

Core Rules

*TRAVELLER*⁵

*Science-Fiction Adventures
in the Far Future*

Far Future Enterprises

Traveller [TRAV-uh-ler, TRAV-ler]. –noun. [Origin circa 1300 CE, from the Middle English *travaillour*, the treader of a path, emphasizing labor or toil, as in “to make a difficult journey”]. 1. One who travels, or who has traveled, or who will travel, as to distant places. 2. An adventurer. 3. The game of science-fiction adventure in the far future.

Deraabelar [der-AAB-el-ur, de-RAAB-e-lur] **ᐃᑭᑦᑲᑦᑲᑦᑲᑦ**. –noun. [Origin circa - 2200 Imperial, loan word from the Anglic, but with connotations of distance because of its similarity to the Vilani *rabelar* **ᑭᑦᑲᑦᑲᑦᑲᑦ**, far away]. 1. One who goes far away, or has gone far away and returned. 2. A rogue. 3. A popular Terran role-playing game transplanted to the worlds of the First Imperium.







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

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

	Traveller5 (T5). The fifth of the direct line of editions of the Traveller 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.
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FFE invites questions and comments on this edition.
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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

TRAVELLER⁵

Science-Fiction Adventures in the Far Future

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Robert Eaglestone

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Gedeon Trias, Wolfgang Reich, Constantin Terton, James Kilbride.

Ty Beard, Tony Lee, Dave Sering, Peter Trevor, Ken Whitman.

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

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



Absent Friends

The **Traveller** universe has been a community of friends since even before its first publication. **Traveller** players are a unique and diverse group who enjoy the opportunities the game provides them for camaraderie and imagination. Lamentably, some of our friends are no longer with us, but 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.

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*.

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**.

Robert E. "Bob" Bledsaw

1942 - 2008

Bob pioneered the concept of the licensed role-playing supplement with *D&D* materials and expanded his efforts to include **Traveller**. Notable among those efforts, he conceived and published *Starships and Spacecraft*, the **Traveller Judges Screen**, and the adventure *Dra'k'ne Station*.

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.

Clayton R. Bush

1958 - 2007

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

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*.

Paul Montgomery Crabaugh

1956 - 1985

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

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.

Traveller Is About Travel

Most people never venture beyond the familiar boundaries of their village: they live their entire lives close to home. 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 labor in obscurity.

Adventure comes only to the bold: to those who move, who act, who travel.

Traveller is about 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

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.

Traveller is about the human condition

*"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

Players may encounter strange worlds, alien races, and exotic cultures, but they always see through human eyes.

Aliens so random, incomprehensible, or illogical that players cannot understand them serve no useful purpose. On the other hand, many alien cultures are puzzles: careful attention reveals an underlying logic of their behavior and their values. A warrior race makes us think about violence and how we perceive it. A world 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.

Traveller is about consequences

*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

Everything we do has consequences: kindnesses are repaid at some other place and some other time; irresponsibility can trigger consequences even years later.

Acts have consequences that strongly influence (or should strongly influence) every role-player's decisions.

Traveller is about danger

*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)

Travel without danger is mere tourism: it's no more than a series of casual looks at interesting places.

Danger is what transforms travel into adventure!

Traveller is about risk and reward

*"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.' "*

*Kartr turned his back upon the Hall of Leave-Taking
and ran lightly down the eroded steps. The wind
was chill but the sun was warm. Dust puffed up from
beneath the marching feet.*

"Yes, the end is not yet! Let us go!"

Andre Norton

Star Rangers, 1953

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

And so, ultimately, Traveller is about goals

*Even though eternity lies before us,
this is the life in which
the work of this life is to be done.
The life that lies beyond will have
its own work to do,
its own decisions to be made,
its own distance to be travelled.*

Richard L. Evans

The Spoken Word, 1945

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. Players assume roles as characters in the universe of the far future. Their characters journey to the many worlds of the galaxy, encountering challenges which may bring rewards or disaster, but always bring adventure.

Traveller is a storytelling game, 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 *personae* 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: the players are friends or comrades, 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, members of a team, 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.

R: "You are on a broad plain, purple clouds rolling across the sky. Twin suns cast long shadows as evening begins. In the distance pillars of dust rise behind vehicles speeding toward you."

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

P1: "Can I see more detail? Do my binox help me identify who they are?"

P2: "I'm checking sensors. Do they pick up anything?"

The **Referee** then resolves the characters' actions and implements the results.

[the referee checks and resolves a few details]

R: "Your binox let you see a bit more: the lead vehicle is a 6-wheel MTV. The largest visible marking is a trefoil."

R: "Sensors show a lot of encrypted comm traffic."

The players react, each in their own way.

P2: "A trefoil? Isn't that the Zhodani military symbol?"

P1: "Do they see us? Or are they after something else?"

The referee responds, and the cycle continues.

Resolution Through Discussion

Many activities are resolved through discussion.

P1: "We all board our ATV and head for the starport."

R: "OK, it takes about an hour, and you have now arrived at the main gates."

The Referee adds descriptions and reveals information in response to questions.

P3: "What does this starport look like?"

R: "It's a Type C, rather shabby and run-down; it looks like there hasn't been much traffic lately."

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

Often, players ask about things the referee has not clearly thought through; some details are literally made up on the spur of the moment.

P2: "Are there telephone poles? Utility poles?"

R: "Mmm. What do you mean?"

P1: "We look around. Are there phone poles? Or is the landscape uncluttered?"

R: "I see. No. There look like personal phone and data

link towers every mile or so. Their cables vanish into ground level manholes. It looks like there is a network of utility tunnels.”

Some Activities Are Controlled By Dice

Some descriptions and details are best driven by randomness. The outcomes of some activities are best resolved by dice.

Dice add an element of unpredictability to the adventure, and unpredictability offers more opportunity for choices and decisions.

[referee rolls the dice against local Law Level]

R: “The traffic enforcer says you can’t park there.”

P1: “What will we do? We need to be at the permit desk by 1400! Stall her while I dash inside.”

Dice also make outcomes uncertain. 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.

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

P1: “That ditch up ahead! We’ll never make it across!”

P2: “Trust me, I’m an expert driver. We’ll make it.”

[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: some Players would take the risk; others would hit the brakes and look for another choice.]

THE REFEREE

The referee is a single individual in charge of the game session. He (or she) knows the rules and enjoys administering them for the players. The referee usually likes storytelling and spends time planning the situations the players will encounter.

Role-playing isn’t a competition: the referee and the 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 (and by the Dice).

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 consistent. 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

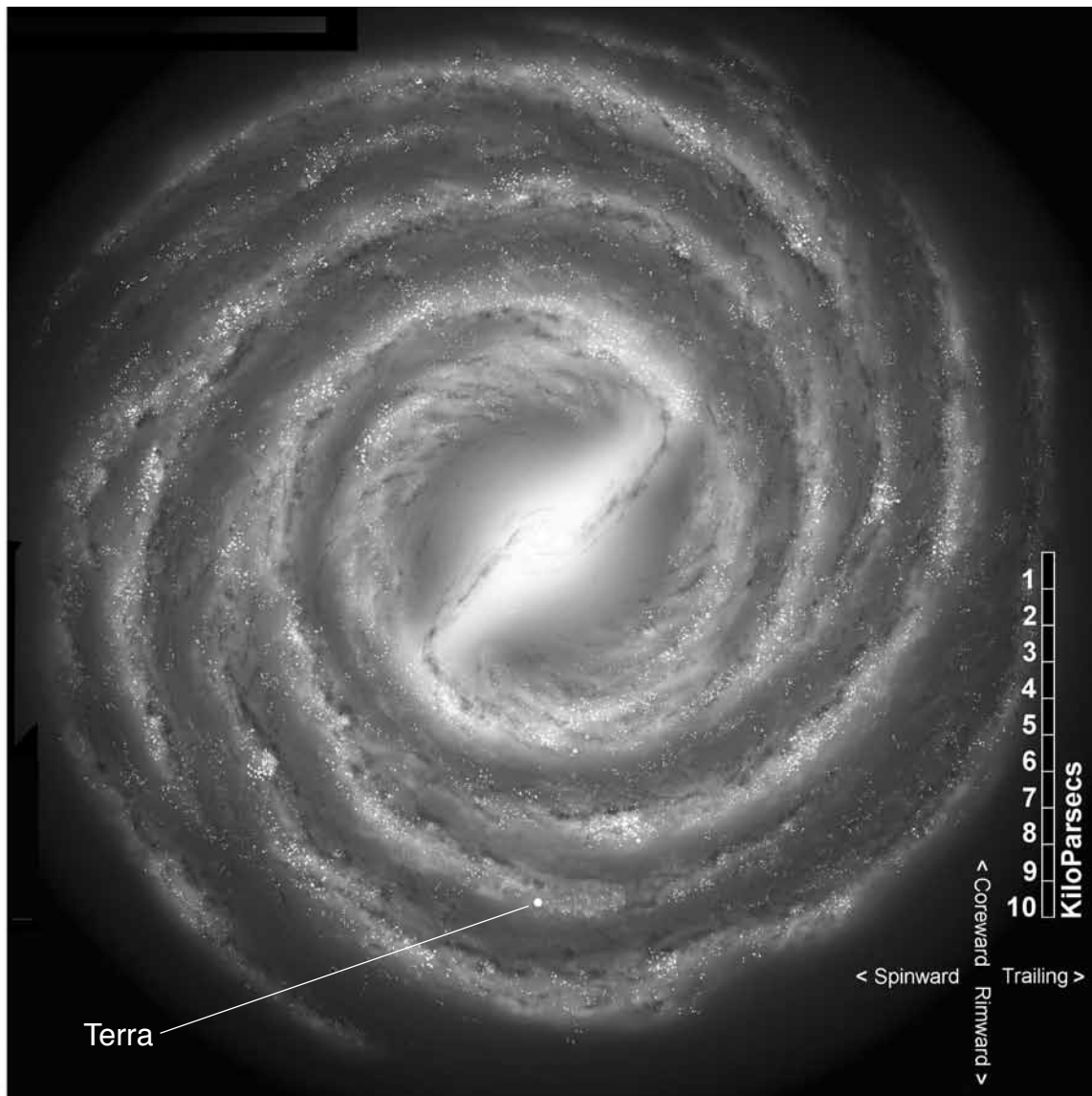
Much of **Traveller** is solitaire: the creation and description of worlds and starships and devices. For example, there is a process for designing starships; the player must decide the details of the ship appropriate for its mission. Another process describes both random and deliberate creation of planets; 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. All of **Traveller’s** resources allow players and referees to describe the universe of the far future in great detail.

ADVENTURING

Ultimately, players and a referee get together for an adventure and an opportunity to experience the **Traveller** universe firsthand.



The Galaxy



The **Galaxy** (also called **Our Galaxy**, the **Milky Way Galaxy**, **Galaxias**¹, or **Dakhaseri**²) is the barred spiral galaxy home to Humaniti and thousands of other alien intelligent species. Some 30 kiloparsecs in diameter and 3 kiloparsecs thick at its center, it contains an estimated 400 billion star systems.

The Galaxy is almost as old as the universe: its oldest stars date to less than a billion years after the beginning of time. The majority of its stars, however, are between 6 and 10 billion years old. There is evidence that even the oldest stars had planets and that some of those planets generated the fertile primordial soups that breed life.

Throughout the Galaxy, stars have habitable zones, and wherever life can appear, it does.

1 **Galaxias**. Literally, *Milky* [Greek]. There is an ancient Terran 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 stardust; 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 sophont¹ 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 NAFAL² 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.

The first truly important milieu³ was Grandfather's Era.

Grandfather 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.

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.** Contrast with FTL Faster Than Light.

3 **Milieu.** *Setting* [French]. -noun. Plural **Milieux**. The common term used by Imperial historians for an important era. A defined period in history. Age. Eon.

Then, some 300,000 years ago, in the blink of an eye, 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 sophontologists; 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. Each of his sons, at Grandfather's direction, focused his genius on conquering some aspect of the universe:

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

The 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 cratered 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 Ancients 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 Space¹.

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.

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

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.

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 discover of the Jump 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 Sirka². Its 7,000-year reign can be divided into three periods:

The Early Empire (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, everyone paid taxes and tariffs to the central empire.

Consolidation (5400 BCE to 4400 BCE). As the Empire's many subject cultures achieved higher tech levels, they began to compete with the Vilani, evading the trade monopolies and forming their own interstellar ties. The Vilani reaction was brutal and uncompromising: a series of Consolidation Wars which forcibly absorbed every competing culture into the Empire, imposing rigid, subservient governments, and ruthlessly exploiting worlds and peoples.

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 not only discouraged, they were 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, brittle culture dedicated to maintaining its *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.

² **Ziru Sirka.** Literally, *Many Star Family* [Vilani]. The Grand Empire Of Stars, the Vilani Empire, the First Imperium.

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 Man¹, to govern the conquered territories. At times it assigned mere lieutenants as governors of worlds, naval captains to rule subsectors of 30-40 worlds, and admirals to take the reins of power.

The 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.

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 what bits of technology and information

they could to keep civilization alive until the Long Night ended.

The Third Imperium (4521 to 5637 CE)

Some worlds, however, maintained their technologies. One such world survived for centuries, preserving its resources and knowledge, finally using them to remain alive during the Long Night, and ultimately bringing about the New Dawn. That world was Sylea.

Sylea began its own reconquest of the worlds of the former empire under the Starburst Banner of the Third Imperium. From a base of a dozen worlds, the forces of the Third Imperium 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	Imperials	600 IC	
Psionic Suppressions	Imperials, Zhodani	880 IC	
Solomani Rim War	Imperial, Solomani	990 IC	
The Golden Age	Imperials	1000 IC	1
The Rebellion	Imperials	1116 IC	2
The Virus Era	-	1130 IC	3
The New Era	-	1200 IC	3
The New New Era	Imperials	1248 IC	
The Far Far Future	-	1902 IC	5

CE= Terran Calendar. IC =Imperial Calendar [0= 4521 CE]

This list is not comprehensive.

Notes

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**.

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

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. Yet 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 work,
how businesses operate and make profits,
how worlds are defined, and how they affect players,
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 concept makes star travel both easy to accomplish 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.

Yet 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 its 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 refuelling stations or complex fuel systems. 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 required 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 (androids¹, sophontoids²), 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 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,

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).

racess, 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 Vilani¹, the Zhodani², and the Solomani³) 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.

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.

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.

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.

Everything Is Driven By Economics

Economics is not strictly the study of finance; it is the study of making choices between 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.

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

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.

Crucial to the Traveller adventure concept is the idea that 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 brings 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 its rich, varied universe filled with information and 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 in detail.

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.

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.

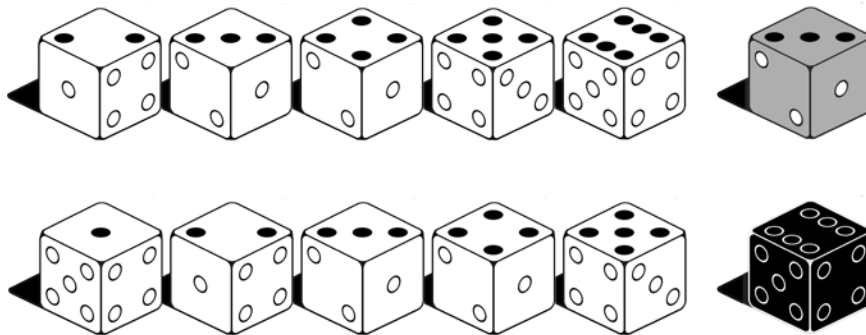
Detailed Role-Players

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.



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 used for standard 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 CHAPTER 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

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

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 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

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.

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.

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

The **Dice Tables** are a reference for players and referees. They help both 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.

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. 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. Someone with Skill-2 and Characteristic-2 (C + S=4) attempts a 2D task: he has a 17% chance of succeeding.

DICE TABLES

Title	Task Difficulty or Purpose	Abbreviation
1D	Easy	EAS
2D	Average	AVE
+ D - D	Flux	Flux
3D	Difficult	DIF
4D	Formidable	FOR
5D	Staggering	STA
6D	Hopeless	HOP
7D	Impossible	IMP
8D	Beyond Impossible	BEY
9D	Hasty Beyond Impossible	Hasty BEY
10D	Double Hasty Beyond Impossible	2Hasty BEY
C + S	Characteristic Plus Skill	C + S
Char	Select Random Characteristic	
Special	Various Special Throws	
0 - 9, 1 - 9	Random Numbers 0 - 9, 1 - 9	
Many	Many Dice (more than 10)	
Flux	Standard, Good Flux, and Bad Flux	

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

1D ONE DIE (6¹= 6 outcomes; range 1 - 6)

Roll	N	N%	N -	N - %	N +	N + %
0	0	no	0	no	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	no	6	100%	0	no

There are 6 possible outcomes ranging from 1 to 6.

2D TWO DICE (6²= 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.
The most probable roll is 7 (17%).

3D THREE DICE (6³= 216 outcomes; range 3 - 18)

Roll	N	N%	N -	N - %	N +	N + %
1	0	no	0	100%	216	100%
2	0	no	0	100%	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	no	216	no	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 (6⁴= 1296 outcomes; range 4 - 24)

Roll	N	N%	N -	N - %	N +	N + %
0	0	no	0	no	1296	100%
1	0	no	0	no	1296	100%
2	0	no	0	no	1296	100%
3	0	no	0	no	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	no	1296	100%	0	no
26	0	no	1296	100%	0	no
27	0	no	1296	100%	0	no

There are 1296 possible outcomes ranging from 4 to 24.
The most probable roll is 14 (11.3%).

FLUX TWO DICE - 7 (6²= 36 outcomes; - 5 to + 5)

Roll	N	N%	N -	N - %	N +	N + %
- 6	0	no	0	no	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	no	36	100%	0	no

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 6D

5D SIX DICE (6^5= 7776 outcomes; range 5 - 30)

Roll	N	N%	N -	N - %	N +	N + %
4	0	no	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	no	7776	100%	0	no
32	0	no	7776	100%	0	no
33	0	no	7776	100%	0	no
34	0	no	7776	100%	0	no
35	0	no	7776	100%	0	no
36	0	no	7776	100%	0	no
37	0	no	7776	100%	0	no

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	<1%	0	no	46656	100%
5	0	<1%	0	no	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	no	46656	100%	0	no

There are 46,656 possible outcomes ranging from 6 to 36.
The most probable roll is 21 (9.3%).

The Table Entries

Title shows 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

7D SEVEN DICE (6^7= 279,936 outcomes; 7 - 42)

Roll	N	N%	N -	N - %	N +	N + %
1	0	<1%	0	no	279936	100%
2	0	<1%	0	no	279936	100%
3	0	<1%	0	no	279936	100%
4	0	<1%	0	no	279936	100%
5	0	<1%	0	no	279936	100%
6	0	<1%	0	no	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	no	279936	100%	0	no
44	0	no	279936	100%	0	no
45	0	no	279936	100%	0	no
46	0	no	279936	100%	0	no
47	0	no	279936	100%	0	no
48	0	no	279936	100%	0	no
49	0	no	279936	100%	0	no

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	no	1679616	100%
2	0	no	0	no	1679616	100%
3	0	no	0	no	1679616	100%
4	0	no	0	no	1679616	100%
5	0	no	0	no	1679616	100%
6	0	no	0	no	1679616	100%
7	0	no	0	no	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	<1%	1679616	100%	0	no

There are 1,679,616 possible outcomes from 8 to 48.
The most probable roll is 28 (8%).

