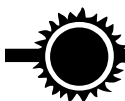
= (7 + Flux) / 2  
= 3.5 + (Flux x 0.5)

### Who Chooses?

Players choose the method when involved with Non-Players.

When Players are rolling against Players, the **recipient** of the result selects the Method.

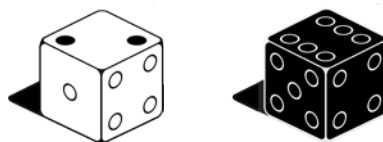
**Manipulating Results.** Selecting the most advantageous Many Dice method is a survival strategy.



Flux is **Traveller's** quick and easy dice-rolling mechanic for creating a reasonable range of variation between - 5 and +5. Interestingly enough, the most probable result is the *status quo*: zero; no change.

## FLUX

Flux is rolled with two dice. Roll 1D. Roll a second 1D and subtract it from the first. This process is most easily done with a light die and a dark die: roll the two dice and subtract the dark from the light. Flux is Light Die minus Dark Die.



$$(+2 - 6 = -4)$$

## Flux= + 1D - 1D

**Good Flux.** Good Flux is a variant of Flux which produces only positive results (average +2, ranges from 0 to +5). Roll 2D and subtract the smaller from the larger. Good Flux is High Die minus Low Die.

**Bad Flux:** Bad Flux is a variant of Flux which produces only negative results (average - 2, ranges from 0 to - 5). Roll 2D and subtract the larger from the smaller. Bad Flux is Low Die minus High Die.

**Quick Rolling Flux:** Flux is defined as + 1D - 1D to clearly state its effects and emphasize the drama. When drama is not an issue, Flux can be quick rolled as 2D - 7. The results and the probabilities are the same, although the numbers on the dice leading to the result are different.

2D TWO DICE				2D - 7				FLUX				GOOD FLUX+			BAD FLUX-		
Roll	N	N%	F=	Roll	N	N%	F=	Roll	N	N%	2D=	Roll	N	N%	Roll	N	N%
1	0	0%		-6	0	0%		-6	0	0%		-6	0	0%	-6	0	0%
2	1	3%	-5	-5	1	3%	-5	-5	1	3%	2	-5	0	0%	-5	2	6%
3	2	6%	-4	-4	2	6%	-4	-4	2	6%	3	-4	0	0%	-4	4	11%
4	3	8%	-3	-3	3	8%	-3	-3	3	8%	4	-3	0	0%	-3	6	17%
5	4	11%	-2	-2	4	11%	-2	-2	4	11%	5	-2	0	0%	-2	8	22%
6	5	14%	-1	-1	5	14%	-1	-1	5	14%	6	-1	0	0%	-1	10	27%
7	6	17%	0	0	6	17%	0	0	6	17%	7	0	6	17%	0	6	17%
8	5	14%	+1	+1	5	14%	+1	+1	5	14%	8	+1	10	27%	+1	0	0%
9	4	11%	+2	+2	4	11%	+2	+2	4	11%	9	+2	8	22%	+2	0	0%
10	3	8%	+3	+3	3	8%	+3	+3	3	8%	10	+3	6	17%	+3	0	0%
11	2	6%	+4	+4	2	6%	+4	+4	2	6%	11	+4	4	11%	+4	0	0%
12	1	3%	+5	+5	1	3%	+5	+5	1	3%	12	+5	2	6%	+5	0	0%
13	0	0%		+6	0	0%		+6	0	0%		+6	0	0%	+6	0	0%
Outcomes= 6^2= 36 Range 2 - 12 Most probable= 0 Average= 0 Column F= 2D to Flux.				Outcomes= 6^2= 36 Range - 5 to + 5 Most probable= 0 Average= 0 F= shows 2D-7 to Flux				Outcomes= 6^2= 36 Range - 5 to + 5 Most probable= 0 Average= 0 2D= 2D Equivalent = Light minus Dark.				Outcomes= 6^2= 36 Range 0 to + 5 Most probable= +1 Average= +2 = High minus Low			Outcomes= 6^2= 36 Range - 5 to 0 Most probable= -1 Average= -2 = Low minus High.		



# eHex

## THE TRAVELLER EXPANDED HEX CODE

The **Traveller Expanded Hex Code** (eHex) substitutes single letters for numbers above 9 and allows the creation of a string of character with values from 0 through 33. Hexadecimal numbers use A, B, C, D, E, F for 10, 11, 12, 13, 14, 15 respectively to create a base-16 number system (used in some computer systems). The letters I (eye) and O (oh) are omitted to avoid confusion with 1 (one) and 0 (zero).

The **Expanded Hex Code** allows representation of values through 33 using single letters, facilitating the number-string profiles used in **Traveller**. For example, the Universal Personality Profile (UPP) represents the six personal characteristics in a string (in the UPP Human format SDEIES). Using single number digits, the values for each profile digit can range from 0 to 9. Using Hex Code, those digit values can range from 0 to 15. Using the Expanded Hex Code, alphabetic letter values can range from 0 to 33. They may also (in some usages) be assigned arbitrary values or non-numeric meanings.

NUMBER TO EHEX		
Value	eHex	Comment
0	0	
1	1	
2	2	prime
3	3	prime
4	4	
5	5	prime
6	6	
7	7	prime
8	8	
9	9	
10	A	
11	B	prime
12	C	
13	D	prime
14	E	
15	F	
16	G	
17	H	prime
	I	=omitted
18	J	
19	K	prime
20	L	
21	M	
22	N	
	O	=omitted
23	P	prime
24	Q	
25	R	
26	S	
27	T	
28	U	
29	V	prime
30	W	
31	X	=unknown
32	Y	=special
33	Z	=ultimate
	?	=unknown
	*	=any value

eHex expects that alphabetic digits will be CAPS. Some uses may differentiate between CAPS and lower case.

**Traditional Digits (Decimal Notation).** The digits 0-9 represent the numbers in base-10.

**Hex Digits (Hexadecimal Notation).** Expanding the numbers available: the letters A-F correspond to the values 10-15 in base-16.

**eHex Digits (Extended Hexadecimal Notation).** Further expanding the numbers available, the letters G-Z correspond to the numbers 16-33.

**Omit I and O.** To avoid potential for confusion, with the digits one (1) and zero (0), the alphabetic letters I and O are omitted.

**Special Meanings.** Digits may be assigned arbitrary or non-numeric meanings: For example, while XYZ have assigned values 31-32-33, they are (sometimes) assigned specialized values like Unknown, Special, or Ultimate.

**Question (?)** shows an unknown value 77??67.

### Why Use eHex?

eHex allows numbers greater than 9 to occupy a single place in a string of numbers.

123456	<p><b>The Situation</b></p> <p>Traveller uses many different strings of digits to show abilities or values for people, equipment, starships, and other items.</p>
89101112 8/9/10/11/12 8,9,10,11,12 8-9-10-11-12 0809101112 08-09-10-11-12	<p><b>The Problem</b></p> <p>Numerical values greater than nine take up two (or more) places and make it difficult to join them into readable strings. If any value is greater than 9, the string can become confusing or unreadable.</p>
89ABCD	<p><b>The Solution</b></p> <p>Make each numerical value one digit: values greater than 9 are assigned a corresponding letter 10=A 11=B 12=C 13=D.</p>

EHEX TO NUMBER		
Comment	Value	eHex
	0	0
	1	1
traditional digits	prime	2
arabic numerals 0-9	prime	3
	2^2	4
	prime	5
	6	6
	prime	7
	2^3	8
	cube	9
	10	A
hex digits	prime	11
anglic A-F	12	C
	prime	13
	14	E
	15	F
	2^4	16
	prime	17
	=omitted	I
	18	J
	prime	19
	20	L
	21	M
	22	N
eHex digits	=omitted	O
anglic G-Z	prime	23
	24	Q
	25	R
	26	S
	27	T
	28	U
	prime	29
	30	W
	unknown=	31
	special=	32
	ultimate=	33
	unknown=	?
	any value=	*

eHex expects that alphabetic digits will be CAPS. Some uses may differentiate between CAPS and lower case.



# Tons

## 1 ton= 13.5 cubic meters

The **ton** is a standard unit of **volume** commonly used throughout Charted Space. It has applications in starship design, payload measurement, and size designations.

### THE BASIS OF THE TON

A ton is the volume of 1,000 kilograms of liquid hydrogen and equal to approximately 13.5 cubic meters.

**Maritime Tons.** In classic water-based shipbuilding, a ton is the volume of 1,000 kilograms of water. A ship with a displacement of 1 ton afloat in water displaces one ton of water.

**Starship Ton.** A 100-ton ship submerged in liquid hydrogen displaces 1350 cubic meters (100 tons) of liquid hydrogen.

A cubic ton is 2.4 meters on a side, but tons are more typically shown as a rectangular volume 3 meters high, 3 meters long, and 1.5 meters wide.

**Subunits of the Ton.** Volume measures of less than a ton are sometimes more convenient (for things, vehicles, or small craft, or if giving a decimal ton volume is inartful).

### DISTINGUISHING BETWEEN A TON AND A TON

Ton (usually) refers to displacement or volume (= 13.5 cubic meters). If a reference to mass (or weight) is absolutely necessary, make the reference clear (by referring to weight or mass).

For example:

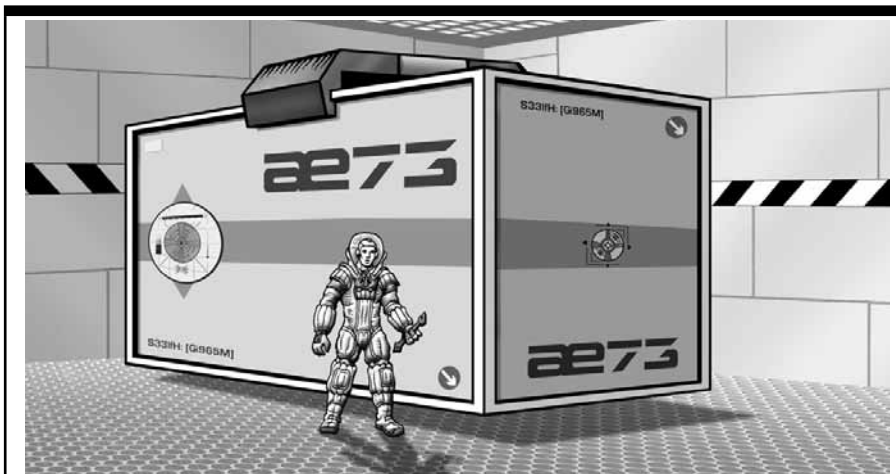
"This is a 10-ton small craft" (refers to displacement).

"This landing gear pad weighs a ton" (refers to mass or weight). Preferred usage is: "This landing gear pad weighs a thousand kilograms."

### THE LEGACY TON

The values used for the ton in some previous editions varied slightly from traditional values. Historians call this value the Legacy Ton.

- One Ton= 14 cubic meters.
- Deck Square= 2 x 2 meters
- Deck Height= 3.5 meters.
- Dimensions= 2m x 2m x 3.5 m



A three-ton cargo pod 3 meters wide by 3 meters high by 4.5 meters long.

Shown for scale comparison: a half-Lan person (actually closer to a Lan considering the vacc suit). Tightly packed, the cargo container could hold 300 vacc suits or 600 human bodies. A (human) person volume is a half-Lan. The hundredth-ton Lan is a cube about a half meter on a side.

Or, a ton is 13,500 liters, a Lan is 135 liters. A half-Lan person has a volume (135 /2)= 68 liters. Since a person is mostly water, the weight of a person and 68 liters should be roughly equivalent. A liter of water is 1 kilogram. A half-Lan person should be about 68 kilos= 150 pounds. QED.

### SUBUNITS OF THE TON

Unit	Tons	Comment	Liters
Ton	1.00	= [Standard] Ton	13,500
* Ton	1.037	= Legacy Ton	14,000
** Square	0.5	= half-ton	6750
*** Cube	0.25	= quarter-ton	3370
Roup	0.10	= tenth-ton	1350
		= deciton	
Lan	0.01	= hundredth ton	135
		= centiton	
Half-Lan	0.005	= 72 liters	72
		= typical human	
Liter	0.00007	= 1/1350 ton	1
Kiloliter	0.075	= cubic meter	1000
* Emthree	0.075	= cubic meter	1000
* Cyard	0.05	= cubic yard	765
* Cuft	0.002	= cubic foot	28

\*Archaic or little used.

\*\*Square= 1.5 x 1.5 x 3 meters.

\*\*\*Cube= 1.5 x 1.5 x 1.5 meters.

For example: the smallest G-Drive is 0.25 tons; often labelled a 1-cube drive. A common vehicle engine is 0.4 tons; often labelled a 4-Roup, or perhaps a 40-Lan, engine.

### TON EQUIVALENTS

Unit	Unit	Per Ton
Cuft	cubic feet	500
Cyard	cubic yards	18
kl	kiloliters	13.5
l	liters	13,500
m3	cubic meters	13.5

### TON DENSITIES

Tons	Material	kg
1	Liquid Hydrogen	1,000
1	Wood	7,000
1	Plastic	12,000
1	Water	13,500
1	Magnesium	25,000
1	Aluminum	35,000
1	Titanium	60,000
1	Steel	100,000

1 ton= 13.5 Cubic Meters

1 ton= 2 Standard Grid Squares deck to deck height= 3 m



1 ton= 4 Short Grid Squares deck to deck height= 1.5 m










1 ton= 1 Tall Grid Squares deck to deck height= 4.5 m





# Distances and Range Bands

R	T
	
Needle	Word
Reading	Talking
0.5 m	1.5 m

Size= Range=	0	1	2	3	4	5	6	7	8	9
										
		Coin	Eye	Head	Rifle	Person	Vehicle	ACS	BCS	Moonlet
Range	Contact	Vshort	Short	Medium	Long	Vlong	Distant	VDistant	Orbit	Far Orbit
Distance	0 m	5 m	50 m	150 m	500 m	1000 m	5000 m	50 km	500 km	5000 km

A thing with Size equal to Range appears approximately the same Size as any other thing with Size equal to Range. For example, a Size-6 Vehicle at R=6 appears roughly the same as a Size-5 Person at R=5, a Size-1 Coin at R=1, or a Size-9 Moonlet in Far Orbit.

## 1 WORLD SURFACE RANGES

Distance	R=	Descriptor	Benchmark	Range Band	Width	S=
Zero Point	0	Contact	Touching.	Zero Point	to about 3 m*	
0.5 m	R	Reading	Normal Reading.	25 cm	to 1 meter*	
1.5 m	T	Talking	Conversations.	1 m	to about 3 m*	
5 m	1	Vshort	Lectures.	3 m	to 25 m	
50 m	2	Short	Shouting Distance. Pistol Shot.	25 m	to 100 m	
150 m	3	Medium	City Block. Rifle Shot.	100 m	to 300 m	
500 m	4	Long		300 m	to 750 m	
1 km	5	Vlong		750 m	to 3 km	B
5 km	6	Distant	Near The Horizon.	3 km	to 25 km	1
50 km	7	Vdistant	Beyond The Horizon.	25 km	to 250 km	2
500 km	8	Orbit		250 km	to 2,500 km	3
5,000 km	9	Far Orbit		2,500 km	to 25,000 km	4

\*Range=R and Range=T fall within Range=0 for many purposes (for example, weapons ranges).

**R=** World Surface Ranges from personal contact to horizon (and to orbit).

$$R = S + 5$$

**S=** Space Ranges from Boarding to the edge of a star system.

$$S = R - 5$$

# Distances and Range Bands

Distance is an open-ended concept of separation between objects: it governs the effectiveness of the senses and of sensors, of weapons, attacks, and communications; it determines travel times. Range Bands distill these many possible distances into a set of easily used typical distances.

There is an infinite number of distances and a corresponding infinity of POSSIBLE exact calculations based on distance. It is possible (but unwieldy) to express exact distances for every situation. It is 11.4 kilometers to the starport; it is 47.3 meters to that red warning sign; that flyer is 87,342 meters above us.

**Traveller** distills the open-ended concept of distance into a series of common range bands, each associated with a typical distance and identified by one or more benchmarks. The sacrifice in detail is more than made up in ease of use. The starport is Distant; that warning sign is at Short range; that flyer is at Upper altitude.

## THE RANGE BANDS

Range Bands define typical distances, standardized for convenience, and quantified for comprehension. Further detail rarely adds enough realism to outweigh the complexity.

**Relative Distances:** Range Bands show relative distances between an observer or a Zero Point such as a world surface. Each Range Band has a descriptive name and an associated distance value. For example, Medium Range is typically 150 meters. It lies between Short Range (about 50 meters) and Long Range (about 500 meters).

**Available Distances.** Each Range Band covers distances from about half-way from the previous Range Band to about half-way to the next range band.

For example, Medium Range Band extends from about 100 meters to about 325 meters.

## Two Distinct Range Types

For ease of use, two different Range types are provided: World Surface Ranges and Space Ranges.

**World Surface Ranges** (identified as R=) are useful with individuals, with individual weapons, and with events on or near worlds.

**Space Ranges** (identified with S=) are useful with spacecraft, with space weapons, and with events within a star system.

World and Space Ranges are convertible.

**S= R - 5.** World Range R= 5 converts to S= B. R= 4 or less converts to S= 0.

**R= S + 5.** Space Range B converts to R= 5.

## The Lettered World Range Bands

Two of the World R= Range Bands are lettered. They lie between R=0 Contact and R=1 Vshort, and refer to typical sense interaction distances. Both are contained within R=0.

**Reading Range= R** is the typical distance for reading books, vision screens, or other texts.

**Talking Range= T** is the typical distance for conversa-

tions with one other, or with a small group. With a typical distance of 1.5 meters, Range= T is also the size of a typical deck plan square.

## The Lettered Space Range Bands

One of the Space S= Range Bands is lettered.

**Boarding Range= B** occupies the gap between S= 1 and S= 0 (and includes S= 0). It is the range between ships at which Boarding can be attempted.

## Sub-Bands

Any Range Band can be divided into several decimal Sub-Bands when the distinction is important. Most often, some altitudes need further differentiation.

**Mid-Band.** The easiest sub band is half-way. Sub Band X.5 allows identification of a Range midway between two established Range Bands.

**Layered Sub-Bands.** Greater differentiation within a Sub Band is possible by specifying four even decimal divisions 0.2, 0.4, 0.6, 0.8).

For example, to reflect various layers within the atmosphere of a Gas Giant, Range 6 is subdivided Bands 6.2, 6.4, 6.6, and 6.8 (which reflect different pressures).

**Decimal Sub-Bands.** It is possible to identify all nine decimal Sub-Bands (0.1 through 0.9) for extreme precision. It is almost never necessary to divide a Range Band into decimal hundredths (6.02, or 6.13).

The purpose of Sub-Bands is to differentiate distances instead of forcing all objects at a range into one distance.

The Range to a Sub Band is the range to the Band (the range from R= 0 to R= 6.4 is 6).

## THE ZERO POINT

Ranges assume a zero point (variously the location of the observer, the world surface or the ocean surface, or the upper cloud deck) as the equivalent of Contact zero range.

The Zero Point is a point of reference rather than an absolute value. It is always the 'current' location as detected

by instruments or an observer. It is subject to change as conditions change, although this rarely matters.

**Zero Point Anomalies.** When variations in the location of the Zero Point occur, they are reflected as anomalies in instrument readings, or as unusual observations. For example, the Zero Point for Depths of the Ocean is Sea Level. It may vary slightly with tides or waves. The effect is minimal from the Abyss level, but it may have an effect on Wading or Fording.

## THE RANGE BAND CHARTS

The Range Band Charts and subcharts show distance relationships associated with world surfaces and with star systems.

**1a 1b 1c** The **Basics** shows a variety of Range R= distances on world surfaces, atmospheric altitudes, and ocean depths.

### 1a World Surface Ranges

address the typical distances of relatively flat terrain. They reflect combat ranges and typical uses of senses.

The Zero Point is the location of the observer.

### 1b Altitudes of the Atmosphere

address the typical altitudes used by flyers, air traffic control concepts, various orbits, and typically encountered layers of atmospheres. The Zero Point is the surface of the world.

Some altitudes have been divided into Sub-Bands for added usefulness.

**Thin Low Worlds.** Some worlds (those with Atmosphere= F Thin Low) have canyons or chasms tens or hundreds of kilometers deep and with correspondingly higher atmospheric pressures. The table includes negative altitudes to properly address these conditions.

### 1c Depths of the Ocean

address the various layers below the ocean surface. Levels are important because increased depth imposes greater pressure. Depths are shown as negative Range Bands. The Zero Point is the water or ocean surface or sea level.

**Ocean Surface Turbulence.** Some values near the Zero Point reflect surface turbulence.

**2** The **Space Ranges Chart** shows distances (using S=) in interplanetary space. Interplanetary ranges address the relative distances in space and are used in the operation of long range sensors and in space combat.

Band and Band Name identifies the space combat locations used in space combat.

Stellar and World Diameters shows the range bands corresponding to the various D values. Diameters govern the effectiveness of lifters, gravitic, maneuver, and jump drives.

Light Delay details the approximate time delay for communicators and sensors.

S= shows the Space Combat Range Band.

R= shows the World Range Band for comparison.

Orbits shows the values compared to standard Orbits.

**3a 3b 3c** The **Gas Giant Charts** show the depths of massive world atmospheres.

Gas Giant Atmospheres addresses the levels or depths of the gas giant atmosphere. Levels are important: increased depth imposes increased pressure and temperature.

The Zero or Surface point is the upper layer of the atmosphere (typically the Cloud Deck, and typically with a density of one atmosphere).

Three types of massive worlds are shown:

**Large Gas Giants** (similar in size to Jupiter or larger),

**Small Gas Giants** (similar in size to Saturn or smaller),

**Ice Giants** (similar to Neptune or Uranus).

Gas Giants are sources of hydrogen for starships in search of cheap fuel, or which are required to use wilderness refueling. Gas Giant atmosphere levels show the conditions such ships must survive in order to acquire fuel.

**4a 4b 4c** The **Strangeworld Charts** show the atmospheric altitudes for worlds with dangerous characteristics. The values for these charts may be overlaid on other worlds.

For example, the normal atmospheric values for a world can be taken from 1b Altitudes of the Atmosphere. If that world is a StormWorld (racked by storms constantly, or perhaps only currently), the appropriate (H= or Hits=) values from atmospheric turbulence can be overlaid on Chart 1b.

The Zero or Surface point is the surface of the world.

**Inferno** is Venus-like with high temperatures.

**StormWorld** has strong atmospheric turbulence.

**RadWorld** has a high level of surface radioactivity (the 1D Rad levels at altitude 6 and 6.2 are windborne particles).

**5** The **Orbital Distances Charts** show the standard orbits in star systems.

Orbits may theoretically be at any distance from a central star. Then again, stable orbits must have a minimum separation. Primarily for ease of use and description, orbital distances are standardized on the Titius-Bode Relation, an 18th Century attempt to predict orbital values. The charts include Orbit 0 to reflect observed values outside the Solar System.

**Orbital Distances** shows the basic orbital distances and supporting information, including Orbit Number (O=) with corresponding distances in AU, Millions of Km, Light-units, and S=.

Sub-Orbits details the availability of orbits for worlds in subsystems. In multiple star systems, it is possible for a companion star to occupy one of the world orbits. If so, it may have its own planets in its suborbits.

For example, if a companion star occupies Orbit= 4, it is possible for it to have worlds in Sub-Orbits 0 and 1.

**Prohibited Orbits.** Some stars are large enough to physically occupy some of the Orbits in a system. Based on the star's Spectral Class and Size, the chart shows such occupied or prohibited orbits.

For example, if the primary star is an A0 Ia, it is large

enough to physically occupy Orbits 0-1-2-3-4; its surface is at approximately Orbit-4. No worlds can be in Orbits 0-1-2-3-4. The innermost world in the system could occupy Orbit O= 5.

**The Drive Limit Charts.** The common starship drives are constrained in their operation by distance from a major gravity source (such as a star). The charts show the expected restrictions by Orbit.

**6** The **Decimal Orbit Chart** provides details on interpolating orbital radii between the standard orbits.

The chart shows decimal variations for the standard orbital distances. For most purposes, unit values are sufficient to identify world orbits. No greater precision is required.

On the other hand, some situations call for greater detail. Decimal Orbits allows the identification of more detailed orbit values.

For example, for most uses, it is sufficient to say that Mercury occupies Orbit O= 1 in the Solar System. It actually varies in position from Orbit O= 0.5 to Orbit O= 1.2.

The Decimal Orbits Chart also identifies how to express Eccentric Orbits.

**7a** The **Habitable Zones Chart** indicates orbits which can be expected to allow habitable world conditions. In most cases, the MainWorld for a system will be in the Habitable Zone (or in an orbit adjacent to the habitable zone).

**7b1 7b2** The **Satellite Orbits Charts** show the orbits for satellites. Satellite Orbits vary with the size of the world they circle. Calculate Satellite Orbit Radius= Multiplier times the Primary World Size (and show in eHex) for a result in thousands of kilometers.

For example, Phobos is a satellite of Mars (Siz= 4) in Orbit O= Bee (about 8,000 km); companion satellite Deimos occupies Orbit O= Eff (about 24,000 km).

Conversely, a satellite orbiting a Siz= 8 world at 400,000 km occupies Orbit O= Ell (= 400,000 / 8= 50).

**8a 8b** The **Travel Charts** detail determining distance between locations within a star system and the speed achieved.

#### 8a How Far?

Determine the distance (as a Range Band) from one location to another. If the locations are on opposite sides

of the system, they are in **opposition**; if they are on the same side of the system, they are in **conjunction**. For other circumstances, the user must make a distance estimation.

#### 8b How Fast?

Assuming a ship begins at zero speed, this chart shows its final speed upon arriving at its destination, assuming constant acceleration.

**9a 9b** The **Travel Times and Distances Charts** show elapsed time for various journeys.

#### 9a Start and Stop Arrival Time

Assuming that a ship begins at zero speed, accelerates at maximum to the midpoint and decelerates to the destination, this chart shows the time required for the journey.

#### 9b Constant Acceleration Impact Time

Assuming a ship accelerates at maximum until it reaches its destination (probably to impact the destination), this chart shows the time required for the journey.

**10** The **Fame, Danger, and Threats Chart** shows the expected distance effects of fame and reputation in society. It is also the magnitude of potential effects from Danger.

**Alternate Descriptors** are based on Fame or Reputation within Organizations or Societies (as opposed to standard Fame based on distance).

**Fame** is created during Character Generation.

**Danger, Threat, and Risk** are a parallel of Fame and are used in the assessment of degrees of danger.

**11** The **Environmental Benchmarks** provide insight into the effects of speed and temperature.

#### 11a Impact Damage Benchmarks

The general effects of speed in producing impact damage are based on the square of the velocity.

#### 11b Hot and Cold

Extremes of temperature and changes in temperature can produce damage.

#### 11c Insulation

Insulation provides protection against some extremes of temperature.

---

## THE SIZE OF A STAR SYSTEM

The **Travel Charts** 8 and 9 provide insight into the size and accessibility of a star system (and into the performance capabilities of ships).

Terra is Orbit O= 3; Uranus is Orbit O= 8. Assuming the two planets are on the same side of the star system, Table 8a (How Far?) indicates they are at Range S= 13.

A ship under constant 1G acceleration, Table 9a (Start and Stop Arrival Time) shows that it can reach S= 13 and stop at a world in about 8 days. Under constant 9G acceleration, it can arrive in about 2 days.

A hostile ship at about the orbit of Uranus can launch a 1G Kinetic Kill Missile toward a target near Terra S=13. Table 8b (How Fast?) indicates that it will achieve Speed=13; Table 9b (Constant Acceleration Impact Time) shows that the time to impact is about (and impact) in 152 hours. At 9G, it would impact in 51 hours.

Terra is Orbit O= 3; Jupiter is Orbit O= 5. They are about 4.2 AU apart at their closest; or 6.2 AU apart at their greatest separation. They are, in either case, in the same Range Band S= 12. A ship capable of 2G (Table 8b) can make the journey in about 3 hours.

---

# 1<sup>a</sup> 1<sup>b</sup> 1<sup>c</sup> Basic World Ranges

## 1a World Surface Ranges

Distance	R=	Descriptor
	<b>11</b>	
	<b>10</b>	
5,000 km	<b>9</b>	Far Orbit
500 km	<b>8</b>	Orbit
	<b>7.8</b>	
	<b>7.6</b>	
	<b>7.4</b>	
	<b>7.2</b>	
50 km	<b>7</b>	Vdistant
	<b>6.8</b>	
	<b>6.6</b>	
	<b>6.4</b>	
	<b>6.2</b>	
5 km	<b>6</b>	Distant
1000 m	<b>5</b>	Vlong
500 m	<b>4</b>	Long
150 m	<b>3</b>	Medium
50 m	<b>2</b>	Short
5 m	<b>1</b>	Vshort
1.5 m	<b>T</b>	Talking
0.5 m	<b>R</b>	Reading
Surface	<b>0</b>	Contact
0.5 m	<b>-R</b>	
	<b>-T</b>	
	<b>-1</b>	
	<b>-2</b>	
	<b>-3</b>	
	<b>-4</b>	
	<b>-5</b>	
	<b>-6</b>	
	<b>-7</b>	
	<b>-8</b>	
	<b>-9</b>	

**Basic Ranges** are used in personal and vehicle combat, especially on world surfaces, in communications, in planning travel, and with the senses

## 1b Altitudes of the Atmosphere

Distance	R=	Descriptor
250k km	<b>11</b>	Satellite
50k km	<b>10</b>	Geo
5,000 km	<b>9</b>	Far Orbit
500 km	<b>8</b>	Orbit
400 km	<b>7.8</b>	Upper8
300 km	<b>7.6</b>	Upper6
200 km	<b>7.4</b>	Upper4
100 km	<b>7.2</b>	Upper2
50 km	<b>7</b>	Upper
30 km	<b>6.8</b>	Mid8
20 km	<b>6.6</b>	Mid6
12 km	<b>6.4</b>	Mid4
8 km	<b>6.2</b>	Mid2
5 km	<b>6</b>	Mid
1000 m	<b>5</b>	Airspace5
500 m	<b>4</b>	Airspace4
150 m	<b>3</b>	Airspace3
50 m	<b>2</b>	NOP
5 m	<b>1</b>	Near Surface
1.5 m	<b>T</b>	Eye Level
0.5 m	<b>R</b>	Low
Surface	<b>0</b>	Contact
0.5 m	<b>-R</b>	Pothole
1.5 m	<b>-T</b>	Trench
5 m	<b>-1</b>	Ditch
50 m	<b>-2</b>	Sinkhole
150 m	<b>-3</b>	Canyon
500 m	<b>-4</b>	Chasm Rim
1000 m	<b>-5</b>	Chasm Wall
5 km	<b>-6</b>	Chasm Floor
50 km	<b>-7</b>	
500 km	<b>-8</b>	
5,000 km	<b>-9</b>	Planet Core

**NOP**= Nap of Planet.  
**Chasm**= as on worlds with Atmosphere F (Thin, Low).  
**Eye Level**: Human.

## 1c Depths of the Oceans

Distance	R=	Descriptor
	<b>11</b>	
	<b>10</b>	
	<b>9</b>	
	<b>8</b>	
	<b>7.8</b>	
	<b>7.6</b>	
	<b>7.4</b>	
	<b>7.2</b>	
	<b>7</b>	
	<b>6.8</b>	
	<b>6.6</b>	
	<b>6.4</b>	
	<b>6.2</b>	
	<b>6</b>	
	<b>5</b>	
	<b>4</b>	
	<b>3</b>	
50 m	<b>2</b>	Tsunami
5 m	<b>1</b>	Vbig Waves
1.5 m	<b>T</b>	Big Waves
0.5 m	<b>R</b>	Waves
Surface	<b>0</b>	Surface
0.5 m	<b>-R</b>	Wading
1.5 m	<b>-T</b>	Fording
5 m	<b>-1</b>	Pond
50 m	<b>-2</b>	Thermocline
150 m	<b>-3</b>	Shelf
500 m	<b>-4</b>	Lake Bottom
1000 m	<b>-5</b>	Deep Lake
5 km	<b>-6</b>	Bottoms
50 km	<b>-7</b>	Depths
500 km	<b>-8</b>	Abyss
5,000 km	<b>-9</b>	

**Thermocline**= of importance to underwater sensor use.

**Abyss**= of importance on Ocean Worlds.



## 2 Space Ranges

Distance	S=	Descriptor	Band	Name	Stellar*	World*	Orbits	Light Delay	R=
1,500 mn km	<b>13</b>	Outer System			<b>1000 D</b>		To Orbit 7	83 lm= 10 AU	<b>18</b>
500 mn km	<b>12</b>						To Orbit 5	30 lm= 3 AU	<b>17</b>
150 mn km	<b>11</b>	Siege	<b>DS</b>	<b>Deep Space</b>	<b>100 D</b>		To Orbit 3	8 lm= 1 AU	<b>16</b>
50 mn km	<b>10</b>						To Orbit 0	3 lm	<b>15</b>
5 mn km	<b>9</b>		<b>LR</b>	<b>Long Range</b>	<b>10 D</b>	<b>1000 D</b>		16 ls	<b>14</b>
2.5 mn km	<b>8</b>							8 ls	<b>13</b>
500,000 km	<b>7</b>	Missile	<b>AR</b>	<b>Attack Range</b>				2 ls	<b>12</b>
250,000 km	<b>6</b>							1 ls	<b>11</b>
50,000 km	<b>5</b>	Far Orbit	<b>SR</b>	<b>Short Range</b>		<b>10 D</b>			<b>10</b>
5,000 km	<b>4</b>							<b>1D</b>	<b>9</b>
500 km	<b>3</b>	Orbit							<b>8</b>
400 km	<b>2.8</b>								<b>7.8</b>
300 km	<b>2.6</b>							<b>7.6</b>	
200 km	<b>2.4</b>			<b>Fighter2</b>				<b>7.4</b>	
100 km	<b>2.2</b>							<b>7.2</b>	
50 km	<b>2</b>	Fighter	<b>F2</b>						<b>7</b>
30 km	<b>1.8</b>								
20 km	<b>1.6</b>							<b>6.6</b>	
12 km	<b>1.4</b>			<b>Fighter1</b>				<b>6.4</b>	
8 km	<b>1.2</b>							<b>6.2</b>	
5 km	<b>1</b>	Close Fighter	<b>F1</b>						<b>6</b>
1000 m	<b>B</b>								
Surface	<b>0</b>	Boarding	<b>B</b>	<b>Boarding</b>					<b>5</b>
		Contact							<b>0</b>

### STELLAR AND WORLD DIAMETERS

- \* Assumes Spectral G star.  
Increase Band + 1 for Spectral A or F.  
Decrease Band - 1 for Spectral K or M.
- \*\* Assumes typical World Size= 3 + .  
Increase Band + 1 for Gas Giant.  
Decrease Band - 1 for Size 2 or less.

### The Diameter Rules

- 1000 D Maneuver Drives inefficient beyond this limit.
  - 100 D Jump Drives will not operate within this limit.
  - 10 D Gravitic Drives inefficient beyond this limit.
  - 1 D Lifters inefficient beyond this limit.
- Technically, maneuver drives, gravitic drives, and lifters operate at about 1% efficiency beyond their limits.

### S=

**Space Combat Ranges**  
used with Space Combat  
and with Space Sensors.

$$S = R - 5$$

### R=

**World Combat Ranges**  
used with World Surface  
and Personal Combat.

$$R = S + 5$$

### Band=

**Space Combat Range Bands** used in Space Combat, especially with Movement. Bands are a subset of Space Ranges.

### Light=

provides insight into maximum radio and light speed time frames over distance.

# 3<sup>a</sup> b c

## Gas Giants

### StrangeWorlds

# a b c 4

#### 3a Large Gas Giant Atmosphere

km	R=	P=	T=	
0	0	1		Cloud
5	6	1		NH3 Ice
10	6.2	1		NH3 Ice
20	6.4	2		Clear H2
30	6.6	3		NH4SH
40	6.8	4		Water Ice
50	7	6	0	Clear H2
100	7.2	40	4	Clear H2
200	7.4	^3	36	Clear H2
300	7.6	^3	^2	Clear H2
400	7.8	^4		
500	8	^4		
1000	8.2	^5		
2000	8.4	^5		
3000	8.8	^6		

#### 3b Small Gas Giant Atmosphere

km	R=	P=	T=	Descriptor
0	0	1		Cloud
5	6	1		Water Ice
10	6.2	1		NH3 Ice
20	6.4	1		Clear H2
30	6.6	1		NH4SH
40	6.8	2		Water Ice
50	7	2	0	NH3
100	7.2	5	1	NH3
200	7.4	20	4	Clear H2
300	7.6	80	36	Clear H2
400	7.8	^3	^2	
500	8	^4		
1000	8.2	^5		
2000	8.4	^6		
3000	8.8	^6		Liq H2

#### 3c Ice Giant Atmosphere

km	R=	P=	T=	
0	0	1		Cloud
5	6	1		NH3 Ice
10	6.2	1		NH3 Ice
20	6.4	2		Clear H2
30	6.6	4		NH4SH
40	6.8	7		Water Ice
50	7	10		Clear H2
100	7.2	^2		Clear H2
200	7.4	^4	1	Clear H2
300	7.6	^4	4	Clear H2
400	7.8	^5	36	
500	8	^5	^2	
1000	8.2	^6		
2000	8.4	^6		Liq H2
3000	8.8	^6		

#### 4a Inferno Atmosphere

km	R=	P=	T=	
500	8	0	0	Cloud
400	7.8	0	0	
300	7.6	0	0	
200	7.4	0	0	
100	7.2	0	0	
50	7	1	0	Cloud Top
30	6.8	^2	64	
20	6.6	^2	^2	
12	6.4	^2	^2	
8	6.2	^2	^2	
5	6	^2	^2	
0.1	5	^3	^2	
Surf	0	^3	^3	Surface

#### 4b StormWorld Atmosphere

km	R=	P=	H=	
500	8	0		
400	7.8			
300	7.6			
200	7.4			
100	7.2			
50	7			
30	6.8		0	Calm
20	6.6		5	
12	6.4		10	Turbulent
8	6.2		5	
5	6		0	Calm
0.1	5		5	
Surf	0		10	Turbulent

#### 4c RadWorld Atmosphere

km	R=	P=	T=	
500	8	0		
400	7.8			
300	7.6			
200	7.4			
100	7.2			
50	7			
30	6.8			
20	6.6			
12	6.4			
8	6.2			Rad= 1D
5	6			Rad= 2D
0.1	5			Rad= 10
Surf	0			Rad= 100

#### Effects (Applies to All Tables)

**R= Range** (or Depth from Zero).

**P= Pressure** in Bars (Terra Surface Pressure= 1). P Effect is Blast-P: P=4 produces Blast-4= 4D hits.

**H= Turbulence** in Dx Hits (Calm atmosphere= 0). Effect is Blast-H: H=5 produces Blast-5= 5D hits.

**T= Temperature.** Positive T Effect is Hot-T (T= 6 is Hot-6); Negative T Effect is Cold-T (T= - 6 is Cold-6).

Values above 99 are exponents (^2= 10^2= 100; ^3= 10^3= 1000).

# Orbital Distances

# 5



## 5 Orbital Distances

	S=	O=	AU=	Million km	Light-	Sub-Orbit	Ia	Ib	II	III	
Inner System	10	0	0.2	30	100 ls		no		A0-F5	A0-K0	Inner System
		1	0.4	60	200 ls Mercury		no	A0	G0-G5	K5	
		2	0.7	105	350 ls Venus		0	A5-G0	K0	M0	
	11	3	1.0	150	8 lm Terra		0				
		4	1.6	240	13 lm Mars		0-1	A0-F5	G5	K5	
Outer System	12	5	2.8	420	30 lm Asteroid Belt		0-2	G0	K0	M0	Outer System
		6	5.2	780	43 lm Jupiter		0-3	G5-K0	K5	M5	
	13	7	10	1,500	83 lm Saturn		0-4	K5	M0	M9	
		8	20	3,000	3 lh Uranus		0-5	M0	M5-M9		
	14	9	40	6,000	5 lh Neptune		0-6	M5-M9			
Remote System	15	10	77	11,550	10 lh Kuiper Belt		0-7				Remote System
		11	154	23,100	21 lh Kuiper Belt		0-8				
	16	12	308	46,200	42 lh		0-9				
		13	615	92,250	3 ld		0-9				
	17	14	1,230	184,500	7 ld		0-9				
Beyond		15	2,500	368,700	14 ld		0-9				Beyond
	18	16	4,900	737,400	4 lw		0-9				
		17	9,800	1,474,500	8 lw		0-9				
	19	18	19,500	2,925,000	16 lw		0-9				
	20	19	39,500	5,925,000	32 lw Oort Cloud		0-9				
	20	78,700	11,805,000	1 ly Oort Cloud							

O=  
Orbit No.

ls= light-second  
lh= light-minute  
lw= light-hour

ld= light-day  
lw= light-week

Stars of Spectral and Size shown have a surface at the Orbit shown. The first (innermost) orbit for the star is the next greater orbit number.

### 10<sub>D</sub> GRAVITIC DRIVE LIMIT

	Ia	Ib	II	III	IV	V	VI	D
A0	7	5	4	1	1	0	*	*
A5	7	5	3	1	0	*	*	*
F0	7	6	3	1	0	*	*	*
F5	7	6	4	1	0	*	*	*
G0	8	6	4	1	0	*	*	*
G5	9	7	5	3	0	*	*	*
K0	10	7	6	3	0	*	*	*
K5	10	8	7	5	-	*	*	*
M0	11	10	8	6	-	*	*	*
M5	11	11	9	8	-	*	*	*
M9	12	11	10	8	-	*	*	*

G-Drives inoperable outside this orbit.  
\*= Inside Orbit-0. Blank= not possible.

### 100<sub>D</sub> JUMP DRIVE LIMIT

	Ia	Ib	II	III	IV	V	VI	D
A0	10	9	7	6	5	5	-	*
A5	10	9	7	5	4	4	-	*
F0	11	9	7	5	4	3	-	*
F5	11	9	7	5	4	3	3	*
G0	11	10	8	6	4	2	2	*
G5	12	10	8	7	4	2	1	*
K0	12	11	9	7	5	2	0	*
K5	13	12	10	9	-	1	0	*
M0	14	13	11	9	-	1	0	*
M5	15	14	13	11	-	0	*	*
M9	15	15	13	12	-	*	*	*

J-Drives inoperable within this orbit.  
\*= Inside Orbit-0. Blank= not possible.

### 1000<sub>D</sub> MANEUVER DRIVE LIMIT

	Ia	Ib	II	III	IV	V	VI	D
A0	13	12	11	9	9	8	-	*
A5	14	12	10	9	8	7	-	*
F0	14	12	10	9	8	7	-	*
F5	14	12	11	9	8	7	7	*
G0	15	13	11	9	8	6	6	*
G5	15	14	12	10	8	6	5	*
K0	16	14	12	10	8	6	5	*
K5	16	15	13	12	-	6	5	*
M0	17	16	14	12	-	5	4	*
M5	18	17	16	14	-	5	2	*
M9	18	18	16	15	-	4	1	*

M-Drives inoperable outside this orbit.  
\*= Inside Orbit-0. Blank= not possible.





# 6

## Decimal Orbits

### 6 Decimal Orbits

		S=	O=	AU=										O=	
		Flux=		-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	
		Decimal Orbit=		.5	.6	.7	.8	.9	.0	.1	.2	.3	.4	.5	
Inner System	<b>10</b>	<b>0</b>	0.2	0.15	0.16	0.17	0.18	0.19	0.2	0.22	0.24	0.26	0.28	0.30	<b>0</b>
		<b>1</b>	0.4	0.30	0.32	0.34	0.36	0.38	0.4	0.43	0.46	0.49	0.52	0.55	<b>1</b>
		<b>2</b>	0.7	0.55	0.58	0.61	0.64	0.67	0.7	0.73	0.76	0.79	0.82	0.85	<b>2</b>
Inner System	<b>11</b>	<b>3</b>	1.0	0.85	0.88	0.91	0.94	0.97	1.0	1.06	1.12	1.18	1.24	1.30	<b>3</b>
		<b>4</b>	1.6	1.30	1.36	1.42	1.48	1.54	1.6	1.72	1.84	1.96	2.08	2.20	<b>4</b>
Outer System	<b>12</b>	<b>5</b>	2.8	2.20	2.32	2.44	2.56	2.68	2.8	3.04	3.28	3.52	3.76	4.00	<b>5</b>
		<b>6</b>	5.2	4.0	4.2	4.4	4.7	4.9	5.2	5.6	6.1	6.6	7.1	7.6	<b>6</b>
	<b>13</b>	<b>7</b>	10	7.6	8.1	8.5	9.0	9.5	10.0	11.0	12.0	13.0	14.0	15.0	<b>7</b>
Outer System		<b>8</b>	20	15	16	17	18	19	20	22	24	26	28	30	<b>8</b>
	<b>14</b>	<b>9</b>	40	30	32	34	36	38	40	43	47	51	54	58	<b>9</b>
Remote System	<b>15</b>	<b>10</b>	77	58	62	65	69	73	77	84	92	100	107	115	<b>10</b>
		<b>11</b>	154	115	123	130	138	146	154	169	184	200	215	231	<b>11</b>
	<b>16</b>	<b>12</b>	308	231	246	261	277	292	308	338	369	400	430	461	<b>12</b>
Remote System		<b>13</b>	615	461	492	522	553	584	615	676	738	799	861	922	<b>13</b>
	<b>17</b>	<b>14</b>	1,230	922	984	1,045	1,107	1,168	1,230	1,352	1,475	1,598	1,721	1,844	<b>14</b>
		<b>15</b>	2,500	1,844	1,966	2,089	2,212	2,335	2,458	2,703	2,949	3,195	3,441	3,687	<b>15</b>
Remote System	<b>18</b>	<b>16</b>	4,900	3,687	3,932	4,178	4,424	4,670	4,916	5,407	5,898	6,390	6,881	7,373	<b>16</b>
	<b>19</b>	<b>17</b>	9,800	7,373	7,864	8,355	8,847	9,338	9,830	10,797	11,764	12,731	13,698	14,665	<b>17</b>

When necessary, star-world distances can be varied deliberately, or with flux. In the rare instance where two adjacent orbits coincide (as in O=9 plus 0.5 and O=10 minus 0.5), the result is a special case.

The Decimal Orbital Distances table shows values in AU to a tenth of an orbit; if necessary, values can be calculated to a hundredth of an orbit or greater (but observe the MOARN principle: Map Only As Really Necessary).

### ECCENTRIC ORBITS

Many orbits are eccentric, ranging across several decimal or even integer orbits. At any one time, however, a planet in an eccentric orbit is in a specific location.

Where necessary, state worlds in eccentric orbits in the format: Orbit Current [Innermost Orbit - Outermost Orbit].

For example, circa 2013 Haumea is 50.8 AU from Sol; it is closest to Sol at 34.7 AU, and farthest at 51.5 AU. Its orbit is O= 9.3 [from 8.7 to 9.3].

Circa 2013 Eris is 96.5 AU from Sol; it is closest to Sol at 37.7 AU, and farthest at 97.5 AU. Its orbit is O=10.3 [from 9.0 to 10.4].

Comet Halley approaches Sol to 0.586 AU, and retreats to 35.2 AU. Its orbit is O=7.8 [from 0.6 to 8.7].

### SOLAR SYSTEM SATELLITES

Planet	Orbit	Noted Position (Year)
Mercury	[from 0.5 - 1.2]	
Venus	[from 2.0 - 2.1]	
Terra	[from 2.9 - 3.0]	
Mars	[from 3.6 - 4.1]	
Ceres	[from 4.9 - 5.1]	
Jupiter	[from 6.0 - 6.1]	
Saturn	[from 6.8 - 7.1]	
Uranus	[from 7.8 - 8.0]	
Neptune	[from 8.4 - 8.5]	8.5 (circa 2045)
Pluto	[from 8.5 - 9.3]	8.5 (circa 1989)
Haumea	[from 8.7 - 9.3]	9.3 (circa 2011)
Makemake	[from 8.9 - 9.4]	9.3 (circa 2009)
Eris	[from 9.0 - 10.4]	10.4 (circa 2011)
Sedna	[from 10.0 - 14.5]	

# Habitable Zones <sup>a</sup><sub>b1</sub><sub>b2</sub> 7



## 7a Habitable Zones

S=	O=	AU=	Million km	Light-	Ia	Ib	II	III	IV	V	VI	D	
<b>10</b>	<b>0</b>	0.2	30	100 ls						M	M	AFGKM	Inner System
	<b>1</b>	0.4	60	200 ls							K		
	<b>2</b>	0.7	105	350 ls						K	G		
<b>11</b>	<b>3</b>	1.0	150	8 lm						G	F		Inner System
	<b>4</b>	1.6	240	13 lm									
<b>12</b>	<b>5</b>	2.8	420	30 lm					GK	F			Inner System
	<b>6</b>	5.2	780	43 lm				F	F				
<b>13</b>	<b>7</b>	10	1,500	83 lm				AG	A	A			Outer System
	<b>8</b>	20	3,000	3 lh				K					
<b>14</b>	<b>9</b>	40	6,000	5 lh			AFGK	M					Outer System
<b>15</b>	<b>10</b>	77	11,550	10 lh		FGK	M						
	<b>11</b>	154	23,100	21 lh	F	AM	M9						
<b>16</b>	<b>12</b>	308	46,200	42 lh	A-GKM								

O= Orbit No.      ls= light-second, lh= light-minute      A world in an orbit labelled HZ is Temperate  
 ld= light-day, lw= light-hour      one orbit closer to the star is Hot, one orbit farther is Cold

S= is an approximation. Calculate Orbit Radius for a definitive S=.

## 7b1 Satellite Orbits-1

S=	O=	Multiplier	Comment
<b>3</b>	<b>Ay</b>	1	}
<b>4</b>	<b>Bee</b>	2	}= Ring System
	<b>Cee</b>	3	} or Size<2.
	<b>Dee</b>	4	}
	<b>Ee</b>	5	
	<b>Eff</b>	6	
<b>5</b>	<b>Gee</b>	8	Umbriel
	<b>Aitch</b>	10	Ganymede, Triton
	<b>Eye</b>	20	Titan
	<b>Jay</b>	30	
	<b>Kay</b>	40	
<b>6</b>	<b>Ell</b>	50	Luna
	<b>Em</b>	60	

Locked To The Primary

## 7b2 Satellite Orbits-2

S=	O=	Multiplier	Comment
	<b>En</b>	70	
	<b>Oh</b>	80	
	<b>Pee</b>	100	
<b>7</b>	<b>Que</b>	150	}
	<b>Arr</b>	200	} If Primary is a
	<b>Ess</b>	250	} White Dwarf Size=D,
	<b>Tee</b>	300	} this region is a
	<b>Yu</b>	400	} Habitable Zone.
<b>8</b>	<b>Vee</b>	500	}
	<b>Dub</b>	600	
	<b>Ex</b>	700	
<b>9</b>	<b>Wye</b>	800	
	<b>Zee</b>	1000	

Not Locked To The Primary

Satellite Orbit radius varies with the gas giant or planet. Calculate Satellite Orbit Radius= Multiplier times Primary World Size (in miles) for a result in thousands of km. Luna is orbit Ell around Terra World Size=8= 50 x 8,000= 400 thousand km. Titan is orbit Eye around Saturn World Size= R (= 70 [thousand miles]). Titan orbits Saturn at 20 x 70,000= 1,400 thousand km.



# 8<sup>a</sup> Travel Distances and Times

8a HOW FAR?				Conjunction (same side of system) O=										Opposition (other side of system) O=									
S=	O=	AU=	M km	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9
Inner System	10	0	0.2	30	-	-	-	-	-	-	-	-	-	10	10	10	11	11	11	12	13	13	13
		1	0.4	60	9	-	-	-	-	-	-	-	-	-	10	11	11	11	11	12	13	13	13
		2	0.7	105	10	9	-	-	-	-	-	-	-	-	-	11	11	11	12	12	13	13	13
Inner System	11	3	1.0	150	10	10	9	-	-	-	-	-	-	-	-	-	11	11	12	12	13	13	13
		4	1.6	240	11	11	10	10	-	-	-	-	-	-	-	-	-	11	12	12	13	13	13
		5	2.8	420	11	11	11	11	11	-	-	-	-	-	-	-	-	-	12	12	13	13	13
Outer System	12	6	5.2	780	12	12	12	12	12	11	-	-	-	-	-	-	-	-	-	13	13	13	13
	13	7	10	1,500	13	13	13	13	13	13	13	-	-	-	-	-	-	-	-	-	13	13	13
		8	20	3,000	13	13	13	13	13	13	13	13	-	-	-	-	-	-	-	-	-	13	13
Outer System	14	9	40	6,000	13	13	13	13	13	13	13	13	-	-	-	-	-	-	-	-	-	-	13
	15	10	77	11,550	13	13	13	13	13	13	13	13	13	-	-	-	-	-	-	-	-	-	-

Table shows distance from one location to the other. **Conjunction**= distance between two orbits on the same side of system. **Opposition**= distance between two orbits on opposite sides of the system. Table values are S= Space Range. For example, Terra (O=3) and Mercury (O=1) are on opposite sides of the Sun. The planets are at S= Space Range= 11.

8b HOW FAST? In SPEED=																
S=	O=	AU=	Million km	Light-	1G	2G	3G	4G	5G	6G	7G	8G	9G			
	5			0.05		5	10	15	20	25	30	35	40	45		
	6			0.25		6	12	18	24	30	36	42	48	54		
	7			0.50		7	14	21	28	35	42	49	56	63		
	8			2.5		8	16	24	32	40	48	56	64	72		
	9			5		9	18	27	36	45	54	63	72	81		
Inner System	10	0	0.2	30	100 ls	10	20	30	40	50	60	70	80	90		
		1	0.4	60	200 ls	10	21	31	41	52	62	72	82	93		
		2	0.7	105	350 ls	11	21	32	42	53	64	74	85	95		
Inner System	11	3	1.0	150	8 lm	11	22	33	44	55	66	77	88	99		
		4	1.6	240	13 lm	12	23	35	46	58	69	81	92	104		
		5	2.8	420	30 lm	12	24	36	48	60	72	84	96	108		
Outer System	12	6	5.2	780	43 lm	13	25	38	50	63	75	88	100	113		
	13	7	10	1,500	83 lm	13	26	39	52	65	78	91	104	117		
		8	20	3,000	3 lh	14	27	41	54	68	81	95	108	122		
Outer System	14	9	40	6,000	5 lh	14	28	42	56	70	84	98	112	126		
	15	10	77	11,550	10 lh	15	30	45	60	75	90	105	120	135		
		11	154	23,100	21 lh	16	31	47	62	78	93	109	124	140		
Remote	16	12	308	46,200	42 lh	16	32	48	64	80	96	112	128	144		
		13	615	92,250	3 ld	17	33	50	66	83	99	116	132	149		
	17	14	1,230	184,500	7 ld	17	34	51	68	85	102	119	136	153		
Remote		15	2,500	368,700	14 ld	18	35	53	70	88	105	123	140	158		
	18	16	4,900	737,400	4 lw	18	36	54	72	90	108	126	144	162		
	19	17	9,800	1,474,500	8 lw	19	38	57	76	95	114	133	152	171		
	18	19,500	2,925,000	16 lw	20	39	59	78	98	117	137	156	176			

Shows Speed= for constant acceleration to impact. KK Missile impacts with Hits= this table entry squared. Maneuver Drive not functional beyond S=13. Gravitic Drive not functional beyond S= 5.

# Travel Distances<sup>a</sup> and Times<sup>b</sup>

# 9



## 9a Start and Stop Arrival Time

S=	O=	AU=	Million km	Light-	1G	2G	3G	4G	5G	6G	7G	8G	9G
5			0.05		79m	55m	45m	39m	35m	32m	29m	27m	26m
6			0.25		2h	2h	102m	88m	79m	72m	66m	62m	58m
7			0.50		4h	2h	2h	2h	111m	102m	94m	88m	83m
8			2.5		9h	6h	5h	4h	4h	3h	3h	3h	3h
9			5		13h	9h	7h	6h	5h	5h	4h	4h	4h
10	0	0.2	30	100 ls	32h	22h	18h	16h	14h	13h	12h	11h	10h
	1	0.4	60	200 ls	45h	32h	26h	22h	20h	18h	17h	16h	15h
	2	0.7	105	350 ls	2d	42h	34h	30h	27h	24h	22h	21h	20h
11	3	1.0	150	8 lm	3d	2d	41h	36h	32h	29h	27h	25h	24h
	4	1.6	240	13 lm	3d	2d	2d	45h	40h	37h	34h	32h	30h
12	5	2.8	420	30 lm	5d	3d	2d	2d	2d	2d	45h	42h	40h
	6	5.2	780	43 lm	6d	4d	3d	3d	3d	2d	2d	2d	2d
13	7	10	1,500	83 lm	9d	6d	5d	4d	4d	3d	3d	3d	3d
	8	20	3,000	3 lh	13d	9d	7d	6d	6d	5d	5d	4d	4d
14	9	40	6,000	5 lh	19d	13d	10d	9d	8d	7d	7d	6d	6d
15	10	77	11,550	10 lh	26d	18d	15d	13d	11d	10d	9d	9d	8d
	11	154	23,100	21 lh	37d	26d	21d	18d	16d	15d	14d	13d	12d
16	12	308	46,200	42 lh	53d	38d	31d	26d	24d	22d	20d	19d	17d

Assumes standing start, accelerate to midpoint, decelerate to endpoint and standing stop.  
Maneuver drive generally does not operate beyond 1,000D (approximately O=13).

## 9b Constant Acceleration Impact Time

S=	O=	AU=	Million km	Light-	1G	2G	3G	4G	5G	6G	7G	8G	9G
5			0.05		52m	37m	30m	26m	23m	21m	19m	18m	17m
6			0.25		117m	83m	68m	58m	52m	48m	44m	41m	39m
7			0.50		2h	117m	96m	83m	74m	68m	62m	58m	55m
8			2.5		6h	4h	3h	3h	2h	2h	2h	2h	2h
9			5		8h	6h	5h	4h	3h	3h	3h	3h	2h
10	0	0.2	30	100 ls	21h	15h	12h	10h	9h	8h	8h	7h	7h
	1	0.4	60	200 ls	30h	21h	17h	15h	13h	12h	11h	10h	10h
	2	0.7	105	350 ls	40h	28h	23h	20h	18h	16h	15h	14h	13h
11	3	1.0	150	8 lm	2d	34h	27h	24h	21h	19h	18h	17h	16h
	4	1.6	240	13 lm	2d	43h	35h	30h	27h	24h	23h	21h	20h
12	5	2.8	420	30 lm	3d	2d	46h	40h	36h	32h	30h	28h	26h
	6	5.2	780	43 lm	4d	3d	2d	2d	2d	44h	41h	38h	36h
13	7	10	1,500	83 lm	6d	4d	3d	3d	2d	2d	2d	2d	2d
	8	20	3,000	3 lh	8d	6d	5d	4d	4d	3d	3d	3d	2d
14	9	40	6,000	5 lh	12d	8d	7d	6d	5d	5d	4d	4d	4d
15	10	77	11,550	10 lh	17d	12d	10d	8d	7d	7d	6d	6d	5d
	11	154	23,100	21 lh	24d	17d	14d	12d	11d	10d	9d	8d	8d
16	12	308	46,200	42 lh	35d	25d	20d	17d	16d	14d	13d	12d	11d

Assumes standing start, accelerate to endpoint and impact.  
Maneuver drive generally does not operate beyond 1,000D (approximately O=13).

## 11 SPEED

Sp	kph	Hits
0	0	0
1	5	1
2	10	4
3	20	9
4	30	16
5	50	25
6	100	36
7	300	49
8	500	64
9	700	81
10	1,000	100
11	2,000	121
12	3,000	144
13	5,000	169
14	10,000	196
15	20,000	225
16	25,000	256
17	30,000	289
18	35,000	324
19	40,000	361
20	45,000	400
21	50,000	450
22	55,000	500
23	60,000	550
24	65,000	600
25	70,000	650
26	75,000	700
27	80,000	750
28	85,000	800
29	90,000	850
30	95,000	900
31	100,000	1000
32		

### Light-Speed

Compute percent of light speed by multiplying the light- column entry (convert to hours if necessary) by travel time (also convert to hours).

1G from S=15 in 17 days is 10 light-hours divided by (17\*24=) 408 hours = 0.025 = 2.5% of light speed.



# 10 Fame, Risk, Danger, and Threats

## 10 FAME, DANGER, AND THREATS

Distance	F=	Descriptor	Alternate Descriptor
	0	Unknown	
	1	Parent, Person	1 person.
	2	Close Family	10 people. Ship crew.
	3	Extended Family	100 people.
	4	Neighborhood	1,000 people.
	5	Town	10,000 people.
	6	City	100,000 people.
10 km	7	Large City	One million people.
100 km	8	Regional	Corporation.
1000 km	9	Continental	
	10	World	Large Corporation.
	11	World Complex	
S= 4	12	World System	Powerful Corporation.
S= 11	13	Inner System	
	14	System	
	15	Greater System	
O=12	16	Outer System	
	17	Systems	
5 pc	18	Many Systems	
10 pc	19	Subsector	
40 pc	20	Sector	MegaCorporation.
100 pc	21	Domain	
	22	Domains	
	23	Many Domains	
	24	Empire	
1,000 pc	25	Beyond Empire	
	26	Several Empires	
4,000 pc	27	This Spiral Arm	
10,000 pc	28	Many Spiral Arms	
20,000 pc	29	The Galaxy	
	30	Several Galaxies	
	31	Many Galaxies	
	32	The Universe	
	33	Present Reality	
	34	All Past Realities	
	35	All Future Realities	
	36	All Reality	

## FAME

Fame is the degree of recognition or respect which society (or subdivisions of society such as the military) holds for an individual. Fame is not a guarantee of recognition; it is the likelihood that a search of documents or databanks will return information about the individual.

**Express Fame** as Fame-<level>. A world-famous entertainer has Fame-10. A Fame-10 entertainer probably has name recognition anywhere on his world.

**Alternate Descriptors** reflect Organizations or Societies (as opposed to standard distance-based Fame).

**Infamy:** Fame may be negative; note magnitude and ignore sign.

## DANGER AND THREATS

**Danger** is the potential for Harm; **Threat** is the source or agent of a Danger. Harm includes death, destruction, injury, illness, reduction in ability, or significant change which rational beings would believe to be harmful or undesirable.

**Expressing Danger and Threat.** Express Threat-<level> and Danger-<level> using the Fame scale.

## RISK

**Risk** evaluates the Probability, Severity, and Imminence of Danger. If these values are low, the Danger can be disregarded. If these values are high, the Danger must be addressed. Minus-18 Risk is inconsequential; Plus 10 Risk threatens great consequences.

## RISK

Flux	Probability	Severity	Imminence
- 6	Impossible	None	Far Future
- 5	Highly Improbable	Trivial	Centuries
- 4	Improbable	Negligible	Lifetime
- 3	Highly Unlikely	Very Minor	Generation
- 2	Unlikely	Minor	Decades
- 1	Not Likely	Mild	Years
0	Either Way	Temporary	Months
1	Possible	Strong	Weeks
2	Likely	Major	Days
3	Probable	Severe	Hours
4	Very Probable	Very Severe	Minutes
5	Almost Certain	Devastating	Seconds
+ 6	Certain	Total	Now

Add the three values. For negative results, the Risk is minimal. Positive results indicate a risk which must be addressed.

# Hot and Cold <sup>a</sup><sub>b</sub> Impact <sup>c</sup> 11



## 11a IMPACT DAMAGE BENCHMARKS

	Speed	kph	Hits	Descriptors	Descriptors
Subsonic	0	0	0	Still	
	1	5	1	Creep	
	2	10	4	Xslow	
	3	20	9	Slow	
	4	30	16	Standard	
	5	50	25	Cruise	
	6	100	36	Fast	
Supersonic	7	300	49	Vfast	
	8	500	64	Sonic	
	9	700	81	Supersonic	
	10	1000	100	Hypersonic	
	11	2000	121		
	12	3000	144		
	13	5000	169		
	14	10,000	196		
	15	20,000	225		
	16	30,000	256	Meteoric	
	17		289		
	18		324		
	19		361		
20		400			

$$\text{Hits} = V^2$$

Hits upon impact (V= Speed):

Multiply by Tons (or fractional Tons) of impacting object.  
Use displacement Tons rather than mass.

## 11c INSULATION PROTECTION

In= protects against Ship AV

144	- 275 to 325	15	For Cold Protection, an On-Board or Local Heater increases the Cold Protected temperature - 100 C.
121	- 250 to 300	12	
100	- 225 to 275	10	
81	- 200 to 250	8	
64	- 175 to 225	7	
49	- 150 to 200	5	
36	- 125 to 175	4	
25	- 100 to 150	3	For Heat Protection, an On-Board or Local Cooler (Air Conditioner) in- creases the Heat Protect- ed temperature + 100 C.
16	- 75 to 125	2	
9	- 50 to 100	1	
4	- 25 to 75	1	
1	0 to 50	1	

## 11b HOT AND COLD BENCHMARKS

Temp	K	C	Hits	Descriptors	
-12	0	- 273	144	Absolute Zero	40D
-11	25	- 250	121	Hydrogen Ice. LHyd	35D
-10	50	- 225	100	Oxygen Ice	30D
-9	75	- 200	81	Nitrogen Ice	25D
-8	100	- 175	64		20D
-7	125	- 150	49		15D
-6	150	- 125	36		10D
-5	175	- 100	25		7D
-4	200	- 75	16	Radon Ice	4D
-3	225	- 50	9		3D
-2	250	- 25	4		2D
-1	275	0	1	Cold	1D
+0	300	25	0	Human Temperate Environ	
+1	325	50	1	Hot	1D
+2	350	75	4		2D
+3	375	100	9	Water boils	3D
+4	400	125	16	Sulfur melts	4D
+5	425	150	25		7D
+6	450	175	36		10D
+7	475	200	49		15D
+8	500	225	64	Tin melts	20D
+9	525	250	81	Fire	25D
+10	550	275	100		30D
+11	575	300	121		35D
+12	600	325	144		40D
+13	700	425	350	Lead melts	100D
+14	800	525	400		115D
+15	900	625	450	Aluminum melts	130D
+16	1000	725	500		140D
+17	2000	1725	1000	Titanium melts	300D
+18	3000	2725	1500	Spectral M Star surface	
+19	4000	3725	2000	Spectral K Star surface	

Hits per Round (= 1 minute)

Above 600 Kelvin (K= Kelvins):  $\text{Hits} = K / 2$

K= Kelvin (0 K= Absolute Zero).

C= Celsius (0 C= Freezing Point of Water= 273 K).



# Distances and Range Bands

**B**

**Boarding**

		<b>F1</b>	<b>F2</b>		<b>SR</b>		<b>AR</b>		<b>LR</b>	<b>DS</b>	
<b>S=</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
<b>Range</b>	<b>Hull Contact</b>	<b>Close Fighter</b>	<b>Fighter</b>	<b>Orbit</b>	<b>Far Orbit</b>	<b>Missile</b>			<b>Siege</b>		
<b>km</b>		<b>5</b>	<b>50</b>	<b>500</b>	<b>5,000</b>	<b>50,000</b>	<b>250,000</b>	<b>500,000</b>	<b>2.5 mn</b>	<b>5 mn</b>	<b>50 mn</b>

A thing with Size equal to Range appears approximately the same Size as any other thing with Size equal to Range.

For example, a Size-6 Vehicle at R=6 appears roughly the same as a Size-5 Person at R=5, a Size-1 Coin at R=1, or a Size-9 Moonlet in Far Orbit.

## 1 WORLD SURFACE RANGES

Distance	R=	Descriptor	Benchmark	Range Band Width	S=
Zero Point	0	Contact	Touching.	Zero Point to about 3 m*	
0.5 m	R	Reading	Normal Reading.	25 cm to 1 meter*	
1.5 m	T	Talking	Conversations.	1 m to about 3 m*	
5 m	1	Vshort	Lectures.	3 m to 25 m	
50 m	2	Short	Shouting Distance. Pistol Shot.	25 m to 100 m	
150 m	3	Medium	City Block. Rifle Shot.	100 m to 300 m	
500 m	4	Long		300 m to 750 m	
1 km	5	Vlong		750 m to 3 km	B
5 km	6	Distant	Near The Horizon.	3 km to 25 km	1
50 km	7	Vdistant	Beyond The Horizon.	25 km to 250 km	2
500 km	8	Orbit		250 km to 2,500 km	3
5,000 km	9	Far Orbit		2,500 km to 25,000 km	4

\*Range=R and Range=T fall within Range=0 for many purposes (for example, weapons ranges).

**R=** World Surface Ranges from personal contact to horizon (and to orbit).

$$R = S + 5$$

**S=** Space Ranges from Boarding to the edge of a star system.

$$S = R - 5$$

# Distances and Range Bands

Distance is an open-ended concept of separation between objects: it governs the effectiveness of the senses and of sensors, of weapons, attacks, and communications; it determines travel times. Range Bands distill these many possible distances into a set of easily used typical distances.

There is an infinite number of distances and a corresponding infinity of POSSIBLE exact calculations based on distance. It is possible (but unwieldy) to express exact distances for every situation. It is 11.4 kilometers to the starport; it is 47.3 meters to that red warning sign; that flyer is 87,342 meters above us.

**Traveller** distills the open-ended concept of distance into a series of common range bands, each associated with a typical distance and identified by one or more benchmarks. The sacrifice in detail is more than made up in ease of use. The starport is Distant; that warning sign is at Short range; that flyer is at Upper altitude.

## THE RANGE BANDS

Range Bands define typical distances, standardized for convenience, and quantified for comprehension. Further detail rarely adds enough realism to outweigh the complexity.

**Relative Distances:** Range Bands show relative distances between an observer or a Zero Point such as a world surface. Each Range Band has a descriptive name and an associated distance value. For example, Medium Range is typically 150 meters. It lies between Short Range (about 50 meters) and Long Range (about 500 meters).

**Available Distances.** Each Range Band covers distances from about half-way from the previous Range Band to about half-way to the next range band.

For example, Medium Range Band extends from about 100 meters to about 325 meters.

## Two Distinct Range Types

For ease of use, two different Range types are provided: World Surface Ranges and Space Ranges.

**World Surface Ranges** (identified as R=) are useful with individuals, with individual weapons, and with events on or near worlds.

**Space Ranges** (identified with S=) are useful with spacecraft, with space weapons, and with events within a star system.

World and Space Ranges are convertible.

**S= R - 5.** World Range R= 5 converts to S= B. R= 4 or less converts to S= 0.

**R= S + 5.** Space Range B converts to R= 5.

## The Lettered World Range Bands

Two of the World R= Range Bands are lettered. They lie between R=0 Contact and R=1 Vshort, and refer to typical sense interaction distances. Both are contained within R=0.

**Reading Range= R** is the typical distance for reading books, vision screens, or other texts.

**Talking Range= T** is the typical distance for conversa-

tions with one other, or with a small group. With a typical distance of 1.5 meters, Range= T is also the size of a typical deck plan square.

## The Lettered Space Range Bands

One of the Space S= Range Bands is lettered.

**Boarding Range= B** occupies the gap between S= 1 and S= 0 (and includes S= 0). It is the range between ships at which Boarding can be attempted.

## Sub-Bands

Any Range Band can be divided into several decimal Sub-Bands when the distinction is important. Most often, some altitudes need further differentiation.

**Mid-Band.** The easiest sub band is half-way. Sub Band X.5 allows identification of a Range midway between two established Range Bands.

**Layered Sub-Bands.** Greater differentiation within a Sub Band is possible by specifying four even decimal divisions 0.2, 0.4, 0.6, 0.8).

For example, to reflect various layers within the atmosphere of a Gas Giant, Range 6 is subdivided Bands 6.2, 6.4, 6.6, and 6.8 (which reflect different pressures).

**Decimal Sub-Bands.** It is possible to identify all nine decimal Sub-Bands (0.1 through 0.9) for extreme precision. It is almost never necessary to divide a Range Band into decimal hundredths (6.02, or 6.13).

The purpose of Sub-Bands is to differentiate distances instead of forcing all objects at a range into one distance.

The Range to a Sub Band is the range to the Band (the range from R= 0 to R= 6.4 is 6).

## THE ZERO POINT

Ranges assume a zero point (variously the location of the observer, the world surface or the ocean surface, or the upper cloud deck) as the equivalent of Contact zero range.

The Zero Point is a point of reference rather than an absolute value. It is always the 'current' location as detected



# Benchmarks

Understanding the unfamiliar is easier when players have standards against which it can be compared.

A Benchmark is a standard by which objects, concepts, or values can be compared or evaluated. Benchmarks are examples which make other examples easier to understand. **Traveller** Benchmarks provide insights into three distinct concepts.

**Benchmarks for Value and Cost** provide insights into the value of money and how it can be earned and used.

**Benchmarks for Size** provide an understanding and useful measure of relative size.

**Benchmarks for Range** help understand distance and its effect on the senses, sensors, weapons, and travel times.

## BENCHMARKS FOR VALUE AND COST

Benchmarks support basic financial information on which economic activities are based.

**Salaries and Wages.** Characters can expect to receive payment for their labor based on specific standards. By knowing the benchmarks, the player can understand if an offer of employment will pay wages which are too low or too high, and they can then react accordingly.

**The Cost of Living.** The typical costs of housing, meals, and other details give players insights into basic costs which they must meet before they can begin accumulating wealth.

**Investment and Speculation Returns.** The discussion of investment and speculation provides a basis for players' efforts to accumulate wealth.

## Rational Constraints On Accumulating Fortunes

History has repeatedly seen the creation of terribly rich people, but with such wealth comes equally terrible responsibilities: primary among them is an all-consuming obsession with the accumulation and management of wealth. Such extreme wealth is incompatible with the central tenets of **Traveller**. Within **Traveller**, the primary purpose of wealth is to support continuing adventures and travel; a character obsessed with unconscionably great wealth has no time for adventures and is more properly a non-player character: one often willing to spend large amounts of money, or to temporarily lend assets such as starships, to finance adventures which incidentally assist him in amassing even more wealth.

Investments and Speculation may manipulate large amounts of money, but benchmarks indicate amounts which a single individual can rationally expect to receive personally.

For example, Starship Investment involves millions of credits, but for the characters involved the investment's primary reason is access to a starship as a means of travel.

## SALARIES AND WAGES

The charts provide standard salary levels and wage rates for characters.

**Salaries.** The Salaries table shows typical salary structures for various character or career types.

For example, a Citizen having served three terms can expect to earn a salary in the range of Cr750 per month

(which, according to The Costs of Living table, is slightly more than an average character needs to live).

For example, a Spectacular Entertainer with Fame-10 can expect to earn Cr240,000 per year.

Salaries are appropriate for Scholars, Entertainers, Scouts, Naval, and Military characters.

**Wages.** The Wages table shows typical hourly wage structures for various skill types. Some characters may decide to work for wages rather than salary if that is more advantageous.

For example, a character with Mechanical-4 can expect to earn Cr10 per hour (assuming 175 working hours per month= Cr1750 per month). A good Fame-3 Entertainer (who can earn Cr300 per month) may want to work for wages (based on a good skill level) in addition to playing in clubs on weekends.

## THE COSTS OF LIVING

The Costs of Living table shows the typical costs an individual expects to pay in the course of living.

Cost of Living is based on Characteristic C6 and reflects the amounts an individual expects to spend in ordinary times.

## INVESTMENTS

Investments focus primarily on creating income streams. Properly employed capital creates a steady stream of income. But, contrast Investment with Speculation.

## Stocks and Bonds

Invested capital in relatively safe ventures produces a compounded annual return on investment of between 1% and 2%, calculated as  $1.5\% + (\text{Flux times } 0.1)\%$ , rolled at the end of the year.

The benefit of a conservative investment is that its chance of loss is almost nil.

## The Starship Investment

Bank financing is available to qualified individuals for the purchase of new commercial starships. After a down payment of 20% of the cash price of the starship is made, the shipyard will begin construction of a specific vessel.

Upon completion, the vessel is delivered to the buyer, with

the bank paying off the purchase price to the shipyard. Because the bank now holds title to the ship, the price must be paid off in a series of monthly payments to it. Standard terms involve the payment of 1/240th of the cash price each month for 480 months. In effect, interest and bank financing cost a simple 120% of the final cost of the ship, and the total financed price equals 220% of the cash purchase price, paid off over a period of 40 years.

In addition, the bank will insist that the purchaser submit an economic plan detailing the projected activity which will guarantee that monthly payments are made.

**How Does This Work?**

Starships are built at shipyards associated with starports. The building process must be profitable, and it has been structured in the following way:

A new MCr100 starship requires an investment by the building shipyard of about MCr60, of which about half is hardware and half is labor. Starports build locally whatever the local economy supports (finely crafted interior; astronics, drives). The buyer makes a down payment of 20% (=MCr20) which covers most of the required hardware. The shipyard sells the remaining note (MCr100 at Cr420,000 per month for 480 months) to a bank (or a Megacorporation) for an amount equal to its remaining costs and a modest profit (=MCr40 + MCr20). The MCr80 note carries a nominal interest rate of about 5.5%. The bank acquires the note for MCr60 and earns close to 8%.

**THE SHIP'S ACCOUNT**

Each adventuring ship has a continuing need for money to pay expenses such as crew salary, maintenance, life support, and other supplies. This cash flow is handled through the Ship's Account.

The ship owner is responsible for maintaining the Ship's Account. In its simplest form, it is a running total all income the ship receives minus all costs the ship incurs.

The Ship's Steward is usually designated by the Ship's Owner to handle the Ship's Account.

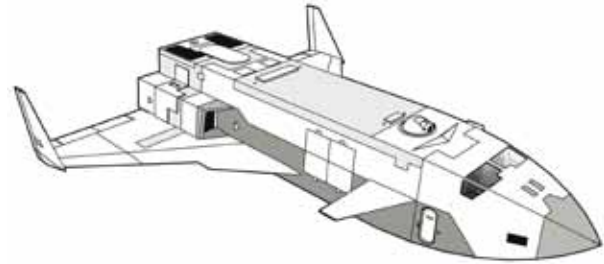
**SPECULATION**

Speculation focuses on acquiring goods (manufactured goods, luxury goods, commodities) or rights (land grants, intellectual property rights such as patents, trade marks, designs, copyright, plant variety rights etc) and selling them within a short period for a profit.

**Shopkeepers.** Trade is a subset of Speculation: short-term buying and selling, making a modest profit sufficient for the proprietor to make a decent living.

Shopkeepers add their labor and expertise to a modest investment in goods (shoes in a shoe store; rooms in a hotel; food in a restaurant; raw materials in a factory) which they resell to the public or to corporate or government clients. A relatively conservative but profitable shopkeeper produces a reasonable income after expenses.

Rarely does a shopkeeper get rich; however, most do live comfortably off the modest profits of their profession. Then again, being a shopkeeper is not the focus of most **Traveller** characters.



**THE STARSHIP INVESTMENT**

	Shipyard	Bank	Buyer	Factories	Labor
Deposit	+ 20		- 20		
Financing		- 100	+ 100		
Purchase	+ 60	- 60			
Components	- 30			+30	
Labor	- 30				+30
Trading			+201		
Payments*		+201	- 201		
	+20	+41	+80	+30	+30

\*480 payments of Cr420,000 = MCr201 over 40 years

**Speculators.** A speculator buys goods in the expectation that they can be sold at a profit later (and usually on another world). A speculator does not necessarily operate a cargo-carrying starship; a speculator may ship his cargo as freight and pay standard freight rates in order to transport the goods to a profitable market.

**Merchant Speculators.** A merchant ship crew evaluates trade goods that it encounters during its travels, buys those it thinks have merit, and transports them to other worlds in an expectation of selling them at a considerably higher price.

**The Land Grant Speculation**

Land has no value unless it can be exploited: a process that involves increasing its population and infrastructure (roads, bridges, transportation, factories, an educational system, and government). A long-term land investor can increase his return (his stream of income) from land by developing it. The individual to whom the Land Grant is given is legally called the Holder.

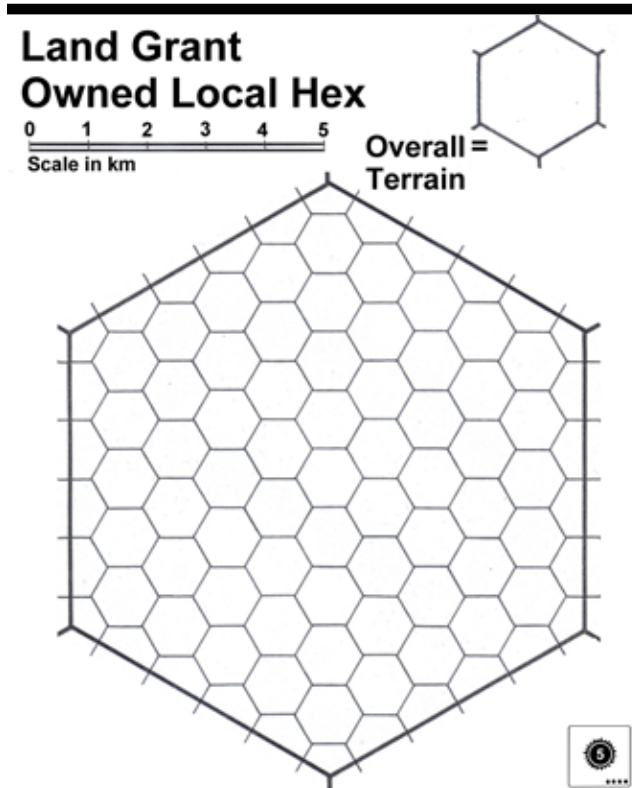
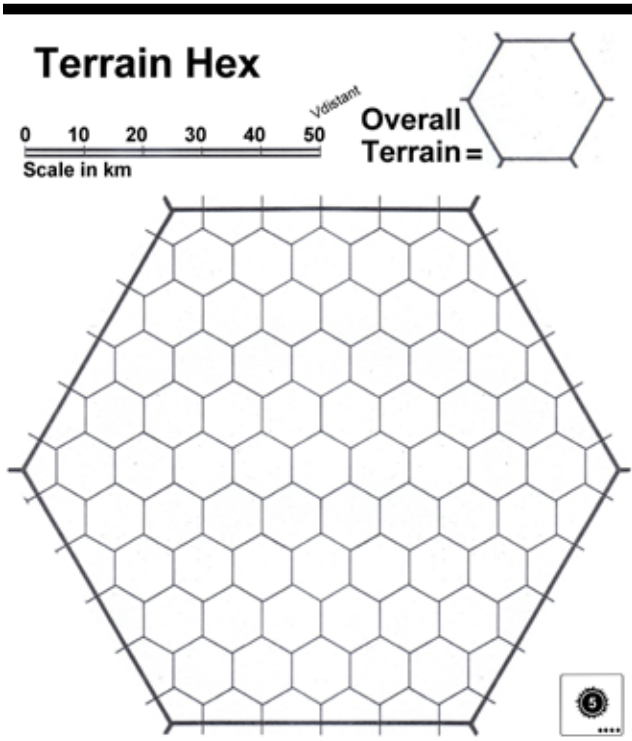
A **Land Grant** differs from ordinary ownership of land; it confers specific rights and privileges on its holder. These rights include:

**Economic Control** over one Terrain Hex (6,500 square km) on a world and an associated income based on taxes and production. Economic Control is similar to governmental control: the ability (within reason) to create law and behavioral expectations; the ability to control who can occupy the land (and pay rent or taxes).

**Outright Ownership** of one Local Hex (approximately 65 square km= 6500 hectares= 16,000 acres).

**A Title** (Lord, Lady, or a local equivalent) reflecting possession of the land, and the accompanying responsibilities as the final authority to which locals may appeal for the righting of injustice (this authority may be locally delegated).

**The Territory Itself.** A land grant is a gift of real estate-land and privileges-made by the government or other au-



thority, to an individual as a reward, especially for service or accomplishment, or as an incentive to develop the land.

The holder is granted a portion of the tax income from the land. Precisely how much is negotiated by the holder and the local authorities, and depends on investment by, and the influence of, the holder.

In addition, the holder owns outright one **Local Hex**. That land may become the holder's personal estate, be leased to create an industrial or governmental center, or exploited as a mine, farm, or ranch.

**The Title.** The holder of the Land Grant is accorded a title (independent of any noble titles): Lord (of <the territory>, Holder <Surname>, Master <Name>). For example, Lord of the South Coast, Holder Hironobu of Junidy, Lady of the Pantel, or the incomparable Dame Hurst of the North Steppe. Titles may vary according to local language or custom, or to refer to variant genders.

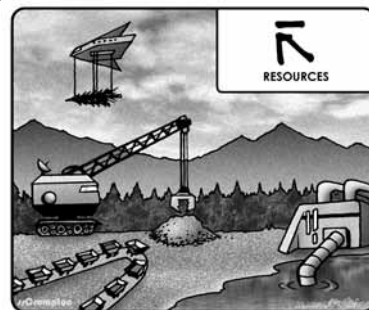
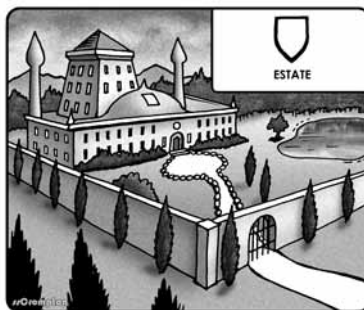
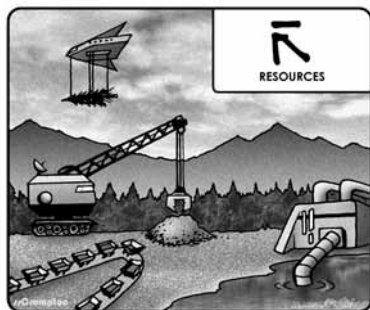
### Subordinate Additional Territory Grants

For each Terrain Hex granted on the Mainworld in a system, the Holder is awarded a Terrain Hex on another world in the system. For example, the Holder may have an undeveloped Terrain Hex on a RadWorld within the system. At some point, technology may allow the exploitation of that territory, and there are incentives for the Holder to encourage development on non-mainworlds.

### Financial Elements That Traveller Ignores

Among the elements that are routinely ignored in the course of play are:

**Taxes.** It is assumed that taxes on goods and income are paid as part of the price or the paycheck. Many mechanisms are possible: a universal included Value Added tax, a routinely imposed sales tax, or border-crossing fees on commonly available good. In any case, taxes are essentially invisible to the user (and the player).



Three Examples of Terrain in the Land Grant Speculation

**Inflation.** It is assumed that the rate of inflation is both constant and low, and that it can be ignored for most purposes. Prices are constant and do not change without specific important circumstances.

### VALUE, COST, AND PRICE

An object has a value to an individual based on a variety of factors. Value is defined in money terms, but often evaluated in other than money (a treasured picture of a parent may be worth a great deal to a son or daughter, and nothing at all to a stranger).

The Value, Cost, and Price Chart addresses many aspects of the concept of Value.

### Cost Is The Money Required To Produce

Cost is the wholesale price of the object. Cost Modifiers can change this amount based on Flux, or on specific features.

The Cost to a manufacturer can be reduced based on volume production. A factory spends much less than the wholesale cost by producing in volume.

For example, Donachie Corp on Regina sells repair parts at retail (it buys them from various factories at wholesale). Various values are determined using the Value, Cost, and Price Chart.

A major part (a Gravitic Translimiter) has a Benchmark Value= 4= Cr10,000 (= Cr10<sup>4</sup>), which is the base wholesale price (modified by Flux) that Donachie pays.

Donachie sells Gravitic Translimiters at retail based on supply and demand. This year (using Price Modifications for Supply) the supply is (Flux= Quite Common= x 0.8 x 10,000)= Cr8,000. At the same time, the Price Modification for Demand is (Flux= Good= x 1.2 x 10,000)= Cr12,000 each. They make a profit of about Cr4,000 for each one they sell.

Meanwhile, AGTC Acme Gravitic Translimiters Corporation manufactures the devices. They produce them in volume (= Value / 10)= Cr1,000 each. They want to sell them for Cr10,000 each, but there is currently an oversupply, so they only get Cr8,000 from distributors like Donachie Corp.

Cost Modifiers do not usually affect player characters unless they are buying in volume or creating a factory.

### Price Is The Money Required To Buy

An ordinary person who needs an object usually goes to a store to buy it. Price Modifiers can change this amount based on Flux, or on specific circumstances.

For example, Merchant 2nd Officer Keir Dullea has arrived on Regina and needs a Gravitic Translimiter for a repair that has needed to be made for weeks. He goes to the local Donachie Corp outlet and sees one on the shelf.

The referee determines (by Flux, or by a decision) that Demand is Good (based on the calculations for Donachie Corp) so the current price is (Value x 1.2=) Cr12,000.

Price can vary from world to world (because local supply and demand may vary from world to world).

---

### Cost Is The Money Required To Produce

### Price Is The Money Required To Buy

### Value Lies Somewhere In Between

---

Supply and Demand Price Modifiers can be applied to most items a player character tries to buy. Price Modifiers provide temporary benefits (or obstacles).

Moderation should be used with Price Modifiers; not every object needs to sell for more or less than its Value.

### Value Lies Somewhere In Between

It is the constant shift in perception between many different buyers and sellers that creates value. When an owner's priorities and perceptions change, so does the value (to that person) of an object. When a buyer sees benefit in ownership, the value (to that person) increases.

### OBJECT SIZE

Benchmark object sizes are expressed in single digits. Special digits R (Reading) and T (Talking) correspond to object sizes smaller than 1.

Benchmark sizes show relative (and approximate) object dimensions. Benchmark sizes allow comparisons of different objects, and provide an understanding of overall size.

**Benchmark Sizes.** Benchmark Size is used with the senses and in combat, and they give players information about carrying or moving objects.

### Decimal Sizes

Decimal sizes are typical technological device outputs. For example, a human sees an object in the distance and identifies it as Size 5 (person-sized; about 1.5 meters). A technological device (a range finder, a visual sensor, a sonic detector) provides a more detailed reading as Size 5.3 (person-sized; about 1.8 meters), or even Size 5.32.

**For very small items (R and T),** the decimal is appended to the letter: Size R.4= 1.4 mm; T.6= 6.0 mm.

**Robots and Sensors.** Most robots and sensors give their estimates of size in decimal (possibly affected by Stage Effects) A sub-Standard Sensor may give its Size estimate in whole numbers only.

**Random Size Variation.** For any specific Size, individual objects may vary slightly. Roll Flux on the Random Size Variation table and add it to Size. For example, a Size=5 object= 1.5 meters tall. Roll Flux for Random Size Variation on Column 5= - 2= 135 cm, or + 4= 6.0 meters.

### How Big Is It Really? (HBIIR?)

Many objects vary somewhat from the standard size values. The HBIIR? Table allows determination of a more specific size of an object. The result can be translated into decimal size or true units.



# Costs

## THE COSTS OF LIVING

Person		Annual	Month	Housing	Meals	Support	Leisure
Poor Person	Soc= 2	2400	200	60	80	30	30
Average Person	Soc= 7	8400	700	210	280	105	105
Rich Person	Soc= C	14400	1200	360	480	180	180
Costs shown in Credits			= 100%	= 30%	= 40%	= 15%	= 15%

## SALARIES

Occupation	Monthly	Annual	Base
Citizen	250x	3000x	Terms
Scholar (no rank)	100	1200	
Scholar	400x	4800x	Rank
Entertainer (ordinary)	25x	300x	Fame 1-9
Entertainer (good)	100x	1200x	Fame 1-9
Entertainer (spectacular)	200x	2400x	Fame 1-9
Entertainer (ordinary)	125x	1500x	Fame 10-16
Entertainer (good)	500x	6000x	Fame 10-16
Entertainer (spectacular)	2000x	24000x	Fame 10-16
Entertainer (ordinary)	250x	3000x	Fame 17 +
Entertainer (good)	1000x	12000x	Fame 17 +
Entertainer (spectacular)	4000x	48000x	Fame 17 +
Ship Crew (Naval/Corp)	100x	1200x	Rank
Ship Officer (Naval/Corp)	200x	2400x	Rank
Scout	200x	2400x	Term
Soldier	100x	1200x	Rank
Soldier Officer	200x	2400x	Rank
Marine	110x	1320x	Rank
Marine Officer	220x	2640x	Rank
Functionary	500x	6000x	Term

Salaries in Credits. Term= terms spent in the career. Rank= Rank number. Housing and meals provided at no cost for Scout, Merchant, Spacer, Soldier, and Marines.

**Basic Cost of Living Formula= Soc \* Cr100 per month**  
 In a Family or group, each Additional Adult plus 75%; each Additional Child plus 50%.  
 If C6= Charisma, use Charisma. If C6= Caste, use Caste/2.

## INDEPENDENT SHIP CREW SALARIES

### Cr1000 per month times required skill level

Independent ship crews (non-naval, non-military, non-corporate) are paid based on the skill required for their position (rather than actual skill):

Pilot (= Maneuver)	Steward-3	Counsellor-2
Astrogator (= Jump)	Gunner-1	Medic-2
Engineer (= PPlant)	Chief Engineer (=PPlant + 1)	

Naval, Scout, Corporate pay crew on the Salaries table.

**Merchant Profit Sharing.** Ships carrying cargo (for speculation) maintain profit-sharing for their officer crew. The total crew determines the number of shares.

Each crew officer receives one share per level of Rank.

4th Officer	= 1 share.
3rd Officer	= 2 shares.
2nd Officer	= 3 shares.
1st Officer	= 4 shares.
Captain	= 5 shares.

The pool receives 10% of the profits of ship's operations.

**Annual Payouts.** Shares are paid out once per year before annual maintenance.

## NOBLE LAND GRANTS

Soc Noble	Where?	Preferred World	Hexes	
			MW	other
A Gentleman		any	any	1
B Knight	homeworld	any	1	1
c Baronet	one system	Pre-Ag or Pre-Ri	2	2
C Baron	one system	Ag or Ri	4	4
D Marquis	one subsector	Pre-Ind	8	8
e Viscount	one subsector	Pre-Hi	16	16
E Count	one sector	In or Hi	32	32
f Duke*	one sector	*Importance=4+	64	64
F Duke*	one sector	**Capital	128	128
G Archduke	one domain	any	256	256
H Imperial Family	in the empire	any	256	256
H Emperor	in the empire	any	256	256

\*but not a Capital. \*\*Subsector or Sector Capital.

Nobles receive Land Grants associated with their fiefs. Each noble title confers a Land Grant. Each Hex generates a profit equal to Cr10,000 per Trade Classification per year.

A Hex with no TC generates Cr5,000 annually.

## WAGES

Skill Level	Annual	Month	Hour
Unskilled Skill 0-1	8,400	700	Cr 4
Novice Skill 1-2	12,600	1050	Cr 6
Competent Skill 3-5	21,000	1750	Cr10
Master Skill 5 +	29,400	2450	Cr14

Wages are based on 40 hours per week. 2000 hours per year. 175 hours per month.

**Rich World:** Increase by 25%.

**Poor World:** Decrease by 25%.

**Industrial World:** Increase by 50% (as overtime pay [+ 2 hours per day]).

**Professionals:** Advocate, Medical, Counsellor earn double the stated rate.

**Craftsperson:** + Cr2 / level of Craftsman.

**Hellworld:** Double pay for a 1-year contract; paid as bonus at end-of-contract.

## LAND GRANT VALUE

An unimproved Land Grant generates income based on the Trade Classifications of the world and equal to Cr10,000 per TC annually (equal to Cr5,000 if there are no TCs).



# Value

## THE WORTH OF THINGS

An object has a value to an individual based on a variety of factors. Value is defined in money, but may be evaluated in other than money terms (a treasured picture of a parent may be worth a great deal to a son, and nothing at all to a stranger).

**Cost Refers To Production.** A manufacturer who creates an object encounters a cost in money based on the elements put into the object, the labor required, and a suitable allowance for overhead.

**Price Refers To Sales.** The amount for which an object is sold to the consumer is the price.

**Value Is Relative.** Somewhere between an object's cost to make and its sale price is its value.

**Buying And Selling Is A Win-Win Situation.** A Seller wants to sell for more than his cost. The Buyer wants to pay less than (or equal to) an object's value. When a buyer and seller make a transaction, it is possible for both to win.

## THE VALUE RULE

Typical Salary	Snack	Meal 1 hr	Clothes	Device 1 mo	Major Part 1 yr	ATV	Large Vehicle	Small Craft	Starship
<b>Value</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>
Credits	<1	10	100	1,000	10,000	100,000	MCr1	MCr10	MCr100

The table shows **Values**. A manufacturer or producer can usually make these goods (in quantity) paying less than Value. A buyer can usually buy these goods individually for Value or slightly more.

## VALUES FOR OBJECTS

Values are orders of magnitude and help in estimating object costs and prices through simple logic.

**Base Value** is a very rough indication of the worth of an object. A good meal is worth about Cr10. A cook could pay a grocery cost of Cr5, prepare a meal, and price it at Cr10.

**Cost Modifications.** The cost (manufacturing cost, production cost, wholesale cost) is some fraction of the Base Value taking into account volume production, production difficulty, resource availability, and available technology.

**Volume Production.** An enterprise can manufacture a quantity of objects at a cost less than their final value.

Very Efficient Production Cost = Value / 10

Mass Production Cost = Value / 5

Small Manufacturer (100 items) Cost = Value / 3

Individual Assembler (20 Items) Cost = Value / 2

**Price Modifications.** The price for an object may be influenced by Supply and Demand, or by QREBS, or both.

## TYPICAL COST MODIFIERS

Flux	Description	Cost	Comment
- 5	Experimental	10.0 x	Before substantial testing.
- 4	Prototype	5.0 x	Handmade sample.
- 3	Early	2.0 x	Preliminary.
- 2	Basic	0.5 x	Elementary. Unenhanced.
- 1	Standard	1.0 x	Normal. Ordinary.
0	(blank)	1.0 x	Normal. Ordinary.
+ 1	Alternate	1.0 x	Nonstandard performance.
+ 2	Improved	1.0 x	Updated.
+ 3	Generic	0.5 x	Low Quality Control.
+ 4	Modified	0.5 x	Changed. New features.
+ 5	Advanced	2.0 x	Multiple new features.
+ 6	Ultimate	2.0 x	Many new features.

## SUPPLY AND DEMAND PRICE MODIFICATIONS

Flux	Supply	Mod	Demand	Mod
- 5	Ubiquitous	0.5 x	Very Low	0.5 x
- 4	Abundant	0.6 x	Quite Low	0.6 x
- 3	Very Common	0.7 x	Low	0.7 x
- 2	Quite Common	0.8 x	Weak	0.8 x
- 1	Common	0.9 x	Less Ordinary	0.9 x
0	Typical	1.0 x	Ordinary	1.0 x
+ 1	Uncommon	1.2 x	Good	1.2 x
+ 2	Scarce	1.4 x	Strong	1.4 x
+ 3	Rare	1.6 x	High	1.6 x
+ 4	Quite Rare	1.8 x	Quite High	1.8 x
+ 5	Truly Rare	2.0 x	Very High	2.0 x

Price Modification can be used in two different ways:

**Ordinary Objects.** Roll for Demand only.

**Special Objects.** Roll for both Supply and Demand and combine them. Special objects are imported, or outside the locally available Tech Levels.



# Size

## UNDERSTANDING SIZE

Size indicates the approximate size or dimensions of an object. The chart shows the basic benchmark sizes. For example, the referee may say,










- “You see a Person-Size something in the distance.”
- “You see a Size-5 object on the starport tarmac.”
- “Sensors see a Size-5 object separating from that ship.”

Size is broadly descriptive with some overlap. Person-Size may indicate anything larger than a suitcase and smaller than a truck. Suitcase may indicate anything larger than a book and smaller than a person.

Sizes can be decimal. An object slightly smaller than Size-6 is Size 5.9; a slightly larger object is Size 6.1.

**Carrying And Using.** A Size-N item can typically carry and use any object less than its own Size. For example, a Size 5 Sophont can carry and use a Size 4 Object. A Size-6 truck can carry several Size-5 objects.

**Size And World Range (Or Distance) Are Related.** A person with ordinary vision can usually see an object of Size-N or larger at Range-N or less.

SIZES AT RANGE R=											
		Wire 1mm thin	Word 2mm 10 point	Coin 7 mm 0.3 inch	Card 75 mm 3 inches	Book 200 mm 8 inches	Console 750 mm 30 inches	Person 1.5 m 5 feet	Vehicle 7.5 m 25 feet	Tower 75 m 250 feet	
Size=	0	R	T	1	2	3	4	5	6	7	
<b>DECIMAL SIZE</b>		<b>R</b>	<b>T</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	
Length	Vary	--	1.0 mm	2.0 mm	7 mm	7.5 cm	20 cm	75 cm	1.5 m	7.5 m	75 m
1	+ 0.1	.1 mm	1.1 mm	2.5 mm	15 mm	9 cm	25 cm	80 cm	1.6 m	15 m	150 m
2	+ 0.2	.2 mm	1.2 mm	3.0 mm	20 mm	10 cm	30 cm	90 cm	1.7 m	20 m	200 m
3	+ 0.3	.3 mm	1.3 mm	3.5 mm	30 mm	11 cm	35 cm	100 cm	1.8 m	30 m	300 m
4	+ 0.4	.4 mm	1.4 mm	4.0 mm	35 mm	12 cm	40 cm	105 cm	1.9 m	35 m	350 m
5	+ 0.5	.5 mm	1.5 mm	4.5 mm	40 mm	14 cm	45 cm	110 cm	2.0 m	40 m	400 m
6	+ 0.6	.6 mm	1.6 mm	5.0 mm	50 mm	15 cm	50 cm	120 cm	5.0 m	50 m	500 m
7	+ 0.7	.7 mm	1.7 mm	5.5 mm	55 mm	16 cm	60 cm	130 cm	5.5 m	55 m	550 m
8	+ 0.8	.8 mm	1.8 mm	6.0 mm	60 mm	18 cm	65 cm	135 cm	6.0 m	60 m	600 m
9	+ 0.9	.9 mm	1.9 mm	6.5 mm	70 mm	19 cm	70 cm	140 cm	6.5 m	70 m	700 m
<b>RANDOM SIZE VARIATION</b>		<b>0</b>	<b>R</b>	<b>T</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>
Flux	Vary	--	1.0 mm	2.0 mm	7 mm	75 mm	20 cm	75 cm	1.5 m	7.5 m	75 m
- 5	0.5	--	0.5 mm	1.5 mm	4.5 mm	40 mm	14 cm	45 cm	110 cm	2.0 m	40 m
- 4	0.6	--	0.6 mm	1.6 mm	5.0 mm	50 mm	15 cm	50 cm	120 cm	5.0 m	50 m
- 3	0.7	--	0.7 mm	1.7 mm	5.5 mm	55 mm	16 cm	60 cm	130 cm	5.5 m	55 m
- 2	0.8	--	0.8 mm	1.8 mm	6.0 mm	60 mm	18 cm	65 cm	135 cm	6.0 m	60 m
- 1	0.9	--	0.9 mm	1.9 mm	6.5 mm	70 mm	19 cm	70 cm	140 cm	6.5 m	70 m
0	1.0	--	1.0 mm	2.0 mm	7 mm	75 mm	20 cm	75 cm	1.5 m	7.5 m	75 m
+ 1	1.2	0.2 mm	1.2 mm	3.0 mm	20 mm	10 cm	30 cm	90 cm	1.7 m	20 m	200 m
+ 2	1.4	0.4 mm	1.4 mm	4.0 mm	35 mm	12 cm	40 cm	105 cm	1.9 m	35 m	350 m
+ 3	1.6	0.6 mm	1.6 mm	5.0 mm	50 mm	15 cm	50 cm	120 cm	5.0 m	50 m	500 m
+ 4	1.8	0.8 mm	1.8 mm	6.0 mm	60 mm	18 cm	65 cm	135 cm	6.0 m	60 m	600 m
+ 5	2.0	1.0 mm	2.0 mm	7.0 mm	75 mm	20 cm	75 cm	150 cm	7.5 m	75 m	750 m



# Hot Cold

## A IMPACT DAMAGE BENCHMARKS

	Speed	kph	Hits	Descriptors	Descriptors
Subsonic	<b>0</b>	0	<b>0</b>	Still	
	<b>1</b>	5	<b>1</b>	Creep	
	<b>2</b>	10	<b>4</b>	Xslow	
	<b>3</b>	20	<b>9</b>	Slow	
	<b>4</b>	30	<b>16</b>	Standard	
	<b>5</b>	50	<b>25</b>	Cruise	
	<b>6</b>	100	<b>36</b>	Fast	
	<b>7</b>	300	<b>49</b>	Vfast	
	<b>8</b>	500	<b>64</b>	Sonic	
Supersonic	<b>9</b>	700	<b>81</b>	Supersonic	
	<b>10</b>	1000	<b>100</b>	Hypersonic	
	<b>11</b>	2000	<b>121</b>		
	<b>12</b>	3000	<b>144</b>		
	<b>13</b>	5000	<b>169</b>		
	<b>14</b>	10,000	<b>196</b>		
	<b>15</b>	20,000	<b>225</b>		
	<b>16</b>	30,000	<b>256</b>	Meteoric	
	<b>17</b>		<b>289</b>		
	<b>18</b>		<b>324</b>		
	<b>19</b>		<b>361</b>		
	<b>20</b>		<b>400</b>		

**Hits= V^2**

Hits upon impact (V= Speed):

Multiply by Tons (or fractional Tons) of impacting object.  
Use displacement Tons rather than mass.