9D 10D

9D NINE DICE ($6^9= 10,077,696$; range 9 - 54)

Roll	N	N%	N -	N - %	N +	N + %
7	0	no	0	no	10077696	100%
8	0	no	0	no	10077696	100%
9	1	no	1	no	10077696	100%
10	9	no	10	no	10077695	100%
11	45	no	55	no	10077686	100%
12	165	no	220	no	10077641	100%
13	495	no	715	no	10077476	100%
14	1287	no	2002	no	10076981	100%
15	2994	no	4996	no	10075694	100%
16	6354	no	11350	no	10072700	100%
17	12465	no	23815	no	10066346	100%
18	22825	no	46640	no	10053881	100%
19	39303	no	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	no	10031056	100%	85943	1%
45	22825	no	10053881	100%	46640	no
46	12465	no	10066346	100%	23815	no
47	6354	no	10072700	100%	11350	no
48	2994	no	10075694	100%	4996	no
49	1287	no	10076981	100%	2002	no
50	495	no	10077476	100%	715	no
51	165	no	10077641	100%	220	no
52	45	no	10077686	100%	55	no
53	9	no	10077695	100%	10	no
54	1	no	10077696	100%	1	no
55	0	no	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 ($6^{10}= 60,466,176$; range 10 - 60)

Roll	N	N%	N -	N - %	N +	N + %
10	1	no	1	no	60466176	100%
11	10	no	11	no	60466175	100%
12	55	no	66	no	60466165	100%
13	220	no	286	no	60466110	100%
14	715	no	1001	no	60465890	100%
15	2002	no	3003	no	60465175	100%
16	4995	no	7998	no	60463173	100%
17	11340	no	19338	no	60458178	100%
18	23760	no	43098	no	60446838	100%
19	46420	no	89518	no	60423078	100%
20	85228	no	174746	no	60376658	100%
21	147940	no	322686	1%	60291430	100%
22	243925	no	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	no	60143490	99%	566611	1%
49	147940	no	60291430	100%	322686	1%
50	85228	no	60376658	100%	174746	no
51	46420	no	60423078	100%	89518	no
52	23760	no	60446838	100%	43098	no
53	11340	no	60458178	100%	19338	no
54	4995	no	60463173	100%	7998	no
55	2002	no	60465175	100%	3003	no
56	715	no	60465890	100%	1001	no
57	220	no	60466110	100%	286	no
58	55	no	60466165	100%	66	no
59	10	no	60466175	100%	11	no
60	1	no	60466176	100%	1	no

C + S

C + S ONE THROUGH EIGHT DICE

Hasty -	-	EAS	AVE	DIF	FOR	STA	HOP	IMP	
Cautious	EAS	AVE	DIF	FOR	STA	HOP	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,

An AVE Average Task is 2D.
 A Hasty AVE Average Task is one level more difficult, which is 3D.
 A Cautious AVE Average Task is one level easier, which is 1D.

RS1-90-9

RANDOMLY SELECTED CHARACTERISTICS

There is sometimes (particularly in wounding or personal injury) a need to select specific characteristics for characters.

Using The C - Code. The Six Characteristics can be randomly selected by corresponding a 1D result with the C - Code (all of this is 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.

If Human Characteristics are called for, use Column 3 - 4.

If non - Human Characteristics are called for, 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.

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.

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

1 - 9 Even Distribution 2D

	1	2	3	4	5	6
1	1	2	3	1	2	3
2	4	5	6	4	5	6
3	7	8	9	7	8	9
4	1	2	3	1	2	3
5	4	5	6	4	5	6
6	7	8	9	7	8	9

Roll 1D for Row and 1D for Column for an even distribution from 1 to 9.

0 - 9 Even Distribution 2D

	1	2	3	4	5	6
1	0	0	0	1	1	1
2	2	2	2	3	3	3
3	4	4	4	5	5	5
4	6	6	6	7	7	7
5	8	8	8	9	9	9
6	rr	rr	rr	rr	rr	rr

Roll 1D for Row and 1D for Column for an even distribution from 0 to 9. For 1 - 10, substitute 10 for 0.

Many Dice

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 180 D 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 involved 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, faced with rolling 100D, roll 2D= 2. Roll 2D (=5 1) and reuse the rolls through 100D (=30 hits).

Or to resolve 100D, roll 2D= 8. Roll 8D (=1 2 3 1 6 6 4 3) and reuse the rolls through 100D (= 319).

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 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%

$$= (7 + \text{Flux}) / 2$$

$$= 3.5 + (\text{Flux} \times 0.5)$$

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 for adept role-players.

Flux

Flux is **Traveller's** quick and easy dice-rolling mechanism 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.

Flux= + 1D - 1D

Flux is defined as + 1D - 1D to clearly state its effects and emphasize 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.

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.

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				Outcomes= 6^2= 36				Outcomes= 6^2= 36				Outcomes= 6^2= 36			Outcomes= 6^2= 36		
Range 2 - 12				Range - 5 to + 5				Range - 5 to + 5				Range 0 to + 5			Range - 5 to 0		
Most probable= 7				Most probable= 0				Most probable= 0				Most probable= + 1			Most probable= - 1		
Average= 7				Average= 0				Average= 0				Average= + 2			Average= - 2		
Column F= 2D to Flux.				F=shows 2D-7 to Flux.				2D=2D Equivalent				= High minus Low			= Low minus High.		

eHex

THE TRAVELLER EXPANDED HEX CODE

The **Traveller Expanded Hex Code** (eHex) substitutes single letters for arabic numerals above 9 and allows the creation of a string of character with values of from 0 through 33. Hexadecimal numbers use A, B, C, D, E, and F for 10, 11, 12, 13, 14 and 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		traditional digits arabic numerals
1	1		
2	2	prime	
3	3	prime	
4	4		
5	5	prime	
6	6		
7	7	prime	
8	8		
9	9		
10	A		hex digits anglic A-F
11	B	prime	
12	C		
13	D	prime	
14	E		
15	F		
16	G		eHex digits anglic G-Z
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 Dec (Decimal Notation). The digits 0-9 represent the numbers in base-10.

Hex (Hexadecimal Notation). Expanding the numbers available: the letters A-F correspond to the values 10-15 in base-16.

eHex (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>The Situation</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 0809101112	<p>The Problem</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>The Solution</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 arabic numerals	2	2	
	3	3	
	square	4	4
	5	5	
	6	6	
	7	7	
	8	8	
	square	9	9
	10	A	
hex digits anglic A-F	11	B	
	12	C	
	13	D	
	14	E	
	15	F	
	square	16	G
17	H		
omitted=		I	
18	J		
19	K		
20	L		
21	M		
22	N		
omitted=		O	
23	P		
24	Q		
square	25	R	
26	S		
27	T		
28	U		
29	V		
30	W		
unknown=	31	X	
special=	32	Y	
ultimate=	33	Z	
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.

Theoretically, 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).

SUBUNITS OF THE TON

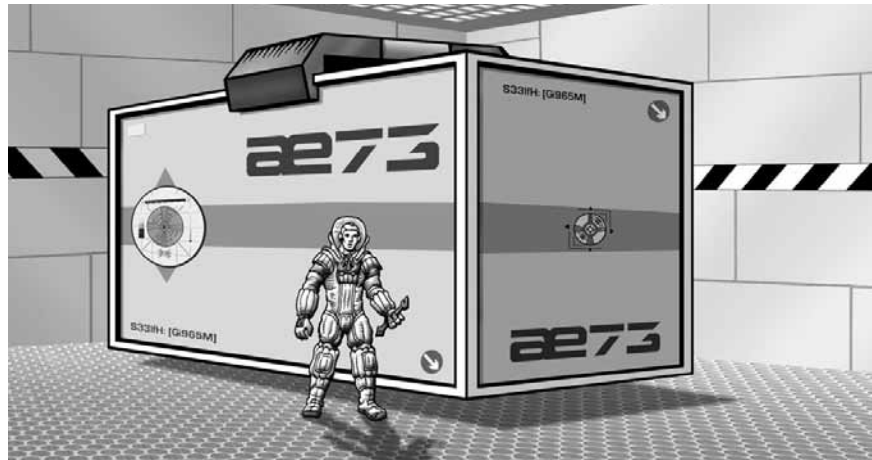
Unit	Tons	Comment
Ton	1.00	= [Standard] Ton
Ton*	1.037	= Legacy Ton
Square**	0.5	= half-ton
Cube***	0.25	= quarter-ton
Roup	0.10	= tenth-ton
		= deciton
		=1350 liters
Lan	0.01	= hundredth ton
		= centiton
		=135 liters
Liter	0.00007	=1/1350
Kiloliter	0.075	= cubic meter
Emthree*	0.075	= cubic meter
Cyard*	0.05	= cubic yard
Cuft*	0.002	= cubic foot

*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.



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.

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

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

Distances and Range Bands

R T



Needle	Word
Reading	Talking
0.5 m	1.5 m

SIZE, RANGE,
AND DISTANCE

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

1 WORLD SURFACE RANGES

Distance	R=	Descriptor	Benchmark	Range Band Width	S=
Zero Point	0	Contact	Touching	Zero Point to about 25 cm	
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	
5 km	6	Distant	Near The Horizon	3 km to 25 km	B
50 km	7	Vdistant	Beyond The Horizon	25 km to 250 km	1
500 km	8	Orbit		250 km to 2,500 km	2
5,000 km	9	Far Orbit		2,500 km to 25,000 km	3

R=

World Surface Ranges from personal contact to horizon, and to orbit.

R= S + 5

S=

B Space Ranges from boarding range to 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 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, the 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 Range Bands

Some specialized Range Bands are lettered rather than numbered. Two of the World R= Range Bands are lettered. They lie between Vshort Range and Contact and refer to typical sense interaction distances.

Reading Range= R is the typical distance for reading

books, vision screens, or other texts.

Talking Range= T is the typical distance for conversations 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.

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 8c The **Travel Times Charts** detail how long a ship requires to travel between various locations in a star system.

Travel time calculation is performed in three steps:

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 Start and Stop Travel

If the ship begins with zero speed and will stop at the destination, use Table 7b. The table provides the travel time for 1G acceleration. If a different acceleration is used, apply the Other Gs conversion.

8c Impact Travel

If the ship will impact (or flyby) the destination, use Table 7c. Although detailed calculations can provide a very accurate travel time, the approximations is often sufficient.

9 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.

THE SIZE OF A STAR SYSTEM

The Travel Times Charts provides 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 indicates they are at Range S= 13.

A ship under constant 1G acceleration, Table 8b shows that it can reach S= 13 and stop at a world in about 8 days. Under constant 9G acceleration, it can arrive in 71 hours.

A hostile ship at about the orbit of Uranus can launch a 1G Kinetic Kill Missile toward a target near Terra. Table 8c indicates that it will arrive (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^a 1^b 1^c Basic World Ranges

1a World Surface Ranges		
Distance	R=	Descriptor
	11	
	10	
5,000 km	9	Far Orbit
500 km	8	Orbit
	7.8	
	7.6	
	7.4	
	7.2	
50 km	7	Vdistant
	6.8	
	6.6	
	6.4	
	6.2	
5 km	6	Distant
1000 m	5	Vlong
500 m	4	Long
150 m	3	Medium
50 m	2	Short
5 m	1	Vshort
1.5 m	T	Talking
0.5 m	R	Reading
Surface	0	Contact
0.5 m	-R	
	-T	
	-1	
	-2	
	-3	
	-4	
	-5	
	-6	
	-7	
	-8	
	-9	

1b Altitudes of the Atmosphere		
Distance	R=	Descriptor
250k km	11	Satellite
50k km	10	Geo
5,000 km	9	Far Orbit
500 km	8	Orbit
400 km	7.8	Upper8
300 km	7.6	Upper6
200 km	7.4	Upper4
100 km	7.2	Upper2
50 km	7	Upper
30 km	6.8	Mid8
20 km	6.6	Mid6
12 km	6.4	Mid4
8 km	6.2	Mid2
5 km	6	Mid
1000 m	5	Airspace5
500 m	4	Airspace4
150 m	3	Airspace3
50 m	2	NOP
5 m	1	Near Surface
1.5 m	T	Eye Level
0.5 m	R	Low
Surface	0	Contact
0.5 m	-R	Pothole
1.5 m	-T	Trench
5 m	-1	Ditch
50 m	-2	Sinkhole
150 m	-3	
500 m	-4	Chasm Rim
1000 m	-5	Chasm Wall
5 km	-6	Chasm Floor
50 km	-7	
500 km	-8	
5,000 km	-9	Planet Core

1c Depths of the Oceans		
Distance	R=	Descriptor
	11	
	10	
	9	
	8	
	7.8	
	7.6	
	7.4	
	7.2	
	7	
	6.8	
	6.6	
	6.4	
	6.2	
	6	
	5	
	4	
	3	
50 m	2	Tsunami
5 m	1	Vbig Waves
1.5 m	T	Big Waves
0.5 m	R	Waves
Surface	0	Surface
0.5 m	-R	Wading
1.5 m	-T	Fording
5 m	-1	Pond
50 m	-2	Thermocline
150 m	-3	Shelf
500 m	-4	Lake Bottom
1000 m	-5	Deep Lake
5 km	-6	Bottoms
50 km	-7	Depths
500 km	-8	Abyss
5,000 km	-9	

Basic Ranges are used in personal and vehicle combat, especially on world surfaces, in communications, in planning travel, and with the senses.

NOP= Nap of Planet.
Chasm= as on worlds with Atmosphere F (Thin, Low).
Eye Level: Human.

Thermocline= of importance to underwater sensor use.

Abyss= of importance on Ocean Worlds.

Space Ranges **2**

2 Space Ranges

Distance	S=	Descriptor	Band	Name	Stellar*	World*	Orbits	Light Delay	R=
1,500 mn km	13	Outer System			1000 D		To Orbit 6	83 lm= 10 AU	18
500 mn km	12						To Orbit 5	30 lm= 3 AU	17
150 mn km	11		DS	Deep Space	100 D		To Orbit 3	8 lm= 1 AU	16
50 mn km	10	Siege					To Orbit 0	3 lm	15
5 mn km	9		LR	Long Range	10 D	1000 D		16 ls	14
2.5 mn km	8				1 D			8 ls	13
500,000 km	7		AR	Attack Range		100 D		2 ls	12
250,000 km	6	Missile						1 ls	11
50,000 km	5	Beam				10 D			10
5,000 km	4	Far Orbit	SR	Short Range		1D			9
500 km	3	Orbit							8
50 km	2	Fighter	F2	Fighter2					7
5 km	1	Close Fighter	F1	Fighter1					6
1000 m	B	Boarding	B	Boarding					5
500 m		Long							4
150 m		Medium							3
50 m		Short							2
5 m		Vshort							1
1.5 m		Talking							T
0.5 m		Reading							R
Surface	0	Contact							0

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; they are extended to extreme values here for comparison. $R = S + 5$.

Band= **Space Combat Range Bands** used in Space Combat, especially with Movement. Bands are a subset of Space Ranges.

Light Delay= provides insight into maximum radio and light time frames over distance.

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.

3^a4^a Gas Giants And Strangeworlds

3a Large Gas Giant Atmosphere					3b Small Gas Giant Atmosphere					3c Ice Giant Atmosphere				
km	R=	P=	T=	Descriptor	km	R=	P=	T=	Descriptor	km	R=	P=	T=	Descriptor
0	0	1		Cloud	0	0	1		Cloud	0	0	1		Cloud
5	6	1		NH3 Ice	5	6	1		Water Ice	5	6	1		NH3 Ice
10	6.2	1		NH3 Ice	10	6.2	1		NH3 Ice	10	6.2	1		NH3 Ice
20	6.4	2		Clear H2	20	6.4	1		Clear H2	20	6.4	2		Clear H2
30	6.6	3		NH4SH	30	6.6	1		NH4SH	30	6.6	4		NH4SH
40	6.8	4		Water Ice	40	6.8	2		Water Ice	40	6.8	7		Water Ice
50	7	6	0	Clear H2	50	7	2	0	NH3	50	7	10		Clear H2
100	7.2	40	4	Clear H2	100	7.2	5	1	NH3	100	7.2	^2		Clear H2
200	7.4	^3	36	Clear H2	200	7.4	20	4	Clear H2	200	7.4	^4	1	Clear H2
300	7.6	^3	^2	Clear H2	300	7.6	80	36	Clear H2	300	7.6	^4	4	Clear H2
400	7.8	^4			400	7.8	^3	^2		400	7.8	^5	36	
500	8	^4			500	8	^4			500	8	^5	^2	
1000	8.2	^5			1000	8.2	^5			1000	8.2	^6		
2000	8.4	^5			2000	8.4	^6			2000	8.4	^6		Liq H2
3000	8.8	^6			3000	8.8	^6		Liq H2	3000	8.8	^6		

4a Inferno Atmosphere					4b StormWorld Atmosphere					4c RadWorld Atmosphere				
km	R=	P=	T=	Descriptor	km	R=	P=	T=	Descriptor	km	R=	P=	T=	Descriptor
500	8	0	0	Cloud	500	8	0			500	8	0		
400	7.8	0	0		400	7.8	0			400	7.8			
300	7.6	0	0		300	7.6	0			300	7.6			
200	7.4	0	0		200	7.4	0			200	7.4			
100	7.2	0	0		100	7.2	0			100	7.2			
50	7	1	0	Cloud Top	50	7	0			50	7			
30	6.8	^2	64		30	6.8	0		Calm	30	6.8			
20	6.6	^2	^2		20	6.6	5			20	6.6			
12	6.4	^2	^2		12	6.4	10		Turbulent	12	6.4			
8	6.2	^2	^2		8	6.2	5			8	6.2			Rad= 1D
5	6	^2	^2		5	6	0		Calm	5	6			Rad= 2D
0.1	5	^3	^2		0.1	5	5			0.1	5			Rad= 10
Surf	0	^3	^3	Surface	Surf	0	10		Turbulent	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					A0-F5	A0-K0
		1	0.4	60	200 ls	Mercury			A0	Go-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
		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			
		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			0-10			
	17	14	1,230	184,500	7 ld			0-11			
	15	2,500	368,700	14 ld			0-12				
	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 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

lw= light-hour

THE 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	-	*	*	*

THE 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	-	*	*	*

THE 1000D 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	*

G-Drives inoperable outside this orbit. J-Drives inoperable within this orbit. M-Drives inoperable beyond this orbit.
Limit shown is beyond (or within for Jump) the orbit number shown. *= Inside Orbit-0. Blank= not possible.

6 Decimal Orbits

6 DECIMAL ORBITS

		S=	O=	AU=	Flux=										O=
		Decimal Orbit=													
			-5	-4	-3	-2	-1	0	+1	+2	+3	+4	+5		
			.5	.6	.7	.8	.9	.0	.1	.2	.3	.4	.5		
Inner System	10	0	0.2	0.15	0.16	0.17	0.18	0.19	0.2	0.22	0.24	0.26	0.28	0.30	0
		1	0.4	0.30	0.32	0.34	0.36	0.38	0.4	0.43	0.46	0.49	0.52	0.55	1
		2	0.7	0.55	0.58	0.61	0.64	0.67	0.7	0.73	0.76	0.79	0.82	0.85	2
	11	3	1.0	0.85	0.88	0.91	0.94	0.97	1.0	1.06	1.12	1.18	1.24	1.30	3
		4	1.6	1.30	1.36	1.42	1.48	1.54	1.6	1.72	1.84	1.96	2.08	2.20	4
Outer System	12	5	2.8	2.20	2.32	2.44	2.56	2.68	2.8	3.04	3.28	3.52	3.76	4.00	5
		6	5.2	4.0	4.2	4.4	4.7	4.9	5.2	5.6	6.1	6.6	7.1	7.6	6
	13	7	10	7.6	8.1	8.5	9.0	9.5	10.0	11.0	12.0	13.0	14.0	15.0	7
		8	20	15	16	17	18	19	20	22	24	26	28	30	8
	14	9	40	30	32	34	36	38	40	43	47	51	54	58	9
Remote System	15	10	77	58	62	65	69	73	77	84	92	100	107	115	10
		11	154	115	123	130	138	146	154	169	184	200	215	231	11
	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
	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	
	18	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	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).

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 as close as 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 a b1 b2 7

7a HABITABLE ZONES

	S=	O=	AU=	Million km	Light-	Ia	Ib	II	III	IV	V	VI	D
Inner System	10	0	0.2	30	100 ls						K9-M9	K4-M9	A0-M9
		1	0.4	60	200 ls							G9-K3	
		2	0.7	105	350 ls							G9-K8	G2-G8
	11	3	1.0	150	8 lm							G2-G8	F2-G1
		4	1.6	240	13 lm							F7-G1	
	12	5	2.8	420	30 lm						F7-K3	F2-F6	
Outer System		6	5.2	780	43 lm				F2-G8	A9-F6	A9-F1		
	13	7	10	1,500	83 lm				G9-K8*	A0-A8	A0-A8		
		8	20	3,000	3 lh			A9-K3	K9-M8*				
	14	9	40	6,000	5 lh			K4-M3*	M9				
	15	10	77	11,550	10 lh		A9-M3	M4-M8					
		11	154	23,100	21 lh	F7-G1	M4-M9*	M9					
16	12	308	46,200	42 lh	G2-M9*								

Orbit No.

Size Ia Orbit 12 also includes A0-F6.

Size Ib Orbit 11 also includes A0-A8.

A world in an orbit labelled HZ is Temperate;
 one orbit closer to the star is Hot;
 one orbit farther from the star is Cold.

Size II Orbit 9 also includes A0-A8.

Size III Orbit 7 also includes A9-F1.

Size III Orbit 8 also includes A0-A8.

S= is an approximation, Calculate Orbit Radius for a definitive S=.

7b1 SATELLITE ORBITS-1

	S=	O=	Multiplier	Comment
Locked To The Primary	3	Ay	1	} = Ring System } or Size<2.
	4	Bee	2	
		Cee	3	
		Dee	4	
		Ee	5	
		Eff	6	
	5	Gee	8	
		Aitch	10	
		Eye	20	
		Jay	30	
		Kay	40	
	6	Ell	50	Luna
		Em	60	

7b2 SATELLITE ORBITS-2

	S=	O=	Multiplier	Comment	
Not Locked To The Primary		En	70		
		Oh	80		
		Pee	100		
		7	Que	150	} If Primary is a } White Dwarf, } this region is a } Habitable Zone.
		Arr	200		
		Ess	250		
		Tee	300		
		Yu	400		
		8	Vee	500	
		Dub	600		
		Ex	700		
		9	Wye	800	
		Zee	1000		

Satellite Orbit radius varies with the gas giant or planet. Calculate Satellite Orbit Radius= Multiplier times Primary World Size (use eHex) for a result in thousands of km. Luna is orbit Ell around Terra World Size=8= 50 x 8= 400 thousand km. Titan is orbit Eye around Saturn World Size= R (= 70 thousand km). Titan orbits Saturn at 20 x 70= 1,400 thousand km.

8^a 8^b 8^c Travel Times

8a HOW FAR? Conjunction (same side of system) Opposition (other side of system)

	HOW FAR?			Conjunction (same side of system)									Opposition (other side of system)											
	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
Outer 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
		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	-	-	-	-	-	-	-	-	-	-	13
	15	10	77	11,550	13	13	13	13	13	13	13	13	13	13	-	-	-	-	-	-	-	-	-	-

Conjunction= the distance between two orbits if on the same side of the system. **Opposition**= the distance between two orbits if on opposite sides of the system. Row and Column are O= Orbit Numbers. 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 TRAVEL TIMES (START AND STOP)

Distance	S=	Band	1G	2G	3G	4G	5G	6G	7G	8G	9G	R=
1,500 mn km	13		8 d	6 d	5 d	4	4 d	3 d	3 d	3 d	71 h	18
500 mn km	12	DS	5d	3d	71h	62h	55h	50h	46h	43h	41h	17
150 mn km	11		68h	48h	39h	34h	30h	27h	25h	24h	22h	16
50 mn km	10		39h	27h	22h	19h	17h	16h	14h	13h	13h	15
5 mn km	9	LR	12h	8h	7h	6h	5h	5h	4h	4h	4h	14
2.5 mn km	8		8h	6h	5h	4h	3h	3h	3h	3h	175m	13
500,000 km	7	AR	3h	166m	136m	117m	105m	96m	89m	83m	78m	12
250,000 km	6		166m	117m	96m	83m	74m	68m	62m	58m	55m	11
50,000 km	5	SR	74m	52m	43m	37m	33m	30m	28m	26m	24m	10

8c TRAVEL TIMES (NO STOP)

Distance	S=	Band	1G	2G	3G	4G	5G	6G	7G	8G	9G	R=
1,500 mn km	13		6 d	4 d	4 d	3 d	3 d	62 h	57 h	54 h	51 h	18
500 mn km	12	DS	4 d	62 h	51 h	44 h	39 h	36 h	33 h	31 h	29 h	17
150 mn km	11		48 h	34 h	28 h	24 h	21 h	20 h	18 h	17 h	16 h	16
50 mn km	10		28 h	20 h	16 h	14 h	12 h	11 h	10 h	10 h	9 h	15
5 mn km	9	LR	9 h	6 h	5 h	4 h	4 h	3 h	3 h	3 h	3 h	14
2.5 mn km	8		6 h	4 h	3 h	3 h	3 h	2 h	2 h	2 h	2 h	13
500,000 km	7	AR	3 h	118 m	96 m	83 m	74 m	68 m	63 m	59 m	55 m	12
250,000 km	6		118 m	83 m	68 m	59 m	53 m	48 m	44 m	42 m	39 m	11
50,000 km	5	SR	53 m	37 m	30 m	26 m	23 m	21 m	20 m	19 m	17 m	10

Fame, Danger, And Threats

9

9 FAME, DANGER, AND THREATS

Distance	F=	Descriptor	Alternate Descriptor
	0	Unknown	
	1	Parent	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	Past Realities	
	35	Future Realities	
	36	All Reality	

FAME

Fame is the degree of recognition or respect which society in general (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.

Express Fame as Fame-<level>. A world-famous entertainer has Fame-9. A Fame-9 entertainer probably has name recognition anywhere on his world.

Alternate Descriptors: Based on Fame within Organizations or Societies (as opposed to standard Fame based on distance).

Infamy: It is possible to have negative Fame.

DANGER AND THREATS

Danger is the potential for harm to an object, group, or location. Harm includes death, destruction, injury, illness, reduction in ability, or significant change. Danger indicates changes which rational beings would believe to be harmful or undesirable.

Threat is the source or agent of a **Danger**.

Expressing Danger and Threat. Attach-<level> as in Danger-<level>. and Threat-<level>.

RISK

Risk is an evaluation of 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.

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. If the result is negative, the Risk is minimal. A positive result indicates a risk which must be addressed.

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.

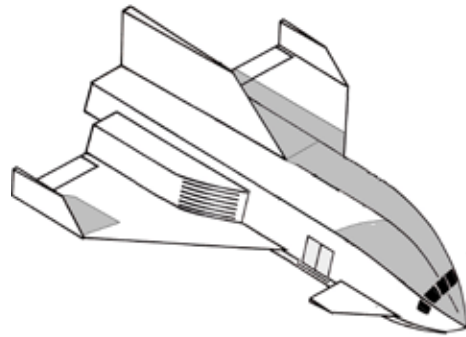
SPECULATION

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



THE STARSHIP INVESTMENT				
(in MCr)	Shipyard	Bank	Buyer	
	+ 20		- 20	cash payment
		+ 100	- 100	bank loan*
	+ 60	- 60		
Components	- 30			
Labor	- 30			
Profit	+ 20	+ 40		

*480 payments of Cr420,000
=MCr201 over 40 years

live comfortably off the modest profits of their profession. Then again, being a shopkeeper is not the focus of most **Traveller** characters.

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 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.

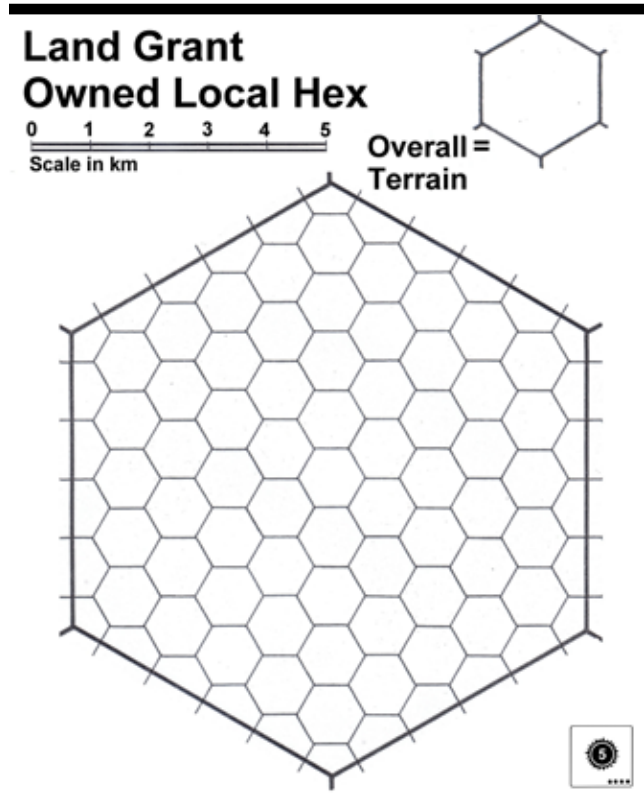
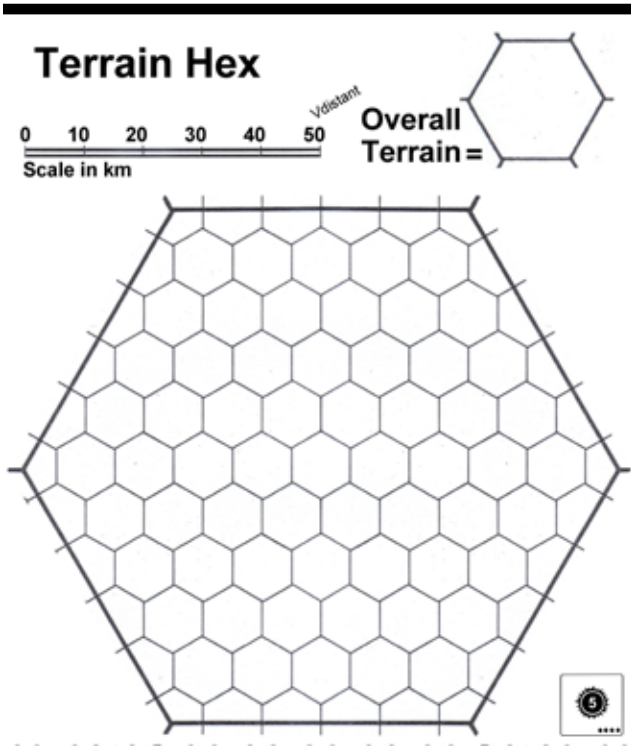
The Land Grant Speculation

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 authority, to an individual as a reward, especially for service or accomplishment, or as an incentive to develop the land.

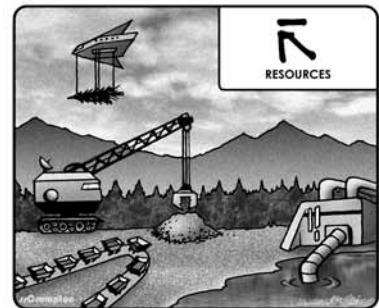
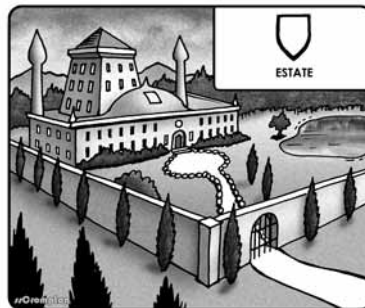
The holder is granted a portion of the tax income from the land. Precisely how much is negotiated by the holder and the local authorities, and depends on investment by, and the influence of, the holder.

In addition, the holder owns outright one **Local Hex**. Depending on the territory, the 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, Lady of the Pantel, Holder Hironobu of Junidy, 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.



Three Examples of Terrain in the Land Grant Speculation

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 invisible to the user.

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 details many aspects 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 (= Cr10⁴), 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).

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. The Benchmark Sizes are 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%

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.

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	200x	2400x	Rank
Marine Officer	400x	4800x	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.

NOBLE LAND GRANTS

Noble	Soc	Hexes	Where?	Preferred World
Gentleman	A	1	any	any
Knight	B	1	homeworld	any
Baronet	c	2	one system	Pre-Ag or Pre-Ri
Baron	C	4	one system	Ag or Ri
Marquis	D	8	one subsector	Pre-Ind
Viscount	e	16	one subsector	Pre-Hi
Count	E	32	one sector	In
Duke*	f	64	one sector	Important World
Duke*	F	128	one sector	Important World
Archduke	G	256	one domain	any

Nobles receive Land Grants on the worlds on which they hold fiefs. Noble Land Grants are cumulative. Each noble title confers a Land Grant.

*Soc= f is Duke (Duchess). The next increase in Soc elevates to F. The title is the same; the power increases.

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).

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.

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 the ship's operations.

Annual Payouts. Shares are paid out once per year before annual maintenance.

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
Value	0	1	2	3	4	5	6	7	8
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	1.1 x	Nonstandard performance.
+ 2	Improved	1.3 x	Updated.
+ 3	Generic	0.7 x	Low Quality Control.
+ 4	Modified	1.2 x	Changed. New features.
+ 5	Advanced	2.0 x	Multiple 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	Very 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 mm 5 feet	Vehicle 7.5 m 25 feet	Tower 75 m 250 feet	
Size=	0	R	T	1	2	3	4	5	6	7

DECIMAL SIZE		R	T	1	2	3	4	5	6	7	
Length	--	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

RANDOM SIZE VARIATION

Flux	R=	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

HOT AND COLD BENCHMARKS

K	C	Hits	Descriptors	
0	- 273	144	Absolute Zero	40D
25	- 250	121	Hydrogen Ice	35D
50	- 225	100	Oxygen Ice	30D
75	- 200	81	Nitrogen Ice	25D
100	- 175	64		20D
125	- 150	49		15D
150	- 125	36		10D
175	- 100	25		7D
200	- 75	16	Radon Ice	4D
225	- 50	9		3D
250	- 25	4		2D
275	0	1	Cold	1D
300	25	0	Human Temperate Environ	
325	50	1	Hot	1D
350	75	4		2D
375	100	9	Water boils	3D
400	125	16	Sulfur melts	4D
425	150	25		7D
450	175	36		10D
475	200	49		15D
500	225	64	Tin melts	20D
525	250	81	Fire	25D
550	275	100		30D
575	300	121		35D
600	325	144		40D
700	425	350	Lead melts	100D
800	525	400		115D
900	625	450	Aluminum melts	130D
1000	725	500		140D
2000	1725	1000	Titanium melts	300D
3000	2725	1500	Spectral M Star surface	
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).

Hot Cold

IMPACT DAMAGE BENCHMARKS

Speed	kph	Hits	Descriptors
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
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	Tin melts

Subsonic

Supersonic

Hits upon impact based on (V= Speed): **Hits= V²**
Multiply by Tons (or fractional Tons) of impacting object.
Use displacement Tons rather than mass.

INSULATION PROTECTION

In=	protects against	Ship AV
144	- 275 to 325	15
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
16	- 75 to 125	2
9	- 50 to 100	1
4	- 25 to 75	1
1	0 to 50	1

For Cold Protection, an On-Board Heater increases the Cold Protected temperature - 100 C.

For Heat Protection, an On-Board Cooler (Air Conditioner) increases the Heat Protected temperature + 100 C.

Money

The standard by which the value of objects and labor is measured is called 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 quarter-hour) of unskilled labor.

For example, a down-and-out spacer, stranded on a frontier world along the Imperial border, does odd jobs for the owner of the Lone Star: he is paid several credits for an hour of work.

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

Resource Units (RU or Aryu)

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 uses direct transactions without the use of money. Such Barter transactions directly trade one type of goods for another; each participant acquires the specific goods he wants 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.

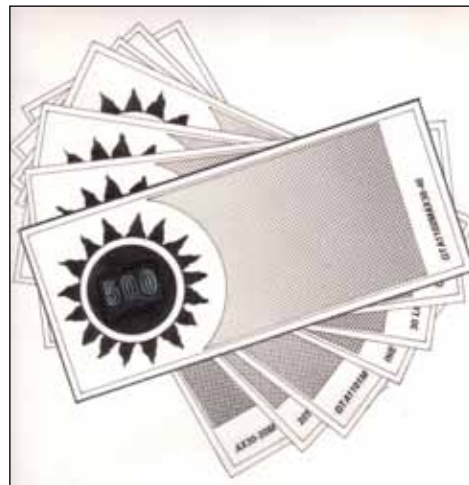
The natives, in response, lay out goods that they think may be attractive to the trader: woven baskets, carved stone or organic material totems, pieces of shiny rock, artifacts, gold nuggets, or whatever they have on hand.

Each side then 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.

IN KIND

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

Scouts, Merchants, Spacers, Soldiers, and Marines are provided housing and meals in addition to their ordinary wages. Such an arrangement is more convenient for both sides: the employer avoids some level of money payment, and also avoids charging the employee for meals or quarters. Both sides have the luxury of avoiding the accounting details.



Humanity

Most player characters are **human**: 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 HUMANITY

Humanity evolved on Terra over the course of millions of years 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 made use of humans, and 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 **Humanity** to identify the species as it evolved on Terra, and **Humanity** to identify greater species as it exists across many worlds.

The Result: Humaniti (some near-identical to Terran humans; 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 be-

yond 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 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 millenia, until a lingering bio-weapon wiped out their partner race. The Zhdani developed their native psionic abilities and incorporated them into their culture.

The Minor Human Races

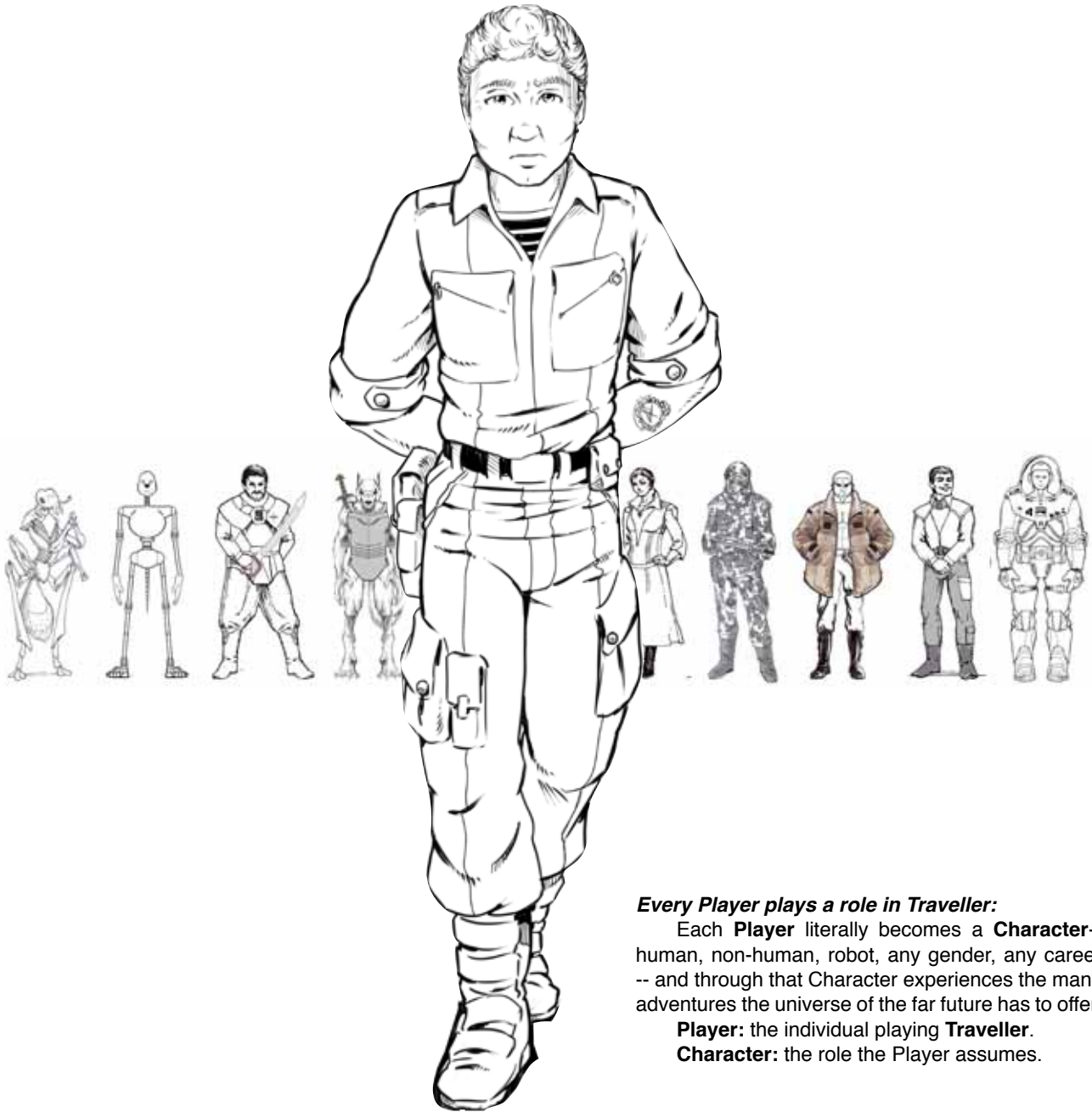
There are many minor (or ordinary) human races, each claiming its own uniqueness based on homeworld or culture. Some are in Charted Space (the Answerin, Azhanti, Geonee, Luriani, Suerrat); others are obscure or relatively unknown.

IMPERIALS

Human characters, 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.

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 in Traveller:

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 distinct 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 (called 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: aliens from their own worlds and civilizations. They may have Characteristics in common with Humans, and they may 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 has a non-Human character, he will

CHARACTERISTICS

The possible personal Characteristics include:

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.

THE UNIVERSAL PERSONALITY PROFILE UPP

Position Code-	C1	C2	C3	C4	C5	C6
Digit	9	A	B	5	6	7
Human=	Strength Agility Grace	Dexterity Stamina Vigor	Endurance	Intelligence Training Instinct	Education Caste Charisma	Social Standing

The UPP shows Characteristics as a six-digit Ehex string; it serves as a ready reference for the abilities of the Character.

certainly encounter non-Humans and ultimately need to deal with non-Human 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 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 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 can be identified by its position in the UPP. Use the letter C (for Characteristic) followed by 1 through 6. For example, for all sophonts, C1 = Str. To avoid confusion between a word's ordinary meaning and its use as a Characteristic (such as Strength and strength), a Characteristic may be explicitly identified with the format:

Position Code = Characteristic Name.

For example, C5 = Training, or C4 = Intelligence.