## C INSULATION PROTECTION

In= protects against Ship AV

144	- 275 to	325	15	For Cold Protection, an On-Board or Local Heater increases the Cold Protected temperature - 100 C.
121	- 250 to	300	12	
100	- 225 to	275	10	
81	- 200 to	250	8	
64	- 175 to	225	7	
49	- 150 to	200	5	For Heat Protection, an On-Board or Local Cooler (Air Conditioner) in- creases the Heat Protect- ed temperature + 100 C.
36	- 125 to	175	4	
25	- 100 to	150	3	
16	- 75 to	125	2	
9	- 50 to	100	1	
4	- 25 to	75	1	
1	0 to	50	1	

## B HOT AND COLD BENCHMARKS

Temp	K	C	Hits	Descriptors	
<b>-12</b>	0	- 273	<b>144</b>	Absolute Zero	40D
<b>-11</b>	25	- 250	<b>121</b>	Hydrogen Ice	35D
<b>-10</b>	50	- 225	<b>100</b>	Oxygen Ice	30D
<b>-9</b>	75	- 200	<b>81</b>	Nitrogen Ice	25D
<b>-8</b>	100	- 175	<b>64</b>		20D
<b>-7</b>	125	- 150	<b>49</b>		15D
<b>-6</b>	150	- 125	<b>36</b>		10D
<b>-5</b>	175	- 100	<b>25</b>		7D
<b>-4</b>	200	- 75	<b>16</b>	Radon Ice	4D
<b>-3</b>	225	- 50	<b>9</b>		3D
<b>-2</b>	250	- 25	<b>4</b>		2D
<b>-1</b>	275	0	<b>1</b>	Cold	1D
<b>+0</b>	300	25	<b>0</b>	Human Temperate Environ	
<b>+1</b>	325	50	<b>1</b>	Hot	1D
<b>+2</b>	350	75	<b>4</b>		2D
<b>+3</b>	375	100	<b>9</b>	Water boils	3D
<b>+4</b>	400	125	<b>16</b>	Sulfur melts	4D
<b>+5</b>	425	150	<b>25</b>		7D
<b>+6</b>	450	175	<b>36</b>		10D
<b>+7</b>	475	200	<b>49</b>		15D
<b>+8</b>	500	225	<b>64</b>	Tin melts	20D
<b>+9</b>	525	250	<b>81</b>	Fire	25D
<b>+10</b>	550	275	<b>100</b>		30D
<b>+11</b>	575	300	<b>121</b>		35D
<b>+12</b>	600	325	<b>144</b>		40D
<b>+13</b>	700	425	<b>350</b>	Lead melts	100D
<b>+14</b>	800	525	<b>400</b>		115D
<b>+15</b>	900	625	<b>450</b>	Aluminum melts	130D
<b>+16</b>	1000	725	<b>500</b>		140D
<b>+17</b>	2000	1725	<b>1000</b>	Titanium melts	300D
<b>+18</b>	3000	2725	<b>1500</b>	Spectral M Star surface	
<b>+19</b>	4000	3725	<b>2000</b>	Spectral K Star surface	

Hits per Round (= 1 minute)

Above 600 Kelvin (K= Kelvins): **Hits= K / 2**

K= Kelvin (0 K= Absolute Zero).

C= Celsius (0 C= Freezing Point of Water= 273 K).



# Master Mods Tables

---

The Master Mods Tables are a compilation of common concepts discussed in greater detail elsewhere in these rules, but presented here for reference and as an inspiration to the Referee.

**Modifications.** Many of the entries provide consistent modifications for tasks and actions; use these charts for consistent reference.

**Inspiration.** The entries provided here are also accessible through randomization: simple die rolls select concepts or details which can then be challenges to the players.

## 00

### Index

01	Environ	Touch	Sound	Smell	Light	Pain	Truth	Beauty	01
02	Barrier H	Barrier W	Barrier D	Stability	Xeno-Med	Typical BR	Typical DH		02
03	Visibility	Respect	Attitude	Conformity	Imagination	Logic	Idea		03
04	Probability	Severity	Imminence	Order and Chaos		Morality	Evidence and Proof		04
05	VLow Low	Med High	Vhigh Xhigh	UHigh Fanta	Gravity	Zero-G	Acceleration	Environ	05
06	Comparatives		Vilani	NewSpeak	Imperial	Anglic	Vilani	MegaCorps	06
07	Size G=	Speed	Walk	Drive	Highway	Comms	Weather	Sounds	07
08	Small Groups1	Large Groups2	Injury		Severity	Diagnosis	Mods	Mods	08
09	Careers	Nobility	Friends	Humaniti	Sophonts1	Sophonts2	Major Races		09
10	Emotion	Degree	Potential	Fraction	Rewards	Std Time In	Jump	Naval TIJ	10
11	Crime	Property	Environment	Sophonts	Society	Justice	Doctrine		11
12	Supply	Demand					Stellar Density		12
13	MegaCorporations				Subsidiaries				13
14	Theme1	Theme2	Thme3	Theme4	Theme5	Theme6			14
15	Planet	Population	Economic	Climate	Secondary	Political	Special	Terrain1/2	15

# Master Mods Tables 01-02-03



## 01

### Typical Mods

Flux	Environ	Touch	Sound	Smell	Light	Pain	Truth	Beauty	Flux
-5	Frigid	Frigid	Silent	Absent	Dark	Unfeeling	GAEWK *	Repulsive	-5
-4	Vcold	VCold	Subliminal	Subliminal	Very Dim	Numb	Unsettling	Ugly	-4
-3	Cold	Cold	Faint	Pheromone	Dim	Insensitive	Obviously False	Vunattractive	-3
-2	Chilly	Chilly	Whisper	Pseudomone	Obscured	Normal	False	Unattractive	-2
-1	Cool	Cool	Soft	Subtle	Hazy	Tingling	Not Quite	Vplain	-1
0	Nice	Normal	Talking	Ordinary	Visible	Discomfort	Ordinary	Plain	0
+1	Warm	Warm	Loud	Fragrant	Bright	Itch	Good Enough	Cute	+1
+2	VWarm	VWarm	Shout	Pungent	VBright	Stinging	True	Prtty	+2
+3	Hot	Hot	Cacaphony	Stinking	UBright	Painful	Obviously True	Vpretty	+3
+4	Vhot	VHot	Deafening	Stifling	Blinding	VPainful	Epiphany	Beautiful	+4
+5	Scalding	Scalding	Destructive	Overwhelming	Burning	Unbearable	Absolute Truth	Helenic	+5

\*Goes Against Everything We Know

## 02

### Typical Mods

Bad	Barrier Height	Barrier Width	Barrier Depth	Stability	Xeno-Med	Typical BR	Typical DH	Bad Flux
-5	Hopeless	Hopeless	Hopeless	Hopeless	Illogical	General	2000 Worlds (K'kree)	-5
-4	Staggering	Staggering	Staggering	Staggering	Obscure	SuSAG	Aslan Hierate	-4
-3	Formidable	Formidable	Formidable	Formidable	Very Strange	Tukera	Darrian Confederation	-3
-2	Average	Average	Average	Average	Strange	Sharurshid	Zhodani Consulate	-2
-1	Easy	Easy	Easy	Easy	Uncommon	Makhid	Sword Worlds	-1
0	Ordinary	Ordinary	Ordinary	Ordinary	Ordinary	Ordinary	Third Imperium	0

## 03

### Typical Mods

Flux	Visibility	Respect	Attitude	Conformity	Imagination	Logic	Idea	Flux
-5	0 Contact	Ignored	Dismissive	Sycophant	Idiotic	Indeterminate	Derivative	-5
-4	R Reading	Utter Contempt	Unenthusiastic	Sheep	Foolish	Fuzzy	Boring	-4
-3	T Talking	Contempt	Unsupportive	Orthodox	VDull	Meaningless	Dull	-3
-2	1 Vshort	Distaste	Unhelpful	Collectivist	Dull	False	Uninspired	-2
-1	2 Short	Tolerance	Indifferent	Obedient	Pedestrian	Probably False	Unoriginal	-1
0	3 Medium	Peer	Helpful	Balanced	Ordinary	Logical	Ordinary	0
+1	4 Long	Acknowledgement	Interested	Odd	Sharp	Probably True	Novel	+1
+2	5 Vlong	Respect	Individualist	Rebellious	Pretty	True	Ingenious	+2
+3	6 Distant	Admiration	Supportive	Unorthodox	VClever	Self-Referential	Innovative	+3
+4	7 Vdistant	Absolute Respect	Attentive	Egotist	Creative	Unsolvable	Imaginative	+4
+5	8 Orbit	Idolization	Enthusiastic	Narcissist	Genius	Paradoxical	Truly Inspired	+5

=Soc1 minus Soc2



# Master Mods Tables 04-05-06

## 04 Typical Mods

Flux	Probability	Severity	Imminence	Order and Chaos	Morality	Evidence and Proof	Flux
-6	Impossible	None	Far Future	Entropic Chaos	Pure Immoral	Inconceivable	-6
-5	Highly Improbable	Trivial	Centuries	Random	Very Immoral	Impossible	-5
-4	Improbable	Negligible	Lifetime	Very Disordered	Immoral	Scintilla	-4
-3	Highly Unlikely	Very Minor	Generation	Disordered	Offensive	Air of Reality	-3
-2	Unlikely	Minor	Decades	Unstructured	Unpleasant	Reasonable Suspicion	-2
-1	Not Likely	Mild	Years	Tainted	Unkind	Probable Cause	-1
0	Even Chance	Temporary	Months	Truly Neutral	Truly Neutral	Preponderance	0
+1	Possible	Strong	Weeks	Arranged	Nice	Clear and Convincing	+1
+2	Likely	Major	Days	Structured	Pleasant	Reasonable Doubt	+2
+3	Probable	Severe	Hours	Ordered	Affable	Beyond a Reasonable Doubt	+3
+4	Very Probable	Very Severe	Minutes	Very Ordered	Moral	Shadow of a Doubt	+4
+5	Almost Certain	Devastating	Seconds	Systematic	Very Moral	Beyond a Shadow of a Doubt	+5
+6	Certain	Total	New	Primeval Order	Absolute Moral	Absolute	+6

## 05 Typical Mods

1D	Technology												Bad Flux	
	VLow	Low	Med	High	Vhigh	Xhigh	Uhigh	Fantastic	Gravity	Zero-G	Acceleration	Environ		
1	0	3.3	6	9	12	15	18	22	28	Crushing	Chaotic	Crushing	Chaotic	-5
2	1	3.6	7	10	13	16	19	23	29	Extreme	Disorienting	Extreme	Disorienting	-4
3	1.3	4	8	11	14	17	20	24	30	Crippling	Disrupting	Crippling	Disrupting	-3
4	1.6	5	8.5	12	15	18	21	25	31	Vstrong	Fluxing	Vstrong	Swirling	-2
5	2	6	9	12.5	15.5	18.5	21.5	26	32	Strong	Abnormal	Strong	Bothersome	-1
6	3	7	10	13	16	19	22	27	33	Normal	Normal	Normal	Normal	0

## 06 Typical Mods

Flux	Comparatives	Brand Names						Flux
		Vilani	NewSpeak	Imperial	Anglic	Vilani	MegaCorps	
-5	Worst	La Gasep	Worst*	Loamer	Glump	Naa	General	-5
-4	Atrocious	Khiba	Double PlusUnGood	Sloeph	NNA	Kakna	GsbAg	-4
-3	Very Bad	Dulamas	PlusUnGood	Cerfan	Peerless	Seleni	Delgado	-3
-2	Worse	Ga Gasep	UnGood	Boron	Consolidated	Lanuur	Hortalez	-2
-1	Bad	Gasep	HalfUnGood	Neol Sibs	Dorado	Khush	SuSAG	-1
0	Average	Ligtar		Engolia	Acme	Ushum	Makhid	0
+1	Good	Kaar	HalfGood	Kosinar	Ponii	Ganun	Zirunkarish	+1
+2	Better	Biilem	Good	JPG	Golden	Shakashdir	Sharurshid	+2
+3	Very Good	Ga Kaar	PlusGood	Vereos	Official TAS	Sebiilem	Naasirka	+3
+4	Excellent	Lamas	DoublePlusGood	Tyxagon	Iridium	Agbar Urdim	LSP	+4
+5	Best	La Kaar	Best	Starling	Corp 715	Karak	Instellarms	+5

\*Technically Ungrammatical

# Master Mods Tables 07-08-09



## 07

### Typical Mods

Flux	Gravity		Speed kph	Descriptive Speeds			Comms	Weather	Sounds	Flux	
	Size	G=		Walk	Drive	Highway					
-5	3	0.0	5	Creep		Stuck	Stuck	Jammed	Extremely Bad	-5	
-4	4	0.5	10	Crawl		Creeping	Creeping	Equip Fault	Very Bad	-4	
-3	5	0.6	20	Xslow		Stop and Go	Jammed	Equip Glitch	Worse	-3	
-2	6	0.7	30	Vslow	Crawl	Vslow	Slow	Interference	Bad	Earbud	-2
-1	7	0.8	50	Slow	Stroll	Slow	Lagging	Static	Inconvenient	Whisper	-1
0	8	1.0	100	Standard	Walk	Drive	Cruise	Good	Neutral	Talking	0
+1	9	1.1	300	Cruise	Trot	Fast	Fast Lane	Very Good	Fortuitous	Lecture	+1
+2	A	1.2	500	Fast	Run	Vfast	Vfast Land	Excellent	Good	Shout	+2
+3	B	1.3	700	Vfast	Sprint	Racing	Grid Control	Clear	Better	Distress	+3
+4	C	1.5	1000	Sonic			Speeding	Very Clear	Very Good	Many Distress	+4
+5	D		2000	Ssonic				Crystal Clear	Extremely Good	Gunshot	+5
+6										Thunder	+6
+7										Explosion	+7

## 08

### Typical Mods

Bad Flux	Small Groups1	Large Groups2	Injury	Severity	Diagnosis	Mods	Mods	Bad Flux	
-6	Individuals	Millions	6D	Disastrous	Near Total			-6	
-5	Groups	Hundred Thousands	5D	Vheavy	Intense	Vobscure		-5	
-4	Hundreds	Ten Thousands	4D	Heavy	Critical	Obscure		-4	
-3	Thousands	Thousands	3D	Common	Serious	Difficult	Hvy Armor	-3	
-2	Ten Thousands	Hundreds	2D	Light	Fair	Hard	Armor	-2	
-1	Hundred Thousands	Groups	1D	Slight	Good	Ordinary	Lt Armor	Evade	-1
0	Millions	Individuals	0	Scratch	Scratch	Easy	Typical	Typical	0

## 09

### Typical Mods

Flux	No. Careers	Nobility	Friends	Humaniti	Sophonts1	Sophonts2	Major Races	Flux
-6	1 Craftsman	Commoner	Nemesis	Iltharan	Shriekers	Salika		-6
-5	2 Scholar	A Gentleman	Enemy	Thaggeshi	Gurvin	Thorells		-5
-4	3 Entertainer	B Knight	Antagonist	Loeskalth	Ahetowa	Tahavi		-4
-3	4 Citizen	c Baronet	Adversary	Answerin	Ael Yael	Xapoqi	Hivers	-3
-2	5 Scout	C Baron	Rival	Suerrat	Llellewlowy	Jessa	Aslan	-2
-1	6 Merchant	D Marquis	Opponent	Solomani	Vegans	Ojehshodu	Zhodani	-1
0	7 Spacer	e Viscount	Acquaintance	Human	Bwaps	Crenduthaar	Solomani	0
+1	8 Soldier	E Count	Contact	Vilani	Virushi	Hhkar	Vilani	+1
+2	9 Agent	f Minor Duke	Friend	Zhodani	Eshar Ashah	Irhadre	Vargr	+2
+3	10 Rogue	F Duke	Companion	Geonee	Mirani	Ithklur	K'kree	+3
+4	11 Noble	G Archduke	Fast Friend	Azhanti	Jgd-II-Jagd	Tagi		+4
+5	12 Marines	h Imperial Family	Best Friend	Vlazdumecta	Lhshana	Stalkers	Droyne	+5
+6	13 Functionary	H Emperor	Blood Sib	Floriani	Shi'awei	Ebokin		+6



# Master Mods Tables 10-11-12

## 10

### Typical Mods

Flux	Emotion	Degree	Potential	Fraction	Rewards	Standard Time In Jump	Naval Drives Time In Jump	Flux
-5	Distress	Utmost	Terrible	Almost None	Insulting	158 hours	163 hours	-5
-4	Hate	Extreme	Extremely Bad	One-Quarter	Insensitive	160 hours	164 hours	-4
-3	Fear	Major	Very Bad	Three-Eighths	Inadequate	162 hours	165 hours	-3
-2	Surprise	Significant	Bad	One-Third	Insufficient	164 hours	166 hours	-2
-1	Unease	Minor	Poor	Almost Half	Short	166 hours	167 hours	-1
0	Blank	Trivial	Ordinary	Half	Adequate	168 hours	168 hours	0
+1	Calm	Minor	Possible	More Than Half	Significant	170 hours	169 hours	+1
+2	Surprise	Significant	Good	Two-Thirds	Satisfying	172 hours	170 hours	+2
+3	Courage	Major	Very Good	Five-Eighths	Generous	174 hours	171 hours	+3
+4	Love	Extreme	Extremely Good	One-Quarter	Very Generous	176 hours	172 hours	+4
+5	Delight	Utmost	Wonderful	Almost All	Incredible	178 hours	173 hours	+5

## 11

### Typical Mods

1D	Crime	Property	Environ	Sophonts	Society	Justice	Crime versus Doctrines	1D
1	Gaffe	Misuse	Litter	Offense	Disharmony	Mistake	Ignorance	1
2	Infraction	Vandalism	Waste	Insult	Rudeness	Inattention	Question	2
3	Misdemeanor	Damage	Damage	Assault	Slack	Inaction	Heterodoxy	3
4	Felony	Theft	Pollution	Mayhem	Dishonor	False Witness	Blasphemy	4
5	High Crime	Destruction	Ravage	Killing	Treason	Injustice	Heresy	5
6	Atrocity	Havoc	Ruin	Mass Killing	High Treason	Tyranny	Mass Deception	6

## 12

### Typical Mods

Flux	Supply	Demand	Stellar Density	Flux
-6	Everpresent	None		-6
-5	Ubiquitous	Very Low		-5
-4	Abundant	Quite Low	Dense Core	-4
-3	Very Common	Low	Core	-3
-2	Quite Common	Weak	Cluster	-2
-1	Common	Less Ordinary	Dense	-1
0	Typical	Ordinary	Standard	0
+1	Uncommon	Good	Scattered	+1
+2	Scarce	Strong	Sparse	+2
+3	Rare	High	Rift	+3
+4	Quite Rare	Quite High	Extra Galactic	+4
+5	Truly Rare	Very High		+5
+6	Unique	Absolute		+6

# Master Mods Tables 13-14-15



## 13

Flux	MegaCorporations	QREBS					Subsidiaries	Flux
		Q	R	E	B	S		
-5	General							-5
-4	GsbAg							-4
-3	Delgado							-3
-2	Tukera						Akerut	-2
-1	SuSAG							-1
0	Makhid							0
+1	Zirunkarish							+1
+2	Sharurshid							+2
+3	Naasirka						Food Extruders	+3
+4	LSP							+4
+5	Instellarms							+5

## 14

Typical Mods							
1D	Theme1	Theme2	Theme3	Theme4	Theme5	Theme6	1D
1	Justice	Loyalty	Awe	Danger	Betrayal	GAEWK	1
2	Happiness	Cheerful	Human Frailty	Paranoia	Heroism	Disappointing	2
3	Kindness	Trustworthy	Brave	Pursuit	Escape	Unreliable	3
4	Honesty	Admiration	Bizarre	Revenge	Deception	Stupidity	4
5	Truthfulness	Friendly	Thrifty	Humiliation	Conformity	Confusion	5
6	Cleanliness	Novelty	Profitable	Improbable	Extremes	Chaos	6

## 15

Typical Mods										
Flux	Planetary	Population	Economic	Climate	Secondary	Political	Special	Terrain1	Terrain2	Flux
-6										-6
-5	Oc							Rural	Exotic	-5
-4	Fl	Di	Pr	Lk				Cropland	Twilight Zone	-4
-3	As	Ba	Na	Fr	Fa			Wetland Wood	Baked Lands	-3
-2	De	Lo	Pa	Co	Mi	Cx	Da	Wetland	Shore	-2
-1	Ga	Ni	Po	Tu	Mr	Cs	Pz	Clear Wood	Islands	-1
0	<none>	<none>	<none>	<none>	<none>	<none>	<none>	Clear	Ocean	0
+1	He	Ph	Ag	Tr	Pe	Cp	Sa	Rough	River	+1
+2	Ic	Hi	Ri	Ho	Re	Cy	Ab	Rough Wood	Lake	+2
+3	Wa		Pi	Tz				Mountain	Ice Cap	+3
+4	Va		In					Desert	Ice Field	+4
+5								Chasm	Frozen Lands	+5

# THE IMPERIAL CALENDAR



Holiday	Wonday	Tuday	Thirday	Forday	Fiday	Sixday	Senday
1	2	3	4	5	6	7	8
	16	17	18	19	20	21	22
	30	31	32	33	34	35	36
	44	45	46	47	48	49	50
	58	59	60	61	62	63	64
	72	73	74	75	76	77	78
	86	87	88	89	90	91	92
	100	101	102	103	104	105	106
	114	115	116	117	118	119	120
	128	129	130	131	132	133	134
	142	143	144	145	146	147	148
	156	157	158	159	160	161	162
	170	171	172	173	174	175	176
	184	185	186	187	188	189	190
	196	197	198	199	200	201	202
	212	213	214	215	216	217	218
	226	227	228	229	230	231	232
	240	241	242	243	244	245	246
	254	255	256	257	258	259	260
	268	269	270	271	272	273	274
	282	283	284	285	286	287	288
	296	297	298	299	300	301	302
	310	311	312	313	314	315	316
	324	325	326	326	327	328	329
	338	339	340	341	342	343	344
	352	353	354	355	356	357	358
	1day	2day	3day	4day	5day	6day	7day

Wonday	Tuday	Thirday	Forday	Fiday	Sixday	Senday
9	10	11	12	13	14	15
23	24	25	26	27	28	29
37	38	39	40	41	42	43
51	52	53	54	55	56	57
65	66	67	68	69	70	71
79	80	81	82	83	84	85
93	94	95	96	97	98	99
107	108	109	110	111	112	113
121	122	123	124	125	126	127
135	136	137	138	139	140	141
149	150	151	152	153	154	155
163	164	165	166	167	168	169
177	178	179	180	181	182	183
191	192	193	194	195	196	197
203	204	205	206	207	208	209
219	220	221	222	223	224	225
233	234	235	236	237	238	239
247	248	249	250	251	252	253
261	262	263	264	265	266	267
275	276	277	278	279	280	281
289	290	291	292	293	294	295
303	304	305	306	307	308	309
317	318	319	320	321	322	323
330	331	332	333	334	335	336
345	346	347	348	349	350	351
359	360	361	362	363	364	365
1day	2day	3day	4day	5day	6day	7day

The Imperial Calendar numbers the days of each year from 1 to 365 (matching both the Sylean and the Terran standard calendar years). Imperial holidays and important dates are marked; additional holidays may be added by local authorities.

# BIRTHDATES



Every character has a birthdate, used to track chronological age, to help produce an understanding of the passage of time, and as a trigger to acquiring experience.

## The Birthdate:

- Is Noted on the Imperial Calendar
- Defines Age
- Governs Experience
- Computes Chronological Age.

## THE CURRENT DATE

The current date for a campaign is established by the Referee. Some dates for campaigns within the Imperium are:

The Dawn of the Imperium	001- 000
First Survey	001- 200
The Civil War	001- 550
The PsionicSuppressions	001- 870
The Golden Age	001-1105
The Rebellion	001-1116
The New Era	001-1248
The Far Far Future	001-1902

## HOLIDAY

To make 7-day weeks fit evenly into 365-day years, the calendar has established the first day of the year as Holiday, a specially-named day of celebration.

## THE EMPEROR'S BIRTHDAY

Since the early days of the Imperium, the public has insisted on celebrating the Emperor's Birthday as a holiday. Efforts to establish an Emperor's Day (usually to coincide with Holiday) have failed to achieve popular support. The population insists on celebrating on the actual birthdate.

## BIRTH DATE GENERATION

D	D	1D= 1-2-3						1D= 4-5-6					
		1	2	3	4	5	6	1	2	3	4	5	6
1	1	1	37	73	109	145	RR	181	217	253	289	325	RR
1	2	2	38	74	110	146	RR	182	218	254	290	326	RR
1	3	3	39	75	111	147	RR	183	219	255	291	327	RR
1	4	4	40	76	112	148	RR	184	220	256	292	328	RR
1	5	5	41	77	113	149	RR	185	221	257	293	329	RR
1	6	6	42	78	114	150	RR	186	222	258	294	330	RR
2	1	7	43	79	115	151	RR	187	223	259	295	331	RR
2	2	8	44	80	116	152	RR	188	224	260	296	332	RR
2	3	9	45	81	117	153	RR	189	225	261	297	333	RR
2	4	10	46	82	118	154	RR	190	226	262	298	334	RR
2	5	11	47	83	119	155	RR	191	227	263	299	335	RR
2	6	12	48	84	120	156	RR	192	228	264	300	336	RR
3	1	13	49	85	121	157	RR	193	229	265	301	337	RR
3	2	14	50	86	122	158	RR	194	230	266	302	338	RR
3	3	15	51	87	123	159	RR	195	231	267	303	339	RR
3	4	16	52	88	124	160	RR	196	232	268	304	340	RR
3	5	17	53	89	125	161	RR	197	233	269	305	341	RR
3	6	18	54	90	126	162	RR	198	234	270	306	342	RR
4	1	19	55	91	127	163	RR	199	235	271	307	343	RR
4	2	20	56	92	128	164	RR	200	236	272	308	344	RR
4	3	21	57	93	129	165	RR	201	237	273	309	345	RR
4	4	22	58	94	130	166	RR	202	238	274	310	346	RR
4	5	23	59	95	131	167	RR	203	239	275	311	347	RR
4	6	24	60	96	132	168	RR	204	240	276	312	348	RR
5	1	25	61	97	133	169	RR	205	241	277	313	349	RR
5	2	26	62	98	134	170	RR	206	242	278	314	350	RR
5	3	27	63	99	135	171	RR	207	243	279	315	351	RR
5	4	28	64	100	136	172	RR	208	244	280	316	352	RR
5	5	29	65	101	137	173	RR	209	245	281	317	353	RR
5	6	30	66	102	138	174	RR	210	246	282	318	354	RR
6	1	31	67	103	139	175	RR	211	247	283	319	355	RR
6	2	32	68	104	140	176	RR	212	248	284	320	356	361
6	3	33	69	105	141	177	RR	213	249	285	321	357	362
6	4	34	70	106	142	178	RR	214	250	286	322	358	363
6	5	35	71	107	143	179	RR	215	251	287	323	359	364
6	6	36	72	108	144	180	RR	216	252	288	324	360	365

Roll four consecutive dice to determine the specific day/date of the year.

## COMPUTING BIRTHDATES

Each character computes his or her birthdate by subtracting Age from the current year. Mike's character Sigg Odra completes character generation and is Age= 30. The current adventuring year is 1105. Sigg was born in 1105 -30= 1075.

The birthday of the year is determined randomly from Birthdate Generation for a date on the Imperial Calendar. Die 1= 4, Die2= 3, Die3=1, Die4=6. Reroll! Die1=2, Die2=2, Die3=2, Die4=2. Day=44. Sigg's birthdate is Wonday 044-1075.

**Alternative Birthdate Option.** Use the Player's actual Birth Date to determine the day of the year for the Character's Birthdate. Martin's birthdate is January 15; his birthdate on the Imperial calendar is 015. Dagin's birthday is April 6: his Imperial calendar birthdate is (Jan=31)+(Feb=28)+(Mar=31)+6 = 096.





Navy	250k km	<b>11</b>	Satellite		
	50k km	<b>10</b>	Geo	Typical Stationary Orbit	
	5,000 km	<b>9</b>	Far Orbit		Limits of Navy Control
	500 km	<b>8</b>	Close Orbit	Typical Medium Orbit	Limits of Army Control
	400 km	<b>7.8</b>	Upper8		
	300 km	<b>7.6</b>	Upper6		
	200 km	<b>7.4</b>	Upper4	Typical Low Orbit	
	100 km	<b>7.2</b>	Upper2		
	50 km	<b>7</b>	Upper		
	Close Orbit And Airspace Control Command	30 km	<b>6.8</b>	Mid8	Most aircraft impractical above this level
20 km		<b>6.6</b>	Mid6		
12 km		<b>6.4</b>	Mid4		
8 km		<b>6.2</b>	Mid2		
5 km		<b>6</b>	Mid		
1000 m		<b>5</b>	Airspace5		
500 m		<b>4</b>	Airspace4		Naval Aircraft
150 m		<b>3</b>	Airspace3	Most aircraft impractical below this level	
50 m		<b>2</b>	NOP	Grav Vehicles	Naval Grav Vehicles
5 m		<b>1</b>	Near Surface	Lifters	Naval Lifters
Army			Ground Force Command	Nautical Force Command	

Army and Navy forces divide their areas of operations based on distance from the world surface.

# System Maps

Explorers and space travellers move from system to star system in pursuit of their goals. Star systems may have many different worlds in many different locations or combinations of locations. Star system maps provide general detail of where worlds are in relation to each other and to their central stars.

Star systems contain a central star and some number of additional stars and worlds. Star systems which have been created by **Traveller Star System Generation** can be mapped to the set of star system diagrams in this chapter.

## IMPORTANT CONCEPTS

The following important concepts apply to the use of the star system diagrams.

**Not All Orbits Are Filled.** The diagrams show an extensive set of possible orbits (although elliptical orbits and the full set of possible decimal orbits) are not shown. Nevertheless, most systems will not fill all, or even most, of the orbits shown.

**Orbits May Vary By Decimal or Eccentricity.** Any orbit called for by any situation can be varied by the Decimal Orbits table to conform to some external requirement. Any orbit can be given an eccentricity in order to conform to an external requirement.

**Kuiper Belts and Oort Clouds.** Traveller System Generation assumes that most stars formed from a cloud of gas, and that the remnants of that gas coalesced into the system of planets that surround it. The planets of the system do not accrete all of the matter; some of it remains in the form of smaller planetesimals generally separated into three groups: The **Kuiper Belt** is centered at approximately Orbit=10.

The **Inner Oort Cloud** is centered approximately on Orbit=17 (with some overlap on Orbit=16).

The **Outer Oort Cloud** is centered on Orbit=19. Unlike the other belts, the Outer Oort Cloud; it is a spherical cloud and is encountered from all directions.

The components of all three groups are objects composed of methane, ammonia, or water ices, with a fraction (perhaps a tenth) of them rocky or metal objects.

Objects range in size from 1,000 miles diameter (World Size=1) downward to 1,000 km, 500 km, 100 km, 10 km, 1 km, and even 100 meters in diameter.

Although the density of these three groups may vary, **Traveller System Generation** assumes that they exist to some degree in every system.

## USING THE MAPS

The System Maps serve several purposes:

They assist in calculating travel times, Space Ranges, and opportunities for communication.

They support the use of sensors and weapons.

They support visualization of situations for the players and the referee.

## THE INNER SYSTEM

The Inner System consist of the first six orbits (numbered 0 through 5) in a star system. Orbit 6, the first orbit of the Outer System is shown for reference.

If an orbit contains a companion star, it may have planets in the suborbits shown.

## THE OUTER SYSTEM

The Outer System consist of the second six orbits (numbered 6 through 11) in a star system. Orbits numbered lower than 6 are too small to be reasonably shown on the diagram. Orbit 12, the first orbit in the Remote System is shown for reference.

If an orbit contains a companion star, planets in suborbit. Scale inhibits showing all of the suborbits.

The probably extent of the Kuiper Belt is also shown.

## THE REMOTE SYSTEM

The Remote System consist of the third six orbits (numbered 12 through 17) in a star system. Orbits numbered lower than 12 are too small to be reasonably shown on the diagram. Orbit 18, the first orbit beyond the limits of the Remote System is shown for reference.

If an orbit contains a companion star, planets in suborbit. Scale inhibits showing all of the suborbits.

The probable extents of the Inner Oort Cloud and the Outer Oort Cloud are also shown.

## BEYOND

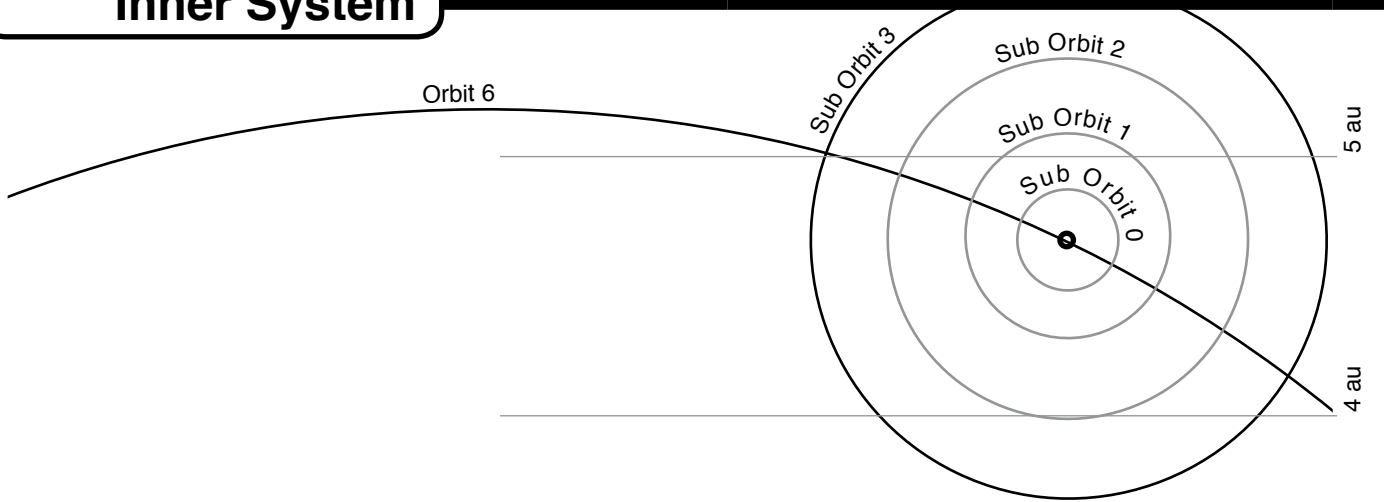
The Beyond is the true beginning of interstellar space. It is conceivable that Traveller System Generation will locate one or more worlds in the Beyond. Orbits 18 and 19 are shown. If necessary, Orbit 20 corresponds to S=21.

Space Ranges S=21 = 1 Light Year, S=22 = half parsec, and S= 23 1 Parsec are shown for reference.

## THE SATELLITE CHARTS

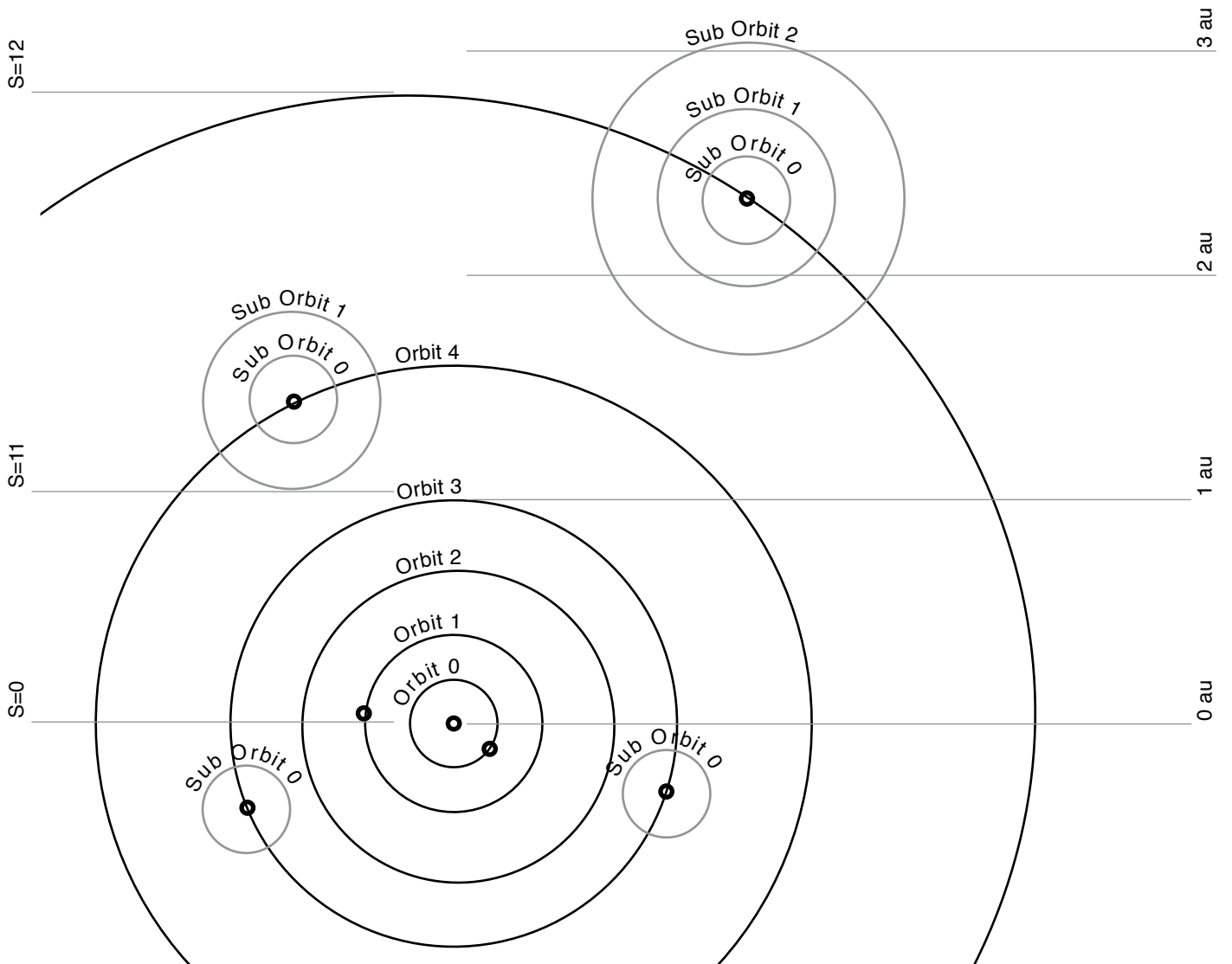
The Satellite Charts diagram the orbits of satellites and provide values for their orbits.

# Inner System



Outer System

Inner System



1 AU= 1.35 inches

# Inner System Diagram and Charts

# 10

The inner System includes Orbits 0 through 5. For most stars, it is the center and focus of most activity.

## 5 Orbital Distances

	S=	O=	AU=	Million km	Light-	Sub-Orbit	la	lb	II	III		
Inner System	<b>10</b>	<b>0</b>	0.2	30	100 ls		no		A0-F5	A0-K0	Inner System	
		<b>1</b>	0.4	60	200 ls	Mercury	no	A0	G0-G5	K5		
		<b>2</b>	0.7	105	350 ls	Venus	0	A5-G0	K0	M0		
Inner System	<b>11</b>	<b>3</b>	1.0	150	8 lm	Terra	0				Inner System	
		<b>4</b>	1.6	240	13 lm	Mars	0-1	A0-F5	G5	K5		
Inner System	<b>12</b>	<b>5</b>	2.8	420	30 lm	Asteroid Belt	0-2	G0	K0	M0	M5	Inner System
		<b>6</b>	5.2	780	43 lm	Jupiter	0-3	G5-K0	K5	M5	M9	

**O=** Orbit No.      ls= light-second      lh= light-minute      ld= light-day      lw= light-week      Stars of Spectral and Size shown have a surface at the Orbit shown. The first (innermost) orbit for the star is the next greater orbit number.

## 6 Decimal Orbits

	S=	O=	AU=	Flux=										O=		
				-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5		
				Decimal Orbit=	.5	.6	.7	.8	.9	.0	.1	.2	.3	.4	.5	
Inner System	<b>10</b>	<b>0</b>	0.2	0.15	0.16	0.17	0.18	0.19	0.2	0.22	0.24	0.26	0.28	0.30	<b>0</b>	Inner System
		<b>1</b>	0.4	0.30	0.32	0.34	0.36	0.38	0.4	0.43	0.46	0.49	0.52	0.55	<b>1</b>	
		<b>2</b>	0.7	0.55	0.58	0.61	0.64	0.67	0.7	0.73	0.76	0.79	0.82	0.85	<b>2</b>	
Inner System	<b>11</b>	<b>3</b>	1.0	0.85	0.88	0.91	0.94	0.97	1.0	1.06	1.12	1.18	1.24	1.30	<b>3</b>	Inner System
		<b>4</b>	1.6	1.30	1.36	1.42	1.48	1.54	1.6	1.72	1.84	1.96	2.08	2.20	<b>4</b>	
Inner System	<b>12</b>	<b>5</b>	2.8	2.20	2.32	2.44	2.56	2.68	2.8	3.04	3.28	3.52	3.76	4.00	<b>5</b>	Inner System
		<b>6</b>	5.2	4.0	4.2	4.4	4.7	4.9	5.2	5.6	6.1	6.6	7.1	7.6	<b>6</b>	

When necessary, star-world distances can be varied deliberately, or with flux. In the rare instance where two adjacent orbits coincide (as in O=9 plus 0.5 and O=10 minus 0.5), the result is a special case.

The Decimal Orbital Distances table shows values to a tenth of an orbit; if necessary, values can be calculated to a hundredth of an orbit or greater (but observe the MOARN principle: Map Only As Really Necessary).

## 7a Habitable Zones

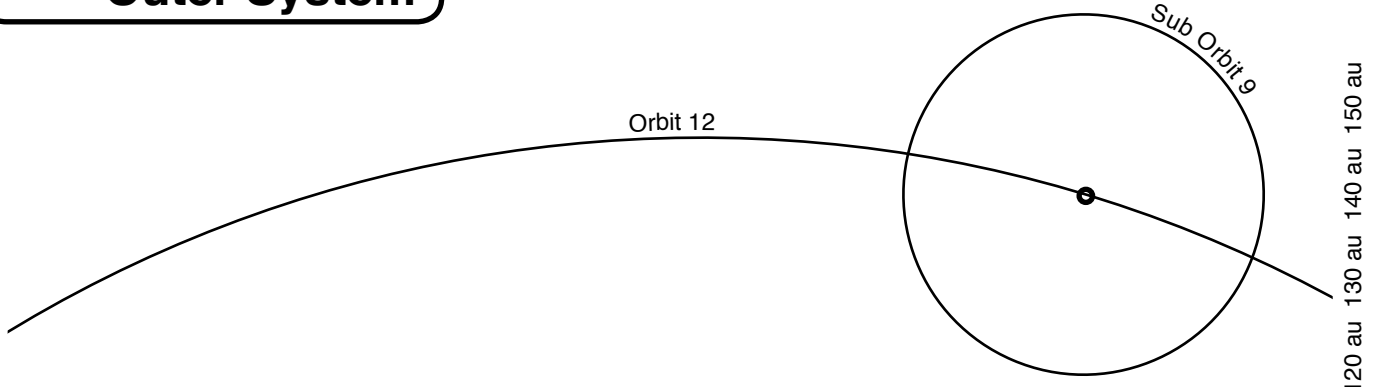
	S=	O=	AU=	Million km	Light-	la	lb	II	III	IV	V	VI	D	
Inner System	<b>10</b>	<b>0</b>	0.2	30	100 ls						M	M	AFGKM	Inner System
		<b>1</b>	0.4	60	200 ls								K	
		<b>2</b>	0.7	105	350 ls							K	G	
Inner System	<b>11</b>	<b>3</b>	1.0	150	8 lm						G	F		Inner System
		<b>4</b>	1.6	240	13 lm									
Inner System	<b>12</b>	<b>5</b>	2.8	420	30 lm					GK	F			Inner System
		<b>6</b>	5.2	780	43 lm				F	F				

**O=** Orbit No.      ls= light-second, lh= light-minute      ld= light-day, lw= light-hour      A world in an orbit labelled HZ is Temperate one orbit closer to the star is Hot, one orbit farther is Cold

**S=** is an approximation. Calculate Orbit Radius for a definitive S=.

# Outer System

S=16

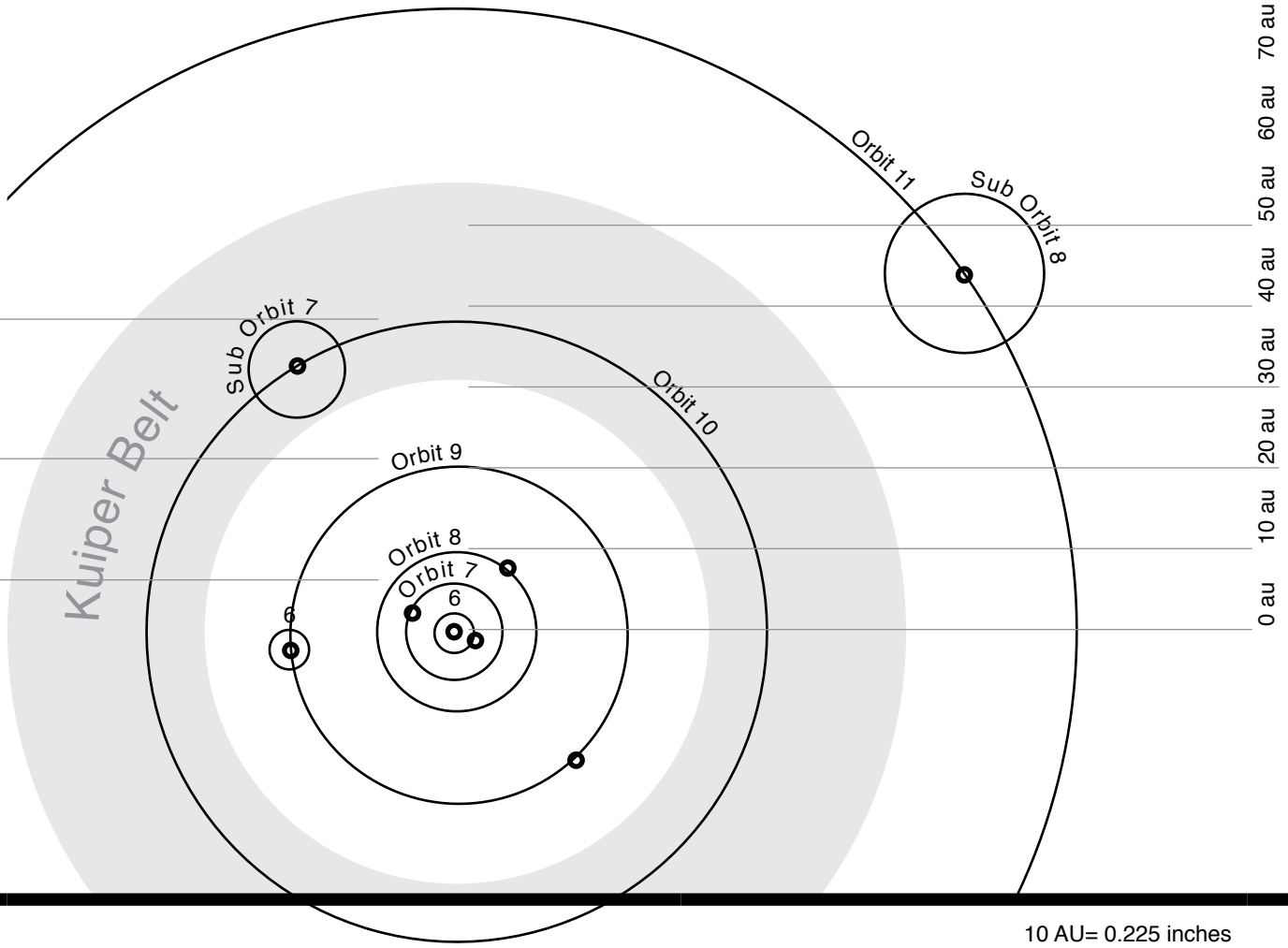


Remote System  
Outer System

S=15

S=14

S=13



10 AU= 0.225 inches

# Outer System Diagram and Charts 11

The Outer System includes Orbits 6 through 11.

## 5 Orbital Distances

	S=	O=	AU=	Million km	Light-	Sub-Orbit	Ia	Ib	II	III		
Outer System		<b>6</b>	5.2	780	43 lm	Jupiter	0-3	G5-K0	K5	M5	M9	Outer System
	<b>13</b>	<b>7</b>	10	1,500	83 lm	Saturn	0-4	K5	M0	M9		
		<b>8</b>	20	3,000	3 lh	Uranus	0-5	M0	M5-M9			
	<b>14</b>	<b>9</b>	40	6,000	5 lh	Neptune	0-6	M5-M9				
	<b>15</b>	<b>10</b>	77	11,550	10 lh	Kuiper Belt	0-7					
		<b>11</b>	154	23,100	21 lh	Kuiper Belt	0-8					
<b>16</b>	<b>12</b>	308	46,200	42 lh		0-9						

**O=** Orbit No.     
 ls= light-second      lh= light-minute      ld= light-day      lw= light-week     
 Stars of Spectral and Size shown have a surface at the Orbit shown. The first (innermost) orbit for the star is the next greater orbit number.

## 6 Decimal Orbits

	S=	O=	AU=	Flux=	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	O=
				Decimal Orbit=	.5	.6	.7	.8	.9	.0	.1	.2	.3	.4	.5	
Outer System		<b>6</b>	5.2		4.0	4.2	4.4	4.7	4.9	5.2	5.6	6.1	6.6	7.1	7.6	<b>6</b>
	<b>13</b>	<b>7</b>	10		7.6	8.1	8.5	9.0	9.5	10.0	11.0	12.0	13.0	14.0	15.0	<b>7</b>
		<b>8</b>	20		15	16	17	18	19	20	22	24	26	28	30	<b>8</b>
	<b>14</b>	<b>9</b>	40		30	32	34	36	38	40	43	47	51	54	58	<b>9</b>
	<b>15</b>	<b>10</b>	77		58	62	65	69	73	77	84	92	100	107	115	<b>10</b>
		<b>11</b>	154		115	123	130	138	146	154	169	184	200	215	231	<b>11</b>
<b>16</b>	<b>12</b>	308		231	246	261	277	292	308	338	369	400	430	461	<b>12</b>	

When necessary, star-world distances can be varied deliberately, or with flux. In the rare instance where two adjacent orbits coincide (as in O=9 plus 0.5 and O=10 minus 0.5), the result is a special case.

The Decimal Orbital Distances table shows values to a tenth of an orbit; if necessary, values can be calculated to a hundredth of an orbit or greater (but observe the MOARN principle: Map Only As Really Necessary).