Characteristic Equivalences

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

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 task for Dexterity 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). A character 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: a result equal to or less than the characteristic gives success; any other result gives failure. To avoid recurring use of an available high Characteristic, a Character cannot use a 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:

CHECK CHARACTERISTIC

Easy Check	1D =< Characteristic
Check	2D =< Characteristic
Hard Check	3D =< Characteristic

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 described 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.

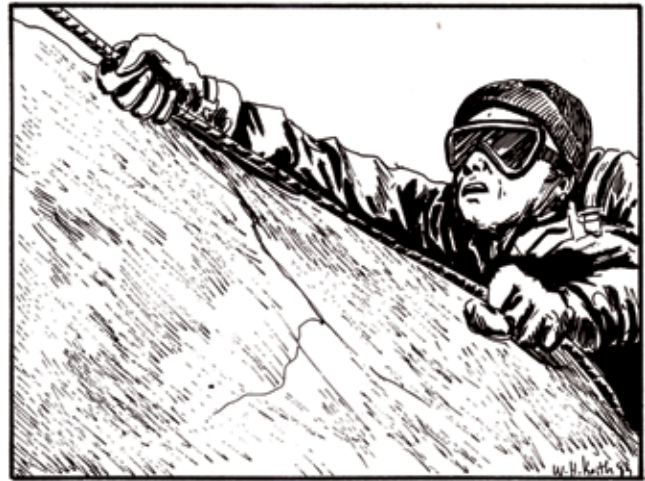
Using C1

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 perceived 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

Why Different Characteristics?

Different characteristics allow players to create 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 with 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 C2 characteristic is used in balance, accuracy (in throwing or weapons 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.

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.

Every character has 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.

CHARACTERISTIC EQUIVALENCE

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

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

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, Gentleone, Gentle). Although technically not Noble, Soc = A represents an awakening awareness of the Noble structure and of the 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.

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 is initially a Viscount (Viscountess). The next increase in Soc remains E but the title increases to Count (Countess).

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 an obscure (and usually unrefer-

enced) characteristic called Sanity. Characters do not generate Sanity until it is first called for by a situation.

Universal Structure. 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. State the value in eHex.

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. Sessions with a Counsellor (Counsellor skill) may increase Sanity (or rather, reinstate Sanity which has previously been reduced).

The Effect of Drugs. 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 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.

The Personal Day

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

* Failure = Character falls asleep for 1D hours in first instance; 1D minutes 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 his 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 awakens at 0600 and starts its watch at 0800. The watch will end 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. Discovering at that food poisoning event will continue, it sets alarms for contingencies and takes a 3-hour nap from 1800 to 2100. It awakens at Optimal to finish this watch and start the third.

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

STRENGTH C1

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. Loads are kg and compared to Str.

Load And Burden

Load is weight in kg of all objects carried. Burden is perceived Load after all Mods. The QREBS Burden Mod changes Load to Burden. Both Burden and Load are in kilograms.

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 distance 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.

DEXTERITY C2

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.

Manipulation

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

AGILITY C2

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

GRACE C2

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 body-limb coordination and often associated with swimmers. Grace is an analog of Dexterity.

ENDURANCE C3

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 physical resistance to fatigue.

Waking Hours

C3 determines the natural day, need for sleep, and ability to perform tasks.

Personal Day (PD).
Endurance = 24 hours;
Stamina = 48 hours;
Vigor = 12 hours.

Varies by Flux.
Sleep needs are addressed in the Personal Day table.

Hold Your Breath

A character can Hold His Breath until he fails Check C3 (check every combat round).

STAMINA C3

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 pursuit. Stamina is an analog of Endurance.

VIGOR C3

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 and shot-term ability to pursue a task. Vigor is an analog of Endurance.

INTELLIGENCE C4

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

When a character is confronted with a puzzle, the throw to solve it is Int or less. The game master manipulates this basic process to reflect harder puzzles, simpler situations, or other complications.

SANITY CS

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

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

EDUCATION C5

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 full value. Ins cannot be substituted for either. For those rare tasks that require Instinct directly, Edu or Tra may be used with a value of 1.

TRAINING C5

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.

INSTINCT C5

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 ability (based on genetic heritage) 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.

SOCIAL C6

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 social level for the character.

Support

C6 establishes the cost to an individual for basic living.

The typical cost of monthly support (food, clothes, lodging, basic entertainment) =

$$\begin{aligned} & Cr100 \times Soc \\ & Cr100 \times Cha \\ & Cr 50 \times Cas \end{aligned}$$

NOBILITY C6

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

Nobility is the expected or equivalent (not necessarily actual) noble rank held by an individual based on Social Standing.

CHARISMA C6

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 in a small group hierarchy.

Lead or Follow. A

low Cha individual will defer to and follow the leadership of a high Cha individual, regardless of other characteristics.

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

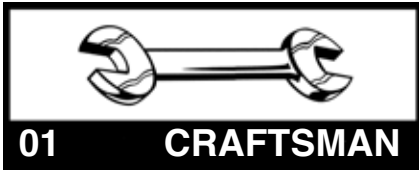
CASTE C6

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 specific sophont species which has Caste.

Someone with Caste is generally oblivious to Social hierarchy outside of Caste.

13 CAREERS



01 CRAFTSMAN

A skilled worker. An artificer, a mechanic, an artisan. A professional with great skill in the manual arts.



02 SCHOLAR

One who, through study, has mastered one or more areas of academic study. A learned person.



03 ENTERTAINER

One who uses his talents or abilities in performance. A participant in the arts.



04 CITIZEN

One who, by birth or other process, owes loyalty to a state, nation, or world. A civilian. An average person.



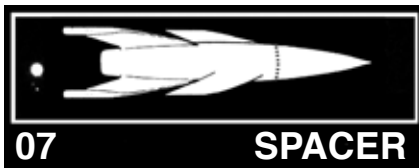
05 SCOUT

One who travels to unknown territory. An explorer.



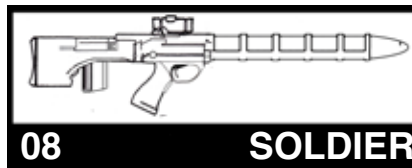
06 MERCHANT

A businessperson. Especially, the operator of a (space or star) ship engaged in trade and commerce.



07 SPACER

One who serves in a navy or crews or works on an armed (star) ship or (space) ship.



08 SOLDIER

One who serves in the Army or other fighting force. Fighter. Warrior. Trooper. Combatant.



09 AGENT

One empowered to act for others, especially for a megacorporation or a government. A spy.



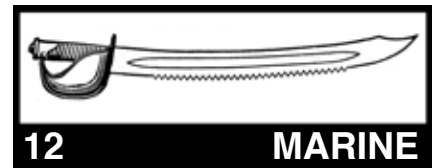
10 ROGUE

A deceitful person, a scoundrel or rascal. A mischievous scamp. A pirate or corsair. A traitor, or rebel.



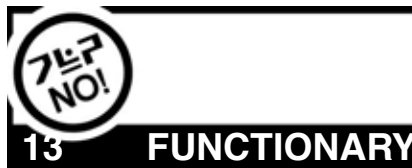
11 NOBLE

One possessing an especially high rank in a political, cultural, or social class structure.



12 MARINE

A member of a specially trained or specially selected elite fighting force.



13 FUNCTIONARY

One who holds an office or a trust or who performs a particular function, an official, a bureaucrat.

Traveller defines thirteen common, typical, or prototype careers for which characters can be created.

Independent of Milieux and Tech Levels. Careers are independent of historical time periods (the *milieux*) and of the technological levels of homeworlds. A soldier is still a soldier regardless of historical period; a craftsman is still a craftsman no matter the tech level in which he works.

Characters

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 prior history for the character 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. The standard **Character Card** is a blank form 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 UPP. The **Universal Personality Profile** is a short-hand 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 standard 4-year Terms without regard to variation among cultures or societies.

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

1 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 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.

The 5 Steps of Character Generation

Create a character in the following sequence.

1. 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.

2. Characteristics. Generate the six personal characteristics.

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

4. 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.

5. 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**.

Birthworlds and Homeworlds. Birthworlds (and homeworlds) are determined through referee assignment, deliberate selection, or random rolls against a map or list of worlds. A character born on a world with Trade Classification = Ba Barren or = Di Dieback was born at the starport.

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, for various reasons, want to hide (or perhaps don't know) their pasts. In casual situations, 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 In Deep Space. A very few characters are born offworld (roll 2 on 2D). Born In Deep Space on **Homeworld Skills** shows the available skills.

Neighboring Worlds. Characters adventuring together probably come from relatively nearby worlds in a stellar region. The **Spinward Marches Homeworld** chart uses the Marches as focus. Referees may produce a similar table 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 from 1105 to determine his birth year, and randomly determine the specific birth day from the Imperial Calendar.

THE UPP UNIVERSAL PERSONALITY PROFILE

The Standard Characteristics	C1	C2	C3	C4	C5	C6
Strength	9	A	B	5	6	7
Dexterity		Agility or Grace	Vigor or Stamina	Intelligence	Education	Social Standing
	Str	Dex Agi Gra	End Vig Sta	Int	Edu Tra Ins	Soc Cha Cas

2 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).

Characteristic Code. The characteristics are also numbered by their position in the UPP and preceded 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. The UPP shows characteristics as single eHex digits in a six-digit string. The string is a ready reference for the abilities of the character.

Creating The UPP

For each of the six characteristics, roll 2D (ignore for the moment that some non-Humans use other die rolls) and record the result. Convert the values to eHex and assemble the UPP string. For example, player Mitch is creating new character Eneri Dinsha.

He rolls 2D for Strength. Die rolls are 2 and 5. Str= 7.

He rolls 2D for Dexterity. Die rolls are 5 and 2. Dex= 7.

He rolls 2D for Endurance. Die rolls are 4 and 3. End= 7

He rolls 2D for Intelligence. Die rolls are 5 and 6. Int= 11 = B.

He rolls 2D for Education. Die rolls are 1 and 6. Edu= 7.

He rolls 2D for Social Standing. Die rolls are 6 and 1. Social Standing= 7.

The final values for the characteristics are 7-7-7-11-7-7. Mitch translates these values to eHex and creates the UPP = 777B77. His character is average in all characteristics with the exception of Intelligence, which is clearly high.

Genetics

The first die roll for (most) 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).

The Basic Character

With the UPP generated, the Character is a Young Adult (age= 18 Human) and ready to begin Career Resolution. A character who then completes 3 Terms (4 years each) is 18 + 12 = 30 years old. Mitch's character is:

Eneri Dinsha 777B77
Genetic 2545XX
Age 30. Born 069-1074
Current Date: 001-1105



3 PRE-CAREER EDUCATION (AND TRAINING)

Characters may pursue improvements to their Education or Training.

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.

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 (being assigned as part of career resolution).

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. Each Pass awards one of the available skills; Failure terminates the process (but Waiver may result in reinstatement, although no skill is received). A character may attempt **Honors**. 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 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 (which determines the skills taken as Major or Minor during career resolution).

A Scholar may always take a skill in his Major or Minor instead of consulting the Scholar Skills table.

Pre-Requisites are minimums: any 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 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).

Honors. A character can optionally make one additional Pass/Fail Roll: success confers Honors and one level from the Major. Failure has no effect.

Skills. Each Pass awards one level from the Major. Each two successful Passes awards one level in the Minor.

Duration is years required for the process.

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

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.

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 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 counsellors).

A University Masters Program requires a Bachelors. A Professors Program requires a Masters. Attending Med School or Law School requires an Honors Bachelors. All of these requirements can be waived.

Military Academies and **Naval Academies** are similar to College: in addition to a degree, they provide an Army or Navy Commission upon graduation. 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). Service Academy Honors Graduates may attend Flight School.

ANM Schools (Army Navy Marine School) are one-year military trade schools teaching Knowledges. They are assigned during career resolution: when assigned, the character uses this Educational process to determine the Pass/Fail and the Knowledge received. The character then returns to Career resolution and resolves the current term.

ANM Schools award Knowledges in addition to any normal skill eligibility during the term.

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 may attend Flight School.

Command College is a special Military School only for characters with Army, Navy, or Marine rank Officer4. At the beginning of the first term the character is O4, the first event is Command College. 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.

Educational Waivers

A student attending an Education Institution who receives an adverse die roll or decision (Prerequisite, Admission, Pass/Fail, Honors) may try for a Waiver. To receive a Waiver, roll 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 Training Process

Training takes three forms: Apprenticeship, Mentoring,

EXAMPLE EDUCATION TABLE

College	Comment	
Pre-requisite	Edu = 5	No if Edu= 4 or less
To Apply	Int or Edu	Check Int or Edu
Pass/Fail	Int or Edu (4x)	Roll 4 times
Duration	4 years	
Graduation	Edu = 8	upon graduation
	and Bachelor	

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 or assigned to a Trainer.

The Apprentice selects a single Knowledge; Check Tra once; Success awards Skill-4. The character begins Life Stage-3 with the apprenticed Knowledge.

For example, young Kyle Martin (a Human boy 777777) is apprenticed to a vehicle repair person. 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; Salton rolls 7 and fails) but Martin is inattentive and ends his Apprenticeship without learning anything. He attributes his later successes to this early failure and the lessons it taught him.

For example, non-human Barr Vech (SDEITS 777777) is apprenticed to the same vehicle repair person. His application (and acceptance) is also automatic. His master trains him over the next four years (roll Tra for Pass/Fail = Tra = 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.

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 automatically.

Training Course. 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 serve as providers of apprenticeships, mentoring, and training courses.

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; occasionally, 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.

4 SELECTING AND RESOLVING A CAREER

A character selects a career from one of the thirteen available. This selection is influenced by the character's characteristics and current experience, but is ultimately a decision based on the player's goals and preferences.

Each Career has a page of instructions detailing the specific career.

Careers are numbered 1 through 13 to allow random selection (using 2D) of a career. Craftsman (1) and Functionary (13) cannot be selected as initial careers.



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 the resulting consequences.

The process uses Target Numbers 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 the Career Resolution Process completes a 4-year Term.

Target Numbers. Target Numbers may be automatic, a number (for example, 10, or 5) or Characteristics (named, or as a Position Code). 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. Or, a character with Agility uses Agility /2 and must roll half-Dexterity or less (round up) or less to succeed.

The requirement may be stated as a Position Code. For example, C3 allows a character to roll Endurance (or Vigor or Stamina; any of the three Characteristics in position 3 of the UPP) or less.

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.

Note the Series of Characteristics Available. The Character picks one of these Characteristics (any one anywhere in the sequence) and it governs Risk and Reward for the current Term. This 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 of the character within the term.

Roll 2D. The Character will roll 2D twice using the same Characteristic.

Before rolling for Risk, the Character may (but is not required to) select a Mod= +2 (Caution) OR Mod = - 2 (Bravery) to apply against the Risk roll. This Mod is applied with an opposite sign to the Reward roll.

The Armed Forces (Army, Navy, Marine) Careers require DMs for Branch and Operations: these DMs must be applied against the Risk Roll and (with opposite sign) against the Reward Roll.

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

Selecting a positive DM decreases the chance of succeeding at Risk and of failing at Reward; selecting a negative DM decreases the chance of failing at Risk and succeeding at Reward.

The Character rolls for Risk ($2D \leq \text{Characteristic} + \text{Mod}$). If Risk fails, he goes no farther. If he succeeds, he rolls again for Reward ($2D \leq \text{Characteristic} - \text{Mod}$). If Reward fails, there is no Reward. If Reward succeeds, the Reward outcome is resolved.

For example, Christopher Peers 798B79 selects Strength for Risk and Reward, and he selects Caution Mod +2. He rolls for Risk ($2D = 9$ versus $\text{Str} = 7 + 2 = 9$) and succeeds. He rolls for Reward ($2D = 7$ versus $\text{Str} = 7 - 2 = 5$) and fails. He will try again next Term.

Or, less fortunately, Marine Eleri Dinsha 777B77 selects Strength for Risk and Reward and Caution Mod +2. He rolls for Risk ($2D = 12$ versus $\text{Str} = 7 + 2 = 9$) and fails: he has been wounded or injured. His wound is hits equal to his Characteristic (Strength) minus the Roll ($= 7 - 12$) = -5. He rolls for Recovery ($= 1D$) = 4. His Strength is permanently reduced minus 1. Because he failed the Risk Roll, he cannot attempt the Reward Roll. He does receive a Wound Badge.

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.

THE CAREERS

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

* One of the Armed Forces

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. Success increases rank +1.

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. Success increases rank +1.

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 an inconsequential 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. Skills are taken from the Career Skills table. The character selects a column and rolls 1D for the specific skill.

Automatic Skills. Some careers provide automatic skills (for example, a Merchant upon reaching rank Merchant1 receives an automatic skill= Steward). Automatic skills are awarded as a one-level increase if the skill is already held. If not, the character receives the skill at level-1.

Continue

At the end of the 4-year Term, the Character must successfully roll (2D) to Continue in the career. Success allows the character to Continue to the next 4-year Term. Failure requires that the character end Career Resolution and begin adventuring. For example, a Spacer must roll 7 or less to Continue in the career when the 4-year term ends.

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.

Changing Careers. A character may avoid the Continue roll by selecting one of the Career Change Options for which he is eligible.

The Armed Forces

Three careers are part of the Armed Forces: Spacers, Soldiers, and Marines. Each adds background information in the form of Branch and Assignment.

Armed Forces Branch. Branch is the specialization the individual has within 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 DM which must be applied to 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 DM. Determine the highest value for the Term: it must be applied to Risk and Reward.

Medals. The primary rewards in the Armed Forces are medals. If the Reward Roll Succeeds, subtract the Reward Roll from the Controlling Characteristic (ignore any Mods) and consult the Medals Table (on the Fame page).

For example, Star Marine Captain Sir Mark Poles 98998B participated in the Retreat from Jewell. In this Term, he is in the Protected Forces (Mod 2), and one of the four annual assignments he draws is Battle (Mod 3). For the Term, he is rolling Risk and Reward once using these required Mods.

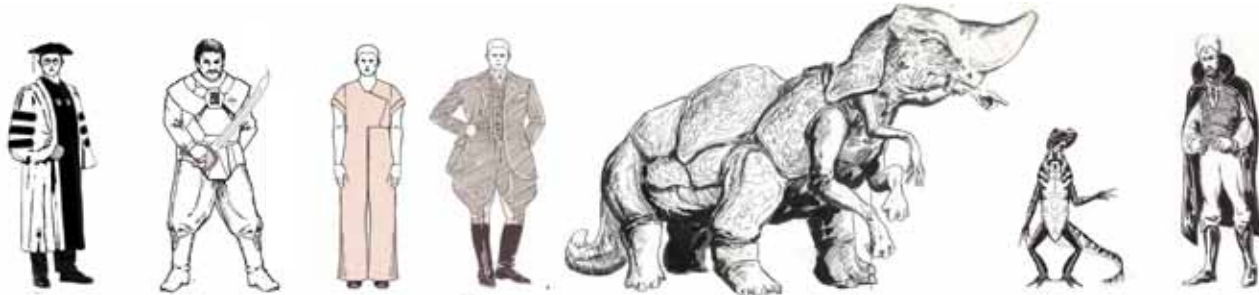
For Risk and Reward, he has selected Str (=9) as his Controlling Characteristic. He also selects Caution Mod 2.

He must roll 6 (=9 -2 -3 +2 = 6) or less to survive the Risk roll. He rolls 5.

He turns to the Reward roll. The signs on the Mods change and he must roll 12 (=9 +2 +3 - 2 = 12) or less to receive a Reward. He rolls 2.

He receives a Campaign Ribbon (The Retreat from Jewell) and consults the Medals Table.

His Controlling Characteristic was Str = 9. His Reward Roll was 2. He consults the Medals Table (=9 - 2 = 7) and at line 7 receives the MCG.



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.

5 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, and 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. Any character who has received Fighting-1 or greater owns one personal weapon, which may be any weapon appropriate for the skill held.

This benefit does not apply for skills other than Fighting (that is, not Heavy Weapons or Gunnery; characters do not automatically acquire an AutoCannon to carry in their personal baggage).

Medals. The character may have received medals for heroism, campaign ribbons, and wound badges. Agents may have received Commendations. These items remain in the possession of the individual and may serve to enhance his reputation.

Fame. Any character may have Fame as a consequence of Career Resolution, or may elect to determine his Fame using 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 non-governmental organization devoted to assisting travellers in need. It is also a hospitality provider with hotels, restaurants, banking,

and library data facilities on most Starport-A and Starport-B worlds.

A **TAS Life Membership** provides one week of free accommodations and one free High Passage per month. Selected individuals are awarded a TAS Life Membership (for example, Award-Winning Scholar, Scout with 3 Discoveries, Imperial Treasure Craftsman, and recipient of the Starburst for Extreme Heroism).

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

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 he acquires).

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 are deducted from income), based on the trade classifications of the world, equal to Cr10,000 per TC. For example, a world classified as Hi In Va 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 the results of Mustering Out die rolls.

A character is allowed one Mustering Out roll for each term served in Career Resolution. He is allowed one additional roll per Commendation, and per 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.

Which Table?

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).

Which Column?

The character may select either the Money or the Benefits column for each roll.

Available Benefits

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

Money. Cash received represents travel allowances and personal savings. Money is provided on a separate column.

Passages. Passages received represent travel allowances provided by a former employer.

StarPass is a multi-use pass redeemable for Middle Passage and valid for one year after its first use. It has a value of Cr250,000.

High Passage is first-class 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 final 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 any final Retirement Pay the character receives from any of the Armed Forces. 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. If the improvement is C6+1 and for the character C6= Caste, the benefit is lost.

Wafer Jack. A Wafer Jack is an implant allowing use of skill or personality wafers and direct access to computer systems.

Automatics

(subject to eligibility)

Personal Weapons

Medals and Commendations

Fame

TAS Life Membership

Land Grants

Masterpieces

Nobles, Scouts

Craftsman

Secrets. 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.

Knighthood. The character receives a Knighthood (= Soc B if the character has C6= Soc).

A character who does not have Soc (instead has C6= Caste or C6= Charisma) nonetheless receives the benefits of Knighthood (the name prefix Sir and a certain level of prominence in society), he just doesn't really care.

Note that a Career Skills Table C6+1 may increase Soc to B or higher. A Knighthood raises any value Soc to B; if the character is already Soc 11+, he receives Soc +1 instead.

In the Armed Forces, Knighthood is only available to Officers. A non-officer receives Soc +1. A character with Soc = 11+ already receives Soc +1 instead.

Some Social Standing values are divided into lower and upper case (c= Baronet; C= Baron; e= Viscount; E= Count; f= Duke; F= Duke). Treat each internal division for the purposes of increases in Soc.

Life Insurance is the archiving of a personality scan and DNA (or equivalent) sample during the Mustering Out Process. It enables the creation of a Clone and Implantation of the character's personality, in the event that a notification of death reaches the archive. Notice that unless updated, the replacement clone will revert to the memories and skills recorded at Mustering Out.

For individuals interested in buying Life Insurance, 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 (world-wide or system-wide) corporation. The appointment is largely ceremonial, requiring only annual attendance at Board meetings.

Benefits

(per Benefit Tables)

Financial

Money

StarPass

High Passage

Middle Passage

Low Passage

Pension x 2

Retirement x 2

Life Insurance

TAS Fellowship

TAS Life Membership

Ship Shares

Non-Financial

Characteristic Improvements

Wafer Jack

Secrets

Forbidden Knowledge

Knighthood

Directorship

Proxy

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, the fact that a character is familiar with the use of machineguns (Fighting) is not usually brought up in polite conversation.

Ship Shares. Each 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 (usually to vote in the Moot) by one Noble to another. The number of Proxies a Noble holds is an indication of his Political Power.

Nobles uninvolved in the political process transfer their voting rights to a political Noble based on family ties, financial or other rewards, or even political considerations.

Each Proxy has a value of about Cr10,000 per year.

Duplicate Benefits

If a result duplicates a benefit previously received (and it is unwanted or unusable), the character may reroll until a different benefit is received.

Unusable duplicate benefits include: Wafer Jack, TAS Life Member. The individual may decide that additional x2 Pension or additional x2 Retirement Pay is unusable.

ENTITLEMENTS

At the end of the Character Generation process, the character may be eligible for specific Entitlements. Entitlements include Pensions and Retirement Pay:

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 also collect his entitlement at a Naval Base.

Duplicate Entitlements: A character may have dupli-

cate Entitlements (for example, both a Reserve and a Functionary pension, or both Military and Professor's retirement pay).

Cashing Out. A character need not wait until Life Stage 9 to retire. Any Entitlement can be cashed out for a lump sum equal to five years of payments.

Pensions

Pensions are available for Citizens (and 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 Cr10,000 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 term served in the Reserves).

Professor's Pension. A tenured Professor receives a Professor's Pension of Cr10,000 per year.

Retirement Pay

The Army, Navy, and Marines have retirement programs for those who served on active duty (not the reserves) for at least 4 terms. Military Retirement Pay is determined based on total combined terms served in Army, Navy, and Marines. Retirement begins when the individual ends his career activity and begins adventuring.

Enlisted Retirement. A Soldier, Spacer, or Marine with at least 4 terms served receives an annual payment of Cr2,000 per term in the service.

Officer Retirement. A Soldier, Spacer, or Marine with at least 4 terms served (and who musters out as an Officer) receives an annual payment of Cr3,000 per term in the service.

For example, a retired Marine Officer with 6 terms of service receives an annual payment of Cr18,000.

Forbidden Uncouth in polite society because

- 1 Fighting accepts weapons and violence as a means of achieving goals.
- 2 Streetwise implies interaction with the lower or fringe social classes.
- 3 Stealth accepts covert and illegal actions as a means to achieving goals.
- 4 Explosives accepts large scale destruction as a means of achieving goals.
- 5 WMD accepts massive violence as a means of achieving goals.
- 6 Programmer accepts computer hacking is an acceptable enterprise.

Entitlements Annual at Life Stage 9

Citizen's Pension	Cr10,000
Functionary Pension	Cr15,000
Reserve Pension	Cr 100 per Reserve Term
Professor's Pension	Cr10,000

Annual at Muster Out	
Enlisted Retirement	Cr 2,000 per Active Duty term
Officer Retirement	Cr 3,000 per Active Duty term

Character Generation Checklist

A. CREATE A HOMEWORLD

The System

HomeStar
Orbit
Habitable Zone
Climate

The World

Is it a Planet Or a Satellite?
UWP
Trade Classifications

Select HomeWorld Skills

Name The HomeWorld

B. 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

C. CONSIDER EDUCATION AND TRAINING

Note possibility of Waivers

Basic Education

ED5 (no time required; Check Int)
Apprenticeship (before age 18;
Check Tra)

Trade Schools

Trade School (Major, Honors)
Training Course (Major; Honors)
Mentor (+2 to Tra)

Advanced Education

College (4 years, Major and Minor;
Honors)
OTC/NOTC
Flight School
University (4 years, Major and
Minor; Honors)
OTC/NOTC
Flight School
Masters Program
Professors Program
Medical School
Law School
Service Academy (4 years, Major
and Minor; Honors)
Flight School

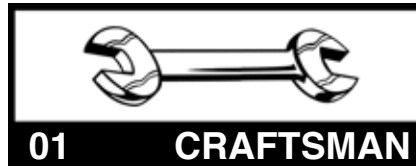
In-Career Education Options

Going Back To School
ANM Schools during Soldier,
Spacer, Marine career
Command College in first term
as Officer O4 in Soldier,
Spacer, Marine career

Note Each School Attended

School Name and Rank

D. SELECT CAREER



To Begin is Automatic
(not a first career)
IF two Skill-6+ and Crafterman-1

Create A Masterpiece

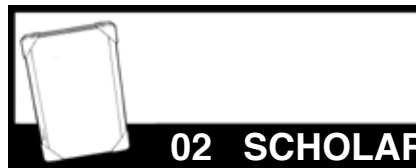
Master Points=

Controlling Characteristics C1 C2
C3 C4
plus Crafterman Skill
plus up to FIVE skill-6+
vs 9D

Determine Skill eligibility; take Skills
Roll Crafterman x2 to Continue

If No, end Career

Note Muster Out benefits



Note Possible Waivers

Roll to Begin vs Edu or Tra
Failure = 1 year no retry
Automatic if Edu= 8+. =Scholar1
Roll Risk and Reward vs C1 C2 C3
C4
Roll Scholar Promotion
Roll Tenure if Scholar3 and Edu 10+
Determine Skill eligibility; take Skills
Roll Edu to Continue. Mod +1 per
Pub
If No, End Career
Note Muster Out benefits



Determine Current Talent (=2D)

Assign Initial Fame = Talent

Roll to Begin

Actor vs C2 C3
Artist vs C1 C2 C3
Author vs C4 C5
Dancer vs C2 C3
Musician vs C2
Chef vs C2

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

Determine Skill eligibility; Skills

Roll Fame to Continue

If No, end career



Begin Citizen Life is Automatic

Roll Citizen Life vs C1 C2 C3 C4

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

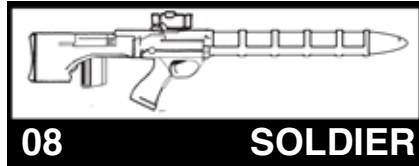
If No, end Career

Note Muster Out benefits



05 SCOUT

Roll 6 - to Begin
Retry vs C5
Select Courier Duty to avoid Risk and Reward
Roll Risk and Reward vs C1 C2 C3 C4
Determine Skill eligibility; take Skills
Roll Int to Continue
If No, end Career
Note Muster Out benefits



08 SOLDIER

Roll to Begin vs Str
Select Branch
Roll Operations 4 x and use highest Mod for R&R
Roll Risk and Reward vs C1 C2 C3 C4
Roll Soldier Promotion vs C2
If Soldier, Roll for Commission vs Soc
If Officer, Roll for Promotion vs Soc
Determine Skill eligibility; take Skills
Roll 7- to Continue
If No, end Career
Note Muster Out benefits



11 NOBLE

To Begin is Automatic if Soc A+
Determine Skill eligibility; take Skills
Roll Return and Intrigue vs C1 C2 C3 C4
Roll Soc to Continue
If No, end Career
Note Muster Out benefits



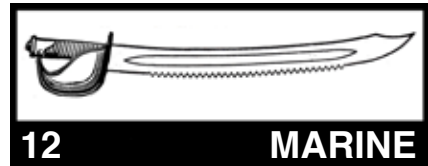
06 MERCHANT

Begin as Temp is Automatic
Roll to Begin as Merchant Officer vs Int
Roll Risk and Reward vs C1 C2 C3 C4
If Temp or Rating, Roll R Promotion vs 9-
Roll Officer Promotion vs Terms x2
Determine Skill eligibility; take Skills
Roll Str to Continue
If No, end Career
Note Muster Out benefits
Roll Str to Continue



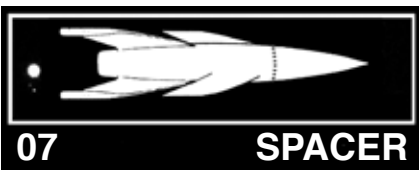
09 AGENT

Roll to Begin vs C3
Roll for Undercover Assignment
Select one Skill from Undercover assignment Career
Determine Skill eligibility; take Skills
Roll Str to Continue
If No, end Career
Note Muster Out benefits



12 MARINE

Roll to Begin vs Str
Select Marine Branch
Roll Operations 4 x and use highest Mod for R&R
Roll Risk / Reward vs C1 C2 C3 C4
Roll Marine Promotion vs C2
If Marine, Roll for Commission vs C3
If Officer, Roll for Promotion vs Edu
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
Roll Naval Operations 4 x use highest Mod for R&R
Roll Risk and Reward vs C1 C2 C3 C4
Roll Spacer Promotion vs C2
If Spacer, Roll for Commission vs C3
If Officer, Roll for Promotion vs Soc
Determine Skill eligibility; take Skills
Roll 7- to Continue
If No, end Career
Note Muster Out benefits



10 ROGUE

Select CC Controlling Characteristic
Roll for Scheme Career
Roll Risk and Reward vs CC
Roll CC 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 C1 C2 C3 C4
If Risk fails, may not Continue
If Risk Succeeds, may Continue
If Reward fails, no Promotion
If Reward succeeds, Promotion
Determine Skill eligibility and take Skills
Note Muster Out benefits

E. MUSTER-OUT BENEFITS

Select Benefits

F. Start Adventuring!

Homeworld-1

HOMEWORLD INFORMATION

Create the homeworld system.

1. Homestar. Roll Flux for Sp Spectral, roll a decimal (0-9), a roll on the appropriate Size column to create a Homestar (for example, G2 V).

2. Orbits. Roll Flux for World, roll for variation in the HZ Habitable Zone, and (if a Satellite) for Satellite Orbit identifier.

3. Habitable Zone. Note Habitable Zone Orbit. For example, Orbit 3 Eff.

HOMEWORLD

Create the SAHPG (Size, Atmosphere, Hydrographics, Population, Government) components of the Universal World Profile.

S. Size. Planetary Size: 2D-2.

A. Atmosphere: Flux + Size.

If Size =0, Atmosphere =0.

H. Hydrographics. Flux+ Size.

Maximum A.

If Size =0-1, Hyd =0;

If Atm =0-1 or A+, Hyd DM - 4.

P. Population. 2D-2.

G. Government. Flux +Pop.

Convert negative values to 0.

NATIVES

Sophonts who evolved on the Homeworld are Natives.

Native sophonts are identified as "of" a homeworld.

All other sophonts are identified as "from" a different (their native) homeworld.

Humans. Although a world may have been home to humans for generations, technically the only world for which they are Natives is Terra.

WORLDS

Important terms are:

World. A planet or satellite.

Planet. A world orbiting a star.

Satellite. A world orbiting a planet.

Mainworld. The most important world in a system.

Belt. An asteroid belt (which may be a mainworld) or a planetoid belt.

1 HOMESTAR

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	M	D	D	D	D	D	D	D

Size IV is not possible for K5-K9 and M0-M9 stars.

Size VI is not possible for A0-A9 and F0-F4 stars.

3 HABITABLE ZONE ORBIT

Spectral> Size	A3	A0- A8	A4- F1	A9- F6	F2- G1	F7- G8	G2- K3	G9- K8	K4- M3	K9- M8	M4- M9
Ia	12	12	12	12	12	11	12	12	12	12	12
Ib	11	11	10	10	10	10	10	10	10	10	11
II	9	9	8	8	8	8	8	8	9	9	10
III	8	8	7	6	6	6	6	7	7	8	8
IV	7	7	6	6	5	5	5	5	-	-	-
V	7	7	6	5	4	3	2	2	0	0	0
VI	-	-	-	3	3	2	1	0	0	0	0
D	0	0	0	0	0	0	0	0	0	0	0

Habitable Zone (HZ) orbit number shown here indicates a world surface environment which is hospitable to humans and similar sophonts. For example, Sol=G2 V HZ=3.

2 WORLDS AND ORBITS

Flux	World	HZ Var	Close	Far
- 6	Close	- 2	Ay	En
- 5	Far	- 1	Bee	Oh
- 4	Far	- 1	Cee	Pee
- 3	Close	- 1	Dee	Que
- 2	World	0	Ee	Arr
- 1	World	0	Eff	Ess
0	World	0	Gee	Tea
+1	World	0	Aitch	Yu
+2	World	0	Eye	Vee
+3	World	+1	Jay	Dub
+4	World	+1	Kay	Ex
+5	World	+1	Ell	Wye
+6	World	+2	Em	Zee

Determine if World or Satellite (Close and Far are Satellites). Determine HZ Orbit (from table 3) and adjust with HZ Var.

NATIVE STATUS

Note the status of the sophonts.

Transients. Pop = 1-2-3 (merchant, military, research).

Settlers. Pop = 4-5-6 (not yet colonists or transplants).

Colonists. Gov = 6.

Corporate. If Gov = 1 (typically employees and contractors).

Transplants. Atm = 0-1 (evolved elsewhere; settled here millenia ago). Not Settlers or Transients.

Extinct / Vanished. Pop = 0 (extinct). If Transplants, call them Vanished. If TL>0, Catastrophic Extinct (or Vanished).

Exotic. Atm = A+ (unsuitable human environment).

Natives. Pop=0 or 7+, Atm 2+ (not otherwise Settlers, Colonists, Transplants, Corporate).

CLIMATE

Mainworld climate based on HZ:

HZ	Temperate
HZ - 1	Hot
HZ +1	Cold
HZ = 0 or 1	Twilight Zone = Tz
Close Satellite	Locked = Lk

Hot. Upper limit human endurance.

Cold. Lower limit human endurance.

Twilight Zone. 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.

Locked. Satellite (Ay through Em) 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.

Homeworld-2

If the Homeworld has a UWP, use it to determine the world's Trade Classifications and the character's Homeworld skills. Otherwise select 1D skills from this list.

	Code	S _{iz}	A _{tm}	H _{yd}	P _{op}	G _{ov}	L _{aw}	Definition	Skill
Planetary	As	0	0	0	--	--	--	Asteroid	-- Zero-G
	De	--	23456789	0	--	--	--	Desert	-- Survival
	Fl	--	ABC	123456789A	--	--	--	Fluid	Hostile Env
	Ga	678	568	567	--	--	--	Garden World	-- Trader
	He	3459ABC	2479ABC	012	--	--	--	Hellworld	Hostile Env
	Ic	--	01	123456789A	--	--	--	Ice-Capped	-- Vacc Suit
	Oc	ABC	--	A	--	--	--	Ocean World	-- Hi-G
	Va	--	0	--	--	--	--	Vacuum	-- Vacc Suit
Wa	56789	--	A	--	--	--	Water World	-- Seafarer	
Population	Di	--	--	--	0	0	0	Dieback (000-T)	T>0
	Ba	--	--	--	0	0	0	Barren	T=0
	Lo	--	--	--	123	--	--	Low Population	-- Flyer
	Ni	--	--	--	456	--	--	Non-industrial	-- Driver
	Ph	--	--	--	8	--	--	Pre-High	--
	Hi	--	--	--	9ABC	--	--	High Population	-- Streetwise
Economic	Pa	--	456789	45678	48	--	--	Pre-Agricultural	-- Trader
	Ag	--	456789	45678	567	--	--	Agricultural	-- Animals
	Na	--	0123	0123	6789ABC	--	--	Non-agricultural	-- Survey
	Pi	--	012479	--	78	--	--	Pre-Industrial	-- JOT
	In	--	012479	--	9ABC	--	--	Industrial	-- One Trade
	Po	--	2345	0123	--	--	--	Poor	-- Steward
	Pr	--	68	--	59	--	--	Pre-Rich	-- Craftsman
	Ri	--	68	--	678	--	--	Rich	-- One Art
Climate	Fr	23456789	--	123456789A	--	--	--	Frozen	HZ +2 or outer Hostile Env
	Ho	--	--	--	--	--	--	Hot	HZ -1
	Co	--	--	--	--	--	--	Cold	HZ+1
	Lk	--	--	--	--	--	--	Locked	Close Satellite
	Tr	6789	456789	34567	--	--	--	Tropic	HZ -1 Survival
	Tu	6789	456789	34567	--	--	--	Tundra	HZ +1 Survival
	Tz	--	--	--	--	--	--	Twilight Zone	Orbit 0-1 Driver
Secondary	Fa	--	456789	45678	23456	--	--	Farming	Not MW. HZ Animals
	Mi	--	--	--	23456	--	--	Mining	Not MW. MW=In Survey
	Mr	--	--	--	--	--	--	Military Rule (note 2)	
	Px	--	23AB	12345	3456		6789	Prison, Exile Camp	
	Pe	--	23AB	12345	3456	6	6789	Penal Colony	
	Re	--	--	--	1234	6	45	Reserve	
Political	Cp	--	--	--	--	--	--	Subsector Capital	Imperial Admin
	Cs	--	--	--	--	--	--	Sector Capital	Imperial Bureaucracy
	Cx	--	--	--	--	--	--	Capital	Imperial Language
	Cy	--	--	--	56789A	6	0123	Colony (note 1)	--
Special	Sa	--	--	--	--	--	--	Satellite	
	Fo	--	--	--	--	--	--	Forbidden	(Red Zone)
	Pz	--	--	--	789ABC	--	--	Puzzle	(Amber Zone)
	Da	--	--	--	0123456	--	--	Dangerous	(Amber Zone)
	Ab	--	--	--	--	--	--	Data Repository	--
	An	--	--	--	--	--	--	Ancient Site	--

Adjustments: Ba requires Starport E or X. Cp, Cs, Cx require Starport A.

Homeworlds for the Spinward Marches

Homeworlds for characters are determined by the nature of the campaign. As an example to referees, the method demonstrated below uses the Spinward Marches as a focus. Referees can produce a similar table suited for their individual campaigns.

CREATE A HOMEWORLD

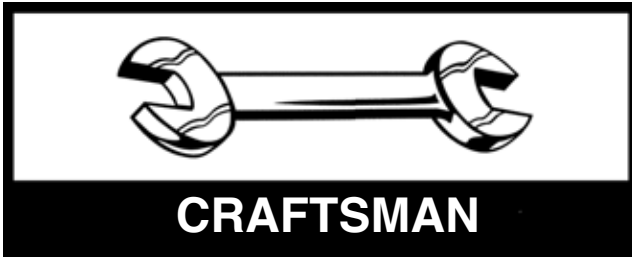
For characters adventuring in the Spinward Marches, create their homeworlds from the available worlds here.