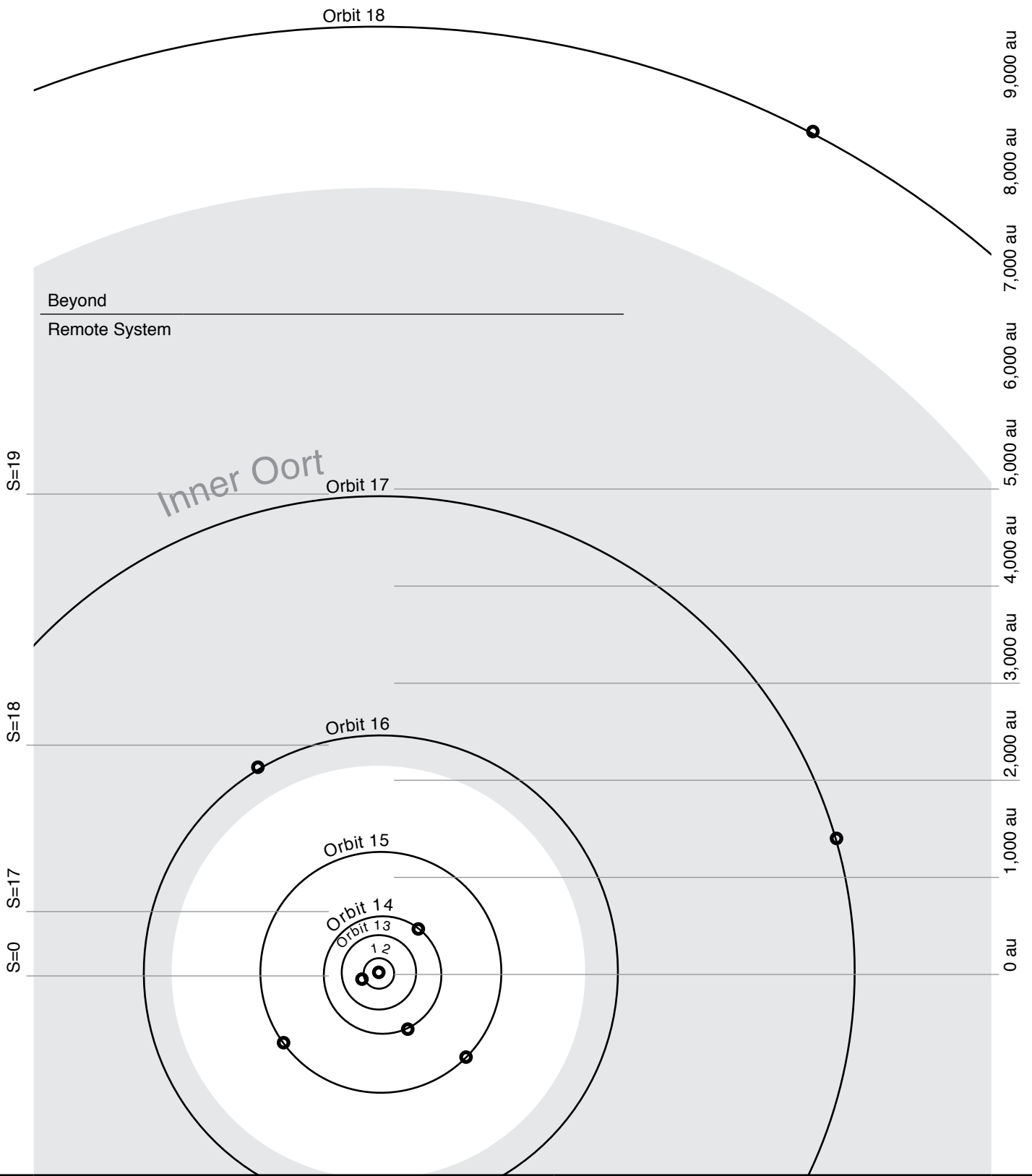
## 7a Habitable Zones

	S=	O=	AU=	Million km	Light-	Ia	Ib	II	III	IV	V	VI	D	
Outer System		<b>6</b>	5.2	780	43 lm				F	F				Outer System
	<b>13</b>	<b>7</b>	10	1,500	83 lm				AG	A	A			
		<b>8</b>	20	3,000	3 lh				K					
	<b>14</b>	<b>9</b>	40	6,000	5 lh				AFGK	M				
	<b>15</b>	<b>10</b>	77	11,550	10 lh			FGK	M					
		<b>11</b>	154	23,100	21 lh	F	AM							
<b>16</b>	<b>12</b>	308	46,200	42 lh	A-GKM									

**O=** Orbit No.     
 ls= light-second, lh= light-minute     
 ld= light-day, lw= light-hour     
 A world in an orbit labelled HZ is Temperate one orbit closer to the star is Hot, one orbit farther is Cold

**S=** is an approximation. Calculate Orbit Radius for a definitive S=.

# Remote System



1,000 AU = 0.35 inches

# Remote System Diagram and Charts

# 12

The Remote System includes Orbits 12 through 17.

## 5 Orbital Distances

	S=	O=	AU=	Million km	Light-	Sub-Orbit	Ia	Ib	II	III	
Remote System	16	12	308	46,200	42 lh	0-9					
		13	615	92,250	3 ld	0-9					
Remote System	17	14	1,230	184,500	7 ld	0-9					
		15	2,500	368,700	14 ld	0-9					
Remote System	18	16	4,900	737,400	4 lw	0-9					
	19	17	9,800	1,474,500	8 lw	0-9					
Beyond		18	19,500	2,925,000	16 lw	0-9					
	20	19	39,500	5,925,000	32 lw Oort Cloud	0-9					
		20	78,700	11,805,000	1 ly Oort Cloud						

**O=** Orbit No.      ls= light-second      ld= light-day      Stars of Spectral and Size shown have a surface at the Orbit shown. The first (innermost) orbit for the star is the next greater orbit number.  
lh= light-minute      lw= light-week

## 6 Decimal Orbits

	S=	O=	AU=	Flux=										O=	
				-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	
			Decimal Orbit=	.5	.6	.7	.8	.9	.0	.1	.2	.3	.4	.5	
Remote System	16	12	308	231	246	261	277	292	308	338	369	400	430	461	12
		13	615	461	492	522	553	584	615	676	738	799	861	922	13
Remote System	17	14	1,230	922	984	1,045	1,107	1,168	1,230	1,352	1,475	1,598	1,721	1,844	14
		15	2,500	1,844	1,966	2,089	2,212	2,335	2,458	2,703	2,949	3,195	3,441	3,687	15
Remote System	18	16	4,900	3,687	3,932	4,178	4,424	4,670	4,916	5,407	5,898	6,390	6,881	7,373	16
	19	17	9,800	7,373	7,864	8,355	8,847	9,338	9,830	10,797	11,764	12,731	13,698	14,665	17
		18	19,500	14,665	15,632	16,559	17,566	18,533	19,500	21,500	23,500	25,500	27,500	29,500	18

When necessary, star-world distances can be varied deliberately, or with flux. In the rare instance where two adjacent orbits coincide (as in O=9 plus 0.5 and O=10 minus 0.5), the result is a special case.

The Decimal Orbital Distances table shows values to a tenth of an orbit; if necessary, values can be calculated to a hundredth of an orbit or greater (but observe the MOARN principle: Map Only As Really Necessary).

## 7a Habitable Zones

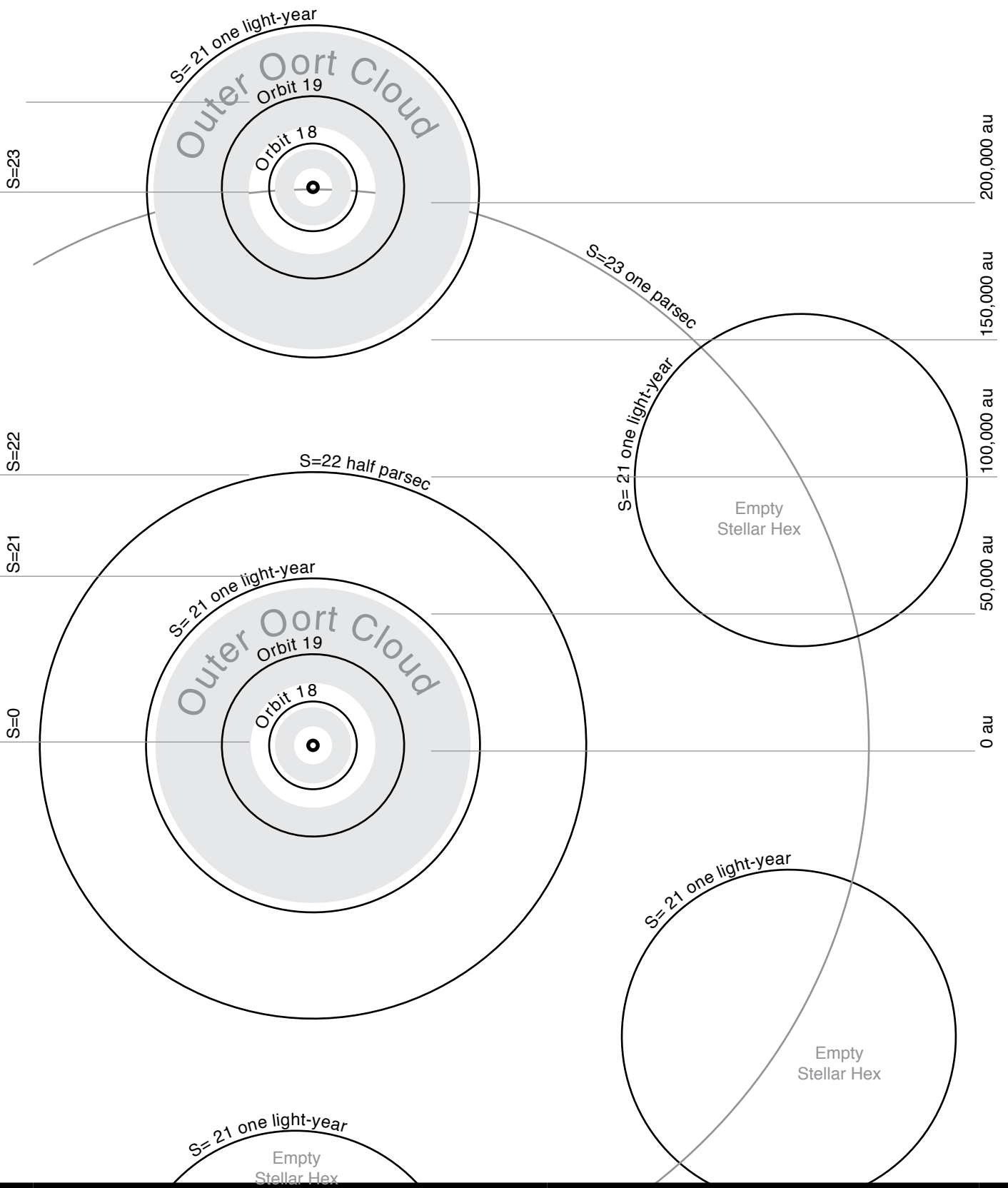
	S=	O=	AU=	Million km	Light-	Ia	Ib	II	III	IV	V	VI	D
	16	12	308	46,200	42 lh	A-GKM							

**O=** Orbit No.      ls= light-second, lh= light-minute      A world in an orbit labelled HZ is Temperate  
ld= light-day, lw= light-hour      one orbit closer to the star is Hot, one orbit farther is Cold

**S=** is an approximation. Calculate Orbit Radius for a definitive S=.



# The Beyond



10,000 AU = 0.167 inches

# Oort Cloud and Beyond 13

The Oort Cloud and Beyond includes Orbits 18 and 19.

## 5 Orbital Distances

	S=	O=	AU=	Million km	Light-	Sub-Orbit	Ia	Ib	II	III		
Beyond	<b>18</b>	19,500		2,925,000	16 lw							
	<b>20</b>	<b>19</b>	39,500	5,925,000	32 lw	Oort Cloud	0-15					
		<b>20</b>	78,700	11,805,000	1 ly	Oort Cloud	0-16					
		<b>O=</b>			ls= light-second lh= light-minute lw= light-hour	ld= light-day lw= light-week	Stars of Spectral and Size shown have a surface at the Orbit shown. The first (innermost) orbit for the star is the next greater orbit number.					Beyond

## 6 Decimal Orbits

	S=	O=	AU=	Flux=	-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5	O=
			Decimal Orbit=		.5	.6	.7	.8	.9	.0	.1	.2	.3	.4	.5	
Beyond	<b>18</b>	19,500	14,665	15,632	16,559	17,566	18,533	19,500	21,500	23,500	25,500	27,500	29,500	<b>18</b>		
	<b>20</b>	<b>19</b>	39,500	29,500	31,500	33,500	35,500	37,500	39,500	43,450	47,400	51,350	55,300	59,250	<b>19</b>	
		<b>20</b>	78,700	59,100	63,020	66,940	70,860	74,780	78,700	86,570	94,440	102,310	110,180	118,050	<b>20</b>	Beyond

When necessary, star-world distances can be varied deliberately, or with flux. In the rare instance where two adjacent orbits coincide (as in O=9 plus 0.5 and O=10 minus 0.5), the result is a special case.

The Decimal Orbital Distances table shows values to a tenth of an orbit; if necessary, values can be calculated to a hundredth of an orbit or greater (but observe the MOARN principle: Map Only As Really Necessary).

## 7a Habitable Zones

S=	O=	AU=	Million km	Light-	Ia	Ib	II	III	IV	V	VI	D
----	----	-----	------------	--------	----	----	----	-----	----	---	----	---

The Oort Cloud and Beyond has no Habitable Zones.

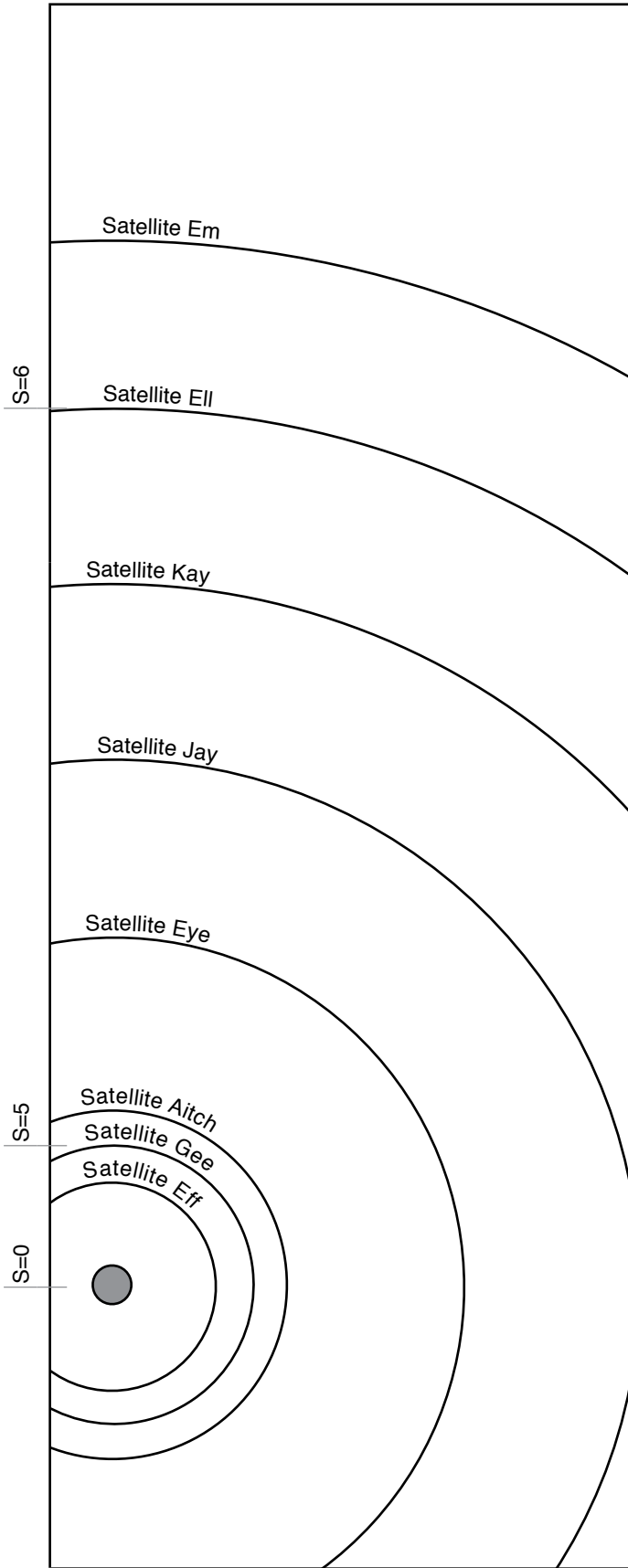
**O=** Orbit No.

ls= light-second, lh= light-minute  
ld= light-day, lw= light-hour

A world in an orbit labelled HZ is Temperate  
one orbit closer to the star is Hot, one orbit farther is Cold

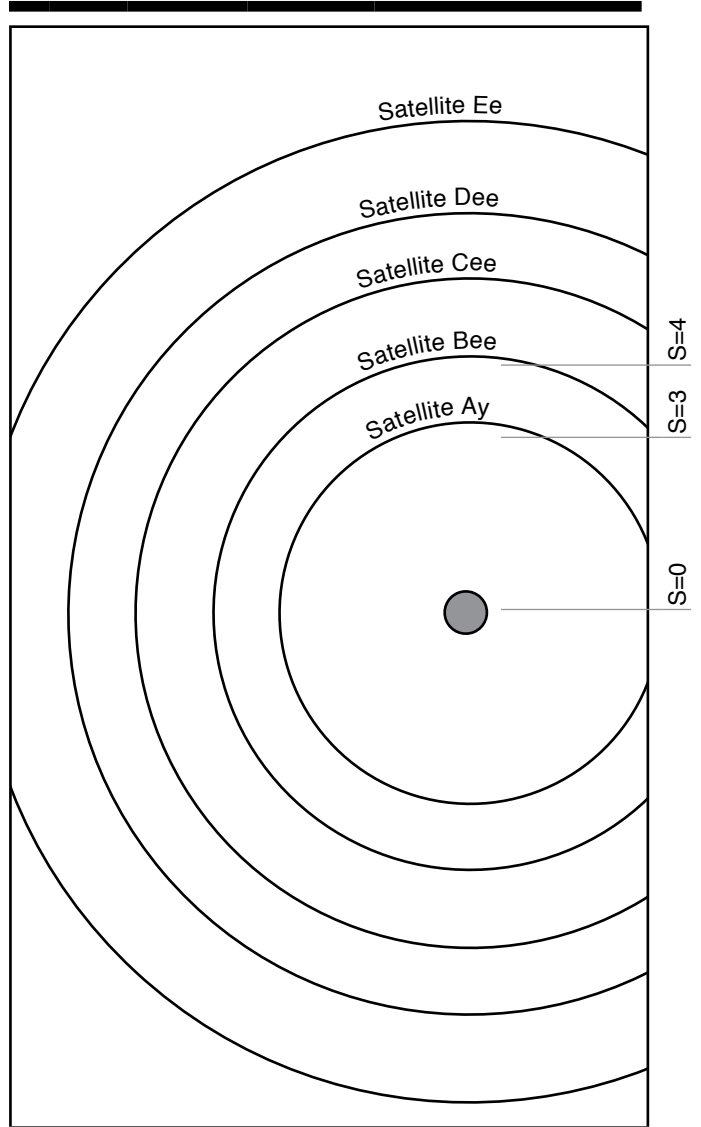
**S=** is an approximation. Calculate Orbit Radius for a definitive S=.

# Close Satellites



## 7b1 Close Satellite Orbits-1

S=	O=	Multiplier	Comment
3	Ay	1	}
4	Bee	2	}= Ring System } or Size<2.
	Cee	3	
	Dee	4	Io
	Ee	5	Titan
	Eff	6	
5	Gee	8	Umbriel
	Aitch	10	Ganymede, Triton
	Eye	20	
	Jay	30	
	Kay	40	
6	EII	50	Luna
	Em	60	



### 7c1a Close Satellite Orbit Radius (Orbiting Worlds)

Multiplier	World Size										Orbit Diameter in km x1000					
	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
Ay	1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Bee	2	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
Cee	3	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45
Dee	4	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60
Ee	5	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
Eff	6	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90
Gee	8	8	16	24	32	40	48	56	64	72	80	88	96	104	112	120
Aitch	10	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150
Eye	20	20	40	60	80	100	120	140	160	180	200	220	240	260	280	300
Jay	30	30	60	90	120	150	180	210	240	270	300	330	360	390	420	450
Kay	40	40	80	120	160	200	240	280	320	360	400	440	480	520	560	600
Ell	50	50	100	150	200	250	300	350	400	450	500	550	600	650	700	750
Em	60	60	120	180	240	300	360	420	480	540	600	660	720	780	840	900

### 7c1b Close Satellite Orbit Radius (Orbiting Gas Giants)

Multiplier	Gas Giant Size													Ehex Decimal Miles x1000
	L	M	N	P	Q	R	S	T	U	V	W	X		
Ay	1	20	30	40	50	60	70	80	90	125	180	220	250	
Bee	2	40	60	80	100	120	140	160	180	250	360	440	500	
Cee	3	60	90	120	150	180	210	240	270	375	540	660	750	
Dee	4	80	120	160	200	240	280	320	360	500	720	880	1000	
Ee	5	100	150	200	250	300	350	400	450	625	900	1100	1250	
Eff	6	120	180	240	300	360	420	480	540	750	1080	1320	1500	
Gee	8	160	240	320	400	480	560	640	720	1000	1440	1760	2000	
Aitch	10	200	300	400	500	600	700	800	900	1250	1800	2200	2500	
Eye	20	400	600	800	1000	1200	1400	1600	1800	2500	3600	4400	5000	
Jay	30	600	900	1200	1500	1800	2100	2400	2700	3750	5400	6600	7500	
Kay	40	800	1200	1600	2000	2400	2800	3200	3600	5000	7200	8800	10000	
Ell	50	1000	1500	2000	2500	3000	3500	4000	4500	6250	9000	11000	12500	
Em	60	1200	1800	2400	3000	3600	4200	4800	5400	7500	10800	13200	15000	

World Size shows diameter in Miles x1000. This table shows Satellite Orbit Radius in km x1000.

Titan is Satellite Ee orbiting Saturn, a Gas Giant -R. Not important to the calculation is that it occupies Orbit-7 around a G2 V star.

Saturn is Size-R 70,000 miles in diameter. Satellite Orbit Ell has a multiplier of 4. The Satellite occupies an orbit approximately  $70,000 \times 50 = 1,250,000$  kilometers from the Gas Giant. Note that the final orbit value is in km despite the fact that the Gas Giant diameter is in miles.

Titan is a Close Satellite; it is tidally locked to Saturn.

Luna is Satellite Ell orbiting Terra, a World Size-8. Not important to the calculation is that it occupies Orbit-3 around a G2 V star.

Terra is Size-8 8,000 miles in diameter. Satellite Orbit Ell has a multiplier of 50. The Satellite occupies an orbit approximately  $8,000 \times 50 = 400,000$  kilometers from the World. Note that the final orbit value is in km despite the fact that the Gas Giant diameter is in miles.

Luna is a Close Satellite; it is tidally locked to Terra.

# Far Satellites

## 7c2 Far Satellite Orbit Radius (Orbiting Worlds)

Multiplier	World Size								Orbit Diameter in km x1000						
	1	2	3	4	5	6	7	8	9	A 10	B 11	C 12	D 13	E 14	
En	70	70	140	210	280	350	420	490	560	630	700	770	840	910	980
Oh	80	80	160	240	320	400	480	560	640	720	800	880	960	1040	1120
Pee	100	100	200	300	400	500	600	700	800	900	1000	1100	1200	1300	1400
Que	150	150	300	450	600	750	900	1050	1200	1350	1500	1650	1800	1950	2100
Arr	200	200	400	600	800	1000	1200	1400	1600	1800	2000	2200	2400	2600	2800
Ess	250	250	500	750	1000	1250	1500	1750	2000	2250	2500	2750	3000	3250	3500
Tee	300	300	600	900	1200	1500	1800	2100	2400	2700	3000	3300	3600	3900	4200
Yu	400	400	800	1200	1600	2000	2400	2800	3200	3600	4000	4400	4800	5200	5600
Vee	500	500	1000	1500	2000	2500	3000	3500	4000	4500	5000	5500	6000	6500	7000
Dub	600	600	1200	1800	2400	3000	3600	4200	4800	5400	6000	6600	7200	7800	8400
Ex	700	700	1400	2100	2800	3500	4200	4900	5600	6300	7000	7700	8400	9100	9800
Wye	800	800	1600	2400	3200	4000	4800	5600	6400	7200	8000	8800	9600	10400	11200
Zee	1000	1000	2000	3000	4000	5000	6000	7000	8000	9000	10000	11000	12000	13000	14000

World Size shows diameter in Miles x1000. This table shows Satellite Orbit Radius in km x1000.

## 7c2 Far Satellite Orbit Radius (Orbiting Gas Giants)

Multiplier	Gas Giant												Orbit Diameter in km x1000	
	L 20	M 21	N 22	P 23	Q 24	R 25	S 26	T 27	U 28	V 29	W 30	X 31	Ehex	Decimal
	20	30	40	50	60	70	80	90	125	180	220	250	Miles x1000	
En	70	1400	2100	2800	3500	4200	4900	5600	6300	8750	12600	15400	17500	
Oh	80	1600	2400	3200	4000	4800	5600	6400	7200	10000	14400	17600	20000	
Pee	100	2000	3000	4000	5000	6000	7000	8000	9000	12500	18000	22000	25000	
Que	150	3000	4500	6000	7500	9000	10500	12000	13500	18750	27000	33000	37500	
Arr	200	4000	6000	8000	10000	12000	14000	16000	18000	25000	36000	44000	50000	
Ess	250	5000	7500	10000	12500	15000	17500	20000	22500	31250	45000	55000	62500	
Tee	300	6000	9000	12000	15000	18000	21000	24000	27000	37500	54000	66000	75000	
Yu	400	8000	12000	16000	20000	24000	28000	32000	36000	50000	72000	88000	100000	
Vee	500	10000	15000	20000	25000	30000	35000	40000	45000	62500	90000	110000	125000	
Dub	600	12000	18000	24000	30000	36000	42000	48000	54000	75000	108000	132000	150000	
Ex	700	14000	21000	28000	35000	42000	49000	56000	63000	87500	126000	154000	175000	
Wye	800	16000	24000	32000	40000	48000	56000	64000	72000	100000	144000	176000	200000	
Zee	1000	20000	30000	40000	50000	60000	70000	80000	90000	125000	180000	220000	250000	

World Size shows diameter in Miles x1000. This table shows Satellite Orbit Radius in km x1000.

Callisto is Satellite En orbiting Jupiter, a Gas Giant -T in the Terra system. Not important to the calculation is that it occupies Orbit-6 around a G2 V star.

Jupiter is Size-T 90,000 miles in diameter. Satellite Orbit En has a multiplier of 70. The Satellite occupies an orbit approximately  $90,000 \times 70 = 1,250,000$  kilometers from the Gas Giant. Note that the final orbit value is in km despite the fact that the Gas Giant diameter is in miles.

Callisto is a far satellite; it is not tidally locked.

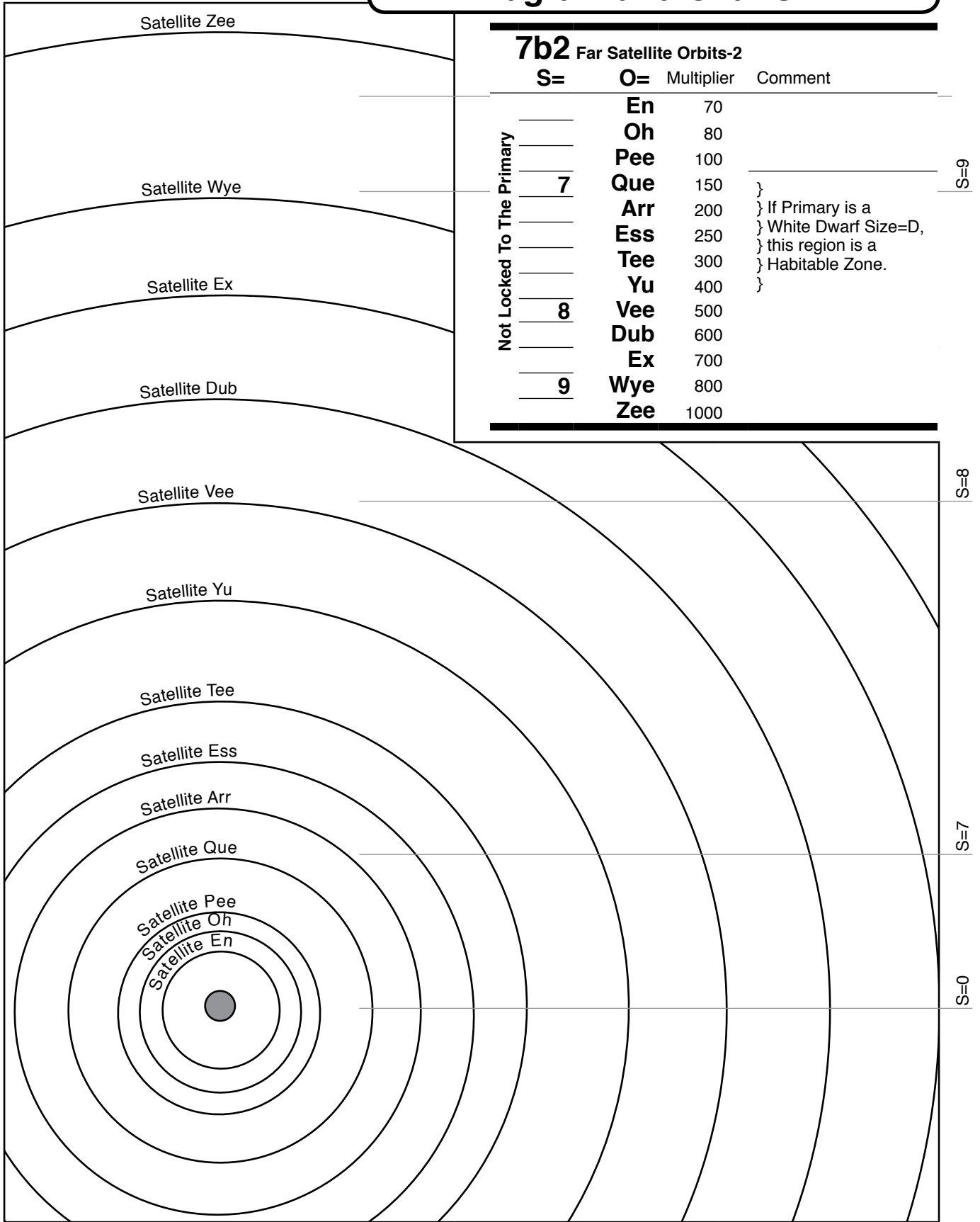
Nereid is Satellite Arr orbiting Neptune, a Gas Giant-M in the Terra system. Not important to the calculation is that it occupies Orbit-3 around a G2 V star.

Neptune is Size-M Small Gas Giant 30,000 miles in diameter. Satellite Orbit Arr has a multiplier of 200. The Satellite occupies an orbit approximately  $30,000 \times 200 = 6,000,000$  kilometers from the World. Note that the final orbit value is in km despite the fact that the Gas Giant diameter is in miles.

Nereid is a Far Satellite, not tidally locked to Neptune.

# Satellites <sup>b2</sup> <sub>c2</sub> **7**

## Diagram and Charts



# Crime and Punishments

Crime is the violation of law serious enough to be punished by the government. It is additionally classified by three distinct identifiers: type (or category), degree (or intensity), and intention.

There are many types of law. Two are of special importance: civil and criminal.

**Civil Law** specifies the details of society and commerce: contracts and agreements, relationships (nobility; marriage and child-raising rights and obligations, corporations and organizations), and the law of wrongs (torts: wrongs that merit compensation rather than punishment).

**Criminal Law** governs violations serious enough to merit personal consequences: deliberate infliction of wrongs, violation of the standard or customary laws, and serious violation of social expectations. Civil and criminal law often overlap: civil law may expect a female to have two spouses; criminal law may make the violation serious enough to be punished.

There is a third type of law: **Social law** (or **Cultural law**). Social law governs the basic structure and expectations that society has for its members, and includes custom, etiquette and politeness, and taboo.

Crime – misconduct which society will punish – varies from culture to culture and from world to world. One society may punish almost nothing. On some worlds, certain modes of dress may be criminal; on others specific forms of expression may be illegal. Nevertheless, there is a consistency to the definition of illegal activity even across the vast distances of space.

## THE CATEGORIES OF CRIME

Crimes are categorized by victim. Strictly speaking, society is always the victim, but the victim can often be more clearly identified. These six categories are:

**Crimes Against Property Rights** involve unauthorized or improper alterations in the ownership or right-to-use property (physical goods, real estate, and intangible possessions), the most easily recognized being theft. Other property crimes include unlawful destruction or alteration of property, trespass into property (entering land or a starship without permission of the sophont entitled to exclude). This category refers to the taking or alterations themselves; if the process involves force or disallowed imposition of will, then the act is also a violation of Crimes Against Sophonts.

**Crimes Against The Environment** involve misuse of common or communal resources of an ecosystem, whether a small and distinct area, a planet, a space vessel, or even a whole star system.

**Crimes Against Sophonts** encompass the infliction of harm or the imposition of one's will on others in violation of accepted standards of behavior.

**Crimes Against Society** encompass non-compliance with the responsibilities of membership of a population group. For example, local conditions may be deemed to require widespread ownership of predators against particular

pests; individuals refusing to own such predators may be subject to punishment.

**Crimes Against Justice** encompass specific disregard or violation of the accepted values of the system in place for the detection, investigation, evaluation, and consequences of the system which deals with crimes. For example, most governments consider interfering with a police investigation or bribing judicial officers to affect the outcome of a case to be criminal.

**Crimes Against Doctrine** involves the expression of ideas or opinions which contradict widely-held foundational concepts within a society.

## THE INTENSITIES OF CRIME

Crimes are evaluated along a hierarchy of intensity: some crimes are small or common in nature, while others are grand or of great consequence. The six intensities are:

**Gaffe.** A slight or minimal violation of social or organizational customs, a mistake.

**Infraction.** A violation of a simple (often administrative) rule. Improperly parking an air/raft is a common example.

**Misdemeanor.** A relatively low level violation of the law. Some assaults are minor enough to be misdemeanors, as are thefts of low value property. However, "value" in this discussion does not always relate to the cost of obtaining the

## CRIMES

Type	Property	Environment	Sophonts	Society	Justice	Doctrine
Gaffe	1 Misuse	Litter	Offense	Disharmony	Mistake	Ignorance
Infraction	2 Vandalism	Waste	Insult	Rudeness	Inattention	Question
Misdemeanor	3 Damage	Damage	Assault	Slack	Inaction	Heterodoxy
Felony	4 Theft	Pollution	Mayhem	Dishonor	False Witness	Blasphemy
High Crime	5 Destruction	Ravage	Killing	Treason	Injustice	Heresy
Atrocity	6 Havoc	Ruin	Mass Killing	High Treason	Tyranny	Mass Deception

property; theft of a two-credit canister of air is likely felony on a world with a severely tainted atmosphere.

**Felony.** A relatively high-level but nonetheless commonly encountered violation of the law. Most societies define felony based on the value of property rights, or the significance of the harm to sophonts. Most (but not all) societies consider causing death or serious injury a felony. Theft (above a specific value) is a usually a felony. Local values determine that value level.

**High Crime.** A legal violation at a high level or of great consequence, usually associated with essential governmental functions.

**Atrocity.** The most extreme of crimes with great and lasting consequences, usually involving harm to many people through a single act or a single plan.

**INTENT**

Criminal intent is evaluated across a spectrum which considers **intent**: motivation (or lack of motivation). Intent affects the severity of consequences of committing a crime (in the general range: Ignorant. Uninformed. Negligent. Passionate. Deliberate. Justifiable.). Someone who intends to violate the law faces more severe consequences than someone acts in the heat of passion, or through inadvertence or negligence. In some legal systems, lack of intent is a defense; in others, lack of intent can be argued to reduce the severity of consequences.

**Pre-Meditated, Planned, Deliberate, or Foreseeable.**

The consequences for a crime are most severe when the act is planned in advance. Consequences may be slightly lessened when a sophont acts quickly and the planning is very brief. The planned killing of a sophont (homicide against humans; sophonticide against sophonts) is *murder* because the act was planned.

Some killings take place during another crime. When someone is killed during a robbery, the act is foreseeable and many legal systems provide consequences as if the act was planned.

**Passion or Emotion.** Many legal systems accord acts committed in the heat of passion or emotion lesser consequences. A sophont who finds his mate acting improperly (depending on the culture: communicating with someone outside the family unit; wearing improper clothing; reading) may kill it in a fit of passion. The crime is identified as a lesser form, *slaughter* (*manslaughter* for humans).

**Negligent.** Some failures to act, when they result in harm, are treated as crimes. Homicide caused by a failure to carefully operate machinery, for example, may be *negligent homicide*. Property damage caused when a sophont has a responsibility to act but fails to do so may be crimes.

**Uninformed or Ignorant.** Some crimes occur even through the individual did not know they were happening. Killing a disgusting spider-like pest (who is nevertheless a sophont) becomes ignorant or uninformed sophonticide. Mistaking a valuable artifact for trash and discarding it is ignorant or uninformed damage to property.

**Justifiable.** Some actions which are normally deemed criminal may be justified by circumstances. Killing or destruction in self-defense; stealing in order to eat; environ-

mental damage in order to maintain a community may all be justifiable crimes.

Some cultures extend justification as a defense to such acts as killing in battle, property crimes against inferior species, genders, or meme-adherents.

**Immune.** Society may label some actors exempt from consequences of their actions: officials in the course of their duties, some sophonts genetically or culturally incapable of understanding what they are doing; high social ranks (or conversely, low social ranks).

**DEGREE**

Crimes can be detailed by **degree**: the exponent of the economic value or cost of the crime: Violation-2 is a minor crime involving a value of about Cr100 (100 = 10<sup>2</sup> where the exponent is 2). Intentionally killing a businessman is Murder-6 (attributing to him a value of Cr1,000,000); killing a laborer is perhaps Murder-4.

Assigning economic value to a crime of violence is at best a highly subjective decision. Killing a child may be assigned a high value based on a general understanding that children are necessary to any future; however, other societies may consider the parental social or financial status of the parents.

**Cultural Values.** Not all cultures believe that all of the instances on these lists are crimes.

**CRIMES AGAINST PROPERTY**

Property is one or more things, tangible or intangible, which exist and are capable of being possessed.

**Misuse.** Use of property for inappropriate purposes.

**Vandalism.** Casual defacing of property.

**Damage.** Physical devaluation of property, but falling short of destruction.

**Theft.** Taking property without permission includes burglary (taking by stealth), robbery (taking by force), fraud (taking by deception), infringement (using intellectual property such as copyrighted or patented material without permission of the owner) and also non-permissive use (temporary use of property without permanent deprivation, e.g. joyriding).

**Destruction.** Physical destruction of property. Includes Arson, Bombing.

**Havoc.** Indiscriminant or mass destruction of property.

**CRIMES AGAINST THE ENVIRONMENT**

Environment is the collective set of physical (and other) factors within which individuals and society function.

**Inattention.** A failure to consider the environment when taking action. Neglect is passive inattention.

**Waste.** Misuse of resources. Includes failing to sort

MODIFIERS			
	Intent	Foreseeability	Degree
1	Justifiable	Sheer Chance	
2	Ignorant	Possible	Based on
3	Uninformed	Foreseeable	the exponent
4	Negligent	Probable	of the value
5	Passionate	Deliberate	of the damage.
6	Deliberate	Pre-Meditated	



trash, failure to maintain equipment in efficient running order.

**Contamination.** Minor crimes against the environment. Includes littering, emitting obnoxious noises or odors, failure to dispose of useless property.

**Pollution.** Serious crimes against the environment. Includes disposal of untreated waste, unauthorized toxic waste production.

**Ravage.** Commercial actions which degrade the environment without regard for long-term consequences. Includes strip mining, clear cutting of forests, unaesthetic ice-harvesting.

**Ruin.** Non-commercial actions which degrade the environment. Includes setting forest fires. Use of WMD.

### CRIMES AGAINST SOPHONTS

Sophonts include all thinking beings. Sophonts may include intelligent beings, animals, artificial beings, artificial intelligences, and artificial entities such as corporations or companies.

**Insult.** Non-physical attacks against others which inflicts no physical injury or fear of physical injury. Includes defamation (libel or slander), which is untruthfully harming reputation. It can also include truthful statements made in an unnecessarily cruel or economically harmful manner

**Assault.** An assault is a threat to commit a battery or other serious unlawful harm, which causes the victim justifiable fear of that the threat will be carried out. May include verbal or emotional abuse, including libel or slander.

**Battery.** Violence against beings which results in injury to the victim or others. Battery is the extension of the threat conveyed by Assault and includes harmful or offensive touching. Some cultures may understand harm without touching, thus making some assaults into batteries.

**Mayhem.** Causing pain or suffering to a being. Includes cruelty to animals, torture.

**Killing.** Causing the death of an intelligent being. Includes murder and serial murder.

**Mass Murder.** Multiple killing of intelligent beings. Includes waging illegal war and crimes of aggression.

### CRIMES AGAINST SOCIETY OR THE STATE

Society (or the State; the two are often identical) is the organized social environment in which beings live. It is often identified by Government Type in the UWP.

In some cultures, Crimes Against Society may merge with Crimes Against Doctrine.

**Violation.** Disobedience of regulations. Includes traffic or curfew violations, failures of permits or paperwork.

**Slack.** Undue dependence on society or the state. Includes welfare or unemployment assistance abuse.

**Dishonor.** Betrayal of the basic principles of society.

**Treason.** Adherence to the principles of an alternate or competing society in such a way as deemed to provide aid or comfort to the alternate or competing society. More liberal cultures require specific acts before treason is committed, such as joining the other side's military, or providing secret information to the other side. More strict societies may consider mere open-mindedness to be treason.

**High Treason.** Active support of the principles of a com-

peting society to the detriment of the individual's native or adopted society.

### CRIMES AGAINST JUSTICE

Justice is the existing mechanism for the detection, apprehension, and punishment of criminals. This includes the entire system, from those who detect and investigate (often called "police"), those who present data or evidence (often called "prosecutors"), those who find facts (often called "juries," especially in societies requiring more than one sophont to agree that a crime has been committed), those who preside over fact-finding procedures (often called "magistrates" or "judges") and those who assess the punishment due to an individual found guilty (juries, magistrates, or judges, depending on the system in operation). Note that some societies have more complicated systems, and some have less complicated systems.

**Mistake.** The confusion of personal or individual standards with the actual requirements of the law. Bureaucrats who administer regulations by their personal belief (as opposed to the conforming to the regulations) are committing mistake.

**Inattention.** Failure to note unlawful acts or conditions where the sophont has a duty (either specific to its function, or a general societal duty).

**Inaction.** Failure to act after noting or learning of unlawful acts or conditions where the sophont has a duty (either specific to its function, or a general societal duty).

**False Witness.** Providing incorrect facts (not necessarily intentionally), falsified analysis, or forged/altered physical/documentary evidence to police or fact-finders. By extension, false witness is applied to any activity which corrupts the evaluation of truth: attempting to influence with a fact-finder of any kind (a single sophont, a group of sophonts, a computer, or a handful of dice), by any means (e.g. bribery, threats, reprogramming, or secretly manipulating gravitic fields).

**Injustice.** The deliberate establishment of, or participation in, a justice system which does not inwardly conform to its outward appearances. Courts which ignore truth in their considerations; secret definitions of crimes not available to those involved; disparate treatment of individuals.

**Tyranny.** The administration of the law as a personal instrument of power (as opposed to a system that reflects the social and cultural standards of the population).

### CRIMES AGAINST DOCTRINE

Doctrine is the common body of beliefs within an organization, society, culture, club, association, belief system, or the state.

**Ignorance.** The failure to know, whether deliberate or inadvertent, the applicable details of Doctrine.

**Question.** Challenge to, or doubt of, Doctrine.

**Heterodoxy.** Holding opinions which vary from Doctrine.

**Blasphemy.** Insult to, or contempt for, Doctrine. Denying the existence of Doctrine, destroying its symbols, undertaking actions which Doctrine prohibits, or avoiding actions which Doctrine requires.

**Heresy.** A belief which, if accepted, leads to conclusions

which contradict doctrine.

**Mass Deception.** The active expression and promotion of ideas or beliefs that do not conform to Doctrine.

The seven new deadly sins: bioethical transgressions, morally dubious experiments that harm human embryos, drug abuse, polluting, social injustice, accumulating excessive wealth and creating poverty.

## CONSEQUENCES

Criminal law involves the vindication of society's interest in correcting the wrongdoer first, the victim's second. Civil law involves the vindication of the individual's right to compensation. Systems of criminal justice generally impose consequences on those found guilty of a crime. These consequences can be purely punitive, purely compensatory, or (in many if not most cases) a mix of the two. Indeed, a system of purely compensatory consequences is more akin to a system of civil law. As noted, systems of law often mix the two.

A system of justice may also include a process of remediation, reconciliation, or re-education. In remediation, the person becomes responsible for righting the wrong of repairing the damage. In reconciliation, the person and the victim participate in a process to restore the previous balance. In re-education, the person (in a personal process, or guided by a mentor) explores the root causes of the unwanted behavior in order to create lasting change.

Consequences are imposed as a part of conviction of the crime. A sophont is convicted if both found guilty and a consequence is assessed.

Consequences (often caused "punishment") are imposed by the state. Financial punishments (fines, court costs) are paid to the state. Financial compensation to the victim may be paid to the state, or directly to the victim. Individual physical correction (incarceration, corrective therapy, and corporal punishment including intentional injury up to and including death) are all performed under the supervision of the overall justice system. Note, however, that "supervision" need not imply that the actual punisher is a state employee or agent; the system may, for example, allow (or require) the victim to inflict a beating or take the life of the convicted criminal.

A society's ethical views are always reflected in the punishments it allows, especially considering the apparent severity of the crime. However, the ethics must be considered in view of the nature of the sophont. Killing and eating one's own young would be worthy of serious criminal consequences in most human societies. Non-human sophonts who reproduce by spawning hundreds or millions of immature larvae, on the other hand, are likely doing their environment a favor when they eat all but the fastest of their own "children," and thus commit no serious crime.

Consequences may be seen as corrective (attempts to reform the individual), separation (separation of the criminal from society), or purely vengeful. Societies which use the most advanced corrective measures seek to bring the sophont back to the fold of useful citizenry. Societies which use the most vengeful methods available are in generally seeking to show the rest of the citizenry that commission of crimes is unhealthy for the individual.

## THE ROLE OF THE ADVOCATE

Many societies allow an accused to enlist the aid of an advocate familiar with the details of a specific justice system. An advocate (lawyer, attorney, champion) uses a variety of allowed activities on behalf of the client. He may make arguments to a judge, jury, or official, and those arguments may be logical, emotional, or a blend of the two. He may bring to bear a variety of resources, including popular opinion, intercession by higher or other officials, or strategies which explain, mitigate, or confuse the issues. He may be able to point out technicalities (the current court is not the correct one to hear the charges; that the law is unclear; that accusers are unworthy) which invalidate the charge.

An advocate typically argues that his client is innocent under the local standards. and, using the local system, attempt to meet its standards of proof. In some systems, the advocate for the accused need only demonstrate that the advocate for the justice system has not proven the charges.; other systems may vary.

Advocates may also argue that the charges are incorrect: that some other (perhaps lower) level of charges is more appropriate.

---

### TYPICAL PARTICIPANTS IN THE LEGAL SYSTEM

---

Person	Variations
Suspect	Person-of-Interest. Accused. Defendant.
Victim	Complainant. Accuser.
Witness.	Bystander. Expert. Friend.
Peace Enforcer	Police. Constable. Sheriff. Agent.
Investigator	Detective. Researcher.
Advisor	Attorney. Counsellor. Solicitor.
Advocate	Prosecutor. Defender. Lawyer. Negotiator. Champion. Barrister.
Fact Decision Maker	Jury. Judge. Magistrate. Arbitrator. Mediator. Umpire. Referee.
Legal Decision Maker	Judge. Magistrate. Arbitrator.

---

# Starship Recognition Guides

---

Starship identification is a crucial component of interstellar travel. Various organizations and agencies produce detailed recognition guides in support of, or as a service to their members.

Recognition guides are produced with several components: a visual recognition image accompanied by a brief descriptive text, and a more encyclopedic data dump with typical sensor templates, performance details, and operational envelopes. Truly comprehensive guides include data on all known models with name, serial numbers, and current owner. Regretably, even the most comprehensive guide is never fully current as new ships are produced daily, older ships are scrapped or retired, and foreign ships enter Charted Space continually.

## COMMONLY AVAILABLE GUIDES

Within the Imperium, there are five commonly known starship recognition guides:

### The Trader's Guild Catalog Of Ships

Maintained by the Trader's Guild, the Catalog Of Ships provides basic information about most commercial ships operating within the Imperium. Its naval forces supplement is sketchier and details basic information about armed ships which may be reasonably encountered in and near the Imperium.

### The Imperial Navy's SRDB Ship Recognition Data Base

The Imperial Navy produces an encrypted data base identifying all of its own forces, most commercial shipping, and a fair set of information about neighboring naval forces.

The SRDB is provided in stepped levels with more comprehensive data available to larger naval ships.

Less reliable versions are available commercially.

### The Imperial Interstellar Scout Service's Known Ships

The IISS consolidates sensor scans of all ships its survey and exploration missions encounter and redistributes it within the service. It includes data on encounter locations and dates; some such sightings were far from Charted Space. Many of the ship descriptions contain only partial data.

An abbreviated version is distributed to reserve ships and ships on loan.

### The AAB Argushiigi Admegulasha Bilanidin Ship List

The Imperial Archive maintains a long-term historical recognition guide detailing ships of the First, Second, and Third Imperia as well as ships of allies and enemies.

Each of the Archive's depositories seems to have a different data set in which contradictions abound and significant gaps are evident.

### The Travellers' Aid Society's Green List

The TAS maintains a Master Ship List of all ships calling at worlds with TAS facilities; the information is consolidated

are regular intervals. The TAS makes available to its members a subset of the MSL, usually including commercial ships currently present, or expected to be present, within about 20 parsecs. It also includes information about naval and private ships in the region.

Passenger ships make a point to check in with local TAS facilities so their data is included in the MSL.

The TAS Green List codes ships in a spectrum Green-Amber-Red based on dependability, safety, and customer service.

## Other Guides

Major interstellar government maintain their own recognition guides: Aslan, Zhodani, Hiver, K'kree, Solomani, and others. Such guides are most knowledgeable about ships within their territory, and their data fades with distance. Such guides, even the older and out-of-date editions, are much-sought-after resources.

## SHIP BUFFS

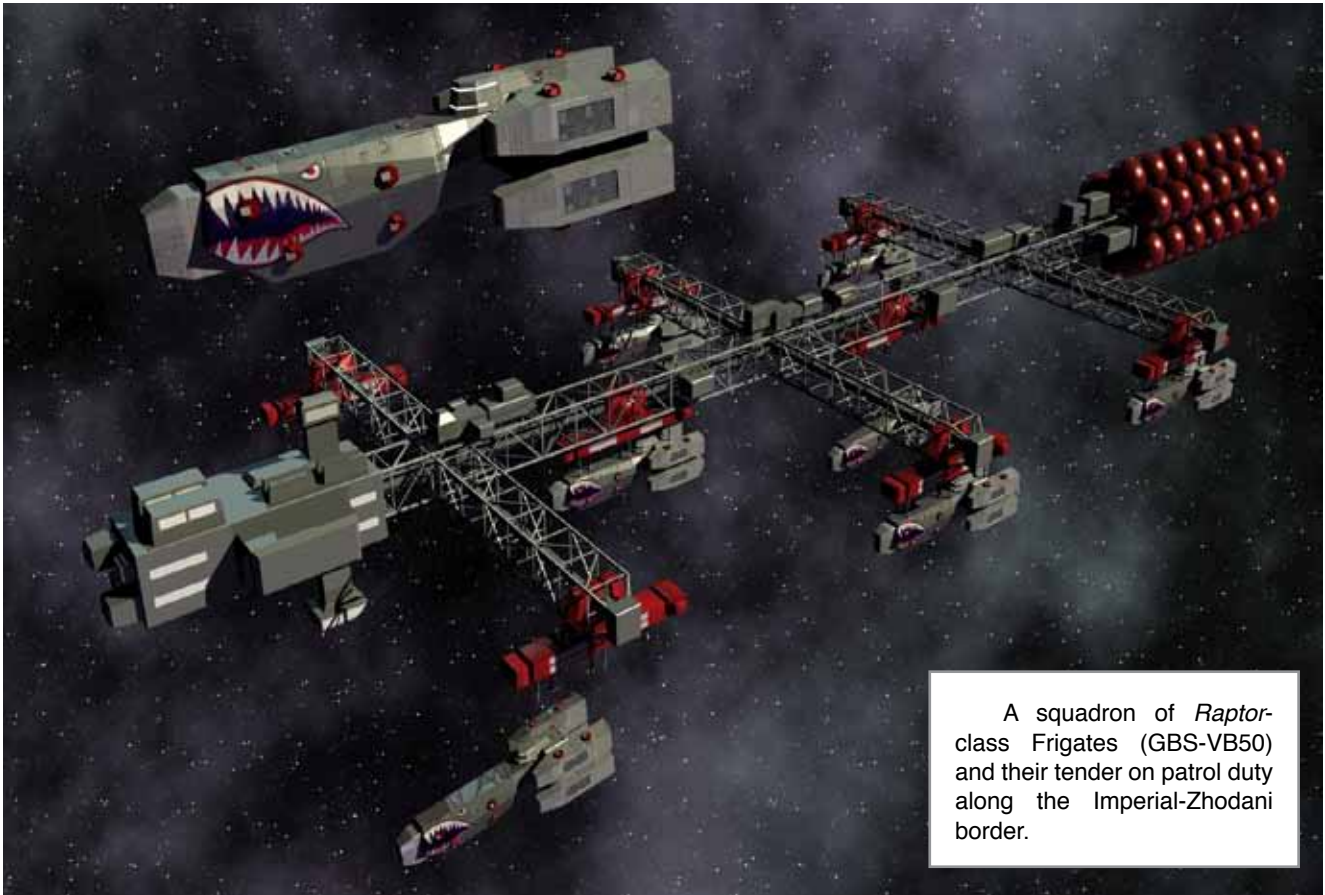
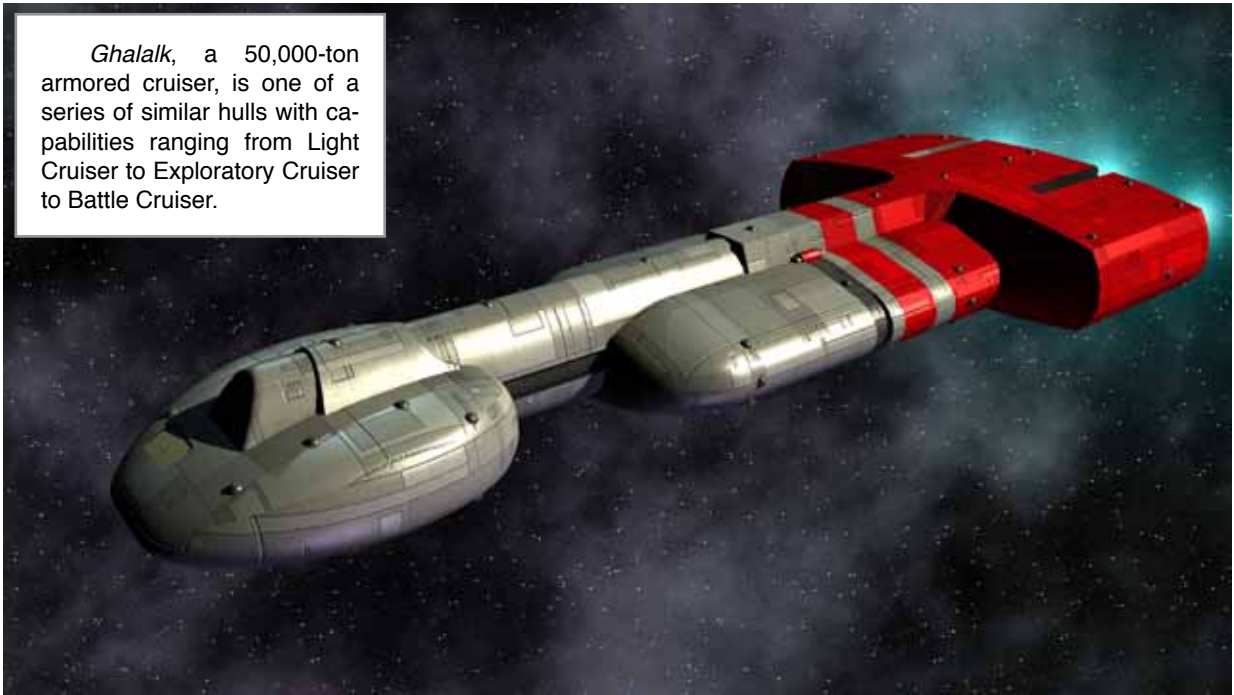
Aside from their utilitarian purposes, a variety of starship fans collect Starship Recognition Guides (sometimes skirting the secrecy laws) and take pride in being able to identify more ships than their companions.



Solomani *Surname*-class Fleet Couriers EN-DS33 are common in the Solomani Rim, but rarely in Imperial territory. Note the distinctive circled cross symbol of the Solomani.

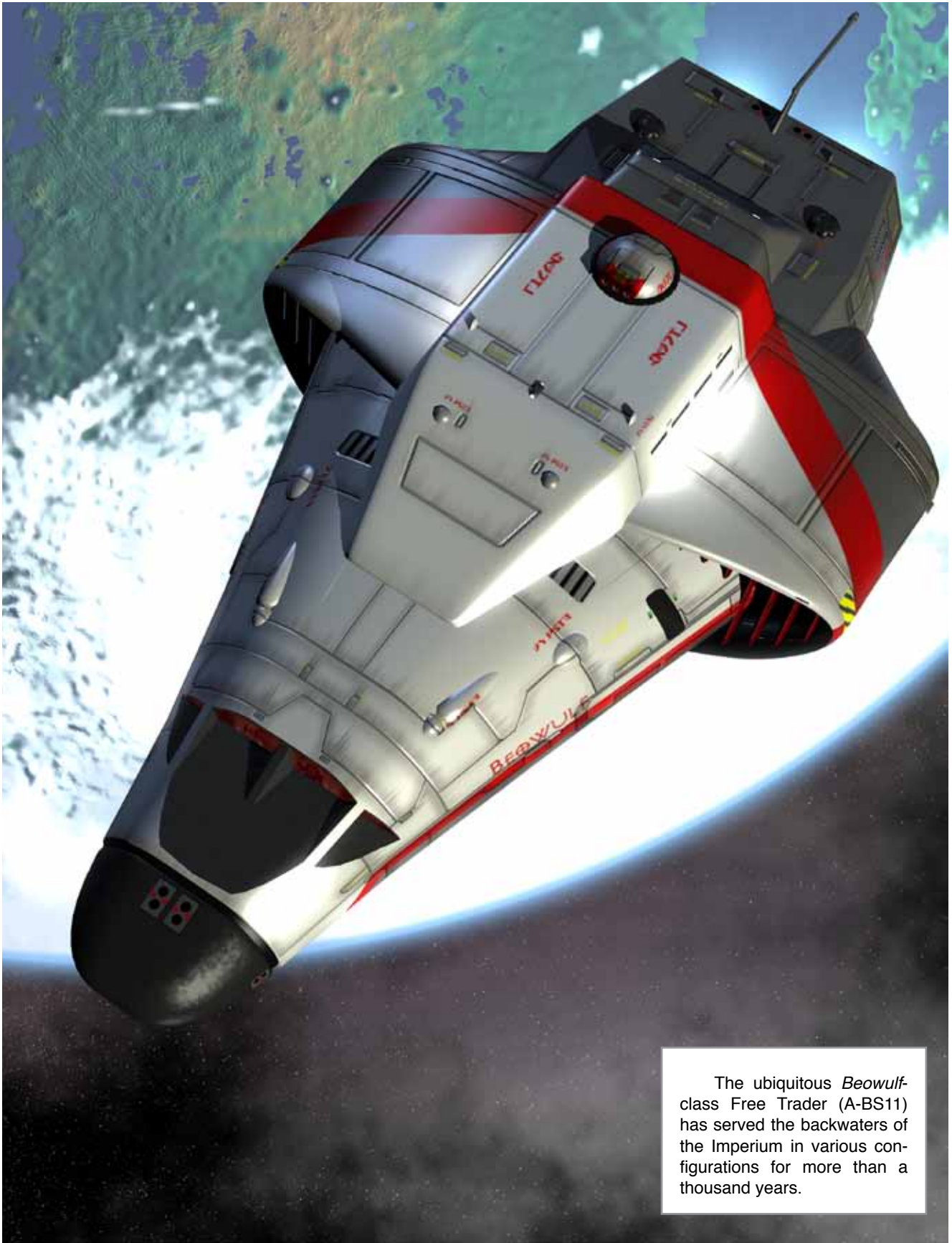
---

*Ghalalk*, a 50,000-ton armored cruiser, is one of a series of similar hulls with capabilities ranging from Light Cruiser to Exploratory Cruiser to Battle Cruiser.

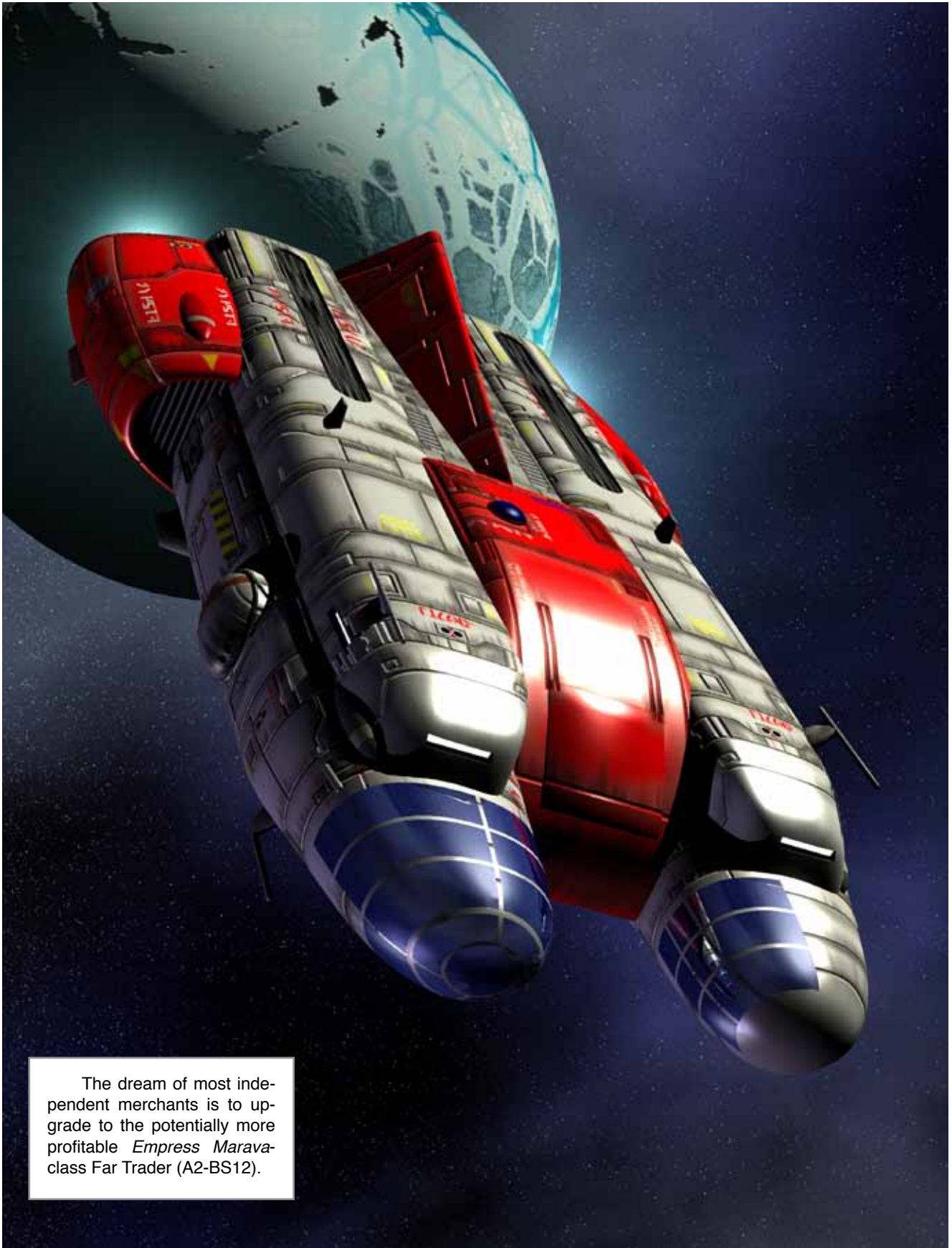


A squadron of *Raptor*-class Frigates (GBS-VB50) and their tender on patrol duty along the Imperial-Zhodani border.



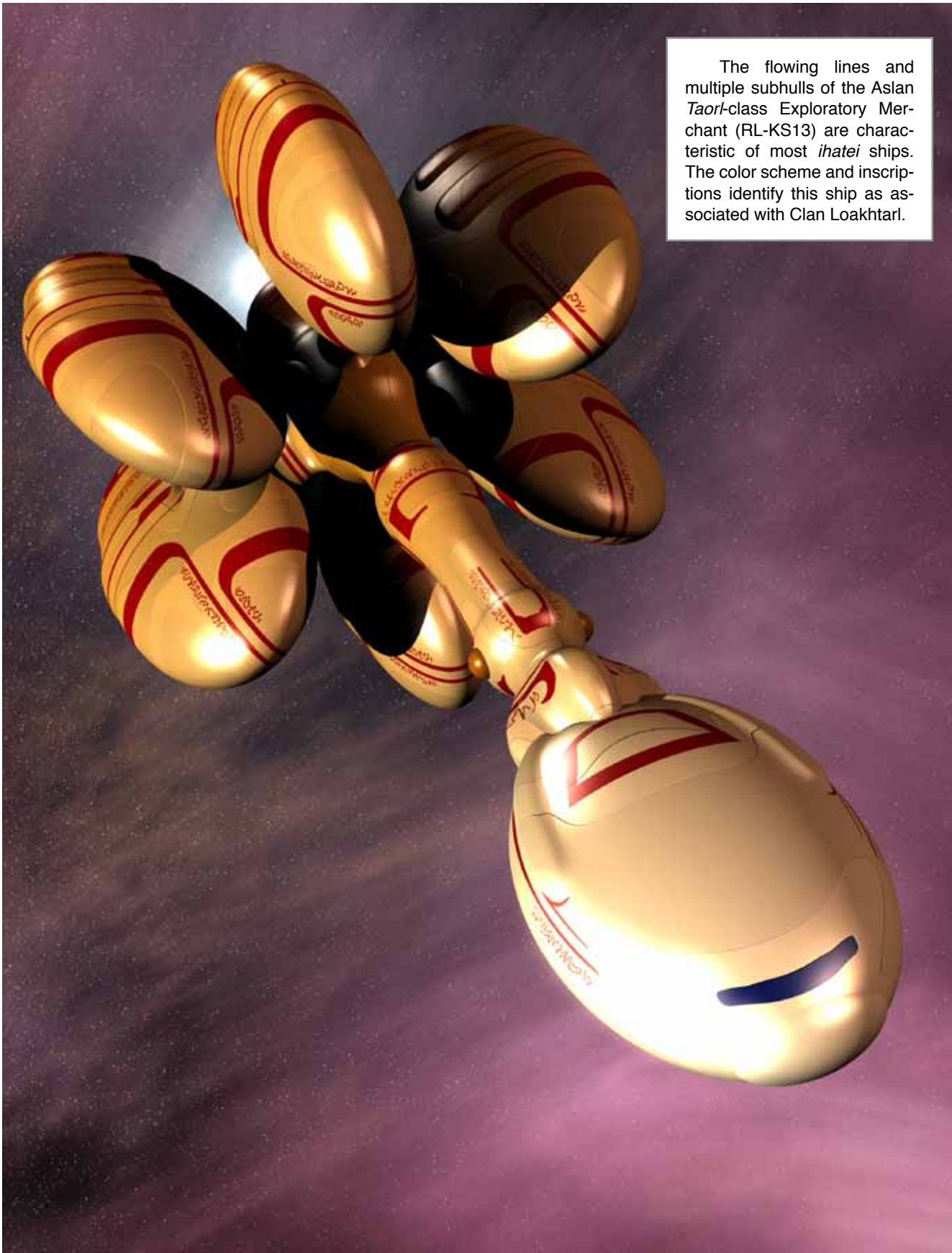


The ubiquitous *Beowulf*-class Free Trader (A-BS11) has served the backwaters of the Imperium in various configurations for more than a thousand years.



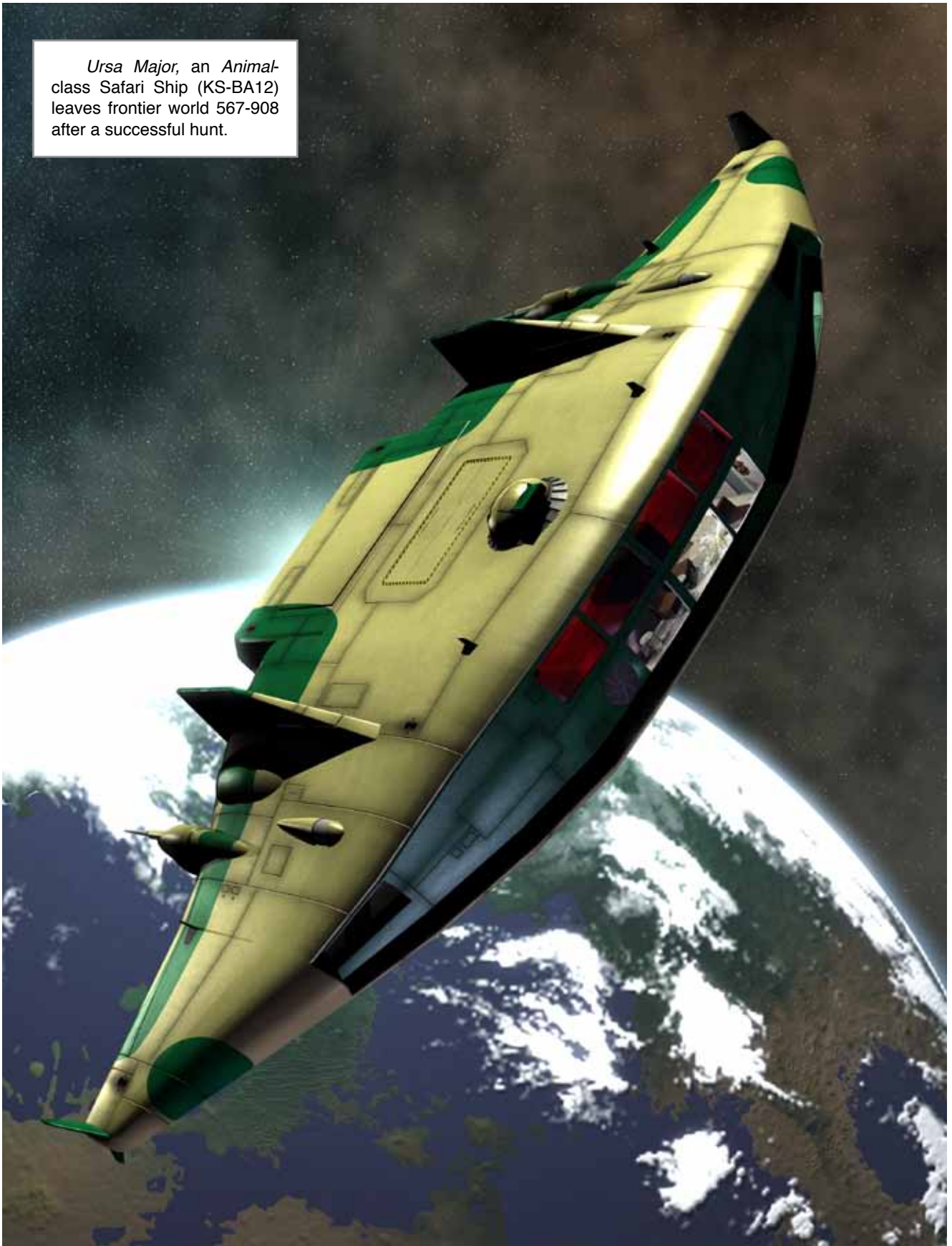
The dream of most independent merchants is to upgrade to the potentially more profitable *Empress Marava*-class Far Trader (A2-BS12).





The flowing lines and multiple subhulls of the Aslan *Taori*-class Exploratory Merchant (RL-KS13) are characteristic of most *ihatei* ships. The color scheme and inscriptions identify this ship as associated with Clan Loakhtarl.

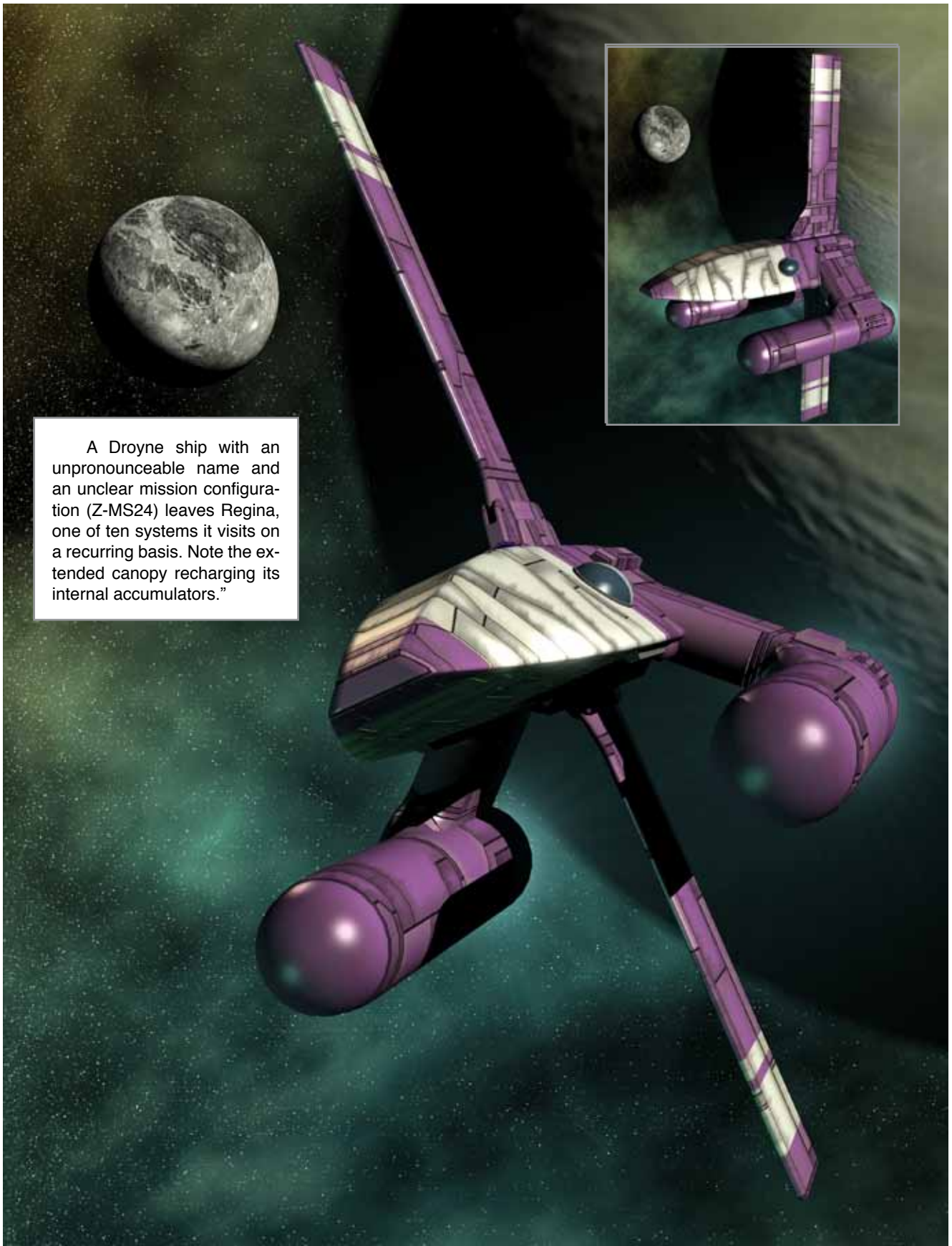
*Ursa Major*, an *Animal*-class Safari Ship (KS-BA12) leaves frontier world 567-908 after a successful hunt.





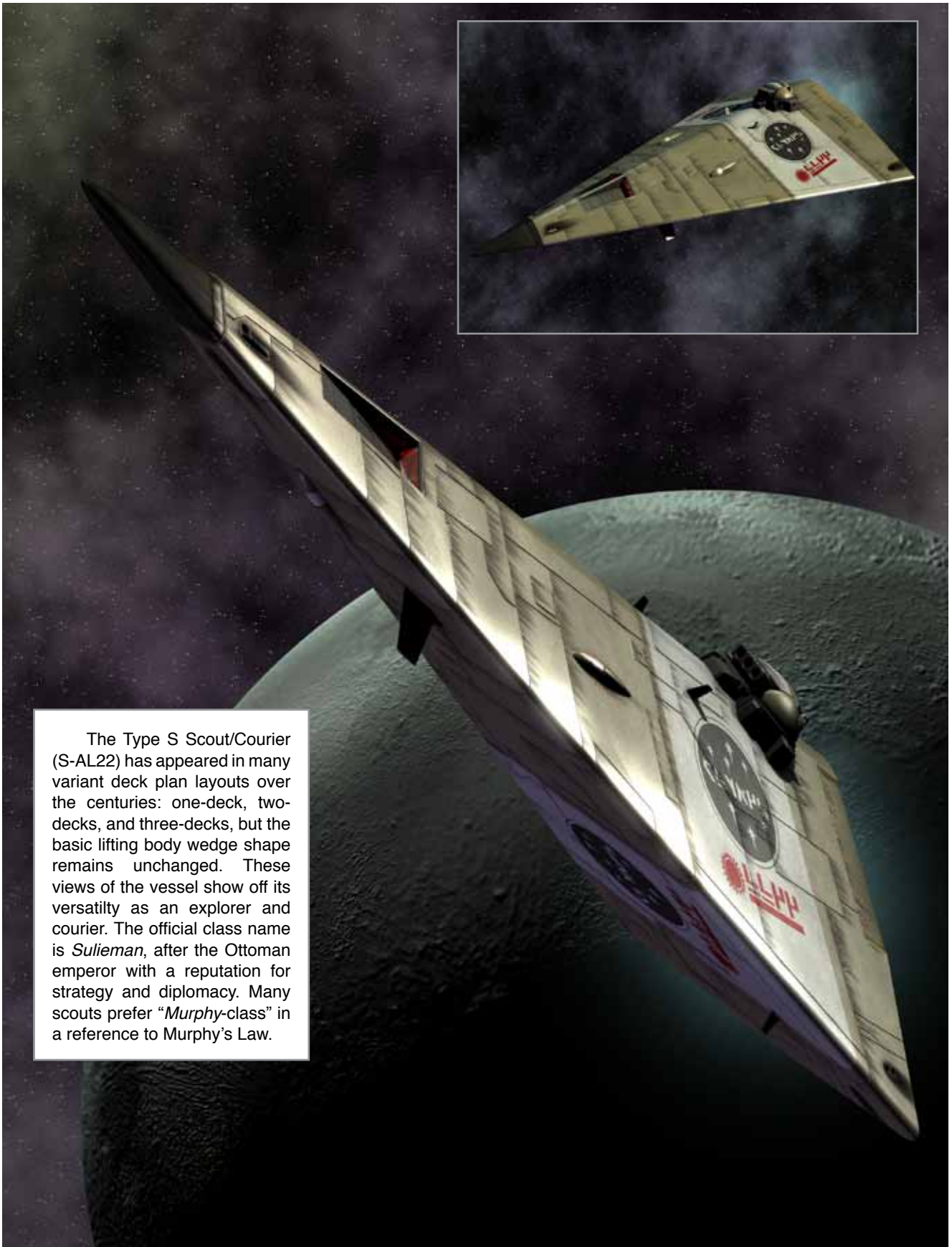


*Rhapsody*, a *Fiery*-class Gunned Escort (EG-DL42) dispatches its launch for a closer look at an approaching unidentified vessel.



A Droyne ship with an unpronounceable name and an unclear mission configuration (Z-MS24) leaves Regina, one of ten systems it visits on a recurring basis. Note the extended canopy recharging its internal accumulators.”





The Type S Scout/Courier (S-AL22) has appeared in many variant deck plan layouts over the centuries: one-deck, two-decks, and three-decks, but the basic lifting body wedge shape remains unchanged. These views of the vessel show off its versatility as an explorer and courier. The official class name is *Suliman*, after the Ottoman emperor with a reputation for strategy and diplomacy. Many scouts prefer “*Murphy-class*” in a reference to Murphy’s Law.

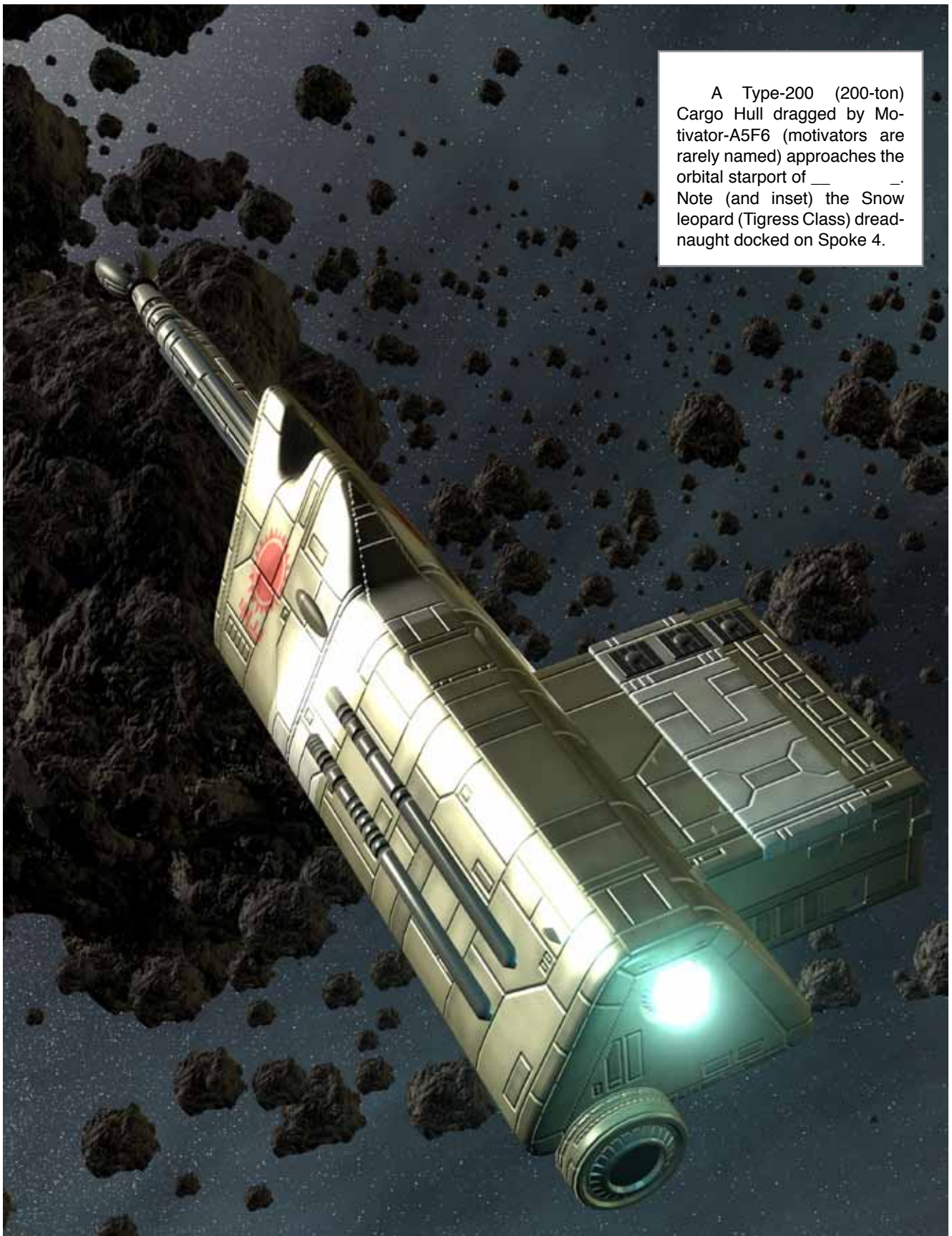






These workhorses of the Imperial Interstellar Scout Service show its primary responsibilities: The Xboat (SL-AS04) carries communications at the speed of travel along the main trade routes of the Imperium. The Xboat Tender (TC-KU11) patrols important systems, retrieving and refuelling xboats before sending them on their way again. IISS Survey Cruiser *Beagle* (NJ-DU23) is one of many ships surveying the worlds of the Imperium and cataloging its resources for the ultimate benefit of the empire.





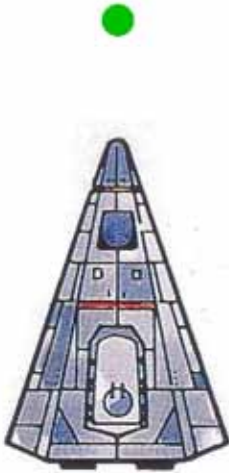
A Type-200 (200-ton) Cargo Hull dragged by Motivator-A5F6 (motivators are rarely named) approaches the orbital starport of \_\_\_\_\_. Note (and inset) the Snow leopard (Tigress Class) dreadnaught docked on Spoke 4.



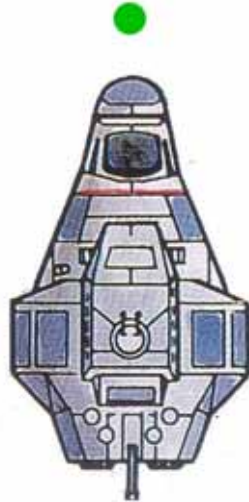
## The Green List

Experienced travellers know the **Green List**: the casual user's ship recognition guide distributed by the Travellers' Aid Society. Its casual writing style conveys a minimum of information to supplement a basic cartoonish ship recognition image; many a young spacer first learned about starships from the Green List. Its name comes from the traditional Green-Amber-Red codes applied to various ship types to show their relative risk to passengers.

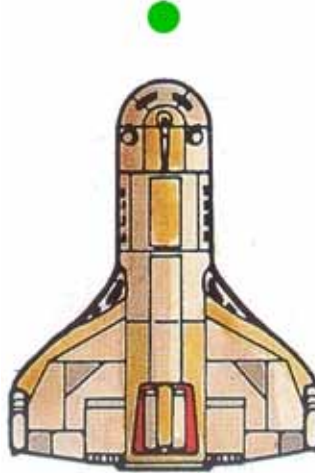
Users are invited to contact the TAS for specific details as they change constantly. Available in print and electronically.



The ubiquitous IISS **Scout/Courier (S-AL22)** flits across the Imperium carrying messages and small parcels vital to the bureaucracy. Some operate on long term loan to Scout veterans.



The **Free Trader (A-BS11)** pursues the merchant ethic of "buy low, sell high" in commerce between the worlds. Many rich merchants had their start on a Free Trader, such as this.



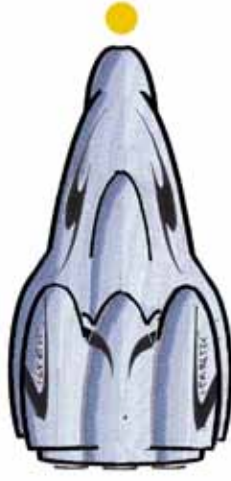
The **Fat Trader (RK-DA11)** specializes in bulky goods (although it carries anything to pay the bills). Fat Not known for passenger comfort, Fat Traders are often the only ship available..



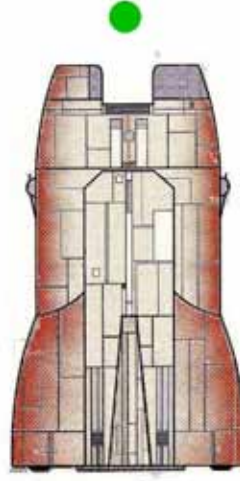
**Armed Packet (UF-CA33)** in unscheduled passenger service for those in a hurry. The crew can be trusted, but these little ships still find themselves jumping in harm's way.



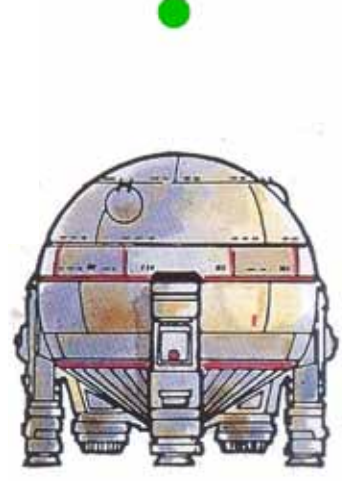
**Vanderbilt class Yacht (Y-EU42)** often in luxury service for nobles or a famous entertainer. Buying passage is impossible, but the master may take a few on board on a whim.



**Aslan Clan Transport (TL-ES22)** operating on the Imperial borders. Cultural differences make passage a minefield of missteps and perceived insults; consider this ship only as a last resort.



**Far Trader (Marava class) (A2-BS12)** carrying cargo and passengers to backwater worlds. Un-scheduled service, but often the only way to reach some worlds.

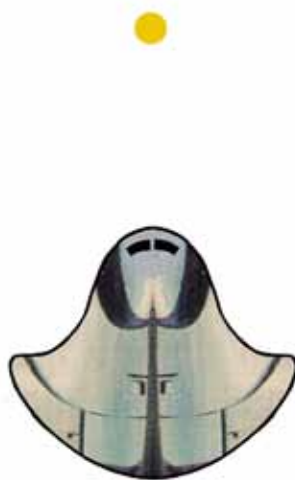


**Broadsword-class Mercenary Cruiser (C-HS33)** re-configured to *N'Ora'Lee* -class **Search and Rescue Ship (PR-VS23)**.

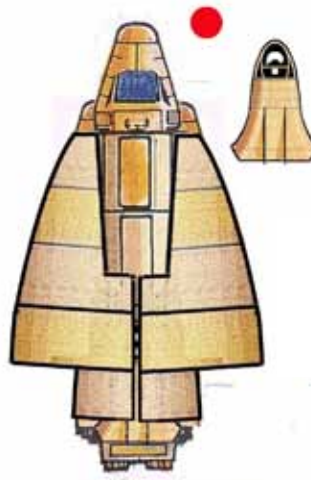
Especially helpful when disaster strikes!



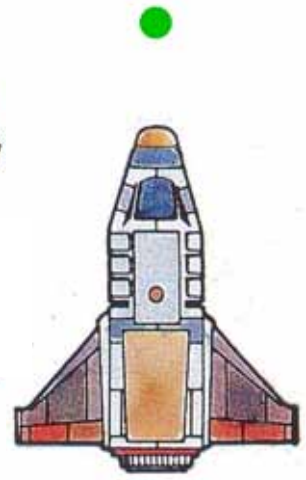
Typical Vargr **Corsair (P-DA41)** with claw-motif extensible weapons mounts and deploying fang sensors. Vargr Corsairs are often captured or renegade naval vessels.



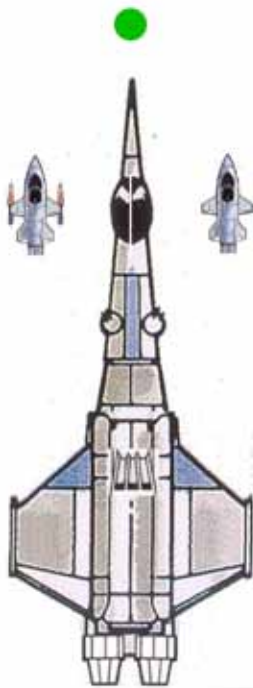
Zhodani **Border Scout (S-AL22)** encountered within 10 parsecs of Zhodani territory. Paradoxically, Zho Border scouts are usually harmless and even helpful; but beware of psi peeping



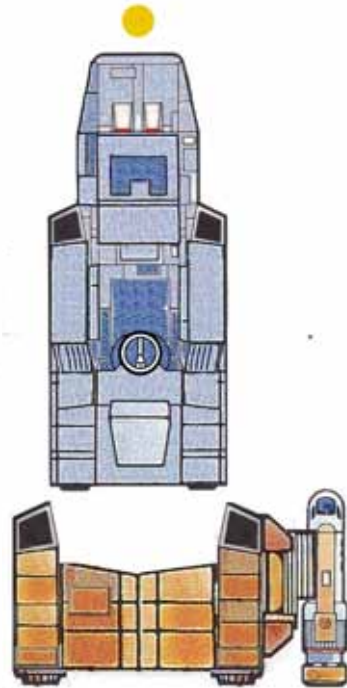
The **Fat Trader (RK-DA11)** specializes in bulky goods (although it carries anything to pay the bills). Fat Not known for passenger comfort, Fat Traders are often the only ship available..



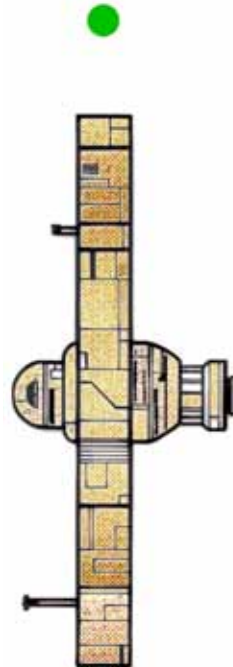
In-system interworld **Shuttle (QS-A9A20)** providing access beyond the mainworld. Scheduled trips from reputable spaceports are dependable and safe; but beware the tramp shuttle.



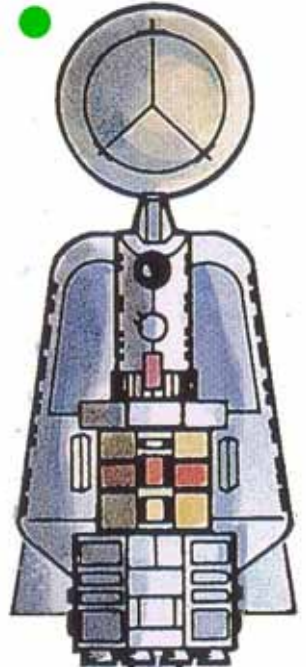
Imperial Navy **Corvette (E-EA52)** shown with typical accompanying fighters. IN ships aid stranded travellers (show your TAS Card) if their mission is not compromised.



**SDB System Defense Boat (DS-DS40)** shown with interstellar **Jump Shuttle (TD-BU12)** and docked **Pinnacle**. The SDB is a vital part of every system's defenses..



University of Regina **Lab Ship (L-DC12)** and docked **Utility Launch**. When Lab Ships offer passage (supplementing research budgets) they are safe, but not especially dependable.



*Tanstaaf*-class **Subsidized Liner (M-FB13)** as encountered along main trade routes in Imperial space. Scheduled service between mainworlds on major routes is the safest way to travel.





## Index

- \*Seh\* Seh With Diamonds, 48, 71  
13.5 Cubic Meters, 247, 254, 288, 382, 475, 599, 675  
4-Year Term, 37, 43, 46  
Ab Anti-Beam, 371, 387, 389  
Ab Data Repository, 36, 489, 490  
Ablat, 231, 235, 240, 241, 278, 292, 293, 391, 582, 629  
Absent Friends, 8, 10  
Absolute Defenses, 389  
Abyss, 253, 422, 431, 435, 437, 439, 458, 460, 461, 468, 473, 678, 680  
Academia (Academics), 144  
Academy (Military Or Naval), 41  
Accelerated Delivery, 476  
Accelerating Tech Levels, 507  
Acceptance, 24, 42, 43, 406, 411, 507  
Accommodations, 47, 140, 266, 269, 276, 285, 305, 307, 308, 310, 314  
Accumulating Fortunes, 692  
Accuracy, 29, 30, 34, 130, 142, 146, 148, 149, 179, 210, 634  
Acme Gravitic Transmitters Corporation, 695  
Acquired Secrets, 72, 75  
Acquiring Skills, 45  
Acr Advanced Combat Rifle-10, 151  
Activator, 84, 85, 560, 569, 617, 627  
Active Control Codes, 586  
Activity Sensor (Neural), 633  
Actor, 36, 40, 52, 57, 58, 63, 112, 116, 117, 119, 121, 122, 125, 136, 157-159, 161, 564, 584  
Actor, 36, 40, 52, 57, 58, 63, 112, 116, 117, 119, 121, 122, 125, 136, 157-159, 161, 564, 584  
Actor (Act, Acting, Drama), 116  
Actor (Skill), 116  
Actual Value Table, 121, 142, 143, 475, 476, 486, 487  
Acv (Air Cushion Vehicle), 126, 127, 144  
Additional Terrain, 460, 463, 465  
Admin, 10, 36, 40, 56-58, 60-63, 65, 67, 76, 112, 116, 117, 122, 126, 134, 476, 486, 564, 584  
Admin (Administration, Management), 116  
Admin (Skill), 112, 116, 117  
Admin Tasks, 116  
Administration, 67, 116, 266, 724  
Adult, 69, 78, 79, 93, 555, 561, 606, 609, 610, 696  
Advanced Base, 648  
Advanced Tools, 121, 127, 128, 131, 134, 135, 137, 138  
Adventure Checklist, 656  
Adventure Class Ships, 9, 274, 387  
Adventures, 3, 4, 7, 9, 10, 18, 21, 25, 26, 43, 99, 108, 153, 201, 267, 421, 542, 590, 627, 652-654, 656-659, 661, 692, 1  
Adventures, Epic, 9, 656  
Advocate, 10, 40, 57, 58, 60, 64, 65, 67, 112, 117, 123, 282, 305, 311, 564, 584, 696, 725  
Advocate, 10, 40, 57, 58, 60, 64, 65, 67, 112, 117, 123, 282, 305, 311, 564, 584, 696, 725  
Advocate (Advocacy, Law, Legal, Attorney, Lawyer), 117  
Advocate (Skill), 112, 117  
Aeronautics, 40, 43, 58, 112, 129, 144, 564, 584  
Aesthetics, 460  
Ag Agricultural, 36, 38, 487, 489, 490  
Agent, 8, 43-45, 48, 49, 51-54, 63, 64, 71, 74-77, 81, 85, 130, 265, 628, 630, 688, 703, 725  
Agent Chargen Chart, 63  
Agility, 27-30, 32, 34, 38, 43, 45, 69, 102, 120, 185, 230, 232, 237, 275-277, 285, 289, 290, 325, 393, 522, 558, 561, 563, 566, 577, 580, 583, 637, 661  
Aging, 37, 47, 53, 69, 78, 79, 91, 97, 98, 109, 155, 483, 524, 547, 553, 554, 561, 568, 579, 586, 600, 645, 646  
Aging Check, 69, 524, 561, 586  
Aging, Clone, 97, 98  
Agricultural Land, 461, 463  
Air Corridor, 249-251, 422, 431, 458, 460, 467, 471, 474  
Air Lane, 467  
Air Tank, 631  
Airlock, 153, 648  
Airpad, 249, 422, 431, 458, 460, 470, 471  
Airport, 248, 249, 422, 431, 458, 460, 470, 471  
Airport, Temporary, 471  
Alien, 11, 13, 14, 21, 37, 83, 85, 115, 134, 172, 333, 379, 423, 545, 551, 565, 652, 658  
Alien Controls, 565  
Alien Dna, 83  
Alien Vs Sophont, 551  
Allegiance, 266, 273, 396, 404, 406, 407, 410, 412, 492, 493, 513  
Alpha Waves, 169  
Alter-Ego, 37  
Alternate Descriptors, 679, 688  
Alternatives To Technology, 495  
Altitude Chart, 472  
Altitudes, 252, 459, 461, 472, 677, 678, 680, 691  
Altitudes Of The Atmosphere, 472, 678, 680  
Aluminum, 541, 623, 639, 640, 675, 689, 699  
Am Anti-Matter, 195, 374  
Am Anti-Missile, 371, 387, 389  
Am Orion, 329, 330, 384  
Am Plant, 280, 297, 349, 383, 385  
Amateur Scholar, 56  
Amber, 271, 320, 404, 410, 412, 482, 489-492, 653  
Amber Zone, 410, 412, 489-492, 653  
Ambient, 347, 379, 603, 616, 618, 625, 627, 628, 635-637, 644  
Ambient Cell, 347, 625  
An Ancient Site, 36, 489, 490  
Anagathic, 75, 645  
Ancient War, 15, 16, 25, 381, 572  
Ancients, 15, 16, 25, 91, 381, 479, 490, 571  
Andrew Boulton, 7, 10, 96  
Android, 19, 92, 93, 95  
Androids, 8, 37  
Anglic, 1, 133, 171, 643, 674, 700, 702  
Anifx, 478, 479, 481, 484, 485, 636, 637  
Anifxz, 167  
Animal Trainer, 117, 118, 584  
Animals, 13, 21, 36, 40, 43, 46, 55-59, 62, 63, 92, 112, 114, 115, 117-119, 141, 144, 145, 150, 154, 167, 225, 266, 360, 479-482, 564, 584, 589-591, 593, 595, 599, 600, 602, 604-606, 608-611, 646, 652, 654, 724  
Animals (Skill), 112, 117, 118  
Anm School, 39, 40, 61, 62, 66, 73, 114  
Annual Maintenance, 280, 284, 348, 696  
Anola, 604, 605  
Anosmic, 170, 562, 564  
Answerin, 25, 703  
Anti-Armor Land Mine, 193  
Anti-Armor Warhead, 193  
Anti-Beam, 371, 387, 389, 391  
Anti-Flyer Warhead, 193  
Anti-Matter, 195, 278, 279, 294, 304, 305, 328-330, 336, 347, 349, 351, 359, 369, 374-377, 382-385, 389-392, 408, 478, 479, 484, 505, 618  
Anti-Matter Plant, 278, 305, 336, 347, 349, 383, 384  
Anti-Matter Power System, 347  
Anti-Missile, 366, 371, 387, 389  
Antibiotic, 645  
Antidote, 645, 646  
Antimatter, 297, 385, 494, 618, 644, 650, 654  
Apprenticeship, 39, 40, 42, 43, 52  
Aquanautics, 40, 43, 58, 112, 139, 144, 564, 584  
Archduke, 35, 65, 68, 412, 696, 703  
Archeology, 19, 40, 102, 112, 144, 564  
Archipelago, 435, 464  
Archon, 65, 559  
Arcology, 249, 422, 431, 433, 435, 437, 439, 458, 460, 461, 466, 474  
Arid Lands, 463  
Arlane Titanium, 126  
Armed Forces, 41, 42, 45-48, 71, 244  
Armor, 18, 24, 95, 137, 144, 176-184, 186-190, 193, 198, 200, 205, 208, 210, 215, 223-241, 243-246, 253, 258-261, 263, 265, 274, 276-278, 285, 287, 290-293, 312, 313, 316, 320, 335, 365, 367, 368, 375, 387, 389-392, 461, 473, 478, 479, 485, 547, 563, 582, 589, 595, 598, 601, 615, 617, 619, 623, 624, 626, 627, 629-631, 640, 644, 660, 703  
Armormaker, 8, 200, 225, 226, 233-241, 244  
Armory, 8, 24, 201, 304  
Art (Artist), 118  
Art Forgery, 118, 119  
Art History, 118  
Artificial Being, 92, 575  
Artificial Gravity, 13, 19, 378  
Artificial People, 19  
Artificial Persons, 499, 502  
Artillery, 40, 43, 58, 62, 66, 76, 97, 112, 130, 132, 139, 144, 181, 192, 193, 204, 207, 213, 215, 216, 269, 367, 504, 564, 575, 584  
Artillery Shell, 193  
Artisan, 55, 559