HOMEWORLD MATRIX

		1D					
		1	2	3	4	5	6
1D	1	1	2	3	4	5	6
	2	7	8	9	0	A	B
	3	C	D	E	F	G	H
	4	J	K	L	M	N	P
	5	Q	R	R	R	S	T
	6	U	V	W	X	Y	Z

Roll 1D and 1D for one result.

Code	WorldName	Hex and Sector	Description
A	Alell	1706 Spinward Marches	Oppressive, rich bureaucratic world (Ph Pa Ri)
B	Boughene	1904 Spinward Marches	Non-industrial, domed world, corrosive atmosphere (FI Ni)
C	Capital	2118 Core	Fabled Capital of the Third Imperium (Hi Cx)
D	Dorannia	0530 Spinward Marches	Poor, non-industrial hellworld (He Ni Po)
E	Efate	1705 Spinward Marches	High-tech industrial world (Hi In)
F	Feri	2005 Spinward Marches	Rich, low gravity world (Ph Pa Ri)
G	Magash	0316 Deneb	High-tech, busy, industrial, capital world (Va Hi Na In Cp)
H	Hefry	1909 Spinward Marches	IISS regional administration (Va Ni)
J	Jenghe	1810 Spinward Marches	"Truck Stop" colony world (Ni)
K	Earth	1827 Solomani Rim	Homeworld of humaniti (Ga Hi)
L	Lakou	0638 Spinward Marches	Tiny, backwater colony (Ni)
M	Macene	2612 Spinward Marches	Asteroid belt mining colony (As Ni)
N	Knorbes	1807 Spinward Marches	Rich, low-tech agricultural/archaeological world (Ag Ri An)
P	Preslin	0633 Deneb	Poor dry rockball (De Ni Na Po)
Q	Yori	2110 Spinward Marches	Rich desert world (De Ri)
R	Regina	1910 Spinward Marches	Rich, Earthlike capital world (Ph Pa Ri Cs)
S	Ruie	1809 Spinward Marches	"Independent", balkanized, TL7 "war world" (Hi In)
T	Tremous Dex	1311 Spinward Marches	Ice world (Ic Ni)
U	Uakye	1805 Spinward Marches	Non-industrial backwater world (Ni)
V	Vland	1717 Vland	Capital world of the former First Imperium (Hi Cs)
W	Wroclaw	0226 Deneb	Agricultural, oppressively collectivist world (Ag Ri)
X	Menorb	1803 Spinward Marches	Poor, crowded world (Hi Po)
Y	Yorbund	2303 Spinward Marches	Domed world, insidious atmosphere (FI Ni)
Z	Traltha	2834 Spinward Marches	Desert "archaeological mysteries" world (De He Ni An)
1	Dentus	2201 Spinward Marches	Desolate border world (Ni)
2	Vanzeti	0218 Deneb	Non-industrial water world (Wa Ni)
3	Syr Darya	1810 Deneb	Nondescript agricultural world (Ni Ag)
4	Aramis	3110 Spinward Marches	Underground colony (He Ni Cp)
5	Rhylanor	2716 Spinward Marches	High tech, crowded capital world (Hi Cp)
6	Raschev	2330 Foreven	Atomic-era backwater world (Ri)
7	Ara Pacis	0419 Deneb	Balkanized, non-industrial world (Ni)
8	Roup	2007 Spinward Marches	Popular dictatorship, water world (Wa Hi In)
9	Pax Rulin	2204 Trojan Reaches	Cold, small, poor capital world (Ic Va Lo Cp)
0	Space	Grew up in space	A free trader serving backwater worlds (Na Va)



01 Craftsman

Craftsman: A skilled creator. An artisan. A master of a trade, manual art, or the practical application of a science. An artificer. A craftsperson. A craftsophont.

A CRAFTSMAN

Event	Throw
To Begin	Automatic*
*if TWO Skill-6 and Craftsman-1 Masterpiece	C1 C2 C3 C4
Continue	Craftsman x 2

B SKILL ELIGIBILITY

Event	Benefit
Per Term	4 Skills
Per Success	1 Skill
Per Success	Craftsman-3
Per Failure	Craftsman-1

D MUSTER OUT BENEFITS

1D	Money	Benefits
2	Low Psg	Forbidden K
3	Mid Psg	Wafer Jack
4	High Psg	C5 +1
5	Cr 15,000	C1 +1
6	StarPass	C2 +1
7	Cr 25,000	C3 +1
8	Cr 30,000	C4 +1
9	Cr 35,000	Ship Share
10	Cr 40,000	TAS Fellow
		DM + Terms

C CRAFTSMAN SKILLS

	1 Personal	2 Academic	3 World Travel	4 General	5 Business	6 Vocation	7 Avocation	
1	C1 +1	Major*	Seafarer	Animals	Comms	One Art	One Art	1
2	C2 +1	Major*	Navigation	Comms	Bureaucrat	One Trade	One Science	2
3	C3 +1	Minor*	Hostile Environ	Designer	Diplomat	One Trade	One Trade	3
4	C4 +1	Minor*	Flyer	Computer	Leader	New Trade***	Athlete	4
5	C5 +1	One Trade	Driver	Designer	Liaison	New Trade***	Animals	5
6	C6 +1**	One Trade	Vacc Suit	Designer	Trader	Naval Architect	Medic	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.

THE CRAFTSMAN'S PASSION

The focus of a Craftsman's activity is creating Masterpieces.

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 Masterpiece Points or less for success in creation. If the Craftsman cannot show at least 40 Masterpiece points, he cannot attempt a Masterpiece (treat as Failure).

MASTER POINTS

Master Points= Controlling Characteristic
Craftsman Skill
Up to FIVE Skills at Skill-6 +

9 D < Master Points

(A Masterpiece attempt is not possible if Master Points is less than 40).

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 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.

If The Creation Fails,

The Craftsman receives Craftsman +1 (called learning from experience).

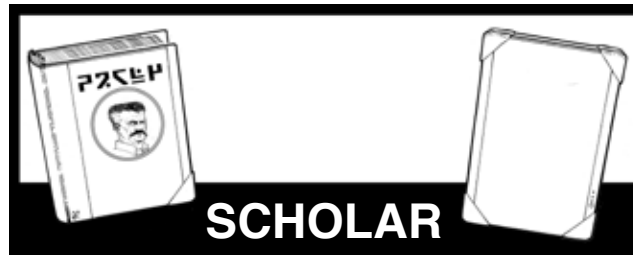
The Value of a Masterpiece

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 39. A Perfect Masterpiece (=55 points or more) sells for Double (= Cr600,000).

Vintage Masterpieces. A Masterpiece increases in value about 1% per year, but are subject to Flux when sold.

02 Scholar

Scholar: A master of an area of academic study. A learned person. Teacher. Professor. Researcher. Scientist.



THE SCHOLAR'S MAJOR

Every Scholar has a Major and a Minor. If no degree (and an associated Major and Minor) then select any Skill, Knowledge, or Talent from the Skills List.

Scholar Position and Promotion. A Scholar with Edu 8+ is automatically Scholar1 when he Begins. Promotion is available only those with Edu 8+.

Amateur Scholars (Scholar0). A character with Edu 7 or less is an Amateur Scholar. He can resolve Risk and Reward, but is ineligible for Promotion.

Non-Traditional Scholars (ScholarX). A character with C5= Tra is a Non-Traditional Scholar. He can resolve Risk and Reward, but is ineligible for Promotion. A character with C5= Ins cannot become a Scholar.

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

THE SCHOLAR'S LIFE

The focus of the Scholar's life is research (=Risk) and publication (=Reward).

If The Risk Roll Fails... The Scholar's Research has been unproductive. There are no results to publish. The Reward roll cannot be made.

If The Reward Roll Succeeds... The Scholar successfully publishes the results of his research. He adds one Publication to his record.

If Characteristic minus Reward roll (disregarding Mods) is 4 or more, the Publication is <Award-Winning> and counts as TWO Publications.

PROFESSORSHIP AND TENURE

A Scholar with Edu 10+ may apply for Tenure upon reaching Scholar3 and in every Term in which the Character is Scholar3 (Promotion beyond Scholar3 is not possible without Tenure).

A SCHOLAR

Event	Throw
To Begin	Edu or Tra
Risk and Reward	C1 C2 C3 C4
Scholar Promotion	Int (if Edu 8+) Mod +1 per Pub
Tenure	Publication x 3
Continue	Edu Mod +1 per Pub

B SKILL ELIGIBILITY

Event	Benefit
Per Term	4 Skills
When Promoted	1 Skill
Success Research	Major +2

D MUSTER OUT BENEFITS

1D	Money	Benefits
1	Low Psg	C5 +1
2	Mid Psg	Wafer Jack
3	High Psg	Edu +1
4	Cr 15,000	Str +1
5	StarPass	C2 +1
6	Cr 25,000	C3 +1
7	Cr 30,000	Int +1
8	Cr 35,000	Fame +1
9	Cr 40,000	Ship Share
10	Cr 50,000	Life Insurance

DM + Scholar Level

TABLE OF SCHOLAR RANKS

Rank / Title	Note
X Non-Traditional Scholar	1
0 Amateur	2
1 Lecturer <of Major>	3
2 Instructor <of Major>	
3 Assistant Professor <of Major>	4
4 Associate Professor <of Major>	
5 Professor <of Major>	
6 Distinguished Professor <of Major>	

ie: Assistant Professor of Physics
 Note 1. C5= Tra. Rank= 0.
 Note 2. Edu less than 8.
 Note 3. Automatic if Edu 8+.
 Note 4. Eligible for Tenure.

C SCHOLAR SKILLS

	1 Personal	2 Academic	3 World Travel	4 General	5 Conflict	6 Vocation	7 Avocation	
1	C1 +1	Major*	Seafarer	Survey	Fighting	Scholar	One Art	1
2	C2 +1	Major*	Navigation	Survival	Fighting	Admin	One Science	2
3	C3 +1	Minor*	Hostile Environ	Hostile Environ	Flyer	Language	Athlete	3
4	C4 +1	Minor*	Flyer	Animals	Stealth	Starship Skill	Medic	4
5	C5 +1	One Trade	Driver	Bureaucrat	Gunner	Bureaucrat	Seafarer	5
6	C6 +1**	One Trade	Vacc Suit	Navigation	Sensors	Comms	One Trade	6

*If the character has no declared Major or 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.



03 Entertainer

Entertainer: A Performer. A person who participates in the arts. Actor. Thespian. Writer. Poet. Bard. Dancer. Storyteller. Shugilii. Singer. Musician. Chef.

THE ENTERTAINER'S GOAL

An Entertainer's success depends entirely on his reputation: on his Fame.

Before beginning, the Entertainer determines current Talent (= 2D), which evaluates basic ability in the career. Higher Talent is better. Talent is also initial Fame.

Beginning in Term 2, Fame may change based on events in the Entertainer career. Roll Flux up to three times (the first is required); the second and third are optional).

Stage Name. An Entertainer with Fame 10+ should create a stage name. If Fame 12+ it may be a single name.

SELECT A SPECIALTY

- 1 **Artist.** Painter. Sculptor. Graphic Artist.
- 2 **Actor.** Voice. Broadcaster.
- 3 **Author.** Writer. Reporter. Poet. Storyteller.
- 4 **Dancer.** Choreographer.
- 5 **Musician.** Singer. Bard.
- 6 **Chef.** Smell Artist. Osmancer.

A ENTERTAINER

Event	Throw
Actor To Begin	C2 or C3
Artist To Begin	C1 or C2 or C3
Author To Begin	C4 or C5
Dancer To Begin	C2 or C3
Musician To Begin	C2
Chef To Begin	C2
Determine Fame for the Term	
Continue Fame	

B SKILL ELIGIBILITY

Event	Benefit
Per Term	4 Skills
If Fame Increases	2 Skills
If Fame Increases	+1 Talent

D MUSTER OUT BENEFITS

1D	Money	Benefits
2	Low Psg	Secret
3	Mid Psg	Wafer Jack
4	High Psg	C5 +1
5	Cr 10,000	Str +1
6	StarPass	C2 +1
7	Cr 30,000	C3 +1
8	Cr 40,000	Int +1
9	Cr 50,000	Ship Share
10	Cr 60,000	Life Insurance
11	Cr 70,000	TAS Fellow
DM + Terms		

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	System
18	Many Systems
19	Subsector
20	Sector
21	Domain
22	Domains
23	ManyDomains
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

C ENTERTAINER SKILLS

	1 Personal	2 Academic	3 Space Travel	4 General	5 Business	6 Vocation	7 Technical	
1	C1 +1	Major*	Zero-G	Survey	Broker	One Art	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	Athlete	3
4	C4 +1	Minor*	Astrogation	Animals	Liaison	Admin	Medic	4
5	C5 +1	One Trade	Sensors	Bureaucrat	Diplomat	Bureaucrat	One Trade	5
6	C6 +1	One Trade	Starship Skill	Navigation	Bureaucrat	Broker	One Trade	6

*If the character has no declared Major or Minor, this benefit is lost. **If the character has C6=Caste, this benefit is lost.

04 Citizen

Citizen: One loyal to the state. An Employee, Civilian, Clerk, Resident.



CITIZEN LIFE SKILLS

A	B	1	2	3	4	5	6
1	1	Recon	Aeronautics	Admin	Advocate	SoundMimic	ACV
1	2	Spines	Aquanautics	Artillery	Artist	Biologics	Author
1	3	Sensors	Automotive	Astrogator	Beams	Computer	Broker
1	4	Actor	Bureaucracy	Craftsman	Computer	Driver	Mole
1	5	Flyer	BattleDress	Dancer	Diplomat	Explosives	Medic
1	6	Empath	Engineer	Designer	Exotics	G-Drive	Grav
2	1	Flapper	Fluidics	Electronics	Forensics	J-Drive	Math
2	2	Leader	Heavy Wpns	Engineer	Legged	Liaison	JOT
2	3	Tracked	Launcher	Gravitics	Mechanic	Athlete	Trader
2	4	Pilot	Magnetics	Hostile Env	Ordnance	Blades	LTA
2	5	Animals	Life Support	Language	P-Plant	Counsellor	Sail
2	6	Tactics	Photonics	Musician	Sapper	Ortillery	Ship
3	1	Turrets	Programmer	Strategy	Small Craft	Fighting	Rotor
3	2	Seafarer	Slug Thrower	M-Drive	Stealth	Osmancer	Rider
3	3	Survey	Naval Arch	Navigation	Survival	Wheeled	Sprays
3	4	Comms	Streetwise	Polymers	Trainer	Screens	Sub
3	5	Teacher	Teamster	Spacecraft	Animals	Steward	Wing
3	6	Unarmed	Vacc Suit	Starships	No Skill	Zero-G	WMD

Roll three dice for a specific skill: Roll A (reroll if >3), then roll B, and top row C.

A CITIZEN

Event	Throw
To Begin	Automatic
Citizen Life	C1 C2 C3 C4
Continue	10

B SKILL ELIGIBILITY

Event	Benefit
Per Term	4 Skills
Job	4 Skills*
Hobby	2 Skills*

*First time only; thereafter 1 Skill.

D MUSTER OUT BENEFITS

1D	Money	Benefits
1	Cr 5,000	Secret
2	Cr 10,000	Wafer Jack
3	Cr 15,000	Str +1
4	Cr 20,000	C2 +1
5	StarPass	C3 +1
6	Cr 30,000	Int +1
7	Cr 40,000	Life Insurance
8	Cr 50,000	Soc +1
9	Cr 50,000	TAS Fellow

DM +Terms

C CITIZEN SKILLS

	1 Personal	2 Academic	3 World Travel	4 General	5 Business	6 Vocation	7 Avocation	
1	C1 +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	Athlete	3
4	C4 +1	Minor*	Flyer	Animals	Liaison	Driver	Medic	4
5	C5 +1	One Trade	Driver	Bureaucrat	Counsellor	Bureaucrat	JOT	5
6	C6 +1	One Trade	Vacc Suit	Trader	Teacher	Computer	One Trade	6

*If the character has no declared Major or Minor, this benefit is lost. **If the character has C6=Caste, this benefit is lost.

CITIZEN LIFE

The focus of the Citizen is participation in local society. Reaching beyond the mundanity of citizen life is often only an unattainable dream, until...

If Citizen Life is Successful...

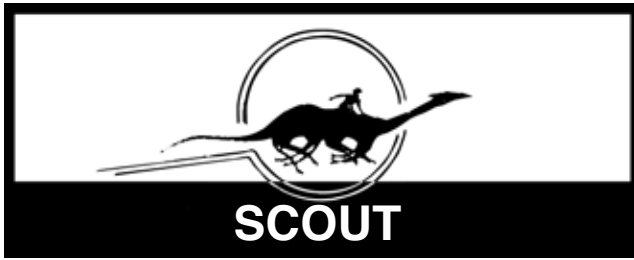
The Citizen's first Success provides a Job, randomly rolled (with Dice A, B, C) on Citizen Life, and he receives Skill-4 (subsequent receipts provide Skill-1).

The Citizen's second Success provides a Hobby, selected by the player from Citizen Life; he receives Skill-2 (later receipts are Skill-1).

Once determined, Job and Hobby cannot be changed. In subsequent Terms, successes alternate providing Job or Hobby skills.

If Citizen Life Fails...

The Citizen continues the term stuck in a dull, boring, unfulfilling life (receiving no Job or Hobby skills), hoping that someday things will be different.



05 Scout

Scout: One engaged in exploration, mapping, or development of a territory. Explorer. Courier. Hunter. Runner. Messenger. 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.

Couriers Avoid Risk. A Scout may avoid the Risk Roll (and the Reward Roll) by volunteering for Courier Duty.

If The Risk Roll Fails...

The Scout is injured (hit points equal to the difference between the roll and the characteristic). Roll for recovery (= 1D, but not to exceed original injury). Unrecovered injury permanently reduces the characteristic.

Service May End. Permanent injury of 3 points or more (even if from more than one injury) requires a disability discharge. Roll 1D for years served in the current term (maximum 4 years) and receive double mustering out benefits.

If The Reward Roll Succeeds...

The Scout is recognized as the Discoverer of a valuable new world or a valuable feature on a known world (a Discovery).

Name the Discovery. Create and name the Discovery. It is traditional for the first discovered world or feature to be named by the Discoverer. The Discoverer receives Fame +4.

Land Grant. The Scout receives a Discoverer's Land Grant.

THE SCOUT'S DUTIES

The Scout is a solitary explorer, equipped with a small ship and a hold full of supplies, sent to seek out and explore new worlds.

Scouts may also be assigned as couriers: carrying messages and data between worlds.

SANITY

Because of the long-term isolation that a Scout endures, reduce San= -1 for each TWO Terms served.

A SCOUT

Event	Throw
To Begin	6
To Retry	C5
Risk and Reward	C1 C2 C3 C4
Continue	Int

B SKILL ELIGIBILITY

Event	Benefit
Per Term	8 Skills
OR if Courier Duty	4 Skills

D MUSTER OUT BENEFITS

1D	Money	Benefits
1	Low Psg	Wafer Jack
2	Mid Psg	C5 +1
3	Mid Psg	Str +1
4	Cr 15,000	C2 +1
5	StarPass	C3 +1
6	Cr 25,000	Int +1
7	Cr 30,000	Ship Share
8	Cr 35,000	Life Insurance
9	Cr 40,000	Soc +1
10	Cr 45,000	TAS Fellow
11	Cr 50,000	Fame +2
12	Cr100,000	Knighthood
		DM + Terms

C SCOUT SKILLS

	1 Personal	2 Academic	3 Courier	4 Exploration	5 Contact	6 Vocation	7 Technical	
1	C1 +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	Fighting	Language	Athlete	3
4	C4 +1	Minor*	JOT	Animals	Teacher	Starship Skill	Medic	4
5	C5 +1	One Trade	Gunner	Vacc Suit	Trader	Engineer	Seafarer	5
6	C6 +1	One Trade	Starship Skill	Navigation	Streetwise	Comms	One Trade	6

*If the character has no declared Major or Minor, this benefit is lost. **If the character has C6=Caste, this benefit is lost.

06 Merchants



Merchant: The operator of a [star] ship engaged in trade and commerce. Trader. Free Trader. Broker. Entrepreneur.

THE MERCHANT SERVICE

Much of interstellar commerce falls to 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.

Merchant Ranks. Any character may begin as a Temp, and may follow the limited promotion potential of a Rating.

Officer Promotion for a Rating advances the character to Fourth Officer.

THE MERCHANT'S GOAL

Every Merchant is working toward a specific goal: his own Free Trader. Risk and Reward for a Merchant are focused on accumulating shares in a merchant starship.

If The Risk Roll Fails...

The Merchant is injured (hit points equal to the difference between the roll and the characteristic). Roll for recovery (= 1D, but not to exceed original injury). Unrecovered injury permanently reduces the characteristic.