Artist, 10, 36, 40, 52, 57, 58, 63, 75, 76,  
 112, 116, 118, 119, 121, 122, 125, 136,  
 559, 564, 584  
 Artist (Skill), 118, 119  
 Arv Dinsha, 119  
 Aryu, 24  
 As Asteroid Belt, 397, 487, 490  
 Asimov, 544  
 Aslan, 17, 39, 54, 74, 75, 133, 210, 213,  
 217, 221, 228, 231, 233, 238, 240, 241,  
 412, 495, 545, 546, 573, 587, 607, 613,  
 650, 726, 730, 738, 701, 703  
 Aslan (Image), 39  
 Aslan Colonies, 495  
 Aslan Hierate, 17, 607, 701  
 Aslan Of Kusyu, 546, 573  
 Assault, 77, 97, 200, 203, 208, 212, 213,  
 216, 220, 221, 227, 233, 236, 238, 265,  
 286, 287, 629, 652, 704, 722, 724  
 Assault Armor, 629  
 Assets, 27, 47, 85, 99-102, 113, 179, 185,  
 192, 354, 363, 389, 411, 692  
 Assigned At, 559, 560  
 Assigned By, 52, 94, 284, 407, 410, 492,  
 493, 550, 559  
 Assisted Carrier, 568  
 Asteroid Belt, 17, 268, 272, 397, 400, 402,  
 403, 405, 409, 413, 487, 490, 491, 660,  
 683, 711  
 Astral Projection, 528  
 Astrogator, 40, 57, 58, 60, 61, 63, 64, 81,  
 95, 102, 107, 112, 113, 119, 120, 128,  
 132, 136, 137, 139-141, 148, 201, 272,  
 284, 308-311, 314, 320, 321, 337-341,  
 519, 521, 564, 584, 643, 696  
 Astrogator (Astrogation), 119  
 At Range, 109, 132, 149, 162, 163, 179,  
 191, 255, 360, 362, 392, 590, 679, 698  
 Athlete, 40, 55-59, 61, 63-67, 80, 112, 119-  
 121, 181, 564, 584  
 Athlete (Athletics), 120  
 Athlete (Skill), 112, 119, 120  
 Atmosphere, 13, 38, 129, 139, 156, 163,  
 168, 182, 196, 231, 244-246, 250, 252,  
 253, 255, 268, 272, 274, 276, 277, 289,  
 290, 324, 325, 328, 349, 359, 366, 379,  
 384, 396, 402, 403, 406, 407, 409, 435,  
 459-461, 472-474, 481, 490, 491, 546-  
 548, 556, 557, 570, 585, 590, 591, 593,  
 596, 602, 608, 610, 611, 618, 632, 633,  
 636, 640, 648, 677, 678, 680, 682, 691,  
 723  
 Atmosphere Tester, 633  
 Atmospheric Sponge, 631, 632  
 Atolls, 464  
 Atrocity, 704, 722, 723  
 Attache Case, 639  
 Attack Fighter, 287  
 Audible, 169  
 Audience Of Stars Vilani, 14  
 Auras, 163, 173, 554  
 Author, 10, 36, 40, 52, 57, 58, 63, 104, 112,  
 116, 119-122, 125, 136, 559, 564, 584,  
 653, 661  
 Author (Skill), 120  
 Automated Highway, 467  
 Automatic Muster Out Benefits, 48  
 Automotive, 40, 42, 43, 58, 112, 127, 144,  
 564, 584  
 Auxiliary Traffic Control Facility, 269  
 Avenue, 467  
 Average Tech Level, 513  
 Awakening, 31, 147, 383, 476, 523, 526,  
 511, 512, 528-530, 536  
 Awareness, 31, 109, 122, 126, 129, 139,  
 148, 162-165, 174, 175, 180, 208, 229,  
 271, 356, 357, 359, 376, 377, 478-481,  
 485, 532, 534, 536-539, 550, 562, 564,  
 581, 625, 634, 647  
 Azhanti, 25, 703  
 Ba Barren World, 487, 490  
 Background For Characters, 8  
 Backpack, 23, 634, 639, 649, 664  
 Bad Flux, 23, 123, 190, 199, 664, 673,  
 701-703  
 Bad Scene, 151, 156  
 Badlands, 462, 468  
 Baked Lands, 431, 433, 435, 437, 439, 458-  
 461, 465, 474, 557, 596, 705  
 Balance, 29, 30, 34, 84, 132, 204, 214, 222,  
 230, 234, 236, 335, 337, 477, 511, 725  
 Bandage, 645, 646  
 Barbette, 132, 281, 282, 298-304, 352, 355,  
 361, 364, 366-369, 373, 375, 381  
 Barge, 286-288  
 Baron, 31, 35, 63, 65, 68, 75, 406, 412,  
 696, 703  
 Baronet, 31, 35, 54, 65, 68, 406, 412, 696,  
 703  
 Barr Vech, 42  
 Barrrens, 468  
 Barrier To Ground Vehicle Travel, 460  
 Barriers, 120, 149, 175, 266, 306, 373, 379,  
 404, 462, 463, 465, 468, 478, 480-482,  
 485, 509, 532, 534, 602  
 Barter, 24  
 Base (Naval, Scout, Military), 404  
 Base TI, 277, 280-282, 292-294, 298, 300,  
 302, 306, 312, 313, 352, 354, 391, 520,  
 496, 498, 620, 621, 648  
 Base Value, 549, 558, 613, 616, 625, 697  
 Baseport, 268  
 Basic Airport, 470  
 Basic Terrain, 141, 462, 463  
 Batch-Produced Sophontoids, 95  
 Battery, 152, 294, 347, 366, 388, 625, 627,  
 638, 644, 646, 724  
 Battle Class Ships, 274, 387  
 Battle Damage, 189, 198, 274  
 Battledress, 58, 144, 181, 201, 210, 223,  
 231, 232, 237, 564, 584, 629  
 Bay Weapons, 43, 112, 132, 144, 181, 321  
 Bayou, 462  
 Beach, 464  
 Beacon, 130, 268, 269, 404, 408, 582, 634,  
 636  
 Beagle, 286, 287, 736  
 Beams, 40, 43, 58, 112, 128, 129, 132, 144,  
 181, 300, 301, 364, 366, 367, 371, 381,  
 389-391, 564, 584  
 Beard, Ty, 7  
 Bearer, 75, 83-85, 227, 560, 569, 628, 643  
 Beast Encounter Tables (Bet), 589  
 Beastmaker, 9, 589, 590, 595-602  
 Behind The Referee's Screen, 199  
 Bell, Joshua, 7  
 Bellerophon Solo 1519 A88a986-E, 606  
 Beltport, 268, 272  
 Benchmark, 25, 108, 163-166, 168, 170,  
 172-175, 177, 196, 354, 355, 382, 383,  
 532, 533, 538, 539, 566, 567, 620, 676,  
 690, 692, 695, 698  
 Benchmark Size, 163, 166, 173, 175, 695  
 Benchmarks, 9, 31, 108, 112, 113, 148,  
 165, 166, 168, 170, 172-174, 378, 379,  
 532, 534, 539-541, 677, 679, 689, 691,  
 692, 699  
 Benthic, 468  
 Bet Beast Encounter Table, 589, 597  
 Beta Waves, 169  
 Bfp Body Form Profile, 566, 567  
 Bilaniden (Vilani Language), 133  
 Bill Cobb, 29  
 Binox, Binocs, 633  
 Biological Weapons, 145  
 Biologics, 36, 40, 58, 112, 120, 121, 124,  
 127, 129, 131, 135, 137, 138, 143, 198,  
 361, 478, 479, 485, 503, 505, 564, 584,  
 600  
 Biologics (Biologic), 121  
 Biologics (Skill), 120, 121  
 Biology, 40, 91, 112, 121, 144, 564  
 Biosniffer, 633, 634  
 Birthday, 69, 81, 561, 707  
 Birthworlds, 38, 488  
 Bizarre, 85, 173, 654, 661, 705  
 Blades, 40, 43, 58, 112, 128, 129, 132, 144,  
 181, 185, 211, 504, 564, 584  
 Blasphemy, 704, 722, 724  
 Bledsaw, Robert E. "Bob" (1942 - 2008), 10  
 Blind, 166, 175, 181, 189, 190, 215, 528,  
 550, 562, 564, 624, 637  
 Bluff, 31, 105, 159, 161  
 Bluffs, 465  
 Boarding, 227, 233, 236, 238, 269, 299,  
 301, 321, 362, 371, 388, 393, 537, 629,  
 676, 677, 681, 690, 691  
 Boarding Armor, 629  
 Boarding Range, 393, 677, 691  
 Boat, 13, 40, 43, 58, 112, 139, 144, 145,  
 250, 251, 254, 255, 259, 264, 265, 272,  
 286, 287, 305, 311, 320, 474, 564, 584,  
 645, 651, 739  
 Body Form Profile Bfp, 566  
 Body Structure, 85, 90, 93, 547, 550, 552,  
 553, 555, 563, 575, 577, 581, 594, 595,  
 598, 606  
 Boots, 602, 632, 649  
 Born At The Starport, 38  
 Born In Deep Space, 36, 38  
 Bottle, 639, 650  
 Boulton, Andrew (1969 - 2012), 10  
 Bound Drive, 507  
 Brain, 91-94, 173, 174, 189, 198, 249, 250,  
 261, 364, 368, 369, 515-517, 519, 520,  
 523-526, 503, 530, 534, 536, 547-550,  
 559, 563, 568, 575-579, 581-587, 598,  
 600, 606, 650  
 Breath, 30, 34, 177, 387  
 Breather, 231, 235, 631, 632  
 Brett Bozeman, 71  
 Brief History Of The Universe, 8, 15  
 Broken, 101, 125, 462, 557, 596, 641, 644,  
 646, 656

Broker, 40, 57, 58, 60, 64, 67, 95, 103, 112, 121, 143, 282, 305, 308, 476, 486, 487, 564, 584  
 Broker, 40, 57, 58, 60, 64, 67, 95, 103, 112, 121, 143, 282, 305, 308, 476, 486, 487, 564, 584  
 Broker (Skill), 112, 121, 476  
 Brown, Fritz, 7  
 Brown, Ron, 7  
 Btsd Behind The Screen Damage, 199  
 Buck, Darren, 172  
 Bug, 10, 630, 633, 634, 636, 659  
 Bug Detector, 633, 634  
 Bulk, 94, 151, 152, 154, 155, 188, 205, 209, 215, 217, 225, 228, 243, 244, 246, 249, 260-263, 286, 287, 478-480, 484, 485, 521, 534, 547, 551, 553, 566, 567  
 Bullet, 176, 178-180, 183, 190, 200, 208, 212, 215, 216, 278, 293, 364, 369, 392, 624  
 Burb, 466  
 Burden, 28, 29, 34, 43, 85, 92, 117, 124, 142, 145, 150-155, 201, 205-207, 209, 213-215, 217, 218, 221, 222, 225, 226, 228, 233, 234, 236, 239, 276, 347, 423, 503, 504, 593, 599, 604-611, 614, 629, 636, 637, 642, 658, 671  
 Bureaucrat (Bureaucracy), 121  
 Bureaucrat (Skill), 112, 121, 122  
 Bureaucratic, 16, 121, 125, 286, 287, 482  
 Bureaucratic Regulations (Br), 121  
 Bush Runner, 604, 605  
 Bush, Clayton R. (1958 - 2007), 10  
 Busy Empire, 411, 513  
 Bwaps, 210, 546, 571, 703  
 Bwaps Of Maharaban, 546, 571  
 Cable, 516-518, 617, 618, 625, 632, 633, 636  
 Cadet Characters, 69, 561  
 Caldera, 469  
 Calderón De La Barca, Pedro (1600 - 1681), 11  
 Calendar, 9, 10, 17, 38, 68, 76, 81, 486, 706, 707  
 Camera, 23, 617, 633, 634, 664  
 Cameron, Bill, 7  
 Canal, 251, 464  
 Canis Lupus, 25, 545  
 Canteen, 639, 649  
 Canyon, 461, 463, 680  
 Capital, 18, 23, 36, 65, 68, 74, 112, 144, 403, 404, 406, 410, 412, 489, 490, 492, 604, 650, 663, 692, 696  
 Capsule Dyson, 507, 509  
 Captain Sir Mark Poles, 47, 210  
 Career, 10, 13, 26, 37, 39, 41-48, 50-53, 55, 57, 60-67, 70-72, 76-79, 81, 105, 110, 112-114, 134, 144, 145, 149, 158, 187, 561, 577, 643, 692, 696  
 Career Knowledges, 114  
 Careers, 8, 24, 37, 39, 43-47, 50, 51, 56, 58, 59, 64, 67, 133, 158, 545, 659, 700, 703  
 Cargo (Trade Goods), 140, 475, 486  
 Cargo Containers, 272  
 Cargo Id, 476, 486, 487  
 Cargo Market, 269, 486  
 Carl Hess, 201  
 Carnivores, 591, 592, 602  
 Carouse (Personal), 115  
 Carrier, 227, 233, 236, 238, 244, 247, 257, 258, 286, 287, 311, 383, 384, 568  
 Carrying, 17, 29, 34, 59, 151, 227, 245, 287, 320, 357, 475, 633-635, 639, 642, 643, 645, 647, 649, 738, 695, 696, 698  
 Cashing Out, 51  
 Cassildan, 546, 572  
 Cassildan Of Ambemsham, 546, 572  
 Cast, 141, 575, 645, 646, 656, 660  
 Caste, 27-31, 35, 38, 50, 55-67, 82-85, 87, 90, 102, 170, 171, 522, 525, 527, 547-555, 558-561, 564, 568, 569, 583, 696  
 Caste Assignment, 553, 554, 559  
 Caste Rotation, 559  
 Caste Shift, 553, 554, 559  
 Caste-Based Differences, 549, 553, 559  
 Caste-Based Special Abilities, 564  
 Casted Breeder, 560  
 Casteless, 559  
 Catastrophic Exn, 412, 556  
 Catastrophic Extinct Natives, 546  
 Catastrophic Xn, 412, 556  
 Cave Trapper, 604, 606  
 Caverns, 422, 431, 458, 460, 468  
 Caves, 460, 468  
 Cc Character Card, 37  
 Cc Characteristic Code, 37  
 Cc Controlling Characteristic, 44, 45, 53, 64  
 Certificate, 75, 80, 81  
 Certificates, 47, 80, 81, 108, 480, 482  
 Chadwick, Frank, 7  
 Challenge Coin, 650  
 Chamax Hunter, 604, 606  
 Character, 13, 18, 19, 21, 25-48, 50-53, 55-72, 78-84, 86, 87, 89, 91, 95-97, 99, 101-105, 107-110, 112-120, 122-134, 136, 137, 139, 141, 142, 147, 151-153, 157-159, 161, 163, 166, 168-176, 179-182, 186, 189, 191, 198, 199, 205, 210, 225, 228, 232, 243, 245, 247, 260, 354, 407, 423, 459, 476, 479, 488, 489, 516, 522, 528-533, 535, 536, 540, 545, 547-550, 553, 558, 559, 561, 564, 566, 602, 613, 615, 616, 627, 633, 645, 653, 654, 657-659, 661, 663, 664, 672, 674, 679, 692, 695, 707  
 Character Card Cc, 37  
 Character Generation, 13, 36-38, 40, 42, 44, 45, 47, 48, 51-53, 55-71, 84, 96, 109, 114, 489, 545, 548-550, 553, 559, 663, 679, 707  
 Character Generation, 13, 36-38, 40, 42, 44, 45, 47, 48, 51-53, 55-71, 84, 96, 109, 114, 489, 545, 548-550, 553, 559, 663, 679, 707  
 Character Generation Checklist, 52, 53  
 Characteristic Code, 37  
 Characteristic Equivalences, 28  
 Characteristic Improvements, 48, 50  
 Characteristics, 8, 13, 23, 27-32, 34-39, 43-45, 50, 52, 55, 69, 78, 79, 82-91, 94-96, 98, 99, 101, 102, 104, 108-110, 120, 128, 144, 147, 149, 150, 154, 173, 176, 179, 181, 183, 189, 223, 227, 232, 250, 276, 289, 375-377, 382, 479, 480, 482, 483, 489, 522, 526, 508, 528, 534, 547-550, 553-555, 558, 561, 562, 566-568, 575, 577, 583, 591, 614, 622, 644, 659, 664, 671, 674, 678  
 Characters, 8, 10, 12, 13, 18, 19, 21, 24, 25, 27, 29-32, 37-40, 42, 43, 45-47, 51, 68-72, 80-84, 91-93, 98, 99, 101-106, 108-111, 113, 115-132, 134-143, 147, 153, 156, 157, 163, 171, 176-182, 185, 186, 191, 198, 199, 201, 205, 210, 225, 226, 228, 231, 243, 250, 267, 274, 275, 337, 353, 356, 366, 387, 388, 422, 423, 459, 476, 528, 530, 531, 545, 547-549, 558, 561, 592, 593, 613, 622, 627, 645, 646, 650, 652-659, 661, 671, 692, 693, 695  
 Charisma, 27-31, 35, 38, 50, 82, 83, 85, 90, 102, 158, 231, 522, 525, 527, 558, 583, 586, 635, 696  
 Charles "Buzz" Van Sickle, 106  
 Charted Space, 14-17, 20, 25, 280, 334, 395, 396, 572, 604, 610, 726, 675  
 Charting Uncharted Territory, 488  
 Chasm, 252, 422, 431, 433, 435, 437, 439, 458, 460, 461, 463, 472, 474, 680, 705  
 Check, 13, 22, 28-35, 39-43, 56, 69, 109, 111, 115, 137, 143, 146-149, 152, 156, 158, 159, 169, 176, 182, 184, 189, 198, 220, 230, 237, 269, 271, 310, 316, 325, 340, 359, 366, 367, 382, 383, 389-393, 472, 476, 486, 523, 524, 527-529, 531-533, 536, 540, 542, 543, 561, 586, 726, 663, 671  
 Check <Skill>, 115  
 Check Anti Defense Mod, 389, 391  
 Check Characteristic, 28, 29, 663  
 Check Double Medical, 109, 176, 189, 340, 390  
 Check Double Skill, 109, 115, 176, 189, 198, 316, 325, 340, 359, 390, 393, 671  
 Checklist (Character Generation), 52, 53  
 Chef, 36, 38, 40, 52, 57, 58, 63, 95, 112, 116, 119, 121-123, 125, 136, 564, 584, 653  
 Chemical Weapons, 145  
 Chemistry, 40, 112, 114, 138, 144, 564  
 Child, 38, 69, 78, 79, 83-85, 96, 97, 537, 561, 696, 723  
 Children, 15, 17, 82, 84-87, 96, 510, 537, 660, 723, 725  
 Chimera, 19, 85, 90-92, 574  
 Chimeras, 8, 19, 25, 90-92, 96, 574, 575  
 Christopher Peers, 45  
 Cirque De Sirkas, 76  
 Citizen, 8, 29, 43-46, 48, 49, 51, 52, 54, 58, 59, 63, 64, 67, 71, 74-77, 81, 94, 106, 114, 249, 269, 533, 542, 692, 696, 703  
 Citizen Career, 45, 46  
 Citizen Chargin Chart, 58  
 Citizen Life, 45, 52, 58, 59, 63, 67, 94, 249  
 Citizen's Pension, 48, 51  
 City, 57, 71, 73, 76, 77, 173, 247, 249, 271, 422, 423, 431, 433, 435, 437, 439, 458-461, 466, 474, 529, 650, 654, 676, 688, 690  
 City, Domed, 461, 466  
 Clairallience, 528  
 Clairaudience, 528  
 Clairgustance, 528

Clairsentience, 528  
 Clairvoyance, 528  
 Classic Traveller (Ct), 4  
 Classification Of Starports, 267  
 Clear Wood, 462, 705  
 Client-State, 68, 404  
 Cliffs, 465, 474  
 Climate, 38, 130, 403, 406-408, 410, 415, 417, 419, 489-493, 548, 553, 555, 556, 611, 700, 705  
 Climate Trade Classifications, 489  
 Climbing, 30, 463, 632, 649  
 Climbing Gear, 632, 649  
 Cloaked Institutes, 529  
 Clone, 19, 50, 69, 84, 92, 96-98, 122, 516, 519, 523, 525, 574, 575, 579, 586  
 Clone Mental Aging, 69  
 Clone Physical Aging, 69  
 Clone, Guest, 96-98  
 Clone, Med, 96-98  
 Clone, Natural, 96-98  
 Clone, Offspring, 96-98  
 Clone, Relict, 96-98  
 Clones, 8, 19, 25, 69, 82, 84, 91, 92, 96-98, 574, 575, 579, 586  
 Close Star, 197, 405, 406  
 Cloth Armor, 629  
 Cloud Other Minds, 531, 532, 534, 540-542  
 Clumsy, 27, 34, 110, 131, 495  
 Cluster, Ship Location, 393  
 Co Cold World, 490  
 Co-Operative Game, 12  
 Coaching, 120  
 Coast, 324, 464, 694  
 Coat, 143, 183, 231, 235, 240, 292, 391, 607-609, 629  
 Cold And Hot, 9  
 Cold World, 183, 230, 490, 556, 568  
 Cold Zone, 465  
 Collector, 278-280, 294, 297, 305, 336, 344, 345, 347, 349, 351, 382-385, 408, 494, 505, 557, 584, 592, 596, 650  
 College, 35, 39-42, 46, 52, 61, 62, 66, 67, 72, 73, 76, 77  
 Colonists, 91, 412, 546, 548, 556, 610  
 Color, 22, 73, 76, 148, 149, 167, 175, 229, 357, 481, 482, 568, 606, 608, 609, 730, 662  
 Color, Subjective, 167  
 Colors, 22, 93, 166, 167, 174, 175, 229, 482, 483, 550, 607, 617, 662  
 Combat, 8, 9, 21, 30, 34, 62, 66, 73, 75, 102, 114, 128, 130, 132, 139-142, 144, 145, 149, 151, 176-180, 182, 184-188, 191, 200, 202, 205, 207, 208, 213, 216, 220, 221, 225-227, 231-233, 236, 238, 241, 243-245, 259, 274, 277, 278, 281, 285-287, 315, 316, 318, 319, 337, 349, 376, 377, 383, 386-393, 478, 480, 484, 587, 607, 608, 615, 629, 637, 641, 642, 644-648, 659, 663, 678, 680, 681, 695  
 Combat Armor, 144, 232, 629  
 Combat Card, 186-188, 285, 315, 318, 319, 386  
 Combat Drug, 75, 478, 480, 484, 645, 646  
 Combination, 20, 92, 99, 231, 235, 281, 282, 322, 329, 459, 478, 480, 485, 516, 526, 549, 562, 631, 632, 636, 641, 653, 665  
 Combining Power Plants, 346, 347  
 Comeback, 44, 57  
 Comm, 101, 125, 188, 189, 272, 298, 352, 356, 359, 371, 486, 582, 628, 630  
 Command (Personal), 115  
 Command College, 39-42, 52, 61, 62, 66, 73  
 Commendation, 50, 63, 71  
 Commendations, 47, 48, 71, 78, 79  
 Commissions, 117  
 Comms, 40, 55, 56, 58-61, 63-65, 67, 101, 112, 122, 123, 125, 138, 188, 198, 228, 234, 237-239, 263, 308, 314, 356, 361, 362, 366, 502, 564, 584, 628, 700, 703  
 Comms, 40, 55, 56, 58-61, 63-65, 67, 101, 112, 122, 123, 125, 138, 188, 198, 228, 234, 237-239, 263, 308, 314, 356, 361, 362, 366, 502, 564, 584, 628, 700, 703  
 Comms (Communications), 122  
 Comms (Skill), 112, 122, 123  
 Communication, 18, 118, 122, 125, 141, 180, 229, 248, 528, 607, 628, 642, 709  
 Communication Limited To Transportation Speed, 18  
 Communications, 13, 101, 106, 121-123, 125, 133, 138, 228, 247, 248, 269, 272, 283, 286, 287, 321, 357, 366, 412, 475, 517, 524, 499, 628, 636, 643, 736, 677, 680, 691  
 Community, 16, 20, 94, 134, 266, 269, 271, 460, 466, 468, 513, 559, 723  
 Compact, 93, 154, 256, 279, 289, 347, 348, 567, 631, 643  
 Company Or Corporate Reputation, 152  
 Compartments, 276, 289, 304, 316, 317, 367, 386, 393, 518  
 Compass, 136, 633, 634, 649  
 Competent Professional, 108  
 Compound, 378, 469, 483, 606, 625  
 Compressor, 152, 231, 631, 632  
 Compulsive Gambling, 131  
 Compute, 112, 146, 186, 206, 226, 475, 521, 641, 687  
 Compute (Talent), 146  
 Computer (Office Equipment), 123  
 Computer (Skill), 112, 123  
 Computers And Consoles, 9, 392, 519  
 Concentration Camp, 468  
 Concourse, 266, 267, 269  
 Confederation, 17, 513, 701  
 Configurable Controls, 565  
 Confusion, 23, 28, 130, 156, 206, 322, 391, 528, 659, 661, 664, 674, 705, 724  
 Conjunction, 111, 125, 148, 513, 679, 686  
 Console, 159, 189, 281-284, 306, 307, 310, 349, 354, 355, 357, 367, 368, 389, 514-521, 525, 579, 587, 616, 641-643, 648, 649, 655, 698  
 Consolidation Wars, 16, 17  
 Constant Acceleration Impact Time, 679, 687  
 Construction Materials, 480, 619, 626, 640, 648  
 Consul, 269  
 Consulates, 269  
 Consumables, 477, 484, 485  
 Contact Poison "Von", 194  
 Contained Knowledges, 46, 114, 115  
 Contamination, 194, 230, 329, 359, 382, 468, 500, 511, 724  
 Contessa, 31  
 Continent, 77, 247, 272, 421, 433, 460  
 Continental, 57, 71, 73, 247, 253, 255, 261, 409, 425, 459-461, 464, 470, 473, 614, 648, 649, 688  
 Continental Airport, 470  
 Continental Shelf., 253, 461, 464, 473  
 Contract (Mail And Private Express), 486  
 Control Code, 94, 153, 578  
 Control Codes, 91, 94, 95, 575-577, 586  
 Control Codes Robot, 575, 586  
 Control Panel, 281-283, 285, 299, 301, 303, 305, 306, 308, 355, 366, 514-516, 518, 520, 616  
 Controlled Stellar Evolution, 15  
 Controller, 75, 130, 228, 248, 272, 306, 514-518, 520, 616, 620, 643  
 Conversion Die-Rolling Approach, 23  
 Corrosive And Insidious Atmospheres, 272, 628, 631  
 Corsair, 64, 70, 72, 75, 286, 287, 321, 739  
 Corvette, 70, 286, 287, 320, 739  
 Cosmopolitan Universe, 20  
 Cost Of Living, 692, 696  
 Counsellor (Advisor), 123  
 Counsellor (Skill), 32, 112, 123  
 Count, 31, 35, 51, 65, 68, 176, 177, 343, 387, 397, 412, 426-429, 534, 544, 550, 696, 703  
 Counteract, 378, 479, 480, 534, 645, 646  
 Countess, 31  
 Countryside, 463  
 Courier, 53, 59, 63, 70, 272, 286, 287, 320, 584, 734, 738  
 Courier Duty, 53, 59  
 Court Hearings, 117  
 Cp, 27-29, 32, 36, 102, 285, 306, 312, 313, 407, 410, 411, 476, 484, 485, 489, 490, 492, 493, 522, 527-530, 532, 558, 671, 705  
 Cp Subsector Capital, 36, 489, 490  
 Crabaugh, Paul Montgomery (1956 - 1985), 10  
 Craftsman, 8, 36, 40, 43-45, 47-49, 52, 54, 55, 58, 64, 71, 74-77, 81, 112, 118, 119, 121, 124, 125, 129, 131, 135, 137, 138, 142, 143, 149, 198, 480, 559, 564, 584, 649, 650, 655, 696, 703  
 Craftsman (Craftsperson, Craftsophont, Craftsbeing), 124  
 Craftsman (Skill), 44, 52, 55, 124  
 Craftsman Career, 45, 55  
 Craftsman Chargin Chart, 55  
 Crater, 422, 431, 433, 435, 437, 439, 458, 460, 468, 469  
 Creating Entertainment, 120  
 Creating Personal Characters, 51  
 Creating Works Of Art, 118  
 Credit, 24, 75, 608  
 Credits (Cr), 24  
 Crested Trapper, 604, 606  
 Crevasse, 461, 463  
 Crime, 9, 130, 643, 700, 704, 722-725  
 Crompton, Ss, 7  
 Cropland, 422, 431, 433, 435, 437, 439,

458, 460, 461, 463, 474, 705  
 Crowd Control, 194  
 Cruiser, 76, 125, 283, 286, 287, 321, 518, 727, 736, 738  
 Cryokinesis, 528  
 Cryokinesis=Eshift, 528  
 Cs Sector Capital, 36, 489, 490  
 Cube, 247, 254, 256, 288, 566, 614, 615, 623, 641, 674, 675  
 Cuft, 675  
 Cultures, 11, 13, 14, 16, 18-21, 27, 37, 43, 126, 134, 144, 158, 308, 333, 334, 381, 411, 479, 483, 495, 496, 499-501, 511, 513, 528, 572, 614, 622, 723, 724  
 Curiosity (Intuition), 115  
 Customs And Immigration, 269  
 Cutlass, 211, 633, 650  
 Cutter (50 Tons), 287, 645  
 Cutting Torch, 640, 642  
 Cx Imperial Capital, 490  
 Cy Colony, 408, 489, 490  
 Cyard, 675  
 Cyber Implant Allowing Use Of Skill, 50  
 Cyborg (Cybernetic Organism), 574  
 D -D, 23  
 D6, 22, 109, 163, 663, 671, 672  
 Da Dangerous, 36, 412, 490  
 Daghadasi, 604, 606, 607  
 Dakhaseri, 14  
 Damage Chart, 186, 190  
 Damage Control, 109, 176, 198, 316, 340, 387, 390, 392  
 Damage Diagnosis, 263, 390  
 Damage Severity, 109, 176, 189, 198, 263, 325, 340, 375, 390, 617, 624, 640  
 Dancer (Dance), 124  
 Dancer (Skill), 124, 125  
 Danforth, Liz, 7  
 Danger, 11, 59, 152, 154, 250, 271, 404, 422, 489, 490, 529, 589, 591, 593, 606, 608, 652, 661, 679, 688, 705  
 Danger, Threat, And Risk, 679  
 Dark Conspiracy, 4  
 Darren Buck, 172  
 Darrian, 133, 502-506, 512, 622, 626, 629, 643, 701  
 Data Display, 642  
 Data Input, 122, 123, 138, 283  
 Data Port, 514-518, 520, 616  
 Data Terminals, 269  
 Databank, 642  
 Date Of Birth, 38  
 Dauterive Iii, Val J., 7  
 De Desert World, 487, 490  
 Deaf, 168, 181, 183, 189, 190, 562, 564, 624  
 Dean Drive, 328  
 Deception, 116, 298, 352, 661, 704, 705, 722, 723, 725  
 Decimal, 274, 338, 406, 408, 412, 421, 498, 547, 553, 556, 614, 622, 671, 674, 675, 677, 679, 684, 691, 695, 698, 709, 711, 713, 715, 717, 719, 720  
 Decimal Orbit Chart, 679  
 Decimal Sizes, 695  
 Decimal Sub-Bands, 677, 691  
 Decimal Tech Levels, 498  
 Deciton, 675  
 Deck Square, 310, 335, 517, 520, 675  
 Decon (Robot Insanity), 586  
 Deep Forest, 462  
 Deep Radar, 298, 299, 352, 358, 360, 361, 371, 506, 633, 634  
 Default Skills, 102, 112, 113  
 Defender, 111, 137, 185, 188, 286, 287, 387, 389, 391, 559, 592, 725  
 Defenses, 9, 139, 140, 269, 274, 276, 281-283, 285, 287, 292, 303, 306, 308, 312-314, 349, 354, 364-366, 371, 373, 381, 387, 389, 391-393, 506, 739  
 Degraff, Jesse, 7  
 Degree, Crime, 723  
 Deitrick, David, 7  
 Deliberate, 13, 104, 118, 119, 159, 161, 206, 207, 226, 255, 545, 586, 722-724  
 Delta Waves, 169  
 Densitometer, 298, 299, 352, 358, 360, 361, 371, 506, 633, 634  
 Depot, 75, 272, 407, 412  
 Depths, 253, 435, 459-461, 468, 473, 535, 557, 590, 596, 678, 680  
 Depths Chart, 459, 473  
 Depths Of The Ocean, 473, 678  
 Desert, 36, 196, 231, 240, 409, 422, 431, 433, 435, 437, 439, 458, 460, 461, 463, 474, 482, 485, 487, 489, 490, 557, 596, 597, 608, 629, 705  
 Desert Cloak, 231, 240, 629  
 Designator, 180, 181, 184, 192, 200, 201, 204, 207-210, 213, 215, 218, 220, 221, 535, 536  
 Designer (Design), 125  
 Designer (Skill), 112, 125, 138  
 Device Design, 121, 127, 129, 131, 135, 137, 138  
 Devlin, Liam, 7  
 Dexterity, 27-30, 32, 34, 37, 38, 43, 45, 52, 69, 80, 83, 98, 99, 102, 107, 108, 110, 111, 118, 119, 125, 135, 149, 181, 182, 185, 192, 226, 232, 522, 558, 561, 566, 577, 580, 583, 637  
 Di Die-Back, 490  
 Diagnosis, 99, 109, 121, 122, 127, 128, 131, 134-138, 176, 177, 189, 198, 230, 263, 316, 340, 375-377, 383, 390, 503, 542, 624, 647, 700, 703  
 Diagnosis And Repair, 121, 122, 127, 128, 131, 134, 135, 137, 138, 198, 375-377  
 Dialability, 330  
 Dice, 8, 9, 12, 13, 21-23, 28-30, 36, 50, 58, 63, 82, 90, 95, 98-102, 104-108, 119, 131, 134, 146, 157, 158, 163, 166, 168, 170, 173, 174, 176, 178, 179, 181, 182, 184, 185, 195, 197, 199, 206, 215, 337, 338, 344, 345, 353, 354, 356, 365, 392, 406, 422, 423, 476, 521, 532, 534, 540, 548, 550, 553, 558, 564, 566, 567, 577, 583, 584, 662-673, 707, 724  
 Dice Modifier, 22, 663  
 Die Modifier, 22, 106, 663  
 Die Roll Revisions, 23  
 Diplomacy Handbook (Dh), 125  
 Diplomat (Diplomacy), 125  
 Diplomat (Skill), 112, 125, 126  
 Directorship, 48-50, 65, 67  
 Dirty Bomb Option, 195  
 Disability Muster Out, 51  
 Disciplines, 495  
 Discontent Robot, 586  
 Discovery Land Grant, 68  
 Disease Robot, 586  
 Dishonor, 704, 722, 724  
 Disruptive Effects Of Charisma, 31  
 Distance And Range, 9  
 Distinction Between A Starport And A Spaceport, 268  
 District, 73, 466  
 Divergence, 507  
 Division Of Labor And Mass Production, 499  
 Dm, 12, 22, 23, 30, 34, 49, 50, 55-67, 118, 121, 124, 125, 390, 406-409, 413, 476, 487, 507, 556-558, 563, 596-598, 609, 649, 663, 664, 671  
 Dm Changes The Die Roll, 23, 664  
 Dna, 38, 50, 78, 82-85  
 Docking, 388, 393  
 Documents, 63, 71, 75, 117, 146, 244, 688  
 Domed, 433, 435, 437, 439, 459-461, 466, 474, 648  
 Domed City, 459, 466  
 Dominant, 25, 84, 86, 87, 523, 524, 500, 573, 605  
 Dominated Carrier, 568  
 Donachie Corp, 695  
 Donor, 83-85, 96, 483, 560, 568, 569  
 Double Benefits, 45, 51, 56, 59-63, 66  
 Downport, 266, 268, 269, 272, 408, 466  
 Dragging, 29, 34  
 Drive Limit Charts, 679  
 Drive Potential, 119, 278-281, 285, 294, 296, 297, 322, 323, 326, 330, 336, 337, 346, 347, 350, 351, 379, 382-385  
 Driver, 36, 40, 43, 46, 55, 56, 58, 60, 62, 64, 65, 67, 95, 103, 112, 114, 115, 126, 127, 129, 139, 144, 231, 245, 246, 248, 250, 282, 283, 308, 309, 311, 517, 564, 575, 582, 584  
 Driver (Skill), 112, 126, 127, 245, 246  
 Drone, 286, 287, 559  
 Droyne, 15-17, 133, 210, 213, 221, 233, 238, 381, 571, 632, 633, 733, 703  
 Droyne Of Droynia, 571  
 Dual, 83, 299, 301, 303, 381, 549, 552, 560, 563, 598  
 Duction And Training, 37  
 Duchess, 31  
 Dukes, 18, 31  
 Dumb Puller, 604, 611  
 Dungeons & Dragons, 10  
 Duplicate Benefits, 50, 51  
 Duplicate Entitlements, 51  
 Dust "Kh", 194  
 Dying During Character Generation, 51  
 Eab, 83, 560  
 Eaglestone, Robert, 7  
 Early Imperium, 16, 17, 650  
 Ease Of Use, 123, 124, 142, 150-156, 521, 497, 628, 641, 642, 671, 677, 678, 691  
 Easy Check, 22, 28-30, 34, 115, 527, 663  
 Easy To Use, 151, 154, 155, 656  
 Ecm Extra Corporeal Manipulation, 530, 533, 540  
 Ecological Niche, 25, 548, 552, 553, 557,

590, 591, 596  
Economic Caste, 559  
Economic Extension (Ex), 404, 411  
Economic Trade Classifications, 489  
Economics, 20, 404, 490, 491  
Ed5, 39-41, 52, 73  
Edge Of The Empire, 4, 18  
Educational Institutions, 39, 41-43, 72, 73, 537  
Educational Process, 39  
Educational Waivers, 39  
Effective Biological Sciences, 499  
Egareva, 114, 359  
Egg Donor, 84, 85, 560, 568, 569  
Ehex, 9, 32, 37, 38, 150, 171, 306, 530, 558, 619, 674, 679, 719, 720  
Eidetic Aural Memory, 148, 149  
Eidetic Visual Memory, 148  
Elder, 69, 78, 79, 555, 561  
Electric Fields (Awareness), 175  
Electrokinesis, 528  
Electrokinesis =Eshift, 528  
Electronics (Electronic), 127, 480  
Electronics (Skill), 102, 126, 127  
Elemental Gas, 638  
Elyosa, 604, 607  
Emergency Medical, 269  
Emitter, 485, 582, 636  
Empath (Empathy), 146  
Empath (Talent), 146, 147  
Emperor, 35, 65, 68, 75, 104, 404, 650, 655, 734, 696, 703, 707  
Empire, 4, 11, 13, 16-18, 20, 25, 38, 46, 57, 59, 61, 65, 66, 68, 71, 74, 75, 210, 228, 404, 407, 411, 500, 513, 611, 654, 736, 688, 696  
Ems, 298, 299, 320, 352, 356, 358, 359, 361, 362, 371, 376, 377, 506, 633, 634  
Emthree, 254, 675  
Energy Drink, 637  
Energy Points, 322, 346, 347, 378  
Eneri Dinsha, 38, 41, 46, 50, 71, 72, 80, 82, 83, 101, 102, 104, 105, 114, 120, 133, 143, 151, 153, 155, 166, 168, 170, 178, 179, 182, 183, 228, 488, 518, 532, 659  
Eneri Endurance Dinsha, 33  
Engineer, 40, 43, 46, 54, 58-61, 63, 64, 95, 105, 112, 114, 115, 120, 126-129, 132, 136, 137, 139, 140, 159, 183, 227, 272, 284, 291, 308, 309, 311, 314, 320, 337, 347, 517, 509, 564, 584, 655, 696  
Engineer (Engineering), 127  
Engineer (Skill), 126-128, 291  
Engineered Societies, 507, 508  
Enigmatic, 16, 465  
Enlisted Retirement, 48, 51  
Entertainer, 8, 43-45, 49, 50, 52, 54, 57, 63, 64, 67, 71, 74-77, 81, 169, 559, 738, 688, 692, 696, 703  
Entertainer Career, 45, 57  
Entertainments, 477, 481, 485, 501, 511  
Entitlements, 47, 48, 51  
Entitlements Muster Out Benefits, 48  
Environmental Tank, 639  
Epic, 4, 9, 75, 523, 524, 653, 656-661  
Epic Adventure, 656, 659, 661  
Equestrian, 144  
Erehwemos, 38  
Escort, 72, 76, 107, 286, 287, 291, 337, 732  
Eshift, 528, 533-535, 537, 540-542  
Esp Extra Sensory Perception, 530, 532, 540  
Estate, 74, 97, 422, 431, 433, 458, 460, 469, 694, 722  
Estimating Sale Price, 476  
Eternity Circuit Module, 640  
Ether, 175  
Evans, Richard L. (1908 - 1971), 11  
Event Branch Manipulation, 509  
Excellent Quality Starport, 267  
Exemplary Service, 46, 48, 71  
Exhaustion, 30  
Exile (Noble), 65  
Expanded Hex Code, 674  
Expedition, 10, 16, 75, 77, 286, 287  
Experience, 8, 13, 27, 30, 32, 37, 43, 50, 55, 69, 70, 72, 78-82, 94, 99, 101, 102, 106, 108, 110, 112-115, 118, 120, 121, 127-129, 131, 133-142, 144, 148, 269, 284, 325, 326, 335, 404, 526, 527, 501, 510, 511, 528-530, 568, 584, 617, 620, 652, 655, 656, 662, 707  
Experienced Expert, 108  
Explorer Duty, 59  
Explosives (Demolitions), 128  
Explosives (Skill), 112, 128  
Express, 4, 20, 63, 76, 80, 102, 107, 108, 117, 122, 134, 136, 146, 149, 173, 269, 286, 287, 475, 486, 550, 677, 679, 688, 691  
Expressway, 467, 471  
Extinct Exotic Natives, 412, 546, 556  
Extinct Natives, 412, 546, 548, 556  
Extra Corporeal Manipulation (Manipulation), 528  
Extra Sensory Perception, 528, 530, 532, 538-540  
Extra-Territoriality, 271  
Extremely Skilled Master, 108  
Exurb, 466  
Ezra The Scribe (480 - 440 Bce), 11  
Fa Farming, 36, 408, 489, 490  
Factory, 93-95, 97, 106, 201, 219, 249, 525, 496, 498, 579, 693, 695  
Fair Use Policy Fup, 4  
False Colors, 174  
False Dawn, 16, 17  
False Institutes, 529  
False Witness, 704, 722, 724  
Fame, 21, 44, 45, 47-50, 52, 56, 57, 59, 63-65, 70, 71, 124, 125, 679, 688, 696  
Fame Flux Event, 47, 71  
Fame, Danger, And Threats Chart, 679  
Family Caste, 559  
Family Choice Caste, 559  
Fantastic Drives, 119, 334, 337  
Far Future Enterprises, 3, 4, 1  
Far Star, 405, 406  
Farmland, 463  
Fast Boost, 197, 325  
Fast Drug, 478, 481, 484, 503, 645, 646  
Fast Re-Entry, 325  
Fatigue, 27, 29, 30, 34, 146, 230, 237, 522, 528, 531-533, 535, 536, 540, 542, 543, 558, 576, 637, 647  
Faux, 92, 93  
Faux (Foe, Fox), 92  
Favored Society Effect, 500  
Felony, 704, 722, 723  
Female, 84, 85, 88, 89, 92, 169, 549, 552, 560, 569, 605, 609, 722  
Fenric Cayne, 28  
Fief, 68  
Field Sensor, 298, 299, 352, 359-361, 371, 506, 633, 634  
Field, Ice, 435, 437, 439, 471  
Field, Open, 471  
Fields, 102, 134, 163, 174, 175, 275, 277, 280, 281, 283, 288, 291, 323, 329, 334, 349, 359, 364, 366, 373, 374, 376-378, 380, 463, 469, 483, 508, 554, 570, 608, 634, 660, 724  
Fighter (10 Tons), 287, 645  
Fighter (Fighting, Personal Combat), 128  
Fighter (Skill), 128, 159  
Fighter Interference, 391, 393  
Fighting Ships, 287  
Filis Ten, 97, 98, 124  
Fillform, 9, 37, 206, 207, 214, 222, 226, 234, 236, 239, 244, 261, 262, 274, 275, 283, 285, 293, 306, 402, 406, 413, 415, 417, 419, 547, 548, 553, 555, 559-561, 577, 578, 621  
Fillform Sophont Creation Card, 555  
Fillform, Sophont Creation, 548, 555  
Filter, 92, 143, 152, 231, 235, 246, 478, 480, 481, 485, 557, 591, 596, 604, 606, 609, 631, 632  
Finding Basic Facts, 30  
Fine Manipulation, 29, 30, 34  
Fire Shield, 231, 630  
Fire Suppressor, 630  
First Aid, 109, 143, 176, 189, 340, 390, 392, 631, 645, 649  
First Aid Kit, 631, 645, 649  
Fission Orion, 329, 330, 384  
Fission Power Plant, 279, 347, 349, 382  
Fitch-Davis, Ryan, 7  
FI Fluid Oceans, 487, 490  
Flapper, 40, 43, 58, 112, 129, 144, 245, 246, 250, 252, 255, 259, 472, 474, 564, 584, 708  
Flapper (Ornithopter, Flapping Wing Aircraft), 144  
Flapping Wing Aircraft, 144  
Flare Gun, 636  
Flash, 23, 133, 168, 175, 181, 183, 187, 188, 190, 193, 195, 208, 213-216, 218-222, 231, 235, 240, 291, 335, 337, 339, 369, 374, 391, 624, 637, 644, 664  
Flash-Bang, 193  
Flask, 639  
Fleet Tactics, 40, 46, 58, 61, 112, 128, 129, 140, 142, 564, 584  
Fleet Tactics (Skill), 112, 128, 129  
Flight School, 39-42, 46, 52, 72, 73  
Fluidics (Fluidic, Hydraulic), 128  
Fluidics (Skill), 129  
Fluids, 78, 79, 90, 92, 93, 277, 478, 480, 481, 483, 484, 516, 547, 553-555, 563, 595, 598, 600, 607  
Flux, 22, 23, 32-34, 44-47, 52, 55-57, 59-66, 71, 81, 84, 86, 87, 94, 103, 104, 106, 109, 120, 122-125, 130, 140, 142, 143,

147, 150-156, 159, 161, 169, 172, 176, 178, 180, 181, 190, 192, 199, 212, 237, 249, 255, 291, 293, 299, 301, 303, 310, 314, 316, 324, 325, 334, 337, 339-341, 343, 344, 367, 368, 376, 381, 384, 387, 390, 392, 393, 397, 402, 404, 406-409, 411, 412, 486, 487, 521, 524, 525, 497, 498, 507, 529, 535, 537, 548, 549, 553, 556-564, 569, 570, 579-581, 583, 593, 595-600, 620, 622, 625, 647, 662-666, 671-673, 684, 688, 692, 695, 697, 698, 701-705, 711, 713, 715, 717  
 Flyer (Aircraft), 129  
 Flyer (Skill), 112, 129, 246  
 Flyer Landing Grounds, 470, 471  
 Flyers, 29, 34, 129, 192, 193, 208, 243-246, 248, 249, 251, 252, 255, 259, 265, 460, 461, 467, 470-472, 558, 582, 597, 599, 602, 678  
 Flyers And Atmospheres, 472  
 Fmn, 83, 560  
 Fo Forbidden, 36, 404, 412, 489, 490  
 Focaline Tree Rat, 604, 607  
 Footpath, 467  
 Forbidden, 36, 48-50, 55, 59, 61-63, 65-67, 404, 407, 412, 489, 490, 528  
 Forbidden Knowledge, 48, 50, 528  
 Forboldn Spin 1808 D893614-5, 610  
 Forced Growth Cloning, 69  
 Ford, Andrew, 7  
 Ford, John M. (1957 - 2006), 10  
 Forensics (Forensic Science, Investigation, Detective), 130  
 Forensics (Skill), 112, 129, 130  
 Foreseeable, 723  
 Forest, 175, 360, 462, 557, 596, 597, 603, 724  
 Forgery Masterpieces, 119  
 Format, 28, 71, 100, 101, 113, 150, 169, 205, 225, 232, 243, 286, 402, 407, 489, 522, 547, 562, 563, 565, 598, 656, 657, 674, 684  
 Format, 28, 71, 100, 101, 113, 150, 169, 205, 225, 232, 243, 286, 402, 407, 489, 522, 547, 562, 563, 565, 598, 656, 657, 674, 684  
 Former Organizations, 72, 76  
 Fortress, 469  
 Forward Observer, 128, 130, 131, 139, 190, 192  
 Forward Observer (Fwd Obs, Fire Director, Fire Controller), 130  
 Forward Observer (Skill), 130, 192  
 Foundations Of The Universe, 8  
 Fr Frozen, 36, 489, 490, 556  
 Frantsen, Greg, 7  
 Free Trader Beowulf, 146, 487, 516, 517, 655, 658  
 Freeway, 467, 471  
 Freezer, 637  
 Freight, 140, 146, 243, 245, 269, 271, 272, 274, 286, 287, 306, 308, 314, 475-477, 486, 645, 693  
 Freight (Trade Goods), 475  
 Freight Docks, 269  
 Freighter, 17, 286, 287  
 Frequency (Hearing), 169  
 Friction, 20, 126, 127, 285, 289, 325  
 Frigate, 75, 286, 287, 321, 383  
 Frontier Starport, 267, 268, 273  
 Frontier Trader's Ramp, 24  
 Frozen Lands, 431, 433, 435, 437, 439, 458-461, 465, 474, 557, 596, 705  
 Frozen World, 568  
 Ftl Faster Than Light, 15  
 Ftl Faster-Than-Light, 16  
 Fuel, 9, 18, 19, 208, 267, 268, 272, 276, 278-281, 285-287, 294, 295, 297, 304, 305, 312-314, 320, 321, 325, 326, 328-331, 337, 339, 340, 344, 345, 347-350, 379, 382-385, 393, 408, 480, 576, 585, 611, 616, 618, 625, 636, 638, 642, 644, 678  
 Fuel Cell, 294, 347, 349, 585, 625  
 Fuel Cells, 347, 349, 616, 618, 625  
 Fuel Gas, 297, 382, 385, 408, 638  
 Fuel Slugs, 297, 349, 385  
 Fugate, Joe, 7  
 Fulacin Spin 2613 A674210-D, 608, 609  
 Full Circle Coverage, 174  
 Full Qrebs, 150  
 Functionary, 8, 43-46, 48-54, 63, 64, 67, 81, 660, 696, 703  
 Functionary Career, 45, 67  
 Functionary's Pension, 48  
 Fundamental Knowledge, 121, 127, 128, 131, 134, 135, 137, 138  
 Fup Fair Use Policy, 4  
 Fusion Orion, 329, 330, 384  
 Fusion Plus, 279, 281, 294, 347-349, 374, 382, 383, 500, 570, 580, 616, 618, 625  
 Fusion Power, 19, 105, 229, 278, 279, 297, 334, 347-350, 355, 374, 382, 385, 576  
 Fusion Power Plant, 105, 278, 297, 334, 347-349, 355, 382, 385  
 Fusionplus, 323, 347-349, 355, 382, 502, 580, 585, 644, 654  
 Future-Predicting Computers, 15  
 G-Drive (Gravity Drive), 144  
 Ga Garden World, 36, 489, 490  
 Gaffe, 704, 722  
 Galaxiad, 4, 17  
 Galaxias, 14  
 Galaxy, 8, 12, 14, 16, 18, 57, 60, 71, 345, 394, 395, 397, 509, 510, 544, 688  
 Galley, 304, 637  
 Gambler (Gambling), 131  
 Gambler (Skill), 112, 130, 131  
 Game Designers' Workshop, 4  
 Game Master, 12, 30, 35, 80, 105, 107, 122, 124, 125, 140, 656, 658  
 Gamma Waves, 169  
 Garnett, Guy, 7  
 Gas Giant, 77, 272, 320, 325, 338, 339, 353, 359, 396-398, 400, 402, 403, 405-408, 413, 442-449, 452, 456, 457, 491, 548, 660, 677, 678, 681, 682, 685, 691, 719, 720  
 Gases, 147, 168, 183, 225, 229, 231, 245, 246, 459, 461, 465, 478-481, 484, 485, 490, 516, 545, 546, 548, 602, 606, 619, 626, 631, 632, 638  
 Gauss Machinegun, 216  
 Gauss Pistol, 216  
 Gdasht, 201  
 Gdint, 201  
 Gender, 20, 26, 69, 78, 79, 83-90, 94, 96, 170, 171, 547-555, 559-561, 564, 568, 569  
 Gender Assignment, 553, 554, 560  
 Gender Generation Table, 549, 553, 560  
 Gender Progression, 560  
 Gender Shifts, 560  
 Gender Symbols, 85  
 Gender-Based Differences, 553, 560  
 Gender-Based Special Abilities, 564  
 Gender-Linked, 84, 86, 87  
 Gene, 82-84, 86, 87, 117, 525, 579  
 Gene Editing, 84  
 Geneering, 82, 84, 90, 91, 96, 98, 516, 519, 495, 499, 501, 503, 508, 575, 577  
 Generated D, 82-84  
 Generator, 347, 372, 377, 379, 380, 479, 616, 618, 625, 640, 641, 644  
 Genetic, 27, 28, 30-32, 35, 38, 41, 42, 46, 50, 52, 82-92, 94, 96-98, 522-526, 499, 508, 512, 530, 536, 545, 550-552, 558, 572-575, 577, 579, 587, 610, 640  
 Genetic Characteristic, 82, 83, 86, 87  
 Genetic Profile, 28, 82, 84, 85, 90, 91, 523, 524, 526, 552, 558, 575, 577  
 Genetic Profile (Gp), 28, 558  
 Genetic Profile Gp, 28, 558  
 Genetic Testing, 38, 82, 83  
 Genetics, 8, 28, 33, 36, 38, 82, 83, 86-89, 98, 524, 526, 495, 559, 570  
 Genetics Card T5-004, 86  
 Genetics Card T5-005, 87  
 Gentle, 31, 477  
 Gentlebeing, 31  
 Gentleman, 31, 35, 65, 68, 696, 703  
 Gentleone, 31  
 Gentleperson, 31  
 Gentlesophont, 31  
 Gentlewoman, 31  
 Geonee, 25, 133, 546, 572, 703  
 Geonee Of Shiwonee, 546, 572  
 Getting Paid, 51  
 Gibson, Bryan, 7, 10  
 Gibson, Bryan (1966 - 2014), 10  
 Gig (20 Tons), 287, 645  
 Gigo, 613  
 Gill, 231, 235, 631, 632  
 Glacier, 461, 464  
 Glesner, Craig A., 7  
 Golden, David, 7  
 Gonk, 133  
 Good Flux, 23, 81, 84, 106, 123, 140, 147, 155, 169, 537, 564, 664, 665, 673  
 Good Quality Starport, 267  
 Gordon, Hunter, 7, 10  
 Gordon, Hunter (1966 - 2013), 10  
 Grace, 27-29, 34, 38, 43, 45, 69, 102, 120, 124, 185, 522, 558, 561, 563, 566, 577, 580, 583, 611, 637  
 Grandfather, 15-17, 25, 572  
 Grandfather's Era, 15  
 Grapples, 276, 288  
 Grasper, 172, 197, 202, 205, 210, 213, 217, 221, 233, 238, 565, 580  
 Grav (Grav Flyer), 144  
 Grav (Grav Vehicle), 144  
 Grav (Grav Watercraft), 144  
 Grav Belt, 632