Service May End. Permanent injury of 3 points or more (even if from more than one injury) requires a disability discharge and double mustering out benefits.

If The Reward Roll Succeeds...

Every instance of Reward gives the character Ship Shares, redeemable toward ownership of a Trader, upon mustering out (a typical merchant starship has between 10 and 20 shares).

Escalating Ship Shares. The first Reward receipt provides one Share. The second receipt provides TWO Shares (and so on). The fifth receipt of a Share provides 5 Shares.

A MERCHANT

Event	Throw
To Begin Temp	Automatic
To Begin M1	Int
Risk and Reward	C1 C2 C3 C4
R Promotion	9
	Mod +2 if Int 6+
Officer Promotion	Terms x2
	Mod +3 if Int 8+
Continue	Str

B SKILL ELIGIBILITY

Event	Benefit
Per Term	4 Skills
When Promoted	1 Skill
Automatic	by Rank

D MUSTER OUT BENEFITS

1D	Money	Benefits
1	Low Passage	Secret
2	StarPass	Wafer Jack
3	Mid Passage	Str +1
4	High Passage	C2 +1
5	Cr 20,000	C3 +1
6	Cr 25,000	Life Insurance
7	Cr 30,000	Ship Share
8	Retire x2	Knighthood
9		
10		
11		

DM + Officer Rank

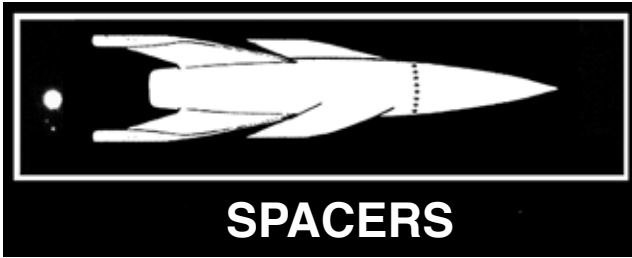
TABLE OF MERCHANT RANKS

Rank	Auto Skill
Temp	
R0	Spacehand
R1	Steward Apprentice
R2	Drive Helper
M1	Fourth Officer
M2	Third Officer
M3	Second Officer
M4	First Officer
M5	Captain
M6	Senior Captain

C MERCHANT SKILLS

	1 Personal	2 Exploration	3 Space Travel	4 Trade	5 Business	6 Vocation	7 Technical	
1	C1 +1	Major*	Astrogation	Broker	Computer	Merchant	One Science	1
2	C2 +1	Major*	Pilot	Trader	Trader	Admin	One Science	2
3	C3 +1	Minor*	Medic	Diplomat	Driver	Language	Computer	3
4	C4 +1	Minor*	Sensors	Broker	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 has no declared Major or Minor, this benefit is lost. **If the character has C6=Caste, this benefit is lost.



07 Spacers

Spacer. Someone who serves in a [space] navy or works on an armed (star) ship. Naval Officer. Rating. Sailor (archaic).

THE NAVAL CAREER

The focus of the Naval career is service: protecting and defending the Empire. Each term, a Spacer participates in naval operations.

After a successful Begin, the Spacer determines Naval Branch; Ratings redetermine Branch when promoted; Officers may not change Branch.

Four times per Term, the Spacer rolls the type of Naval Operation.

If The Risk Roll Fails. The Spacer is wounded (hit points = C-R); recovery points = 1D (unrecovered injury is permanent) and receives a Wound Badge. Permanent injury of 3+ points requires disability discharge and awards double mustering out benefits.

If The Reward Roll Succeeds. The spacer receives a Campaign Ribbon (name the campaign involved) and consults the Medals Table if Battle, Strike, Siege, Patrol, or Mission.

A SPACERS

Event	Throw
To Begin	Int
Select Branch	Choice
Risk and Reward	C1 C2 C3 C4
Promotion Spacer	C2 Mod +1 per WB
Commission	C3
Promotion Officer	Soc Mod +1 per Medal
Continue	7 Mod + Terms

C SPACER SKILLS

	1 Personal	2 Shore Duty	3 Battle	4 Patrol/Strike	5 Siege	6 Mission	7 Technical	
1	C1 +1	Gambler	Fighting	Astrogation	Gunner	Navy	One Art	1
2	C2 +1	Major*	Fleet Tactics	Fleet Tactics	Gunner	Admin	One Science	2
3	C3 +1	Minor*	Pilot	Computer	Sensors	Language	Athlete	3
4	C4 +1	Athlete	Starship Skill	Starship Skill	Counsellor	Starship Skill	Medic	4
5	C5 +1	One Trade	Gunner	Gunner	Strategy	Liaison	Seafarer	5
6	C6 +1**	One Trade	Sensors	Sensors	Computer	Comms	One Trade	6

*If the character has no declared Major or Minor, this benefit is lost. **If the character has C6=Caste, this benefit is lost.

ENLISTED NAVAL RANKS

Rank	Auto Skill
R1 Spacehand	Fighting
R2 Able Spacer	
R3 Petty Officer Second	
R4 Petty Officer First	Gunnery
R5 Chief Petty Officer	Sensors
R6 Master Chief Petty Officer	

Auto Skill. If Medical Branch, use Medical. If Technical Branch, use any Trade instead.

NAVAL BRANCH

1D	Officer	Mod	Crew	Mod
1	Line	1	Crew	1
2	Line	1	Crew	1
3	Line	1	Engineer	0
4	Engineer	0	Engineer	0
5	Gunnery	1	Gunnery	1
6	Flight*	2	Gunnery	1
7	Technical	0	Technical	0
8	Medical	0	Medical	0

DM+2 if Edu 10+
Mod applies to Risk and Reward

B SKILL ELIGIBILITY

Event	Benefit
Per Term	4 Skills
When Commissioned	1 Skill
When Promoted	1 Skill
Automatic	by Rank

Term skills must be taken on the corresponding Naval Operations column of the Spacer Skills Table.

OFFICER NAVAL RANKS

Rank	Auto Skill
O1 Ensign	Astrogation
O2 Sublieutenant	
O3 Lieutenant	Engineer
O4* Lt Commander	Pilot
O5 Commander	
O6 Captain	Leader
O7 Admiral	

*Automatic Command College in Year 1 of this Term.

NAVAL OPERATIONS

1D	Officer	Mod	Crew	Mod
1	Battle	2	Battle	2
2	Strike	2	Strike	2
3	Siege	0	Siege	0
4	Patrol	1	Patrol	1
5	Mission	3	Shore Duty	0
6	ANM School	0	ANM School	0
7	Shore Duty	0	ANM School	0
8	Shore Duty	0	OCS	0

DM+2 if Edu 10+
Mod applies to Risk and Reward.

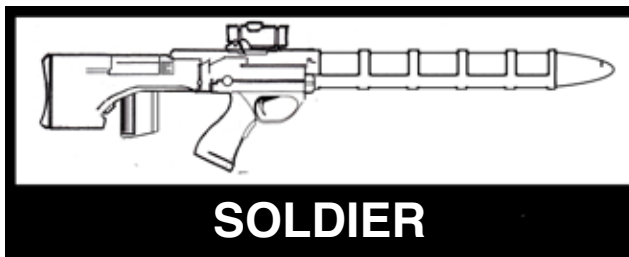
D MUSTER OUT BENEFITS

1D	Money	Benefits
1	Low Passage	Secret
2	StarPass	Wafer Jack
3	Mid Passage	Str +1
4	High Passage	C2 +1
5	Cr 20,000	C3 +1
6	Cr 25,000	Life Insurance
7	Cr 30,000	Ship Share
8	Retire x2	Knighthood

DM + Officer Rank

08 Soldier

Soldier. One who serves in an army or fighting force. Trooper. Fighter. Man-at-arms. Warrior. Militiaman. Combatant.



THE ARMY CAREER

The focus of the Army career is keeping the peace and defending the Empire. Each Term, he participates in military operations.

After a successful Begin, the Soldier determines Branch; Ratings redetermine Branch when promoted; Officers may not change Branch.

Four times per Term, the Soldier rolls the type of Operations.

ARMY BRANCH		OPERATIONS		
1D	Branch	Mod	1D	Inf Art Cav Mod
1	Infantry	1	1	Combat 2
2	Infantry	1	2	Combat 2
3	Artillery	1	3	Peace Keeper 1
4	Cavalry	1	4	Insurgency 1
5	Protected	2	5	Occupation 0
6	Commando	2	6	ANM School 0
7	Technical	0	7	ANM School 0
8	Medical	0	8	Garrison 0

If The Risk Roll Fails...

The soldier is wounded (hit points = C-R); recovery points = 1D (unrecovered injury is permanent). Permanent injury of 3+ points requires disability discharge and awards double mustering out benefits.

If The Reward Roll Succeeds...

The Soldier receives a Campaign Ribbon (name the campaign involved) and may consult the Medals Table if Battle, Combat, Insurgency, or Mission.

ENLISTED ARMY RANKS

Rank	Auto Skill
S1	Private Fighting
S2	Corporal
S3	Sergeant Heavy Wpns
S4	Staff Sergeant Gunnery
S5	Master Sergeant
S6	Sergeant Major

OFFICER ARMY RANKS

Rank	Auto Skill
O1	2nd Lieutenant
O2	1st Lieutenant
O3	Captain
O4*	Major Flyer
O5	Lt Colonel
O6	Colonel Leader
O7	General

*Automatically attends Command College when promoted to this Rank.
Auto Skill. If Medical Branch, use Medical. If Technical Branch, use any Trade instead.

A SOLDIERS

Event	Throw
To Begin	Str
Select Branch	Choice
Risk and Reward	C1 C2 C3 C4
Promotion	C2
	Mod +1 per WB
Officer Promotion	Soc
	Mod +1 per Medal
Continue	7

B SKILL ELIGIBILITY

Event	Benefit
Per Term	4 Skills
When Promoted	1 Skill
When Promoted	1 Skill
Automatic	by Rank
Term skills must be taken on the corresponding Operations column of the Soldier Skills Table.	

D MUSTER OUT BENEFITS

1D	Money	Benefits
1	Low Passage	Forbidden
2	Mid Passage	Secret
3	High Passage	C1 +1
4	Cr 15,000	Life Insurance
5	StarPass	C5 +1
6	Cr 25,000	Wafer Jack
7	Cr 30,000	C4 +1
8	Retire x2	Knighthood
	DM + Officer Rank	

C SOLDIER SKILLS

1 Personal	2 Base	3 Combat	4 Peacekeeper	5 Occupation	6 Military	7 Technical	
1	C1 +1	Athlete	Fighting	Admin	Fighting	Army	One Art 1
2	C2 +1	Major*	Vacc Suit	Fighting	Vacc Suit	Liaison	One Science 2
3	C3 +1	Minor*	Fighting	Hostile Environ	Driver	Language	Explosives 3
4	C4 +1	Gambler	Stealth	Animals	Stealth	Gunner	Medic 4
5	C5 +1	One Trade	Gunner	Liaison	Gunner	Computer	Seafarer 5
6	C6 +1**	One Trade	Tactics	Navigation	Sensors	Tactics	One Trade 6

*If the character has no declared Major or Minor, this benefit is lost. **If the character has C6=Caste, this benefit is lost.



09 Agent

Agent. The authorized representative of a government or powerful organization. Operative. Diplomat. Emissary. Deputy. Enforcer. Paladin. Negotiator.

AGENT MISSIONS

The focus of the Agent is Missions. Each is a single Term in length: for the first half of the Term, the Agent is Undercover, serving in a different career (investigating, gathering information, preparing); in the second half of the Term, the Agent is completing the Mission.

A AGENTS

Event	Throw
To Begin	C3
Risk and Reward	C1 C2 C3 C4
Continue	Str
	Mod + Terms

B SKILL ELIGIBILITY

Event	Benefit
Per Term	2 Skills
Per Undercover	1 Skill
Successful Mission	4 Skill

D MUSTER OUT BENEFITS

1D	Money	Benefits
2	Low Passage	Forbidden
3	Mid Passage	Secret
4	High Passage	Wafer Jack
5	Cr 15,000	Str +1
6	StarPass	C2 +1
7	Cr 25,000	C3 +1
8	Cr 30,000	Int +1
9	Cr 35,000	Ship Share
10	Cr 40,000	Life Insurance
11	Cr 45,000	Soc +1
12	Cr 50,000	Knighthood
	DM + Terms and Commendations	

Undercover (the Risk)

Roll for Undercover career. Select (not Roll) one skill from the skill table of that Career.

If The Risk Roll Fails... The Agent is injured (hit points equal to the difference between the roll and the characteristic). Roll for recovery (= 1D, but not to exceed original injury). Unrecovered injury permanently reduces the characteristic.

Mission (the Reward)

Roll the Controlling Characteristic or less.

If the Reward Roll Succeeds... Successful Agent activities are recognized and rewarded with Commendations: official documents which express the appreciation of the organizations involved.

UNDERCOVER ASSIGNMENT

A	B	1	2	3
1 1	Army Enlisted	Private	Corporal	Sergeant
1 2	Army Officer	First Lieutenant	Captain	Major
1 3	Marine Enlisted			
1 4	Marine Officer			
1 5	Navy Enlisted			
1 6	Navy Officer			
2 1	Scholar			
2 2	Scholar			
2 3	Entertainer	Musician	Actor	Dancer
2 4	Entertainer			
2 5	Craftsman			
2 6	Craftsman			
3 1	Merchant	Engineer	Astrogator	Steward
3 2	Merchant	Pilot	Freightmaster	Counsellor
3 3	Scout			
3 4	Scout			
3 5	Citizen			
3 6	Functionary			
3 6	Noble	Knight	Baron	Marquis or Count

Roll three dice for a specific skill: Roll A (reroll if >4), then roll B, and finally top row C (reroll if >4) if required..

C AGENT SKILLS

	1 Personal	2 Academic	3 Travel	4 Mission	5 Conflict	6 Vocation	7 Avocation	
1	C1 +1	Major*	Zero-G	Survey	Fighting	Any Knowledge	One Art	1
2	C2 +1	Major*	Vacc Suit	Survival	Fighting	Admin	One Science	2
3	C3 +1	Minor*	Pilot	Hostile Environ	Flyer	Language	Athlete	3
4	C4 +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 has no declared Major or Minor, this benefit is lost. **If the character has C6=Caste, this benefit is lost.

10 Rogue

Rogue: A scoundrel, rascal, or deceiver. Knave. Scamp. A Non-Conformist. Bandit. Highwayman. Pirate. Corsair. Brigand. Thief. Robber.



THE ROGUE

The focus of the Rogue is Schemes created to amass wealth at the expense of others.

A Rogue selects one Controlling Characteristic which is then used throughout his career.

In each Term, the Rogue masterminds a Scheme within a specific, non-Rogue Career. He rolls on the Rogue Schemes table to determine its potential (the times 1D roll is deferred until after the Scheme has succeeded).

Rogue <Former Career>. A character who has become a Rogue from a previous career automatically picks that former career on the Rogue Schemes table.

If The Risk Roll Fails...

The Rogue is caught and serves the current Term and the next Term in Prison. He receives Fame +1 (actually Infamy, but he is more widely known than before).

If The Reward Roll Succeeds...

The Rogue's Scheme is successful. He rolls 1D to determine the precise value outcome.

A Rogue may roll for Success even if the Risk Roll fails. In such case, Success provides only half value from the Scheme.

Before beginning, pick one Controlling Characteristic CC.

A ROGUES

Event	Throw
To Begin	CC
Risk and Reward	CC
	Mod + Terms
Continue	CC
	Mod + Terms

B SKILL ELIGIBILITY

Event	Benefit
Per Term	2 Skills
Abandoned Scheme	1 Skill
Successful Scheme	4 Skill
In Prison	1 Skill

ROGUE SCHEMES

Career	Value	X
1 Craftsman	Cr100,000	x1D
2 Scholar	Cr 20,000	x1D
3 Entertainer	Cr100,000	x1D
4 Citizen	Cr 10,000	x1D
5 Scout	Type S Scout	
6 Merchant	Ship Share	x1D
1 Spacer	Cr 50,000	x1D
2 Soldier	Cr 30,000	x1D
3 Agent	Cr100,000	x1D
4 Noble	Cr200,000	x1D
5 Marine	Cr 40,000	x1D
6 Functionary	Cr 30,000	x1D

Select the first or second table and roll 1D for the Scheme Career

A Rogue may select (rather than roll) any previous career for his Scheme.

D MUSTER OUT BENEFITS

1D	Money	Benefits
2	Low Passage	Forbidden
3	Mid Passage	Secret
4	High Passage	Wafer Jack
5	Cr 50,000	C2 +1
6	StarPass	C3 +1
7	Cr 70,000	TAS Fellow
8	Cr 80,000	Life Insurance
9	Cr 90,000	Int +1
10	Cr100,000	Directorship
11	Cr110,000	Knighthood
12	Cr120,000	Barony
	DM + Terms	

C ROGUE SKILLS

	1 Personal	2 Academic	3 World Travel	4 Space Travel	5 Business	6 Vocation	7 Technical	
1	C1 +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	C4 +1	One Art	High G	Zero G	JOT	Leader	Starship Skill	4
5	C5 +1	One Trade	Vacc Suit	Vacc Suit	Teacher	Streetwise	Seafarer	5
6	C6 +1**	One Trade	Navigation	Astrogation	Computer	Comms	One Trade	6

*If the character has no declared Major or Minor, this benefit is lost. **If the character has C6=Caste, this benefit is lost.



11 Noble

Noble. One with a higher rank in a political or social class system. Ruler. Politician. Dilettante. Scion. Archon. Chief. Heir. Heiress. Aristocrat.

A NOBLE

Event	Throw
To Begin	Automatic*
Return and Intrigue	C2 C3 C4 C5 Mod - Intrigues Mod + Exiles
Continue	Soc
* If Soc A+	

B SKILL ELIGIBILITY

Event	Benefit
Per Term	4 Skills
When Elevated	2 Skills

D MUSTER OUT BENEFITS

1D	Money	Benefits	Power
2	Cr 20,000	Wafer Jack	Proxy (1)
3	Cr 30,000	Str +1	Proxy (2)
4	StarPass*	C2 +1	Proxy (1D)
5	StarPass*	C3 +1	Proxy (1D)
6	StarPass*	C4 +1	Proxy (Flux)
7	Cr140,000	Ship Share	Proxy (Flux)
8	Cr160,000	Proxy (1D)	Proxy (2D)
9	Cr180,000	Proxy (2D)	Proxy (2D)
10	Cr200,000	Life Insurance	Proxy (2D)
11	Cr220,000	Int +1	Proxy (2D)
12	Cr240,000	Directorship	Proxy (2D)
13	Cr260,000	TAS Life Member	Proxy (2D)

DM + Terms. *upgraded to High as a courtesy.

NOBLE INTRIGUE

Intrigue is a political fight for some important policy within the government; it is central to the life of the Noble.

Return From Exile. A Noble in Exile at the start of a Term rolls the current Controlling Characteristic to Return from Exile. If he fails, he may not roll for Intrigue or Elevation. Exile is a banishment of a noble to the edges of the empire (orchestrated by the political enemies).

Intrigue. A Noble (not in Exile) rolls the Controlling Characteristic. If he fails, he is sent into Exile and may not roll for Elevation.

ELEVATION

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).

Total successful Intrigues (in the Noble's lifetime) is a Mod for Elevation.

Flux. Once during character generation after a successful intrigue, a Noble may invoke Flux as a Mod on the Elevation roll.

LAND GRANTS

At each level of Nobility during Character Generation the character receives a Land Grant.

NOBLE LAND GRANTS

Noble	Soc	Hexes	Where?	Preferred World
Gentleman	A	1	any	any
Knight	B	1	1	homeworld.
Baronet	c	2	2	one system
Baron	C	4	4	one system.
Marquis	D	8	8	one subsector
Viscount	e	16	16	one subsector
Count	E	32	32	one sector
Duke	f	64	64	one sector
Duke*	F	128	128	one sector
Archduke	G	256	256	one domain

Nobles receive Land Grants on the worlds on which they hold fiefs. Noble Land Grants are cumulative. Each noble title confers a Land Grant.

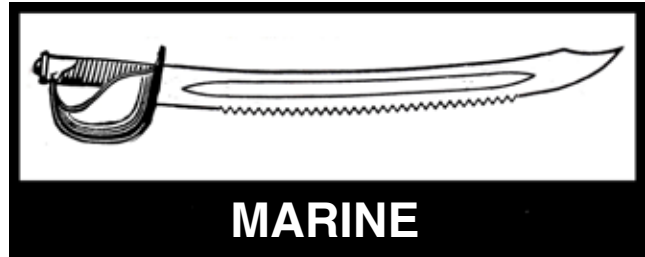
C NOBLE SKILLS

	1 Personal	2 Academic	3 Travel	4 General	5 Political	6 Vocation	7 Technical	
1	C1 +1	Major*	Flyer	Advocate	Liaison	Capital	One Art	1
2	C2 +1	Major*	Driver	Counsellor	Strategy	Admin	One Science	2
3	C3 +1	Minor*	Pilot	Bureaucrat	Tactics	Language	Computer	3
4	C4 +1	Minor*	Starship Skill	Liaison	Diplomat	Starship Skill	Comms	4
5	C5 +1	One Trade	High G	Leader	Advocate	Bureaucrat	Seafarer	5
6	C6 +1**	One Trade	Zero G	Leader	Leader	Comms	One Trade	6

*If the character has no declared Major or Minor, this benefit is lost. **If the character has C6=Caste, this benefit is lost.