Gravitic, 19, 127, 129, 131, 144, 208, 245, 246, 277-281, 294, 297, 322-325, 328, 329, 333, 343-345, 349, 362, 373, 375-377, 380, 384, 385, 393, 414, 416, 418, 479-481, 516, 494, 505, 587, 602, 617, 625, 639, 678, 681, 683, 686, 695, 724  
 Gravitic Tank, 639  
 Gravitic Translimiter, 695  
 Gravitics (Gravitic), 131, 481  
 Gravitics (Skill), 131  
 Gravity Manipulation, 19, 323, 499  
 Gravity-Drive (G-Drive), 144  
 Gravypad, 470  
 Grenade, 178, 193, 200, 202, 208, 209, 212, 213, 216, 218, 220, 221  
 Grey Goo, 507, 508, 641  
 Grip, 172, 188, 189, 198, 375, 565, 602  
 Gripper, 172, 197, 205, 213, 217, 221, 233, 238, 565, 580, 632  
 Groat, 544, 600, 604, 608, 609  
 Group Personalities, 507, 508  
 Guest Clone, 96-98  
 Guest Worker, 97  
 Gulag, 468  
 Gunmaker, 8, 200, 205, 213-223, 277, 498  
 Gunner (Gunnery, Ship's Guns), 131  
 Gunner (Skill), 131, 132  
 Guns (Slug Throwers), 145  
 Gunsight, 633, 634  
 Gurps Traveller (Gt), 4  
 Gvegh, 39, 133, 643  
 Gygax, E. Gary (1938 - 2008), 10  
 Habitable World Terrain, 462, 463  
 Habitable Zone, 197, 400, 402, 403, 405-408, 413, 414, 416, 418, 489-491, 547, 548, 553, 555, 556, 679, 685, 721  
 Habitable Zone Chart, 556  
 Habitable Zones Chart, 679  
 Habitat, 466, 593, 648  
 Hadron, 146  
 Half-Dice, 23, 663  
 Half-Die, 23  
 Half-Organic, 92  
 Hamlet, 466  
 Hangar, 230, 237, 304, 305, 648  
 Happiness, 15, 507, 508, 661, 705  
 Hard Check, 22, 28-30, 34, 115, 527, 663  
 Hard To Use, 151, 154, 230, 232, 237  
 Harm, 68, 207, 575, 738, 688, 722-725  
 Harshman, John, 7  
 Hartman, Andrew, 7  
 Hatch, 13, 103, 175, 533, 640, 659  
 Hazardous, 84, 152, 154, 155, 227, 231, 577, 603, 628  
 He Hellworld, 36, 489, 490  
 Healing, 91, 93, 94, 98, 135, 136, 147, 278, 508, 528, 542, 646, 647, 649  
 Healing =The Touch, 528  
 Hearing, 78, 79, 109, 119, 148, 162-165, 168, 169, 173, 180, 230, 237, 528, 532, 533, 537-541, 550, 552, 554, 555, 562, 564, 569, 578, 581, 608, 647  
 Hearing Benchmarks, 165, 168, 539  
 Hearing, Frequency, 169  
 Hearing, Range, 169  
 Hearing, Span, 169  
 Hearing, Voice, 169  
 Heavy Anti-Armor Warhead, 193  
 Heavy Weapons (Heavy Wpns), 132  
 Heavy Weapons (Skill), 132  
 Heck, Joseph, 7  
 Helene Dark 1005 C665866-7, 607  
 Helicopter, 129, 144, 245, 246, 257  
 Helipad, 470  
 Heplar, 252, 280, 294, 297, 322, 323, 325, 328, 329, 382, 384, 385, 494  
 Heplar High Efficiency Plasma Re-Combustion, 328, 329  
 Heresy, 704, 722, 724  
 Heterodoxy, 704, 722, 724  
 Hexadecimal, 674  
 Hexagon, 396, 421, 459  
 Hexaphant, 566, 567  
 Hi High Population, 36, 487, 489, 490  
 Hi-G (High-Gravity, Hi-Gravity), 132  
 Hibernate, 112, 147, 550, 564, 611  
 Hibernate (Talent), 147  
 Hibernation, 147, 383, 568, 646  
 Hidden Pasts, 38  
 High Crime, 704, 722, 723  
 High Efficiency Plasma Re-Combustion, 328, 329  
 High Law Levels, 272, 645  
 High Passage, 47, 48, 50, 65, 305, 307, 486  
 High Speed, 146, 326, 431, 458, 460, 467, 474  
 High Treason, 704, 722, 724  
 High-G (Skill) Hostile Environ (Skill), 112  
 High-G (Skill) Hostile Environment (Skill), 132  
 Higher Plane, 507, 509, 511, 544, 570  
 Higher Planes, 509  
 Highport, 267-270, 272, 408  
 Highport (Orbital Starport), 268  
 Highway, 249, 251, 422, 431, 458, 460, 466, 467, 471, 474, 700, 703  
 Highway, Automated, 467  
 Hiring Hall, 269-271  
 Hironobu, 694  
 History, 4, 8, 11, 12, 15, 17, 20, 21, 25, 37, 40, 112, 117, 118, 124, 144, 334, 402, 482, 522, 508, 511, 564, 643, 650, 653, 654, 658, 692  
 Hive Federation, 17  
 Hivers, 546, 573, 587, 703  
 Hivers Of Guaran, 546, 573  
 Ho Hot World, 490  
 Hobby, 52, 58, 63, 80, 94, 95, 113, 249, 250, 525, 537, 583, 584  
 Hohmann Orbit, 328  
 Hoist, 640  
 Hold Your Breath, 30  
 Holiday, 706, 707  
 Holovisor, 298, 299, 352, 356, 357, 361, 362, 371, 506, 633, 634  
 Homestar, 408, 546, 547, 553-556  
 Homeworld, 15, 16, 24, 25, 33, 36-38, 42, 46, 52, 65, 68, 72, 74, 77-79, 114, 115, 122, 123, 187, 412, 489, 495, 500, 544-548, 552-557, 568, 596, 610, 611, 696  
 Homo Erectus, 25  
 Homo Neanderthalensis, 25  
 Homo Rhodesiensis, 25  
 Homo Sapiens, 25, 545  
 Horizon, 163, 164, 166, 175, 191, 201, 423, 433, 434, 436, 438, 538, 603, 634, 676, 690  
 Hospitable Worlds, 405  
 Hostile Environ (Hostile Environment), 132  
 Hostile Environ Suit, 183, 200, 629  
 Hostile Environment (Skill), 132, 134  
 Hot World, 230, 490, 556, 568  
 Hot Zone, 465  
 How Big Is It Really?, 695  
 How Fast?, 499, 590, 679, 686  
 How To Play, 12, 25, 659  
 How To Play Traveller, 12  
 Howe, Roger, 7  
 Human Character Generation, 37  
 Human Characteristics, 27, 37, 52, 548, 671  
 Human Mental Aging, 69  
 Human Physical Aging, 69  
 Human-Dominated Universe, 20  
 Humaniform, 223, 575, 576  
 Humanity, 14, 16, 25, 571, 700, 703  
 Humanity, 8, 20, 25, 395, 545, 552, 572, 660  
 Humanoid, 93, 573, 614  
 Humans Of Terra, 20, 25, 544, 546, 572  
 Hypno, 112, 147, 564  
 Hypno (Talent), 147  
 Hz (Habitable Zone), 400, 402, 413, 414, 416, 418, 556  
 Hz Habitable Zone, 400, 402, 413, 414, 416, 418, 556  
 I Think I Might Be Psionic, 529  
 Ic Ice-Capped, 36, 489, 490  
 Ice Cap, 433, 435, 437, 439, 460, 461, 464, 609, 705  
 Ice Field, 249, 422, 431, 433, 435, 437, 439, 458, 460, 461, 465, 471, 705  
 Ice Gear, 632  
 Ice Pack, 461, 464  
 Ice Sheet, 461, 464  
 Ice Shelf, 461, 465  
 Ice Shelf., 461, 465  
 Icon (Armor), 292  
 Icon (Defenses), 292  
 Icon (Drives), 294, 296, 298, 300, 302, 304, 306, 308, 310  
 Icon (Sensors), 295, 299, 301, 305, 307, 309, 311  
 Iconographics, 292, 294-296, 298-302, 304-311  
 Icosahedron, 421  
 Identifying Cargos, 476  
 Ied Improvised Explosive Device, 193  
 Ignorance, 704, 722, 724  
 Ignorant, 528, 661, 723  
 Illness Robot, 586  
 Imbalance Items, 477  
 Imbalances, 477, 484, 485  
 Imitation Animal, 92  
 Immediate Action, 109, 143, 148, 176, 189, 198, 250, 263, 316, 325, 340, 367, 387, 390, 392  
 Imminence, 688, 700, 702  
 Immune, 32, 69, 122, 376, 723  
 Impact Crater, 460, 468  
 Imperial Calendar, 9, 17, 38, 706, 707  
 Imperial Family, 65, 68, 696, 703  
 Imperial Interstellar Scout Service, 544,

594, 726, 736  
 Imperium Games, 4  
 Implantable Ethics, 507, 508  
 Importance, 21, 38, 65, 68, 72, 80, 99, 243, 274, 348, 403, 404, 406, 407, 411, 486, 500, 501, 530, 545, 547, 558, 589, 654, 658, 661, 680, 696, 722  
 Important Events, 72, 77  
 Improvised Explosive Device, 193  
 In Contact, 109, 163, 178, 185, 378, 532, 543  
 In Industrial, 36, 487, 489, 490  
 In Kind Transactions, 24  
 Ina, 119, 562, 581, 605, 618  
 Inaction, 115, 158, 161, 368, 524, 704, 722, 724  
 Inattention, 289, 704, 722-724  
 Indirect Fire Weapons, 130, 192  
 Individual Qrebs Values, 150  
 Individual Transformations, 499, 507, 508  
 Industrial World, 475, 500, 587, 696  
 Industry, 67, 269, 270, 382, 479-483, 490, 515, 631, 638  
 Inertial, 19, 131, 136, 151, 289, 323, 327, 329-331, 358, 377, 378, 632-634, 642  
 Inertial Compensation, 323, 327, 330, 331  
 Inertial Dampers, 19  
 Inertial Navigator, 136, 151, 632, 633  
 Inertialess Maneuver, 509  
 Inertialess, 280, 325, 507  
 Infamy, 64, 71, 688  
 Infant, 69, 84, 537, 561  
 Infection, 85, 183, 190, 215, 237, 367, 624, 646  
 Inferno, 413, 678, 682  
 Inflation, 631, 695  
 Information Processors, 123, 515, 499  
 Infraction, 704, 722  
 Infrasonic, 163, 169  
 Ingles Yreva, 125  
 Inheritance, 85, 98  
 Inheritance Of Money, 85  
 Inheritance Of The Learning Characteristics, 85  
 Inheritance Of The Social Characteristics, 85  
 Inherited Caste, 559  
 Inherited D, 82, 83  
 Inhospitable World Surfaces, 465  
 Injustice, 149, 693, 704, 722, 724, 725  
 Inner Worlds, 405  
 Insanity, 32, 523, 569, 586  
 Insanity Robot, 586  
 Insight (Intuition), 115  
 Inspecting An Object, 152  
 Instinct, 27-30, 32, 35, 38, 39, 69, 82, 84, 85, 102, 306, 522, 525, 527, 544, 558, 561, 570, 583, 584, 592  
 Instinct Provides A Time Advantage, 30  
 Instinctual Reactions, 30  
 Instinctual Skills And Knowledges, 30  
 Insult, 159-161, 704, 722, 724  
 Insystem Drives, 278  
 Intensity, Crime, 723  
 Intent, Crime, 723  
 Interceptor Fighter, 287  
 Intercontinental Airport, 470  
 Interface Terrain, 470, 471  
 Interference, 20, 283, 285, 291, 337, 339, 340, 357, 391, 393, 469, 499, 703  
 Interplanetary Defense Forces, 270  
 Interplanetary Drives, 278, 280, 285, 322, 323, 346, 347  
 Interspecies Fertility, 85, 91  
 Interstellar Drives, 25, 278-280, 285, 287, 295, 311, 323, 347-349, 508, 509, 611  
 Interstellar Tech Level, 513  
 Interstellar Wars, 17  
 Intferhi Of Beta Hydrae, 568  
 Intrigue (Noble), 65  
 Intuition, 112, 115, 147, 564  
 Intuition (Talent), 147  
 Intuitions, 112, 115, 528, 532, 540  
 Intuitions (Intuition), 115  
 Investment, 692-694  
 Ir, 91, 94, 167, 219, 237, 478, 481, 484, 618, 636  
 Iris Valve, 640  
 Iroan (Inspect And Repair Only As Necessary), 151  
 Islands, 251, 272, 422, 431, 433, 435, 437, 439, 458, 460, 462, 464, 474, 705  
 Isolative Effects Of Caste, 31  
 Ivory Gazelle, 600, 609  
 J-Drive (Jump Drive), 144  
 Jack, 48-51, 55-67, 102, 107, 112, 113, 134, 135, 229, 231, 235, 240, 248, 523, 525, 526, 542, 578, 579, 629, 642, 643  
 Jack Of All Trades (Jot, Rarely Joat, Jack-Of-All-Trades), 134  
 Jammer, 298, 299, 352, 356, 359-362, 371, 506, 636  
 Jane, Fred T. (1865 - 1916), 10  
 Jane's Naval Wargame, 10  
 Jaquays, Jennell, 7  
 Jaquays, Paul, 7  
 Jinn, 650  
 John Smith, 80  
 John Wick, 7, 51  
 Jot Jack Of All Trades (Skill), 112, 134  
 Journal Of The Travellers' Aid Society, 4, 10  
 Juice, 637, 639  
 Jump Drive, 16-18, 58, 105, 144, 150, 151, 155, 272, 277-280, 283, 291, 314, 333-337, 339-341, 347, 367, 378, 379, 382, 383, 414, 416, 418, 516-518, 500, 509, 545, 564, 584, 640, 643, 654, 683  
 Jump Drive (J-Drive), 144  
 Jump Drive Reciprocator, 150, 151  
 Jump Space, 18, 308, 333, 334, 337, 339, 340, 379, 500, 641  
 Jump Tape, 642, 643  
 Jump Technology, 342, 500, 570  
 Jumpspace, 18, 272, 280, 332-334, 337, 339-341, 643  
 Jupiter, 19, 400, 406, 413, 445-449, 452, 678, 679, 683, 684, 711, 713, 720  
 Justifiable, 723, 724  
 K'kree, 133, 210, 213, 217, 221, 233, 238, 240, 412, 546, 573, 726, 701, 703  
 K'kree Of Kirur, 546, 573  
 Keith Jr, William H., 7  
 Keith, Andrew J., 7  
 Keith, J. Andrew (1958 - 1999), 10  
 Kian, 592, 604, 608, 609  
 Kian (Riding Beast), 592  
 Kilbride, James, 7  
 Killing, 132, 479, 592, 604, 704, 722-725  
 Kiloliter, 254, 675  
 Kinetic Kill Weapons, 145  
 Kisthdra, 500  
 Kk Kinetic Kill, 195  
 Knight, 31, 35, 63, 65, 68, 406, 412, 696, 703  
 Knighthood, 31, 48-51, 57, 59-64, 66, 67  
 Knowledge List, 39, 112, 144, 145  
 Knowledge Maximums, 114  
 Knowledge: Power System, 347  
 Krause, Collin, 7  
 Krause, Sawyer, 7  
 Kudebeck's Gazelle, 604, 609  
 Kursae, 16, 17, 133, 495  
 Kyle Martin, 43  
 Lab, 17, 70, 286, 287, 304, 321, 521, 648, 739  
 Labor Multiplier, 495  
 Laboratory Ship, 287, 321  
 Labyrinth, 468, 652  
 Lacipyrt, 38  
 Lagash, 76, 396, 398, 655  
 Lagoon, 464  
 Lair, 25, 91, 546, 573  
 Lake, 249, 251, 253, 422, 431, 437, 439, 458, 460, 461, 464, 465, 473, 474, 680, 705  
 Lan, 254, 435, 675  
 Land Grant, 47, 59, 65, 68, 74, 489, 693, 694, 696  
 Land Grant Income, 489  
 Land Mine, 193  
 Landing Ground, 248, 249, 460, 466, 470, 471  
 Landing Ground, Temporary, 471  
 Landing Grounds, 249, 252, 470, 471  
 Landing Pad And Runways, 268, 269  
 Lane, 467, 471, 703  
 Language, 36, 39, 40, 46, 56-67, 112, 114, 115, 118, 120, 133, 142, 173, 283, 356, 517, 534, 550, 553, 555, 562, 564, 573, 584, 643, 694  
 Language, 36, 39, 40, 46, 56-67, 112, 114, 115, 118, 120, 133, 142, 173, 283, 356, 517, 534, 550, 553, 555, 562, 564, 573, 584, 643, 694  
 Language (Skill), 112, 133  
 Large Computer, 515, 643  
 Large Equipment, 151  
 Launch (20 Tons), 287, 645  
 Launcher, 40, 43, 58, 112, 144, 181, 184, 200, 201, 203, 204, 207-209, 212, 213, 215, 216, 218, 220, 221, 364, 367-369, 564, 584, 636  
 Launching, 328, 357, 365, 368, 393, 524  
 Lava Tubes, 468  
 Law 101, 117  
 Law School, 39-41, 52, 73  
 Layered Sub-Bands, 677, 691  
 Leader (Leadership), 134  
 Leader (Skill), 112, 134, 569  
 Leap Drive, 334, 507  
 Lee, Gregory P., 7  
 Lee, Tony, 7  
 Legacy Ton, 675  
 Legal Advice, 117

Legal Arguments, 117  
 Legged, 40, 42, 43, 58, 112, 126, 127, 144, 231, 237, 245, 250, 251, 255, 258, 474, 564, 584  
 Legislative Body, 68  
 Lek, 174, 175, 376, 478, 481, 484, 636  
 Lek, 174, 175, 376, 478, 481, 484, 636  
 Lethargic, 34, 510-512  
 Lettered Range Bands, 677, 691  
 Levels Of The Atmosphere Chart 11, 461  
 Levitation, 528, 534  
 Levitation =Move, 528  
 Liaison, 40, 55, 57, 58, 61, 62, 65, 112, 126, 134, 135, 282, 305, 308, 476, 486, 564, 584  
 Liaison (Skill), 112, 134  
 Life Insurance, 48, 50, 97, 522, 523  
 Life Membership, Tas, 48  
 Life Motivations, 72, 74  
 Life Pursuit, 80, 81  
 Life Pursuits, 8, 80, 158  
 Life Stages, 47, 69, 90, 91, 96, 98, 510, 512, 547, 549, 550, 553, 555, 561, 568  
 Life Support, 40, 43, 58, 112, 127, 144, 188, 189, 198, 229, 230, 237, 263, 268, 274, 283, 285, 297, 304, 305, 307, 308, 311, 314, 325, 347, 365, 382, 383, 385, 518, 564, 584, 630-632, 648, 650, 693  
 Lifepod (10 Tons), 287, 645  
 Lifespan, 15, 69, 479, 510-512, 547, 561, 608  
 Lifespan Of An Intelligent Species, 510, 512  
 Lift Plate, 632, 633  
 Lifters, 19, 131, 245, 246, 248, 251, 255, 277-280, 290, 323-325, 329, 330, 343-345, 358, 376, 474, 494, 503, 582, 678, 681, 708  
 Lifting, 29, 34, 102, 245, 246, 260, 268, 276, 277, 289, 311, 320, 325, 634, 734  
 Light (Portable), 636  
 Light Delay, 678, 681  
 Limb Reattacher, 645, 646  
 Liner, 286, 287, 739  
 Linguistics, 40, 112, 118, 133, 142, 144, 308, 564  
 Liquid Hydrogen, 305, 328, 382, 384, 675  
 Liter, 254, 329, 330, 349, 384, 577, 599, 616, 637, 639, 642, 644, 675  
 Litter, 84, 96, 367, 605, 704, 722  
 Little Wars, 10  
 Living Costs, 31  
 Lk Locked, 36, 489, 490, 556  
 Lllelwylyol, 546  
 Lllelwylyol Of Junidy, 546  
 Lloyd Cramer, 114  
 Lo Low Population, 36, 487, 489, 491  
 Load, 28, 29, 34, 151, 186, 188, 243, 244, 247, 258-263, 265, 272, 276, 307, 471, 593, 595, 599  
 Load And Burden, 29, 34  
 Loaned Ships, 70  
 Local Airport, 470  
 Local Features (Awareness), 175  
 Local Hex, 138, 139, 141, 250, 362, 420-423, 427, 428, 432, 436-439, 459, 602, 693, 694  
 Local Hex (10 Km), 420, 421  
 Loch, 464  
 Lock, 13, 153, 220, 230, 246, 304, 307, 380, 630, 631, 640, 641, 648, 649  
 Locked, 16, 36, 219, 283, 403, 465, 489-491, 556, 557, 596, 608, 685, 718-721  
 Locomotion, 90, 188, 189, 198, 244-246, 263, 548, 553-555, 557, 589-591, 595-597, 601, 605  
 Long Distance Running, 30  
 Long Plateau, 510-512, 551  
 Lord Rolling, 521  
 Lot, 18, 475  
 Lot (Trade Goods), 475  
 Low Berths, 645, 646  
 Low Lottery, 477, 486  
 Low Passage, 48, 50, 307, 477, 486, 645  
 Lta (Lighter Than Air Craft), 144  
 Luck (Intuition), 115  
 Luriani, 25  
 M-Drive (Maneuver Drive), 144  
 Machete, 632, 633  
 Machinegun, 184, 200, 204, 207, 209, 212, 213, 215, 216, 218, 220, 221, 369, 504  
 Mag, 174, 175, 181, 208, 213, 216, 218, 220, 221, 230, 237, 292, 302, 303, 367, 371, 373, 375-377, 381, 409, 478, 481, 484, 506, 617, 636, 637  
 Mag, 174, 175, 181, 208, 213, 216, 218, 220, 221, 230, 237, 292, 302, 303, 367, 371, 373, 375-377, 381, 409, 478, 481, 484, 506, 617, 636, 637  
 Maglev, 467  
 Magnesium, 623, 639, 675  
 Magnet, 633, 634, 655  
 Magnetic Fields (Awareness), 175  
 Magnetism (Magnetic), 134  
 Magnetism (Skill), 134  
 Mail, 231, 235, 240, 269, 320, 475, 486, 629  
 Mail (Trade Goods), 475  
 Mail Shipments, 486  
 Mail Vault, 320, 486  
 Main Weapons, 132  
 Mainframe, 514-517, 519  
 Mainworld, 68, 145, 266-268, 272, 273, 326, 337, 338, 353, 396, 397, 402-408, 410, 413, 415, 417, 419, 490-493, 513, 553, 555, 556, 739, 679, 694  
 Mainworld Orbit, 408, 553, 555, 556  
 Majack Sierra, 98  
 Major Races, 545, 700, 703  
 Male, 84, 85, 88, 89, 92, 169, 549, 552, 560, 569, 605, 608, 609  
 Maneuver Drives, 19, 75, 127, 144, 278, 279, 289, 323, 324, 681  
 Manipulator, 172, 193, 197, 205, 210, 217, 225, 228-230, 237, 238, 247, 248, 283, 517, 563, 565, 580, 581, 598, 631  
 Manipulators, 25, 134, 152, 172, 188, 189, 198, 213, 229, 230, 232, 233, 368, 495, 528, 547, 550, 553-555, 563, 565, 576, 578, 580, 598, 631  
 Manipulators, Sophont, 550  
 Manufacturers, 477, 485  
 Manufacturers Robot, 587  
 Many Capsule Dyson Sphere, 509  
 Map Box, 642, 643  
 Mapping Worlds, 9, 422  
 Mar, 464, 707  
 Marauder, 286, 287  
 Marc Miller's Traveller (T4), 4  
 Marchioness, 31  
 Mariel, 133  
 Marine, 8, 41-45, 47, 49-54, 63, 64, 66, 71, 74-77, 81, 183, 201, 211, 232, 309, 311, 378, 650, 652, 696  
 Marine Chargin Chart, 66  
 Maritime Tons, 675  
 Mark Poles, 47, 210  
 Market World, 475, 477  
 Markings, Clone, 97, 98  
 Marquis, 31, 35, 54, 63, 65, 68, 77, 412, 655, 696, 703  
 Mars, 17, 182, 400, 403, 660, 679, 683, 684, 711  
 Marsh, 422, 431, 435, 437, 439, 458, 460, 462, 557, 596  
 Martin, Scott, 7  
 Mass Deception, 704, 722, 725  
 Mass Murder, 724  
 Massive Explosion, 195, 369, 379, 390-392  
 Master Mods, 9, 152, 166, 168, 170, 173, 174, 700-705  
 Master Point (Craftsman), 55  
 Master Ship List Msl, 271  
 Masterpiece (Craftsman), 55  
 Masterpieces, 45, 47, 48, 55, 71, 119, 124, 478, 480, 481, 484, 485  
 Masters Program, 39, 41, 52  
 Math, 112, 115, 119, 147, 148, 283, 338, 517, 564, 633  
 Math (Talent), 147, 148, 338  
 Matter Transport, 499, 502-504, 509  
 Matter Transporter, 640  
 Maximum Skill, Knowledge, Or Talent, 114  
 Maximum Tech Level, 513, 551, 570  
 Mayhem, 704, 722, 724  
 Mcg Medal For Conspicuous Gallantry, 48, 71  
 Mckinney, Don, 7  
 Mclean, Shane, 7  
 Mcuf, 46-48, 71, 650  
 Mcuf Meritorious Conduct Under Fire, 46-48, 71  
 Mechanic (Mechanics, Mechanical), 135  
 Mechanic (Skill), 134, 135  
 Mechanical Being, 575  
 Mechanical Wings (Droyne), 633  
 Med, 96-98, 220, 260, 286, 287, 307, 630, 645, 647, 649, 700, 702  
 Med Clone, 96-98  
 Med Scanner, 630, 645, 647, 649  
 Med Ship, 287  
 Medal For Conspicuous Gallantry, 48, 71  
 Medic, 40, 55-63, 66, 112, 113, 120, 128, 132, 135-137, 139, 140, 307-309, 311, 314, 320, 321, 476, 486, 559, 564, 584, 646  
 Medic (Medical, Doctor), 135  
 Medic (Skill), 135, 136, 646  
 Medical Capsule, 645, 646  
 Medical Kit, 645, 649  
 Medical School, 39-41, 52, 73  
 Medium Computer, 515  
 Megacredit (One Million Credits), 24  
 Megaffora, 460, 462, 481  
 Megatraveller (Mt), 4

Memaware (Eidetic Awareness Memory), 148  
 Memaware (Talent), 148  
 Memclip, 642, 643  
 Memorize, 112, 148, 550, 564  
 Memorize (Talent), 148  
 Mempercep (Eidetic Perception Memory), 148  
 Mempercept (Talent), 148  
 Memscent (Eidetic Scent Memory), 148  
 Memscent (Talent), 148  
 Memsight (Talent), 148  
 Memsound (Talent), 149  
 Mental Aging, 69, 78, 79, 98, 554, 561  
 Mental Characteristics C4 And C5, 29  
 Mentoring, 39, 42, 43, 529  
 Merchant, 8, 13, 18, 43-45, 49-54, 60, 63, 64, 67, 71, 74-77, 81, 96, 140, 283, 284, 286, 287, 320, 407, 475-477, 479, 486, 658, 730, 738, 693, 695, 696, 703  
 Merchant Chargen Chart, 60  
 Merchant Profit Sharing, 696  
 Merchant Ships, 140, 287  
 Mercury, 17, 400, 402, 403, 660, 679, 683, 684, 686, 711  
 Mere, 15-17, 20, 72, 464, 509, 550, 650, 724  
 Meritorious Conduct Under Fire, 46-48, 71, 650  
 Mesh, 199, 231, 235, 291, 335, 629  
 Meson Screen, 282, 292, 302, 303, 371, 374, 375, 378, 381, 389  
 Message Center, 269  
 Messenger, 59, 286, 287, 584  
 Metal Detector, 633, 634  
 Metamorphosis, 568  
 Meteor Crater, 468  
 Meteorologicals, 460  
 Mi Mining, 36, 408, 489, 491  
 Mid-Band, 677, 691  
 Mid-Life, 69, 78, 79, 555, 559, 561  
 Mid-Life Caste Shift, 559  
 Middle C, 169  
 Middle Passage, 48, 50, 307, 486  
 Milieu, 15  
 Milieux, 15, 82  
 Military Academy, 41, 42, 73  
 Military Caste, 559  
 Military Gas, 638  
 Milky Greek, 14  
 Milky Way Galaxy, 14  
 Miller, Darlene, 5  
 Miller, Marc, 7  
 Mimicry, 116  
 Mind-Reading, 528, 534  
 Mind-Reading =Mentation, 528  
 Mine, 97, 193, 422, 431, 458, 469, 694  
 Minor Races, 545  
 Mirror, 380, 636, 649  
 Misdemeanor, 704, 722  
 Mission (Agent), 63  
 Mistake, 77, 583, 659, 704, 722, 724  
 Mitch, 38  
 Moarn, 155, 163, 400, 402, 407, 422, 432, 459, 589, 613, 625, 627, 684, 711, 713, 715, 717  
 Moarn Applied To Senses, 163  
 Moarn Map Only As Really Necessary, 400, 402, 407, 422, 432, 459  
 Mod Changes The Target Number, 23, 664  
 Mode Selection, 122  
 Model Numbers, 153, 587  
 Model Numbers Robot, 587  
 Modifier, 22, 29, 106, 286, 312-314, 635, 663  
 Mole, 40, 43, 58, 112, 126, 127, 144, 245, 249, 250, 255, 260, 474, 564, 584, 660  
 Molecular Disassembler, 640, 641  
 Molt, 568  
 Money, 8, 11, 21, 24, 31, 43, 47-50, 55-67, 85, 106, 161, 270-272, 475, 477, 478, 480-483, 485, 654, 657, 692, 693, 695, 697  
 Mongoose Games, 4  
 Mongoose Traveller (Mgt), 4  
 Monitor, 106, 275, 283, 286, 287, 517, 519, 523, 537  
 Monorail, 467  
 Moot, 51, 68, 75, 76  
 Morgan, Michael, 7  
 Morio Nakamura, 97  
 Morph, 112, 149, 227, 564  
 Morph (Talent), 149  
 Motion Sensor, 633, 634  
 Mountain, 251, 422, 423, 431, 433, 435, 437, 439, 458-460, 463, 469, 474, 557, 596, 597, 608, 609, 705  
 Move (Psionic), 541  
 Mover Line, 467  
 Mr Military Rule, 410, 489, 491-493  
 Msl Master Ship List, 271  
 Music, 11, 80, 101, 104, 136, 150, 154, 169, 229, 270, 478, 480, 482, 485, 496, 564  
 Musician (Music), 136  
 Musician (Skill), 136  
 Muster Out, 37, 38, 45, 47, 48, 51-53, 55-67, 201  
 Mustering Out, 47, 50, 51, 60, 201  
 Mustering Out, 47, 50, 51, 60, 201  
 Mutation, 15, 82, 84, 86, 87  
 Mutation And Genetic Engineering, 82  
 Mutation Risk, 84  
 Mutations, 84  
 Myths, 14, 16, 529  
 Na Non-Agricultural, 36, 484, 487, 489, 491  
 Naasirka-Regina Nr1000 Cleaning System, 93  
 Nabz Nil, 404, 412  
 Nafal, 15, 19, 278, 280, 294, 297, 311, 322-324, 326, 334, 343-345, 358, 384, 385, 494, 500, 503, 505  
 Nap Of Earth, 461  
 Nap Of Planet, 255, 461, 472, 474, 680  
 Nargle Agash, 341  
 Nargle Stamina Agash, 33  
 Native Environment, Sophont, 548  
 Native Language, 39, 133  
 Native Status, 404, 406, 415, 417, 419, 545, 546, 553-556  
 Native Terrain, 548, 553, 555, 557, 595-597  
 Natives, 24, 138, 141, 412, 544-548, 556  
 Natural Chimera, 91  
 Natural Clone, 92, 96-98  
 Naval Academy, 41, 42, 73  
 Naval Architect (Skill), 112, 136  
 Naval Base, 51, 81, 266, 267, 269, 272, 406, 412  
 Naval Courier, 287  
 Naval Officer, 41, 61  
 Naval Rating, 61  
 Navigator (Navigation, Land Navigation, Sea Navigation), 136  
 Navigator (Skill), 136  
 Near Star, 405, 406  
 Negligent, 723  
 Neptune, 400, 413, 444, 678, 683, 684, 713, 720  
 Netting, 630  
 Neuter, 83-85, 96, 552, 560, 569, 605  
 Neutrino Detector, 298, 299, 320, 352, 355, 356, 358, 361, 371, 383, 506, 633-635  
 Nexus (Plural = Nexi), 322, 336, 346  
 Ngo, 47, 286  
 Ni Non-Industrial, 36, 487, 489, 491  
 Nil Native Intelligent Life, 407, 412, 544  
 Nilsen, David, 7  
 No Spaceport Or Starport, 267, 268  
 Nobility, 20, 31, 35, 65, 68, 74, 75, 404, 406, 407, 412, 700, 703, 722  
 Noble, 8, 31, 35, 42-46, 49, 51-54, 63-65, 67, 68, 70, 71, 74-77, 81, 241, 320, 404, 407, 415, 417, 419, 433, 435, 437, 460, 469, 488, 524, 638, 694, 696, 703  
 Noble Chargen Chart, 65  
 Noble Estate, 460, 469  
 Noble Gas, 638  
 Noble Land Grant, 65, 68  
 Noe Nap Of Earth, 461  
 Non-Aligned, 404  
 Non-Governmental Organization, 47  
 Non-Human, 12, 21, 25-27, 29, 31, 37, 38, 42, 43, 52, 56, 57, 79, 83, 87, 97, 98, 102, 107, 119, 133, 146, 162, 186, 187, 249, 305, 338, 404, 522, 532, 545, 558, 600, 646, 725  
 Non-Human Characteristics, 27  
 Non-Human Check Characteristic, 29  
 Nop Nap Of Planet, 255, 461, 474, 680  
 Norhin Sakdili, 175  
 North Pole, 421  
 Norton, Andre (1912 - 2005), 11  
 Not As Fast As Light, 15, 278, 280, 323, 326  
 Not As Fast As Light Drive, 278, 280, 323, 326  
 Not-Foam Manipulation, 507, 509  
 Notc Naval Officer Training Corps, 41  
 Novelties, 477, 484, 485  
 Nuclear Damper, 303, 330, 371, 373-375, 378, 381, 384, 389, 498, 506  
 Nuclear Weapons, 75, 132, 145, 195, 379, 499  
 Nutrient, 93, 479, 482, 579, 582, 585, 645, 647  
 Object Size, 166, 168, 173, 174, 177, 360, 362, 364, 599, 617, 625, 695  
 Oblivious, 31, 35, 562, 564  
 Obscure Characteristics Cs And Cp, 29  
 Observer, 116, 128, 130, 131, 139, 147, 181, 190, 192, 434, 436, 438, 636, 677, 678, 691  
 Obvious Marking, 94  
 Oc Ocean World, 36, 489, 491  
 Ocean, 36, 139, 249, 251, 253, 421, 422,

431, 433-439, 458, 460, 461, 464, 465, 468, 473, 474, 489, 491, 495, 557, 596, 597, 607, 677, 678, 680, 691, 705  
 Ocean Depths, 460, 468, 473, 557, 596, 678  
 Ocean Surface Turbulence, 678  
 Office Politics, 45, 53, 67  
 Officer Retirement, 48, 51  
 Offspring, 69, 82-89, 91, 96-98  
 Offspring Clone, 96-98  
 Oil, 422, 431, 437, 439, 458, 460, 469, 483, 502, 625, 636  
 Oil Fields, 469  
 Omitted, 85, 119, 205, 209, 210, 225, 226, 228, 243, 284, 364, 581, 638, 651, 674  
 Onwee (Robot Discontent), 586  
 Open Field, 183, 249, 471  
 Open Institutes, 529  
 Open Pit Mine, 469  
 Open Water, 249, 471  
 Opposition, 172, 387, 565, 679, 686  
 Optimized Controls, 565  
 Orbit To Orbit Oto, 476  
 Orbital Distances Charts, 678  
 Orbits, 323, 400-403, 405-407, 412-419, 490, 491, 508, 547, 556, 678, 679, 681, 684-686, 709, 711, 713, 715, 717  
 Ordnance (Gun Repair), 144  
 Organic Brain, 92, 516, 519, 524, 525, 575, 579, 584  
 Organic Clone Brain, 519, 525, 575, 579  
 Organic Device, 92  
 Organization Of The Starport, 270  
 Organized Sports, 120  
 Orion, 280, 323, 325, 328-330, 384, 660  
 Ornithopter, 129, 144, 246  
 Ortilery, 40, 43, 58, 76, 77, 112, 130, 132, 139, 144, 181, 192, 193, 195, 286, 287, 300, 301, 364, 367, 369, 371, 391, 564, 584  
 Ortilery (Orbital Bombardment), 144  
 Ortilery Shot, 193  
 Osborne, Tim, 7  
 Osmaner, 57, 122  
 Otc Officer Training Corps, 41  
 Other Planes, 509  
 Oto. Orbit To Orbit, 476  
 Out Of The Body, 528, 533, 534, 540, 543  
 Out Of The Body =Oob, 528  
 Outer Worlds, 405, 413  
 Overclock, 347, 348, 660  
 Oversize Sophont, 566  
 Oynprith, 133, 643  
 P-Plant (Power System, Power Plant), 144  
 Pa Pre-Agricultural, 36, 489, 491  
 Packet, 75, 286, 287, 628, 738  
 Painkiller, 645, 647  
 Paint, 75, 175, 615, 630  
 Panacaea, 645, 647  
 Paradigm Shift, 334, 500, 570  
 Paradoxical, 465  
 Paralysis, 507  
 Parasitism, 495  
 Parents, 82-85, 96, 98, 537, 606, 609, 723  
 Park, 270, 469  
 Parkland, 469  
 Parsec, 16, 18, 280, 311, 326, 333-338, 341, 344, 345, 396, 709, 716  
 Parsec (3.26 Light Years), 18, 326  
 Passage Demand Mod, 486  
 Passages, 47, 50  
 Passengers, 16, 60, 140, 243-245, 249, 269-272, 274, 282-287, 304, 307, 308, 310, 314, 320, 366, 476, 477, 486, 545, 738  
 Passion, 55, 74, 723  
 Passive Control Codes, 586  
 Pastoralization, 507  
 Pasture, 463  
 Path, 1, 11, 16, 132, 460, 462, 467, 471, 507, 542, 572, 591, 602, 603, 633, 655, 659  
 Patrol, 46, 61, 245, 259, 283, 286, 287, 321, 660, 727  
 Paw, 172, 197, 210, 213, 217, 221, 233, 238, 542, 565, 580  
 Pe Penal Colony, 408, 489, 491  
 Peak, 69, 78, 79, 120, 167, 254, 339, 550, 555, 561, 599, 606, 608, 609, 644, 647  
 Peaks, 173, 460, 463  
 Pelagic, 468  
 Penal Colony, 408, 410, 433, 435, 437, 439, 460, 468, 489, 491, 492  
 Penny Williams, 96  
 Pension X 2, 48, 50  
 Pensions, 51  
 Pentagons (Pents), 422  
 Pents, 422  
 Perception, 109, 146, 148, 162-165, 173, 180, 229, 356-359, 482, 528, 530, 532, 536-540, 550, 552, 562, 564, 581, 625, 633, 634, 647, 695  
 Perception Benchmarks, 165, 173, 539  
 Perception-Based Analog Of Hearing, 173  
 Perception, Poice, 173  
 Perception, Tone, 173  
 Perceptual Language, 562  
 Period (Defined By Quality), 151  
 Peripheral Facilities, 269  
 Personal Choice Caste, 559  
 Personal Combat, 8, 114, 128, 132, 144, 177, 184, 186, 187, 376, 377, 663, 681  
 Personal Day, 30, 33, 34, 526-528, 531, 540  
 Personal Day (Pd), 34  
 Personal Weapons, 47, 48, 128, 132, 144  
 Personalities And Brains, 9, 522  
 Personals, 8, 112, 115, 157-161  
 Persuade (Personal), 115  
 Pestguard, 630  
 Petro, 459, 469  
 Ph Pre-High, 36, 489, 491  
 Pharma, 272, 476-485  
 Pheromones, 170, 171, 478-480, 482, 484, 605  
 Philosophy, 16, 40, 74, 112, 144, 531, 564  
 Phobos, 679  
 Phoenix Missions, 334  
 Phonographic Memory, 148, 149  
 Photographic Memory, 102, 148  
 Photonics (Photonic), 137, 482  
 Photonics (Skill), 136, 137  
 Physical Activity, 29, 120, 121, 147  
 Physical Aging, 69, 78, 79, 98, 554, 561, 646  
 Physical Characteristics C1, C2, And C3, 29, 82  
 Physical Conditioning, 120  
 Physics, 40, 112, 144, 333, 379, 564  
 Pi Pre-Industrial, 36, 489, 491  
 Picket, 286, 287  
 Pike, 211, 467  
 Pilot, 13, 18, 40, 41, 43, 46, 57, 58, 60, 61, 63-65, 111-115, 119, 120, 128, 129, 132, 136, 137, 139, 140, 248, 250, 283, 284, 306, 308-311, 314, 320, 321, 325, 337, 357, 393, 481, 515, 517, 564, 584, 614, 655, 696  
 Pilot (Skill), 137, 325  
 Pinnacle (40 Tons), 287, 645  
 Pistol, 75, 102, 151, 184, 200, 201, 204, 205, 207, 209, 213, 215, 216, 218, 220, 221, 504, 676, 690  
 Pitch, 148, 168, 169, 632  
 Plague "Da", 194  
 Plague "Ni", 194  
 Plain, 166, 199, 433, 462, 630, 701  
 Planet, 97, 115, 145, 255, 267, 339, 353, 365, 402, 403, 405, 407, 408, 415, 417, 419, 461, 472, 474, 490, 491, 547, 548, 553, 556, 605, 609, 611, 680, 684, 685, 700, 722  
 Planetary Core Energy Tap, 507, 508  
 Planetary Core Tap, 640  
 Planetary Trade Classifications, 489  
 Planetbreaker, 507, 508  
 Planetbreaker Bombs, 507, 508  
 Planetbuster Bombs, 507, 508  
 Planetology, 40, 112, 144, 564  
 Planned, 140, 147, 161, 237, 285, 337-341, 723  
 Plastic, 219, 480, 482, 495, 582, 623, 630, 631, 633, 641, 675  
 Plate, 231, 235, 240, 276-278, 290-293, 328-330, 335, 391, 392, 582, 629, 632, 633, 642, 650  
 Playing Roles, 116  
 Plexan, 83, 133, 210, 228, 240, 550  
 Po Poor, 36, 487, 489, 491  
 Pocket Universes, 15, 499, 507, 509, 641  
 Pod, 276, 277, 286-288, 304, 305, 311, 317, 378, 380, 645, 675  
 Pod (< 100 Tons)., 287  
 Pod (Less Than 100 Tons), 645  
 Poice, 133, 164, 173, 538, 553, 555, 562, 564, 581  
 Poison Gas "Gali", 194  
 Poison Gas "Zala", 194  
 Poles, Mark, 210  
 Political Trade Classifications, 489  
 Pollution, 704, 722, 724  
 Polymer, 137, 276, 278, 290, 292, 293, 362, 478, 482, 485, 640, 641  
 Polymers (Polymer, Plastics), 137  
 Polymers (Skill), 137  
 Poor Quality Installation, 267  
 Poor Quality Starport, 267  
 Poor World, 487, 696  
 Populated Terrain, 461, 466, 468  
 Populating, 141, 397, 398, 422, 434-439  
 Population Centers, 141, 461, 466  
 Population Trade Classifications, 489  
 Port Authority, 270, 271  
 Port Warden, 270, 272

Portal, 640-642  
 Portals, 378, 380, 499, 507, 509, 641  
 Position Codes, 28, 43  
 Position Tracker, 582, 633, 634  
 Positronic Brain, 368, 524, 525, 503, 575, 576, 579, 586  
 Positronic Brains, 481, 524, 530, 536, 579, 585, 586  
 Post-Jump Drives, 509  
 Potential Bad Scene, 151, 156  
 Power Cell, 212, 347, 349, 580, 585, 616-618, 620, 625  
 Power Cells, 279, 347-349, 383, 585, 616-619, 625, 626  
 Power System (Power Plant, P-Plant), 144  
 Power System Rule, 322, 346, 347  
 Power Systems, 9, 43, 112, 115, 127, 278, 281, 285, 294, 295, 346-350, 618  
 Powercell, 246, 260, 617, 625, 627, 628, 632, 643, 644, 646  
 Pr Pre-Rich, 36, 489, 491  
 Practical Psychohistory, 507, 508  
 Prairie, 462, 603  
 Pre-Meditated, 723  
 Precipice, 422, 431, 433, 435, 437, 439, 458, 460, 461, 465, 474  
 Precluded Orbits, 405  
 Preferred Controls, 565  
 Premium Passage Pricing, 486  
 Premium Sophontoids, 94, 95  
 Pressure Gauge, 633, 635  
 Price, 121, 140, 142, 272, 284, 382, 475-477, 484, 486, 487, 489, 607, 615, 616, 633, 640, 645, 646, 650, 692-695, 697  
 Prilissa Spin 3035 B985588-6, 608  
 Primary Star, 267, 336, 359, 405, 465, 678  
 Primary World Size, 679, 685  
 Prime, 20, 147, 477, 499, 641, 674  
 Prime Directive, 20, 499  
 Primitive Quality Installation, 268  
 Prior Career, 43, 47, 67, 134  
 Private Express, 486  
 Professor's Pension, 48, 51  
 Professors Program, 39, 41, 52  
 Programmable Goos, 507, 508  
 Programmer (Programming, Coding, Coder), 138  
 Programmer (Skill), 137, 138  
 Progression, Gender, 560  
 Prohibited Orbits, 678  
 Projector, 178, 184, 200, 201, 204, 207-209, 213, 215, 218, 220, 221, 366, 380  
 Prospector, 59, 97, 200, 227, 233, 236, 238, 286, 287, 584, 660  
 Proton Screen, 292, 302, 303, 374, 375, 381, 389, 506  
 Proximeter, 298, 299, 320, 352, 359-361, 371, 506, 633-635  
 Proxy, 48, 49, 51, 65, 68, 75, 409  
 Pseudo-Ostrich, 566, 567  
 Pseudo-Technological Hypothesis, 495  
 Pseudomone, 171, 701  
 Psi, 27, 28, 32, 36, 37, 102, 181, 183, 187, 188, 190, 201, 209, 213, 215, 216, 218, 220, 221, 235, 357, 377, 378, 409, 522, 529-535, 537, 538, 540-543, 558, 569, 624, 645, 647, 648, 739, 671  
 Psi Test, 530, 537  
 Psi-Immune, 32  
 Psimacopeia, 535, 540  
 Psinull, 530  
 Psionic, 17, 25, 32, 76, 183, 201, 209, 225, 231, 240, 282, 409, 523, 524, 499, 507, 509, 528-543, 569, 592, 605, 636, 647, 650, 707  
 Psionic Abilities Are Acquired, 531  
 Psionic Ability, 32, 209, 528-530, 532, 533, 536, 569  
 Psionic Engineering, 499, 507, 509  
 Psionics, 40, 112, 144, 564  
 Psionics, 9, 27, 29, 32, 37, 74, 144, 522, 524, 527-533, 535-537, 540-542, 551-553, 558, 569, 572, 636, 654  
 Psionics, 9, 27, 29, 32, 37, 74, 144, 522, 524, 527-533, 535-537, 540-542, 551-553, 558, 569, 572, 636, 654  
 Psionics Is Culturally Inappropriate, 528  
 Psionics Is Elitist, 528  
 Psionics Is Forbidden Knowledge, 528  
 Psionics Is Genetic, 32  
 Psionics Is Not Genetic, 530  
 Psionics Is Obscure, 528  
 Psionics Potential, 531  
 Psionics Testing, 529, 530  
 Psu, 119, 167, 562, 581  
 Psychohistory, 19, 40, 112, 144, 507, 508, 564  
 Psychokinesis, 528  
 Psychokinesis =Move, 528  
 Psychology, 19, 40, 41, 112, 144, 561, 564  
 Purchased Ships, 70  
 Px Exile Camp, 491  
 Px Prison, 36, 489, 491  
 Pyrokinesis, 528  
 Pyrokinesis =Eshift, 528  
 Pysadi Spin 3008 C5766d8-5, 604  
 Pz Puzzle, 489, 491  
 QREBS, 8, 29, 34, 55, 109, 124, 142, 150-156, 186, 188, 206, 210, 211, 214-217, 222, 225, 226, 228, 232, 234, 237, 239, 243, 244, 247, 262, 263, 294, 299, 301, 303, 326, 350, 366, 381, 384, 496, 498, 535, 541, 613, 616, 617, 620-622, 627, 642, 671, 697, 705  
 Qrebs, Format, 150  
 Quadnox, 633  
 Quarry, 469  
 Query (Personal), 115  
 Question, 91, 124, 125, 147, 158, 509, 530, 655, 674, 704, 722, 724  
 Quick World Generation, 488  
 Quilted Armor, 629  
 Quintaphant, 566, 567  
 Quintnox, 633  
 Quixotic, 465  
 Race, 11, 16, 20, 25, 91, 105, 133, 166, 168, 171, 174, 183, 490, 500, 545-547, 550, 553, 559-561, 564  
 Racial Scent, 90, 553, 554, 562  
 Radar, 298, 299, 352, 354, 356, 358-362, 364, 371, 506, 630, 631, 633-635  
 Radiation, 84, 132, 137, 183, 187, 188, 194, 197, 209, 298, 299, 329, 347, 352, 358-361, 366, 371, 374, 375, 377, 378, 405, 460, 468, 483, 568, 582, 617, 631, 633-635, 649  
 Radiation Detector, 375, 633, 635  
 Radio, 122, 123, 137, 228, 248, 356, 358, 362, 516, 582, 620, 625, 628, 634, 635, 642, 649, 681  
 Radworld, 413, 678, 682, 694  
 Rage, 112, 149, 564, 586  
 Rage (Talent), 149  
 Raider, 286, 287, 367  
 Random Places, 432  
 Randomizers, 22, 508, 663  
 Range (Hearing), 169  
 Range Band, 167, 170, 171, 177, 180, 190-193, 219, 255, 326, 337, 338, 340, 341, 344, 364, 366, 375, 376, 382, 393, 534, 541, 543, 590, 593, 633, 676-679, 690, 691  
 Range Bands, 119, 177, 191, 252, 253, 324, 326, 386, 393, 534, 590, 635, 676-678, 681, 690, 691  
 Rapid, 16, 139, 208, 209, 230, 237, 244, 339, 375, 507, 508, 510  
 Rapid Terraform, 507  
 Rapid Terraforming, 508  
 Rapp, Don (1936 - 2007), 10  
 Rares, 477, 484, 485  
 Rations, 378, 637, 638  
 Ravage, 704, 722, 724  
 Raws, 477, 484, 485  
 Rdme Rich Decision Making Environment, 21  
 Re Reserve, 36, 408, 489, 491  
 Reading Range, 179, 677, 691  
 Reality, 12, 13, 15, 25, 31, 57, 71, 280, 494, 499, 500, 507-509, 544, 570, 654, 688, 702  
 Reality Drive, 280, 507, 509  
 Reality Engineering, 507-509  
 Reality Manipulation, 500, 507-509, 570  
 Realspace, 18, 333, 337, 340  
 Rebellion Era, 4  
 Rebreather, 231, 235, 631, 632  
 Recessive, 50, 84, 86, 87  
 Recon (Skill), 138, 139  
 Recorder, 633, 635, 642  
 Recording Genes, 83  
 Recording Psionics, 32, 530  
 Recording Sanity, 31  
 Red, 167, 271, 320, 404, 410, 412, 477, 485, 489, 490, 492, 655, 661, 677, 691  
 Red Tape, 477, 485  
 Red Travel Zones, 271  
 Red Zone, 410, 412, 489, 490, 492  
 Reefs, 464  
 Referee's Synopsis, 656  
 Reflec, 229, 231, 232, 235, 237, 238, 278, 292, 293, 391, 582, 629-631  
 Regina, 36, 38, 41, 46, 72, 93, 96, 105, 112, 125, 144, 341, 406, 407, 476, 495, 576, 610, 650, 658, 733, 739, 695  
 Regional Airport, 470  
 Regression, 499, 507, 510-512  
 Reich, Wolfgang, 7  
 Related Skills, 116-119, 121-126, 128, 129, 132-134, 136-138, 140-143  
 Relative Direction (Awareness), 175  
 Reliability, 109, 124, 142, 150-156, 206, 210, 219, 230, 237, 480, 498, 628, 633, 634, 644, 645, 671

Reliable, 124, 151, 153-155, 521, 628, 647, 654, 726  
 Relict Clone, 96-98  
 Rem From Opaph ( Mio 0 K7 V ), 549  
 Remex Muta (Dumb Puller), 611  
 Remote Technology, 507, 509  
 Remote Viewing, 528  
 Reserve, 36, 48, 51, 73, 152, 201, 229, 232, 383, 408, 410, 422, 431, 458, 460, 469, 489, 491, 492, 526, 580, 585, 646, 726  
 Reserve Pension, 48, 51  
 Reservoir, 212, 378, 464  
 Resource, 24, 141, 274, 286, 383, 404, 411, 422, 431, 433, 435, 437, 439, 458, 469, 491, 510, 697  
 Resource Units, 24, 404, 411  
 Resource Units (Ru), 24  
 Respirator, 152, 153, 231, 235, 631, 632  
 Restorative, 645, 647  
 Restraints, 630, 631  
 Retirement, 48, 50, 51, 69, 547, 555, 561, 653  
 Retirement Pay, 50, 51  
 Reverse World Creation, 488  
 Rgb, 119, 167, 219, 357, 562, 581, 617, 625  
 Rgb (Red-Green-Blue), 167  
 Ri Rich, 36, 487, 489, 491  
 Rich World, 485, 487, 488, 696  
 Rider, 40, 43, 58, 112, 117, 144, 286, 534, 564, 568, 584, 594, 595, 611  
 Rider (Equestrian), 144  
 Rifle, 75, 141, 162, 183, 184, 200, 201, 204, 207-209, 212, 213, 215, 218, 220, 221, 497, 504, 634, 676, 690  
 Rigid Dyson, 509  
 Ringworlds, 507, 509  
 Risk, 11, 34, 35, 43-47, 51-53, 55-57, 59-67, 71, 84, 86, 87, 102, 131, 159, 268, 320, 353, 382, 523, 501, 531, 738, 665, 666, 672, 679, 688  
 Risk And Reward, 11, 43, 45-47, 53, 55, 56, 59, 60, 71, 131, 665  
 River, 249, 251, 253, 422, 431, 458, 460, 464, 465, 473, 474, 705  
 Road, 11, 102, 127, 139, 243, 249-251, 255, 422, 431, 458, 460, 466, 467, 471, 474, 533  
 Robot, 15, 19, 26, 92, 223, 249, 250, 524, 525, 574-587  
 Robot Aging, 586  
 Robot Disease Or Illness, 586  
 Robot Manufacturers, 587  
 Robotics, 17, 40, 41, 112, 144, 576, 577, 586, 587, 651  
 Robots, 9, 13, 19, 21, 25, 37, 91, 92, 96, 140, 223, 478, 483, 485, 519, 499, 501, 502, 574-587, 619, 626, 627, 695  
 Rocket, 203, 209, 213, 216, 218, 220, 221, 252, 294, 297, 322, 323, 325, 328-330, 382, 384, 385, 494, 636  
 Rogue, 1, 8, 43-45, 49, 52-54, 64, 67, 71, 74-77, 81, 341, 396, 523, 524, 659, 703  
 Rogue Chargen Chart, 64  
 Rogue Isolated Personality, 523  
 Role-Playing Game, 1, 4, 8, 10, 12, 18, 25, 662  
 Roles, 12, 13, 25, 116, 525, 526, 549, 552, 559, 560, 583  
 Roll Low, 23, 100, 664  
 Rollan Burriss, 114  
 Rolling Many Dice, 23, 664, 672  
 Rosettes, 507, 508  
 Rotary Wing Aircraft, 144  
 Rotor (Helicopter, Rotary Wing Aircraft), 144  
 Rough, 28, 71, 141, 172, 183, 197, 250, 251, 256, 326, 422, 431, 435, 437, 439, 458, 460, 462, 474, 544, 549, 557, 577, 596, 597, 609, 628, 654, 697, 705  
 Rough Wood, 422, 431, 435, 462, 557, 596, 597, 705  
 Route, 74, 77, 266, 272, 283, 323, 396, 398, 403, 412, 422, 471, 486  
 Routine Quality Spaceport, 267  
 Routine Quality Starport, 267  
 Ru Resource Unit, 24  
 Ruin, 704, 722, 724  
 Runway, 248, 249, 470, 471  
 Rural, 411, 422, 431, 433, 435, 437, 439, 458, 460, 461, 463, 474, 513, 705  
 Rural Empire, 411, 513  
 Russell, Chad, 7  
 Rustic, 463  
 Sa Satellite, 489, 491, 624  
 Safari, 286, 287, 606, 731  
 Safe, 11, 63, 68, 94, 147, 151, 154, 155, 183, 220, 266, 277, 283, 285, 291, 314, 325, 330, 334, 339, 378, 382, 393, 404, 490, 639, 654, 739, 692  
 Safe Boost, 325  
 Safe Re-Entry, 325  
 Safety, 107, 109, 121, 124, 127, 128, 131, 134, 135, 137, 138, 142, 143, 150, 152-156, 188, 189, 198, 199, 220, 230, 231, 243, 266, 271, 282, 460, 467, 521, 575, 619, 626, 628, 630, 633, 634, 642, 726, 671  
 Sagamaal, 133  
 Salaries And Wages, 692  
 Salary, 692, 693, 697  
 Samples, 25, 75, 96-98, 130, 200, 359, 360, 477, 484, 485, 618  
 Sanity, 27-29, 31, 32, 35, 37, 59, 75, 94, 102, 123, 149, 249, 284, 310, 366, 522, 525-527, 529, 533, 535, 536, 540, 541, 558, 569, 578, 583, 586, 614  
 Sanity Check, 149, 527, 529  
 Sanity Is Reduced By Crises, 32  
 Sanity Robot, 583, 586  
 Sapiient, 173, 544, 545  
 Sapper, 40, 58, 112, 128, 131, 132, 137, 139, 200, 227, 233, 236, 238, 564, 584  
 Satellite Orbit, 338, 406-408, 415, 417, 419, 547, 553, 555, 556, 679, 685, 719, 720  
 Satellites, 267, 402, 403, 405, 407, 413, 421, 425, 426, 547, 548, 552, 582, 616, 634, 679, 684, 709, 718-721  
 Saturn, 400, 413, 445-449, 452, 678, 683-685, 713, 719  
 Savannah, 462  
 Scanner, 146, 298, 299, 352, 356, 358, 359, 361, 362, 371, 522, 506, 630, 633, 635, 645, 647, 649  
 Scene, 10, 13, 130, 151, 153, 156, 654, 656-660  
 Scene Mods, 156  
 Scene Roll, 151, 153, 156  
 Scheduled Routes, 287  
 Scheme (Rogue), 64  
 Schilrathen Of Poros 3, 334  
 Scholar, 8, 13, 39, 43-45, 47-49, 51, 52, 54, 56, 63, 64, 67, 71, 74-77, 81, 144, 659, 696, 703  
 Scholar Chargen Chart, 56  
 School Rank, 42, 73  
 Schroedinger's Natives, 544, 547  
 Scope, 102, 163, 298, 299, 320, 352, 356, 357, 361, 362, 371, 506, 545, 633, 635  
 Scout, 8, 43-45, 47-49, 51-54, 59, 63, 64, 67, 70, 71, 74-77, 81, 116, 139, 145, 170, 183, 266, 267, 269-272, 284, 286, 287, 320, 356, 396, 404, 406-408, 411, 412, 488, 544, 559, 594, 726, 734, 736, 738, 739, 696, 703  
 Scout Base, 51, 67, 81, 266, 267, 269, 272, 406, 411, 412  
 Scout Chargen Chart, 59  
 Scout Lounge, 269, 270  
 Scout Service (Scout), 145  
 Scrap, 477, 485, 488, 586  
 Screens, 40, 43, 58, 112, 132, 145, 167, 303, 371, 373, 375-377, 381, 564, 584, 677, 691  
 Scrubbing, 506-508  
 Scs Sophont Creation Card, 545, 548, 554  
 Sde Starport Defense Establishment, 266, 269  
 Sea, 10, 17, 136, 139, 175, 251, 253, 270, 433, 435, 437, 439, 464, 468, 473, 491, 557, 591, 596, 606, 631, 659, 678  
 Sea Depths, 468  
 Seafarer (Sailor, Wet Sailor, Watercraft), 139  
 Seafarer (Skill), 112, 139  
 Seaway, 464  
 Second Survey, 402, 407  
 Second Survey Format, 402, 407  
 Secondary Trade Classifications, 489  
 Secret Of Happiness, 15  
 Sector, 36, 42, 57, 65, 68, 71, 73, 74, 76, 77, 107, 275, 343-345, 396-399, 402, 403, 406, 407, 412, 415, 417, 419, 489, 490, 511, 513, 544, 587, 610, 688, 696  
 Sector Capital, 36, 65, 68, 403, 412, 489, 490, 696  
 Sectors, 4, 9, 10, 13, 25, 74, 76, 334, 344, 345, 396, 397, 411  
 Seeing Colors, 167  
 Seeing Heat, 167  
 Seh, 48, 50, 71, 650, 659  
 Seh Starburst For Extreme Heroism, 48, 71  
 Seh With Diamonds, 48, 71  
 Self-Aware Brains, 524  
 Selling Price, 475, 489  
 Semi-Organic, 92-94, 368, 383, 516, 519, 524, 525, 503, 530, 536, 575, 579, 582, 584-587, 650  
 Semiotics, 292, 294-296, 298-302, 304-311  
 Senior, 41, 60, 67, 69, 75, 78, 79, 308, 555, 561  
 Sense Actions, 109, 163, 164, 538, 614  
 Sense Only As Really Necessary, 163, 353  
 Sense, Awareness, 163-165, 174, 175

Sense, Hearing, 163-165, 168, 169  
 Sense, Perception, 163-165, 173  
 Sense, Smell, 163, 164, 170, 171  
 Sense, Taste, 163, 164, 170, 171  
 Sense, Touch, 163, 164, 172  
 Sense, Vision, 163-167, 581  
 Senses, Sophont, 550  
 Sensitivity (Touch), 172  
 Sensor Arrays, 269, 359  
 Sensor Mapping, 423  
 Sensory Drug, 645, 647  
 Sentient, 163, 544  
 Sentinel, 286, 287  
 Sentry Kit, 633, 635  
 Sering, Dave, 7, 10  
 Sering, Dave (1946 - 2014), 10  
 Service Academy, 40-42, 46, 77  
 Settlers, 412, 491, 546, 548, 556  
 Seven Drive, 342, 343, 507  
 Severity, 109, 135, 136, 176, 177, 181, 189, 198, 263, 316, 325, 340, 375, 390, 542, 617, 624, 640, 647, 688, 700, 702, 703, 723, 725  
 Shadowland, 465  
 Shaft, 469  
 Shelter, 141, 231, 273, 393, 603, 613, 630, 641, 648  
 Shield, 102, 107, 134, 211, 231, 235, 240, 358, 531, 540, 614, 622, 629, 630, 634  
 Shimmercube, 630, 631  
 Shinn, Stan, 7  
 Ship, 9, 12, 13, 17, 19, 23, 24, 40, 41, 43, 48-51, 55-61, 63-66, 70, 71, 74, 75, 96, 104, 107, 112, 119, 123, 130-132, 136, 137, 139, 140, 145, 146, 156, 159, 170, 175, 183, 189, 198, 201, 245, 250, 251, 254, 255, 259, 266-268, 271, 272, 274-291, 293-295, 299, 301, 303-321, 323-326, 328-330, 333-341, 343, 347-349, 353-357, 359, 360, 362, 365-367, 369, 375, 377, 379, 382-384, 386-393, 403, 404, 411-413, 422, 474-476, 486, 488, 514, 515, 517-520, 522, 524, 526, 500, 509, 513, 533, 535, 542, 543, 564, 584, 606, 608, 616, 624, 625, 627, 640-642, 645, 652, 654, 659, 726, 730, 731, 733, 738, 739, 664, 675, 679, 688, 689, 693, 696, 698, 699  
 Ship Details, 9  
 Ship Interference, 393  
 Ship Shares, 48, 51, 60, 70  
 Ship Traffic, 287, 383, 411, 513  
 Ship's Boat (30 Tons), 287, 645  
 Shipsheet, 274, 293, 316, 317, 335, 340, 387  
 Shipyards, 75, 269, 270, 275, 285, 292, 298, 300, 302, 352, 354, 366, 692, 693  
 Shopkeepers, 693  
 Shore, 61, 139, 249, 251, 253, 422, 431, 433, 435, 437, 439, 458, 460, 464, 473, 474, 705  
 Short Grid Squares, 675  
 Shotgun, 184, 201, 204, 207, 209, 212, 213, 215, 218, 220, 221  
 Showmanship, 117  
 Shrine, 650  
 Shuttle, 125, 264, 265, 272, 286, 287, 305, 311, 328, 645, 739  
 Shuttle (90 Tons), 287, 645  
 Sigg Odra, 707  
 Silver Globe, 302, 303, 371, 373, 377, 378, 380, 381, 507, 508  
 Simple Airport, 470  
 Simultaneous Lives, 507, 508  
 Single Hex (1 Km), 420, 422  
 Six Drive, 342, 343, 507  
 Six Sided Dice, 22, 663  
 Six-Sided Dice, 22, 662, 663, 671  
 Size Chart, Sophont, 551  
 Size, Sophont, 551, 554, 566  
 Skeleton, 78, 79, 90, 189, 198, 553-555, 563, 575, 578, 580, 582, 594, 595, 598, 600, 605, 609, 610  
 Skill Format, 113  
 Skill List, 112, 113, 559  
 Skill Maximums, 114  
 Skill: Engineer, 126, 127, 347  
 Skilled Caste, 553, 559, 560, 564, 569  
 Skills Are Areas Of Expertise, 113  
 Skills Are Assets In The Resolution Of Tasks, 113  
 Skin, 78, 79, 90, 93, 94, 149, 172, 174, 189, 198, 201, 276, 290, 478, 479, 483, 485, 547, 553-555, 563, 578, 582, 594, 595, 598, 607, 609-611, 645, 647, 649  
 Skin Glue, 645, 647, 649  
 Skyway, 467, 471  
 Slack, 704, 722, 724  
 Slap Tape, 640, 642  
 Slick, 278, 292, 293, 391  
 Sling, 152, 633-635, 645  
 Slow Boost, 197, 325  
 Slow Drug, 478, 483, 484, 503, 645-647  
 Slow Re-Entry, 325  
 Slug, 40, 43, 58, 112, 128, 129, 132, 145, 178, 181, 297, 300, 301, 344, 345, 349, 364-366, 369, 371, 383-385, 391, 392, 506, 564, 584  
 Slug Throwers (Guns), 145  
 Small Computer, 515  
 Small Craft, 13, 19, 40, 43, 111, 112, 129, 136, 137, 145, 246, 250, 264, 265, 272, 274-276, 283-287, 305, 306, 308, 311, 315, 317, 318, 359, 360, 362, 364, 369, 386, 387, 391-393, 515, 526, 616, 619, 626, 645, 675, 697  
 Small Craft (Ship's Boat), 145  
 Small Size Sophont, 566  
 Smart, David, 7  
 Smell, 57, 75, 78, 79, 92, 109, 148, 162-164, 170, 171, 180, 359, 477, 481, 482, 528, 532, 533, 537-541, 550, 552, 554, 555, 562, 564, 569, 578, 581, 592, 608, 613, 614, 625, 700, 701  
 Smellblind, 170  
 Smith, Lester, 7  
 Snowcat, 542, 543, 604, 608, 609, 655  
 Snowshoes, 632, 633  
 Soarn Sense Only As Really Necessary, 163, 353  
 Social Caste, 559  
 Social Characteristics C6, 29  
 Social Standing, 27-31, 35, 37, 38, 45, 52, 65, 82, 85, 90, 102, 231, 522, 525, 527, 537, 558, 583, 635  
 Socioneering, 507-509  
 Socket, 172, 213, 217, 221, 233, 238, 565, 580  
 Soldier, 8, 13, 40, 43-45, 48-54, 62-67, 71, 74-77, 81, 95, 112, 128, 131, 132, 136, 137, 139, 145, 180, 559, 584, 655, 659, 696, 703  
 Soldier (Army, Military), 145  
 Soldier Chargin Chart, 62  
 Solitaire, 13, 83, 84, 87, 96, 549, 560  
 Solo, 36, 85, 560, 569, 606  
 Solomani, 17, 20, 25, 412, 545, 546, 552, 572, 587, 606, 650, 726, 703  
 Solomani Of Terra, 546, 552  
 Solving Puzzles, 30  
 Sophisticated Operations (Tap, Jam, Clone), 122  
 Sophont Body Structure, 547, 550, 553, 563  
 Sophont Bulk, 551, 567  
 Sophont Caste, 549, 559  
 Sophont Characteristics, 549, 553, 558  
 Sophont Creation, 21, 90, 91, 171, 511, 530, 544-568  
 Sophont Creation Card, 90, 91, 171, 545, 547-549, 553-555, 559-561, 568  
 Sophont Fillform, 548, 555  
 Sophont Gender, 549, 550, 560  
 Sophont Homeworld, 548, 555, 556  
 Sophont Life Stages, 550, 561  
 Sophont Manipulators, 550, 565  
 Sophont Mental Aging, 69, 561  
 Sophont Native Environment, 548  
 Sophont Physical Aging, 69, 561  
 Sophont Senses, 550, 562  
 Sophont Size, 98, 551, 553, 566, 567  
 Sophont Size And Bulk Charts, 551  
 Sophont Size Benchmark, 567  
 Sophont Special Abilities, 550, 553, 564  
 Sophont Species Lifespan, 510  
 Sophont Tech Level Cap, 570  
 Sophont Trainer, 118  
 Sophont Uniques, 551, 568  
 Sophont-Based Special Abilities, 564  
 Sophontiform, 223, 574-577, 587  
 Sophontiform Robot, 575, 577, 587  
 Sophontoid, 19, 92-95  
 Sophontology (Xenology), 145  
 Sophontology Rethought (Solomani Rim Edition), 552  
 Sound Amplifier, 636, 637  
 Sound Frequencies (Pitch), 169  
 Sound Sensor, 298, 299, 352, 359, 361, 371, 506, 614, 633, 635  
 Soundmimic, 112, 115, 149, 564  
 Soundmimic (Talent), 149  
 Source World, 475, 476  
 South Pole, 421, 460  
 Space Combat, 9, 114, 128, 140, 142, 316, 386-393, 642, 644, 659, 678, 681  
 Space Ranges, 281, 354, 364, 366, 393, 676-678, 681, 690, 691, 709  
 Space Ranges Chart, 678  
 Spacecraft Acs, 43, 112, 137, 145  
 Spacecraft Bcs, 43, 112, 137, 145  
 Spacecraft Construction (Tnas-Certified Designs), 267  
 Spaceport, 267-269, 271, 403, 409, 413, 433, 460, 466  
 Spaceport Types (And Capabilities), 267



Spaceport, Elements Of, 268, 269  
 Spacer, 8, 24, 28, 43-45, 48-54, 61, 63, 64, 71, 74-77, 81, 114, 145, 183, 284, 307, 309, 311, 738, 696, 703  
 Spacer (Navy, Naval), 145  
 Spacer Chargin Chart, 61  
 Span (Hearing), 169  
 Special Ability, 550, 564  
 Special Terrain, 422, 468, 548  
 Special Throws, 23, 664, 671  
 Special Trade Classifications, 489  
 Specials, 115, 410, 492, 493, 550, 564, 623  
 Species, 11, 14-17, 21, 25, 27, 31, 32, 35, 50, 78, 79, 82-87, 91, 96, 136, 170-173, 210, 228, 334, 523, 524, 495, 510-513, 544-553, 555-561, 569, 570, 574, 575, 590, 592, 593, 596, 600, 604, 609, 610, 650, 655, 723  
 Species Life Span Table, 512  
 Spectral Type, 405, 406, 412, 547, 553, 556  
 Spectrum Goggles, 633, 635  
 Spectrum Of Technology, 496  
 Speculation, 140, 475, 656, 692-694, 696  
 Speculator, 475, 693  
 Spines, 40, 43, 58, 112, 132, 145, 181, 563, 564, 584, 598  
 Spinward Marches, 4, 36, 38, 41, 46, 74, 76, 96, 406, 610, 650  
 Spitz, L. M., 7  
 Splint, 645  
 Spotlight, 636, 637  
 Sprays, 40, 43, 58, 112, 128, 129, 132, 145, 181, 272, 564, 584  
 Sprints, 30  
 Spyke Alpha, 98  
 Square, 254, 257, 306, 307, 310, 335, 396, 421, 517, 520, 607, 620, 675, 677, 679, 691, 693  
 Ssssth Vigor Kshth-Othth, 33  
 Stafford Sr., Bari Z. (1953 - 2002), 10  
 Stamina, 27-30, 33, 34, 38, 69, 102, 229, 232, 237, 238, 522, 532, 558, 561, 566, 577, 580, 583, 646, 671  
 Standard Grid Squares, 675  
 Standard Response, 143  
 Standard Size Sophont, 566  
 Star Energy Tap, 640  
 Star System, 9, 12, 19, 267, 268, 278, 287, 294, 308, 323, 333, 336-338, 353, 386, 388, 396, 402, 407, 489-491, 509, 513, 547, 642, 643, 676, 677, 679, 690, 691, 722, 709  
 Star System Creation, 9, 407  
 Star System Generation, 402, 709  
 Star System Maps, 9, 709  
 Starburst For Extreme Heroism, 47, 48, 71  
 Starchart, 642, 643  
 Stargazing, 505  
 Starkillers, 507, 508  
 Starpass, 48-50, 55-67  
 Starport, 38, 50, 67, 74, 75, 77, 81, 137, 153, 156, 249, 266-273, 275, 284, 291, 297, 338, 353, 382, 385, 396, 398, 402, 403, 406-412, 422, 423, 431, 433, 435, 437, 439, 458, 460, 466, 474, 486, 490, 492, 493, 500, 653, 737, 677, 691, 698  
 Starport Accommodations, 269  
 Starport Ambience, 272  
 Starport Authority, 270  
 Starport Beacon, 268, 269  
 Starport Cargo Market, 269  
 Starport Concourse, 269  
 Starport Consulates, 269  
 Starport Customs And Immigration, 269  
 Starport Data Terminals, 269  
 Starport Defense Establishment, 266, 269  
 Starport Emergency Medical, 269  
 Starport External Controls, 271  
 Starport Extrality, 271  
 Starport Finances, 272  
 Starport Freight Docks, 269  
 Starport Hiring Hall, 270, 271  
 Starport Hote, 269  
 Starport Industrial Park, 270  
 Starport Landing Pad And Runways, 268  
 Starport Law And Order, 271  
 Starport Meeting Place (The Lone Star), 270  
 Starport Message Center, 269  
 Starport Operational Mission, 270  
 Starport Repair Shops, 270  
 Starport Scout Lounge, 270  
 Starport Sensor Arrays, 269  
 Starport Shipyard, 270  
 Starport System Defense Field, 270  
 Starport Terminal, 269  
 Starport Traffic Control, 269  
 Starport Transport Hub, 270  
 Starport Types (And Capabilities), 267  
 Starport Warden, 67, 74, 270  
 Starport, Elements Of, 268, 269  
 Starport, Organization, 270  
 Starports, 8-10, 47, 266-272, 279, 297, 348, 349, 382, 383, 385, 405, 408, 636, 693  
 Starports, 8-10, 47, 266-272, 279, 297, 348, 349, 382, 383, 385, 405, 408, 636, 693  
 Starports, Classification Of, 267  
 Starship Construction (Tnas-Certified Designs), 267  
 Starship Design, 9, 21, 136, 247, 274, 284, 675  
 Starship Fillforms, 9  
 Starship Skills. Astrogator, 112, 120, 128, 132, 136, 137, 139, 140  
 Starship Ton, 675  
 Start And Stop Arrival Time, 679, 687  
 Startown, 266, 269-272  
 Stasis Capsule, 75, 645, 647, 658  
 Stasis Drawer, 637, 638  
 Stasis Globe, 302, 303, 371, 373, 377, 378, 380, 381, 507, 508  
 Stead, Ian, 7  
 Stealth (Clandestine, Spycraft), 140  
 Stealth (Skill), 112, 139  
 Stealth Mask, 298, 299, 320, 352, 354, 356, 359-362, 371, 389, 506, 633, 635  
 Steel, 615, 623, 631, 640, 650, 675  
 Stellar Energy Tap, 507, 508  
 Stellar Scale Constructs, 507  
 Stellar Scale Physical Constructs, 509  
 Stellar Scale Physical Manipulation, 499  
 Step By Step Die-Rolling Approach, 23  
 Steve Jackson Games, 4  
 Stevenson, Robert Louis (1850 - 1894), 11  
 Steward, 36, 40, 45, 58, 60, 63, 112, 120, 128, 132, 136, 137, 139-141, 272, 283, 284, 305, 306, 308, 309, 311, 314, 320, 321, 476, 477, 486, 517, 564, 584, 658, 693  
 Steward (Skill), 140  
 Stocks And Bonds, 692  
 Storage, 16, 93, 123, 151, 154, 155, 229, 246, 266, 279, 281, 283, 285, 305, 321, 334, 348, 379, 384, 515, 625, 631, 632, 638, 639, 641, 643, 644, 646, 660  
 Stormworld, 325, 413, 678, 682  
 Strange, 11, 14, 75, 85, 102, 106, 144, 163, 173, 230, 231, 237, 271, 334, 368, 423, 478, 480, 483-485, 490, 499, 545, 557, 573, 596, 614, 654, 659, 661, 701  
 Strangeform, 249, 250, 574-577, 582, 587  
 Strategic Nuke, 195  
 Strategy (Skill), 112, 140  
 Street, 241, 467, 471  
 Streetwise, 36, 40, 48, 58, 59, 63, 64, 112, 131, 140, 141, 476, 486, 564, 584  
 Streetwise (Skill), 112, 140  
 Strephon, 4  
 Strongbox, 639  
 Sts. Surface To Surface, 476  
 Stsahpgl-T, 403, 407, 409, 413, 415, 417, 419  
 Sub (Submarine, Submersible, Undersea Craft), 145  
 Sub-Bands, 677, 678, 691  
 Subhull, 276, 286-288, 305  
 Subjective Color, 167  
 Subsector Capital, 36, 403, 406, 489, 490  
 Subsectors, 9, 17, 396, 399, 411, 500, 610  
 Substituting Edu, Tra, And Ins, 30  
 Substituting Soc, Cha, And Cas, 31  
 Subunits Of The Ton, 675  
 Suburb, 249, 439, 461, 466  
 Suerrat, 16, 17, 25, 54, 572, 577, 703  
 Suitcase Bomb, 195  
 Supplies And Equipment, 118  
 Supply And Demand, 616, 625, 695, 697  
 Surface To Surface Sts, 476  
 Survey, 36, 40, 56-59, 63, 74, 76, 77, 112, 119, 137, 140, 141, 227, 286, 287, 308, 320, 326, 356, 396, 398, 402, 407, 552, 564, 584, 642, 643, 726, 736, 707  
 Survey (Skill), 112, 140, 141  
 Survey Data, 642, 643  
 Survival, 36, 37, 40, 56-59, 63, 66, 112, 141, 147, 200, 205, 209, 213, 216, 220, 221, 287, 499, 564, 575, 584, 600, 630, 631, 645, 646, 649, 652, 664, 672  
 Survival (Skill), 112, 141  
 Survival Bubble, 630, 631  
 Suspended Animation, 480, 568, 645, 646  
 Swamp, 422, 431, 435, 437, 439, 458, 460, 462, 557, 596  
 Sylea, 17, 268  
 Symbiont, 570  
 Symbiosis, 495, 568  
 Symbols, 85, 266, 273, 275, 292, 294-296, 298-302, 304-311, 398, 406, 411, 421, 422, 431, 457, 458, 478, 481, 485, 614, 622, 724  
 Symbols, Terrain, 458  
 Synthetic, 19, 92, 93, 174, 231, 479, 480, 482, 491, 574, 608, 629  
 Synthetics, 8, 19, 25, 91-94, 96, 478, 480,

484, 574, 575, 623  
System Defense Field, 267-270  
Tactical Nuke, 195  
Tactics, 40, 46, 58, 61, 62, 65, 66, 112, 120, 128, 129, 140-143, 157, 159, 161, 177, 180, 182, 564, 584  
Tactics (Skill), 112, 128, 129, 141  
Tactile Sign Language, 562  
Tailored Defenses, 387, 389  
Talent, 20, 44, 52, 57, 80, 99, 101, 102, 112, 114, 115, 118, 119, 125, 145-149, 338, 526, 527, 584  
Talent, 20, 44, 52, 57, 80, 99, 101, 102, 112, 114, 115, 118, 119, 125, 145-149, 338, 526, 527, 584  
Talent (Entertainer), 57  
Talent List, 112  
Talent Maximums, 114, 145, 149  
Talents, 10, 15, 30, 37, 80, 99, 101, 102, 108, 112-115, 145-147, 149, 522, 526, 527, 501, 528, 529, 550, 552, 564, 584, 602, 654, 656  
Talking Range, 179, 677, 691  
Tall Grid Squares, 675  
Tape, 477, 485, 640, 642, 643  
Tar Pits, 469  
Target Number, 22, 23, 43, 99-101, 157, 158, 160, 179, 338, 354, 363, 365, 389, 628, 637, 663, 664  
Tas Fellow, 47, 49, 55-59, 62, 63, 67  
Tas Life Membership, 47, 48  
Tas Travellers' Aid Society, 270  
Task Cycle, 100, 101  
Task Difficulties, 100, 101  
Task Enabler, 516-518, 520, 620, 621  
Task Format, 100, 101  
Task Resolution System, 99  
Task Resolver, 516, 517, 519, 520  
Tasks, 8, 21, 23, 25, 28, 30, 34, 42, 80, 81, 93, 99-111, 113-119, 121, 125, 127, 129, 134, 135, 138, 139, 145-151, 179, 186, 188, 244, 250, 270, 338, 353, 516, 518-520, 532, 565, 592, 595, 600, 613, 614, 617, 620, 622, 627, 635, 643, 647, 650, 662, 663, 670, 700  
Tasks, Example, Explosives, 110  
Tasks, Example, Small Craft, 111  
Taste, 162-164, 170, 171, 230, 237, 480, 481, 528, 538, 539, 595, 600, 607  
Taxes, 16, 271, 693, 694  
Taylor, Craig, 7  
Teacher (Instruction, Instructor, Teaching), 142  
Teacher (Skill), 112, 118, 142  
Teamster, 40, 43, 58, 112, 117, 145, 564, 584  
Tech Level Cap, 512, 570  
Tech Level Stage, 277, 281, 282, 293, 294, 299, 301, 303, 326, 341, 348, 350, 361, 372, 373, 381, 384, 521, 526, 496-498, 627  
Tech Level Stage Effects, 277, 281, 282, 293, 294, 299, 301, 303, 326, 341, 348, 350, 361, 372, 373, 381, 384, 521, 496-498, 627  
Tech Level Stages, 496, 497  
Technological Singularity, 499, 501, 507, 511  
Technological Singularity, 499, 501, 507, 511  
Technology, 4, 9, 15-19, 25, 90, 93, 96, 98, 113, 127, 129, 139, 144, 151, 169, 179, 180, 204, 207, 209, 210, 228, 243, 247, 279-281, 287, 323, 328-330, 333, 334, 342, 351, 353, 364, 365, 368, 373, 380, 381, 383, 384, 403, 480, 515, 521, 522, 526, 494-501, 503, 507-513, 551, 570, 577, 584, 590, 613, 614, 622, 625, 654, 660, 694, 697, 702  
Teen, 69, 561  
Telekinesis, 528, 534  
Telepathy, 528, 534  
Teleport, 507, 509, 528, 533-535, 537, 540-543, 640-642, 650  
Teleportation, 509, 528, 542, 642, 660  
Telescope, 633, 635  
Temperate, 196, 377, 406, 408, 491, 541, 548, 552, 556, 557, 596, 685, 689, 699, 711, 713, 715, 717  
Temporary Airport, 471  
Temporary Landing Ground, 471  
Tender, 286, 287, 727, 736  
Tentacle, 172, 197, 202, 205, 210, 211, 213, 217, 221, 233, 238, 565, 580  
Tenure, 52, 56  
Term (4-Year), 37  
Terminal, 182, 183, 269, 270  
Terra, 17, 20, 25, 72, 74, 91, 130, 182, 252, 400, 402, 403, 440, 457, 461, 472, 544, 546, 547, 551, 552, 572, 573, 679, 682-686, 711, 719, 720  
Terraform, 74, 507  
Terrain Effects, 251, 422  
Terrain Group, 462-471  
Terrain Hex, 68, 138, 141, 247, 250, 362, 420-422, 426, 427, 432, 434-437, 439, 459, 464, 471, 589, 590, 601, 693, 694  
Terrain Hex (100 Km), 420, 421  
Terrain Numbers, 422  
Terrain Symbols, 421, 422, 431, 457, 458  
Terrain Types, 244, 422, 430, 433, 458-471, 548, 589, 601  
Terrain Types (List), 460  
Terrain, Additional, 459, 465  
Terrain, Basic, 462, 463  
Terrain, Interface, 470, 471  
Terrain, Populated, 466, 468  
Terrain, Resource, 469  
Terrain, Special, 468, 602  
Terrain, Transport, 466, 467  
Terrain, Wet., 464  
Terton, Constantin, 7  
Tests And Certificates, 108  
Tezapet, 133  
The Effect Of Counselling On Sanity, 32  
The Effect Of Drugs On Sanity, 32  
The Fantastic Drives, 119, 334, 337  
The Green List, 271, 738  
The Lifespans Of Intelligent Species, 510, 512  
The Lone Star, 24, 168, 266, 269, 270  
The Long Night, 17  
The Rule Of Man, 17  
The Scene Roll, 151, 153, 156  
The Scene Roll (Qrebs Chart-3), 153  
The Senses, 8, 99, 109, 147, 162, 163, 166-175, 178, 180, 181, 183, 528, 530, 532, 547, 550, 553, 562, 569, 575, 590, 616, 633, 677, 680, 691, 692, 695  
Theme, 270, 659, 661  
Thermal Blanket, 231, 630, 631  
Theta Waves, 169  
Thick Forest, 462  
Thingmaker, 9, 498, 613, 614, 619-625, 627  
Third Imperium, 4, 16, 17, 20, 38, 395, 572, 650, 654, 701  
This Is Hard!, 102, 104, 107, 108, 110, 134, 179  
Thomas, Gary, 7  
Three Mapping Principles, 422  
Throwing At A Target, 34  
Thruster, 322, 325, 328, 330, 384, 494  
Thrusters, 248, 280, 328, 330  
Tih! (This Is Hard!), 102  
Tinroa, 511, 568  
Tinroa Of Shvireeyiyi, 568  
Titan Size Sophont, 566  
Titanium, 126, 381, 541, 623, 640, 675, 689, 699  
Titius-Bode Relation, 678  
Title, 31, 56, 60-62, 65-68, 74-77, 80, 81, 102, 323, 559, 602, 665, 667, 693, 694, 696  
TI Cap, 510-512, 551, 570  
Tluugir, 610  
Tms Traveller Mapping System, 422, 423, 432, 440  
Toolbag, 639  
Toolchest, 639, 649  
Toolkit, 614, 645, 649  
Tools, 19, 24, 25, 75, 101, 106, 114, 121, 124, 125, 127, 128, 131, 134-138, 198, 205, 227, 243, 478, 479, 485, 495, 499, 501, 551, 614, 619, 626, 640, 643, 649  
Tools^2, 136, 495, 501  
Touch, 29, 78, 79, 94, 109, 110, 119, 151, 162-164, 172, 220, 283, 378, 382, 421, 482, 483, 518, 528, 531-535, 537-542, 550, 552, 554, 555, 562, 564, 565, 569, 578, 581, 586, 625, 700, 701  
Touch Heal, 533, 540, 541  
Touch Hurt, 533, 540, 541  
Touch Sensitivity, 172  
Touch, Manipulator, 172  
Touch, Texture, 172  
Town, 57, 71, 249, 422, 431, 433, 435, 437, 439, 458, 460, 461, 466, 474, 688  
Tr Tropic, 36, 489, 491, 556  
Tracked, 40, 42, 43, 58, 81, 112, 127, 145, 177, 243, 245, 250, 255, 258, 265, 386, 474, 564, 584, 659  
Trade Classification, 36, 38, 47, 65, 68, 272, 403-404, 406, 407, 410, 415, 417, 419, 433, 476-478, 484, 487-493, 513, 554, 696  
Trade Good Detail, 485  
Trade Maps, 488  
Trade Routes, 321, 403, 411, 736, 739  
Trade Schools, 39, 41  
Trader, 24, 28, 36, 40, 55, 57-60, 64, 67, 70, 74, 81, 112, 121, 124, 142, 143, 146, 153, 201, 282, 286, 287, 291, 305, 308, 311, 320, 325, 367, 476, 477, 487, 488, 516-518, 564, 584, 655, 658, 726, 728,

729, 738, 739  
 Trader (Skill), 112, 142, 476  
 Traditional Lifespan, 69, 561  
 Traffic, 129, 139, 196, 248, 250, 266-272, 287, 383, 411, 460, 467, 471, 513, 584, 636, 678, 724  
 Traffic Control Facility, 269  
 Trail, 171, 251, 422, 431, 458, 460, 467, 474  
 Trainer (Training), 145  
 Training, 27-30, 32, 35, 37-43, 52, 73, 78, 79, 82, 85, 90, 93, 94, 102, 104, 106, 108, 110-114, 116, 118, 120, 140, 141, 144, 145, 151, 232, 269, 284, 306, 516, 519, 522, 525, 527, 529-533, 535, 537, 558, 575, 576, 580, 583, 584, 592, 595, 600, 655  
 Training Course., 39-41, 43, 52, 73  
 Tranq, 183, 190, 194, 197, 208, 215, 216, 218, 624, 638, 645, 647  
 Transfer Pump, 297, 385  
 Transfer To Orbit, 328  
 Transferring, 29, 34  
 Transformation, Gender, 560  
 Transients, 412, 491, 546, 548, 556  
 Transplants, 412, 503, 546, 548, 556  
 Transport Hub, 269, 270  
 Transport Net, 466  
 Transport Terrain, 467  
 Transportation Net, 270, 467  
 Travel Charts, 679  
 Travel Oob, 541  
 Travel Zones, 271, 404, 406, 407, 412  
 Traveller Mapping System, 421-424, 432, 440, 459  
 Traveller Mapping System (Tms), 421, 422  
 Traveller Sophont Creation System Tscs, 545-558, 560-568  
 Traveller Sophont Creations System Tscs, 545  
 Traveller: The New Era (Tne), 4  
 Traveller4 (T4), 4  
 Traveller5 (T5), 4  
 Travellers' Aid Society, 4, 10, 47, 51, 266, 270, 271, 653, 726, 738  
 Treason, 661, 704, 722, 724  
 Treat As Highway, 466  
 Treat As Road, 466  
 Tree Kraken, 604, 610  
 Trench, 77, 120, 211, 461, 468, 680  
 Trevor, Peter, 7  
 Trias, Gedeon, 7  
 Tribunals, 117  
 Trigger Mechanism, 565  
 Trinox, 617, 633  
 Trokh, 133, 643  
 Trom, 17  
 Tropic World, 568  
 Truth Drug, 645, 647  
 Tscs Traveller Sophont Creation System, 545-558, 560-568  
 Tscs Traveller Sophont Creation System Charts, 553-558, 560-568  
 Tu Tundra, 36, 489, 491, 556  
 Tundra World, 568  
 Turbulence, 196, 289, 325, 378, 405, 457, 602, 678, 682  
 Turret, 131, 132, 145, 181, 200, 210, 213, 217, 244, 257, 258, 265, 276, 281-283, 298-304, 352, 355, 357, 361, 364-369, 373, 376, 377, 381, 516, 517, 536  
 Turrets, 40, 43, 58, 112, 132, 181, 357, 365, 375, 377, 517, 564, 584  
 Twilight Zone, 36, 400, 403, 413, 414, 416, 418, 433, 459-461, 465, 474, 489-491, 548, 556, 557, 596, 705  
 Twilight: 2000, 4  
 Two Thousand Worlds, 17  
 Types Of Tasks, 99, 100, 104  
 Types Of Terrain, 458-461  
 Types Of Weapons, 204, 207, 208  
 Typical Frontier Starport, 273  
 Tyranny, 704, 722, 724  
 Tz Twilight Zone, 36, 400, 413, 414, 416, 418, 489, 491, 556  
 Ultrasonic, 163, 169, 586, 649  
 Ump Drive Diagnosticator, 155  
 Unarmed (Unarmed Combat, Melee, Brawling), 145  
 Unaware, 31, 147, 156, 174, 341, 562, 564  
 Uncharted Territory, 488  
 Unconscionably Great Wealth, 692  
 Undercover Assignment (Agent), 63  
 Uninformed, 723  
 Unique Default Skills, 113  
 Uniques, 477, 484, 485, 547, 551, 553, 568, 619, 626, 650  
 Uniques, Sophont, 551  
 Universal Odor Profile Uop, 170  
 Universal Personality Profile (Upp), 27, 37, 674  
 Universal Personality Profile Upp, 27, 37, 674  
 Universal Psionic Structure, 32  
 Universal Task Format, 100, 101  
 University, 39-41, 52, 73, 75, 76, 81, 125, 529, 576, 739  
 Unknown, 13, 25, 32, 47, 57, 71, 85, 123, 135, 140, 152, 171, 311, 353, 388, 488, 500, 529, 570, 571, 652, 674, 688  
 Unobtrusive Marking, 94, 98  
 Unreliable, 151, 154, 155, 521, 497, 500, 511, 661, 705  
 Unsag Vornia, 115  
 Unscheduled Routes, 287  
 Unskilled Individual, 108, 111  
 Uop Universal Odor Profile, 170  
 Upp, 27, 28, 37, 38, 52, 78, 79, 82-84, 86-89, 94, 95, 98, 102, 110, 111, 186, 489, 558, 559, 566, 674  
 Upp Universal Personality Profile, 27, 28, 37, 38, 102, 558  
 Uranus, 400, 678, 679, 683, 684, 713  
 Urb, 466  
 Urban, 466  
 Use And Operation, 122, 123  
 Using Burden, 151  
 Using Ease Of Use, 151  
 Using Reliability, 151  
 Using Safety, 152  
 Utf Universal Task Format, 101  
 Va Vacuum World, 487, 491  
 Vacc Suit, 36, 38, 40, 55-60, 62-64, 66, 67, 104, 112, 142, 143, 150, 151, 183, 200, 225, 227, 231, 237, 478, 483, 485, 564, 584, 629, 630, 675  
 Vacc Suit (Skill), 104, 112, 142, 143  
 Vaccine, 645, 647  
 Vallance, Andrea, 7  
 Valuta, 477, 484, 485  
 Vanished Transplants, 412, 546, 556  
 Vargr, 17, 39, 76, 91, 133, 205, 210, 213, 217, 221, 233, 238, 240, 241, 357, 367, 412, 545, 546, 573, 587, 739, 703  
 Vargr Extents, 17  
 Vargr Of Lair, 91, 546, 573  
 Vat, 93  
 Vault, 120, 304, 320, 334, 337, 342, 343, 345, 385, 414, 416, 418, 486, 494, 507, 509, 570, 639  
 Vault Drive, 507  
 Vectors, 323, 324, 339, 483, 509  
 Vehicle Operations, 127, 139, 244, 250, 261, 459  
 Vehicle Speed, 247, 255, 261, 474, 590, 604  
 Vehiclemaker, 8, 243  
 Verbal Language, 562  
 Vhdus, 167, 478, 483-485, 636, 637  
 Vibration, 78, 79, 163, 168, 230, 237, 339, 378, 554, 625  
 Video Recorder, 633, 635  
 Vigor, 27-30, 33, 34, 38, 69, 102, 230, 237, 522, 531, 532, 540, 558, 561, 566, 577, 580, 583, 646, 661  
 Vilani, 1, 14, 16, 17, 20, 25, 54, 133, 500, 545, 572, 577, 610, 611, 636, 643, 650, 700, 702, 703  
 Vilani Empire, 16, 17, 20, 611  
 Vilani Era, 16  
 Village, 11, 460, 461, 466  
 Violation, 655, 722-724  
 Virtual Battery, 366, 388  
 Virushi, 42, 54, 546, 550, 567, 571, 703  
 Viscount, 31, 35, 65, 68, 406, 412, 696, 703  
 Viscountess, 31  
 Vision, 25, 78, 79, 91, 109, 119, 137, 148, 162-167, 174, 175, 180, 208, 218, 229, 356, 357, 359, 478, 483, 484, 528, 532, 533, 537-541, 550, 552, 554, 555, 562, 564, 569, 578, 581, 582, 590, 605, 617, 633-635, 647, 659, 677, 691, 698  
 Vision Benchmarks, 165, 166, 539  
 Vision Goggles, 633, 635  
 Vison And Stellar Spectrum, 167  
 Visual Sign Language, 562  
 Vland, 16, 20, 25, 36, 74, 133, 610, 650  
 Voice, 57, 92, 116, 122, 123, 159, 164, 168, 169, 173, 190, 192, 228, 229, 248, 272, 356, 359, 529, 538, 548, 550, 553, 555, 559, 562, 564, 581, 582, 586, 628, 636, 637, 642, 652  
 Voice (Hearing), 169  
 Volatiles, 78, 79, 163, 359, 554, 633, 639  
 Volcano, 199, 422, 431, 458, 468, 469  
 Volume Production, 695, 697  
 Wa Water World, 36, 489, 491  
 Wafer, 48-51, 55-67, 75, 98, 229, 237, 238, 248, 338, 368, 522, 523, 525-527, 503, 577-579, 584, 642, 643, 655, 659  
 Wafer Jack, 48-51, 55-67, 229, 248, 523, 525, 526, 578, 579, 642, 643  
 Wage, 692  
 Waiver (Educational), 39

Waking Hours, 34, 579  
 Wall Patches, 630  
 Walsh, Kevin, 7  
 Waste, 93, 94, 229-231, 237, 347, 349, 463, 477, 480, 483, 485, 516, 500, 585, 600, 632, 704, 722-724  
 Wasteland, 422, 431, 433, 435, 437, 439, 458, 460, 468  
 Watch, 14, 33, 67, 304, 306, 307, 633, 635, 646  
 Water Purification, 639, 649  
 Water-Related Terrain, 464  
 Water, Open, 471  
 Watercraft Maintenance And Repair, 144  
 Waterskin, 639  
 Waterway, 464  
 Wavelengths Of Light, 163, 481  
 Waves Theta, 169  
 Waves, Alpha, 169  
 Waves, Beta, 169  
 Waves, Delta, 169  
 Waves, Gamma, 169  
 Way Station, 51, 272, 407, 411, 412  
 Wealth Beyond Imagining, 24  
 Weapon Description, 205-207, 214, 216, 217, 222  
 Weapons Of Mass Destruction, 132, 145, 194  
 Weapons Skills, 114, 181  
 Weighted Voting, 68  
 Welding Torch, 640, 642  
 Wells, H. G. (1866 - 1946), 10  
 Wet Terrain, 464  
 Wetland, 251, 460, 462, 474, 557, 596, 597, 705  
 Wetland Wood, 462, 557, 596, 597, 705  
 Wetland Woods, 557, 596  
 Wetlands, 462, 557, 596  
 What A Factory Produces, 496  
 What Is Traveller?, 12  
 Wheeled (Wheeled Vehicle), 145  
 Wheels Within Wheels, 20  
 Which Way?, 13, 507  
 Whitman., Ken, 7  
 Why Is It Bulky?, 152  
 Why Is It Easier To Carry?, 152  
 Why Is It Hard To Use?, 151  
 Why Is It Unreliable?, 151  
 Why Is It Unsafe?, 152  
 Why Use Qrebs?, 153  
 Wick, John, 7, 51  
 Wightman, Mike, 7  
 Wilds, 468  
 Willer, Kurt, 7  
 Wilson, William, 7  
 Wing (Fixed Wing Aircraft, Winged Flyer), 145  
 Winged Flyers, 249, 252, 460, 470, 471  
 Wiretap, 636  
 Wiseman, Loren, 7  
 Wiseman's Guide To Sophonts (Solomani Rim Edition), 552  
 Wmd, 40, 43, 48, 58, 112, 132, 145, 409, 564, 584, 724  
 Wolves, 25, 91, 592  
 Woods, 422, 431, 437, 458, 462, 478, 480, 482, 484, 557, 596  
 World (Mainworld, Planet), 145  
 World Hex, 141, 247, 250, 362, 420-424, 426, 432-436, 459, 589  
 World Hex (1000 Km), 421  
 World Knowledges, 81, 114  
 World Map, 421-424, 432, 433, 440-452, 454-456, 459  
 World Map Creation, 433  
 World Scale Constructs, 507  
 World Scale Physical Constructs, 509  
 World Surface Ranges, 676-678, 680, 690, 691  
 World Triangle, 247, 421, 424, 425, 432, 440, 459  
 Wound Badge, 45, 46, 61, 62, 66, 71  
 Wound Dressing, 645  
 Wrightson, Anthony, 7  
 Xenology, 145  
 Xmail, 642, 643  
 Xs Exemplary Service, 46, 48, 71  
 Yacht, 70, 75, 286, 287, 320, 321, 521, 738  
 Year Zero, 4, 502-506, 626  
 Young Adult, 69, 555, 561  
 Zdetl, 133  
 Zeitlin, Jeff, 7  
 Zero Point, 676-678, 690, 691  
 Zero Point Anomalies, 678  
 Zero-G (Skill), 112, 143  
 Zhdant, 20, 25, 74, 546, 572  
 Zhodani, 17, 20, 25, 42, 54, 74, 75, 97, 107, 133, 173, 183, 201, 241, 412, 529, 537, 542, 545, 546, 572, 587, 643, 726, 739, 701, 703  
 Zhodani Consulate, 17, 20, 542, 701  
 Zhodani Noble (Image), 42  
 Zhodani Of Zhdant, 546, 572  
 Ziru Sirka, 16, 17