12 Marine

Marine. One who serves in a naval infantry unit. An elite fighter. A commando. Special Forces. A soldier serving aboard a starship.



THE MARINE CAREER

The focus of the Marine career is keeping the peace and defending the Empire. Each Term, he participates in Marine operations.

After a successful Begin, the Soldier determines Branch; Ratings redetermine Branch when promoted; Officers may not change Branch.

Four times per Term, the Marine rolls the type of Operations.

If The Risk Roll Fails...

The Marine is wounded (hit points = C-R); recovery points = 1D (unrecovered injury is permanent). Permanent injury of 3+ points requires disability discharge and awards double mustering out benefits.

If The Reward Roll Succeeds...

The Marine receives a Campaign Ribbon (name the campaign involved) and may consult the Medals Table if Battle, Combat, Insurgency, or Mission.

ENLISTED MARINE RANKS

Rank	Auto Skill
M1 Private	Fighting
M2 Corporal	
M3 Sergeant	Heavy Wpns
M4 Staff Sergeant	Gunnery
M5 Master Sergeant	
M6 Sergeant Major	

OFFICER MARINE RANKS

Rank	Auto Skill
O1 2nd Lieutenant	
O2 1st Lieutenant	
O3 Captain	
O4* Force Commander	Flyer
O5 Lt Colonel	
O6 Colonel	Leader
O7 General	
*Automatic Command	
College in Year 1 of Term.	
Auto Skill. If Medical	
Branch, use Medical. If Technical Branch, use any Trade.	

MARINE BRANCH			OPERATIONS			Commando		Technical			
1D	Branch	Mod	1D	Inf Art Cav	Mod	1D	Protected	Mod	1D	Medical	Mod
1	Infantry	1	1	Combat	2	1	Battle	3	1	Rear Area	0
2	Infantry	1	2	Combat	2	2	Combat	2	2	Relief	1
3	Artillery	1	3	Peace Keeper	1	3	Peace Keeper	1	3	Peace Keeper	1
4	Cavalry	1	4	Insurgency	1	4	Insurgency	1	4	Insurgency	1
5	Protected	2	5	Occupation	0	5	Insurgency	2	5	Mission	2
6	Commando	2	6	ANM School	0	6	ANM School	0	6	ANM School	0
7	Technical	0	7	ANM School	0	7	ANM School	0	7	ANM School	0
8	Medical	0	8	Garrison	0	8	Garrison	0	8	Garrison	0

A MARINES

Event	Throw
To Begin	Str
Risk and Reward	C1 C2 C3 C4
Marine Promotion	C2
	Mod +1 per Rank
Commission	C3
Officer Promotion	Edu
	Mod +1 per Medal
Continue	Str
	Mod + Terms

B SKILL ELIGIBILITY

Event	Benefit
Per Term	4 Skills
When Commissioned	1 Skill
When Promoted	1 Skill
Automatic	by Rank
Term skills must be taken on the corresponding Operations column of the Marine Skills Table.	

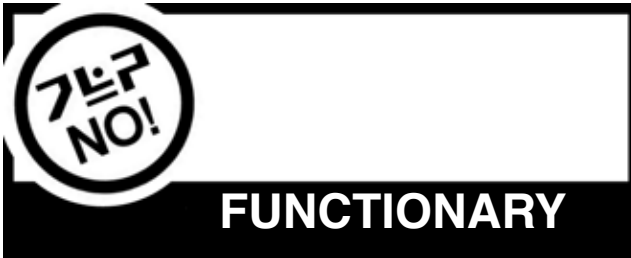
D MUSTER OUT BENEFITS

1D	Money	Benefits
1	Low Passage	Secret
2	StarPass	Wafer Jack
3	Mid Passage	Str +1
4	High Passage	C2 +1
5	Cr 20,000	C3 +1
6	Cr 25,000	Life Insurance
7	Cr 30,000	Ship Share
8	Cr 50,000	Int +1
9	Retire x2	Knighthood
DM + Officer Rank		

C MARINE SKILLS

	1 Personal	2 Garrison	3 Battle	4 Peacekeeper	5 Occupation	6 Military	7 Technical	
1	C1 +1	One Trade	Fighting	Vacc Suit	Fighting	Marines	One Art	1
2	C2 +1	Major*	Fighting	Fighting	Fighting	Survival	One Science	2
3	C3 +1	Minor*	Gunner	Hostile Environ	Flyer	Language	Explosives	3
4	C4 +1	Gambler	Gunner	Stealth	Stealth	Gunner	Medic	4
5	C5 +1	Driver	Tactics	Tactics	Tactics	Fighting	Seafarer	5
6	C6 +1**	One Trade	Leader	Leader	Leader	Leader	One Trade	6

*If the character has no declared Major or Minor, this benefit is lost. **If the character has C6=Caste, this benefit is lost.



13 Functionary

Functionary: One who holds an office or position of trust or performs a particular function; an official. Inspector. Manager. Bureaucrat. Administrator. Supervisor.

FUNCTIONARIES

The focus of a every Functionary is Office Politics and 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.

No Mods are used for Office Politics.

OFFICE POLITICS

The Functionary rolls for both Risk and Reward.

Risk

If the Risk Roll fails... the Functionary career ends. The character may not Continue.

If the Risk Roll succeeds... the Functionary may continue in the career. A Functionary **MUST** succeed on the Risk Roll to continue in the career.

Reward

If the Reward Roll fails...
the Functionary is not promoted.

If the Reward Roll succeeds...
the Functionary is promoted one rank.

Both

If Risk fails and Reward succeeds...
the character is promoted, but may not continue.

A FUNCTIONARIES

Event	Throw
To Begin	Total Terms x3
Office Politics	C1 C2 C3 C4

B SKILL ELIGIBILITY

Event	Benefit
Per Term	4 Skills
Per Promotion	1 Skill

TABLE OF FUNCTIONARY RANKS

Rank	Auto Skill
F0	Clerk
F1	Supervisor
F2	Senior Supervisor
F3	Manager
F4	Senior Manager
F5	Assistant Director
F6	Director
F7	Nth UnderSecretary*
F8	Secretary

* N= 1D (ie: 3rd UnderSecretary).

D MUSTER OUT BENEFITS

1D	Money	Benefits
1	Cr 5,000	Forbidden
2	Cr 10,000	Secret
3	Cr 15,000	Wafer Jack
4	Cr 20,000	Str +1
5	StarPass	C2 +1
6	Cr 30,000	C3 +1
7	Cr 40,000	Int +1
8	Cr 50,000	Life Insurance
9	Cr 60,000	TAS Fellow
10	Pension x2	Knighthood
11	Pension x2	Directorship

DM + Officer Rank

Plus Automatic: Gold Watch

Value= Cr 100 x Terms

C FUNCTIONARY SKILLS

	1 Personal	2 Academic	3 World Travel	4 General	5 Business	6 Vocation	7 Avocation	
1	C1 +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	C4 +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 has no declared Major or Minor, this benefit is lost. **If the character has C6=Caste, this benefit is lost.

Noble Lands

Nobles hold Land Grants on the worlds on which they hold fiefs.

IMPERIAL FIEFS

Nobles of the Imperium receive, as part of their grant of title and rank, Noble Lands: Land Grants 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 (which means that with proper development the world can become Ind, Ri, or Ag).

Noble 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.

NOBLE LAND GRANTS

Noble	Soc	Hexes	Where?	Preferred World
Gentleman	A	1	any	any
Knight	B	1	1 homeworld.	any
Baronet	c	2	2 one system	Pre-Ag or Pre-Ri
Baron	C	4	4 one system.	Ag or Ri
Marquis	D	8	8 one subsector	Pre-Ind
Viscount	e	16	16 one subsector	Pre-Hi
Count	E	32	32 one sector	In
Duke	f	64	64 one sector	Important World*
Duke*	F	128	128 one sector	Important World*
Archduke	G	256	256 one domain	any

*Importance = 4.

Nobles receive Land Grants on the worlds on which they hold fiefs. Noble Land Grants are cumulative. 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.

Duke f and F. There is no external or stated difference between the two levels; but those in the government know the relative hierarchy.

DISCOVERER LAND GRANTS

The Imperium makes Land Grants to the discoverers of new worlds. The Imperium pays the Discoverer standard fees in lieu of actual possession.

Within the Imperium, the Land Grant operates much like a Noble grant. 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. 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 such grants have been made, and have lain in safe deposit boxes for generations, waiting for the time when the world enters the Imperium.

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.

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 has one vote, a Duke has five 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.

Values. A Proxy is worth about Cr100,000 per vote. A Baron with one vote can expect a powerful politician to pay about Cr100,000 for his proxy; A Count with 3 votes can expect to receive about Cr300,000 annually for his proxy.

Complications. The entire matter of proxies is complex. For characters far from the capital, proxies can be seen as merely a source of income; for those actively involved in politics and the Moot, they are a matter of constant negotiation and intrigue.

NOBLE VOTING STRENGTH

	Noble	Votes	Total Value
C	Baron, Baronet	1	Cr100,000
D	Marquis	2	Cr200,000
E	Count, Viscount	3	Cr300,000
F	Duke	4	Cr400,000
G	Archduke	5	Cr500,000

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)

$2D < \text{Life Stage}$

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

Forced Growth Cloning (Relicts, Guests, and Meds) accelerates the aging pattern of the individual: Physical Aging begins at Life Stage 4 (one stage earlier than the original sophont); mental aging begins at Life Stage 8 (also one stage earlier than the original sophont).

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).

Characters naturally grow old and as they do they experience the effects of Aging.

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

*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 physically mature individual with full responsibilities in society. Traditional character generation begins at the start of 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 the start of Peak.

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 the start of Retirement (= 66 for Humans).

THE IMPERIAL CALENDAR



Holiday	Wonday	Tuday	Thirday	Forday	Fiday	Sixday	Senday		Wonday	Tuday	Thirday	Forday	Fiday	Sixday	Senday	
1	2	3	4	5	6	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	36		37	38	39	40	41	42	43	
	44	45	46	47	48	49	50		51	52	53	54	55	56	57	
	58	59	60	61	62	63	64		65	66	67	68	69	70	71	
	72	73	74	75	76	77	78		79	80	81	82	83	84	85	
	86	87	88	89	90	91	92		93	94	95	96	97	98	99	
	100	101	102	103	104	105	106		107	108	109	110	111	112	113	
	114	115	116	117	118	119	120		121	122	123	124	125	126	127	
	128	129	130	131	132	133	134		135	136	137	138	139	140	141	
	142	143	144	145	146	147	148		149	150	151	152	153	154	155	
	156	157	158	159	160	161	162		163	164	165	166	167	168	169	
	170	171	172	173	174	175	176		177	178	179	180	181	182	183	
	184	185	186	187	188	189	190		191	192	193	194	195	196	197	
	196	197	198	199	200	201	202		203	204	205	206	207	208	209	
	212	213	214	215	216	217	218		219	220	221	222	223	224	225	
	226	227	228	229	230	231	232		233	234	235	236	237	238	239	
	240	241	242	243	244	245	246		247	248	249	250	251	252	253	
	254	255	256	257	258	259	260		261	262	263	264	265	266	267	
	268	269	270	271	272	273	274		275	276	277	278	279	280	281	
	282	283	284	285	286	287	288		289	290	291	292	293	294	295	
	296	297	298	299	300	301	302		303	304	305	306	307	308	309	
	310	311	312	313	314	315	316		317	318	319	320	321	322	323	
	324	325	326	326	327	328	329		330	331	332	333	334	335	336	
	338	339	340	341	342	343	344		345	346	347	348	349	350	351	
	352	353	354	355	356	357	358		359	360	361	362	363	364	365	
Holiday	1day	2day	3day	4day	5day	6day	7day		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). 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:

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

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.

Strephon's Birthday. The Emperor during the Golden Age, Strephon, was born on 202 and that day is generally a holiday throughout the Empire.

BIRTH DATE GENERATION

		1D= 1-2-3						1D= 4-5-6					
D	D	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	361
1	2	2	38	74	110	146	RR	182	218	254	290	326	361
1	3	3	39	75	111	147	RR	183	219	255	291	327	363
1	4	4	40	76	112	148	RR	184	220	256	292	328	364
1	5	5	41	77	113	149	RR	185	221	257	293	329	365
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	RR
6	3	33	69	105	141	177	RR	213	249	285	321	357	RR
6	4	34	70	106	142	178	RR	214	250	286	322	358	RR
6	5	35	71	107	143	179	RR	215	251	287	323	359	RR
6	6	36	72	108	144	180	RR	216	252	288	324	360	RR

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 computes 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 the Birthday Chart. 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.

Education-1

EDUCATION	College*	University	University
Pre-requisite	Edu= 5+ or 7+*	Bachelor	Masters
To Apply	Int or Edu	Int or Edu	Int or Edu
Pass/Fail	2x Int or Edu	2x Int or Edu	2x Int or Edu
Duration	4 years	2 years	2 years
Graduation and	Edu = 8 Bachelor	Edu = 9 Master	Edu= 12 Doctor

*University requires Edu= 7+

	Med School	Law School	Trade School
Pre-requisite	Honors BA	Honors BA	C5 = 5
To Apply	Int or Edu	Int or Edu	C2 or C3
Pass/Fail	4x Int or Edu	3x Int or Edu	1x Int or Tra
Duration	4 years	2 years	1 year
Graduation and	Edu = 10 Medical Doctor	Edu = 10 Lawyer	--

TRAINING	Apprentice	Course	Mentor
Pre-requisite	--	C5 = Tra	C5 = Tra
To Apply	auto	auto	Int
Pass/Fail	1x Tra	1x Tra	1x Int or Tra
Duration	4 years**	1 year	1 year
Graduation	--	--	Tra +2 (no Major)

**during Life Stage 2

Major and Minor. The character selects a Major and a Minor from the appropriate Skill and Knowledge list.

Honors. A College or University student may roll one additional Pass/Fail: success confers Honors and Major+1.

OTC/NOTC. A College or University student may enroll in OTC (Officer Training Course) or NOTC (Naval Officer Training Course) and make one Pass/fail roll: success confers a Commission (OTC = Army Officer1 or Marine Officer1; NOTC = Navy Officer1).

College University	Law School	Apprentice Training Course	Trade School
Any Art	Advocate	Admin	Engineer
Any Science	Bureaucrat	Advocate	Explosives
Athlete	Counsellor	Animals	Flyer
Broker	Diplomat	Any Art	Forensics
Bureaucrat	Psychology	Any Talent	Language
Counsellor		Any Trade	Medical
Designer	Med School	Comms	Seafarer
Language	Biology	Computer	Sensors
Teacher	Forensics	Counsellor	Small Craft
	Medical	Driver	
	Sophontology		

MILITARY SCHOOLS	ANM School	Command College	Service Academy
Pre-requisite	assigned	assigned	C5 = 6
To Apply	auto	auto	Int or Edu
Pass/Fail	1x C2 or C3	2x Int or C5	4x Int or C5
Duration	1 year	2 years	4 years
Graduation and	--	--	C5 = 8 Commission

ANM Army Navy Marine School

Army Navy Marine Schools are assigned during a military or naval career. The school is resolved and the character returns to career resolution. ANM schools confer Knowledge (rather than Skills), but each year confers Knowledge-2. The ANM Schools Chart shows the available Majors (coded A=Army, N=Navy, M=Marines).

ANM Schools-1

A - - ACV
A N - Aeronautics
A - M Artillery
A - M Automotive
- N - Bay Wpns
A - M Beams
A - M Blades
A N M Battle Dress
A - M Exotics
A - - Flapper
A N M Grav
- N - J-Drives
A - M Launcher
A - - Legged
A N - Life Sup
A - - LTA
- N - M-Drives
A - - Mole

ANM Schools-2

A - M Ordnance
- N M Orillery
A N M P-Plants
A - - Rotor
A N - Screens
A N M Slug Throw
- N - Spines
A - M Sprays
A - M Tracked
A N M Turrets
A - M Unarmed
A N M Wheeled
A N - Wing
A N M WMD
A - M Rider
A N M Trainer
A - M Ship
A - M Small Craft

Naval Academy

Any Starship Skill
Leader
Tactics
Naval Architect

Military Academy

Any Soldier Skill
Leader
Tactics

Flight School. Service Academy Honors graduate may take a 1-year Flight School (Pass/Fail: C2): Pass confers three total levels of skill.

Flight School

Pilot
Small Craft

Command College

Every Army Navy and Marine Officer4 is assigned to Command College in the the Term he is promoted to Officer4. He resolves the college (one year) and returns to career resolution.

Command College

Strategy
Leader
Liaison
Fleet Tactics (Navy only)

Education-2

ED5

Flux School Name Rank= inconsequential

- 5 <City> Municipal Education System
- 4 <City> City Schools
- 3 <City> Consolidated School District <Random>
- 2 <City> Charter Schools
- 1 <City> Independent School System <Random>
- 0 <City> School System
- +1 <Province> Peoples Pedagogical Institute
- +2 <Province> Provincial Schools
- +3 <Province> Academy
- +4 <Province> Alternative Schools
- +5 <Province> Regional Education System

TRADE SCHOOLS

Flux School Name Rank= 1D

- 5 <Brand Name> Trade School
- 4 <Company> School of <Skill>
- 3 Institute of <Skill>
- 2 <Brand Name> School of the <Skill> Arts
- 1 <Company> Institute of <Skill>
- 0 Standardized <Skill> Qualification Program
- +1 <Skill> Instruction Course
- +2 <Skill> Instruction Program
- +3 <Skill> Correspondence Course
- +4 <Skill> Career School
- +5 Certified <Skill> Course

COLLEGE

Flux School Name Rank = 2D

- 5 <City> College
- 4 <Province> College
- 3 College of <World>
- 2 <City> City College
- 1 <Province> Provincial College
- 0 <World> College
- +1 All-<World> College of <Skill>
- +2 <Province> College of <Skill>
- +3 Peoples College of <Skill> (<World> Campus)
- +4 <Province> <Skill> College
- +5 <World> College (<Skill>)

UNIVERSITY

Flux School Name Rank= 3D

- 5 <World> University
- 4 <Company> University
- 3 <Surname> University
- 2 <World> <Surname> University
- 1 University of <World>
- 0 Imperial University of <World>
- +1 All- <World> University
- +2 <Color> Faculty of the <World> Institute
- +3 <Surname> Institute
- +4 The <Color> Institute
- +5 <World> Orbital University

Educational Institutions for characters are identified by name and reputation.

For each attended educational institution, determine the school name and its reputation.

For each bracketed item, insert a random value: <City>= any random City Name.

MEDICAL SCHOOL

Flux School Name Rank = 2D

- 5 <World> University Medical School
- 4 <Company> University Medical School
- 3 <Surname> University Medical School
- 2 <World> <Surname> University Medical School
- 1 University of <World> Medical School
- 0 University of <World> Medical School
- +1 All- <World> University Medical Specialty Course
- +2 <World> Institute Online Medical Systems
- +3 <Surname> Institute School of Medicine
- +4 The <Color> Institute School of the Medical Arts
- +5 <World> Orbital University College of Medicine

LAW SCHOOL

Flux School Name Rank = 2D

- 5 <World> University Law School
- 4 <Company> University Law School
- 3 <Surname> University Law School
- 2 <World> <Surname> University Law School
- 1 University of <World> Law School
- 0 University of <World> Law School
- +1 All- <World> University Legal Specialty Course
- +2 <World> Institute Online Legal Instruction
- +3 <Surname> Institute School of Advocacy Arts
- +4 The <Color> Institute School of the Legal Arts
- +5 <World> Orbital University College of Law

NAVAL / MILITARY ACADEMY

Flux School Name Rank = 1D

- 5 <Government> <Type> Academy (<World>)
- 4 <Subdivision> <Type> Academy (<World>)
- 3 <World> Continental <Type> Academy
- 2 <Subdivision> Reserve <Type> Academy
- 1 <Government> Reserve <Type> Academy
- 0 <World> <Type> Academy
- +1 <Government> <Type> Training Institute at <World>
- +2 <Subdivision> <Type> Training Institute at <World>
- +3 People's <Type> Academy at <World>
- +4 All-System Faculty for <Type> Instruction, (<World>)
- +5 Online <Type> Instruction Directorate

Life Events-1

Select the table appropriate for the specific career. The result provides a component for the individual's life.

Enhance the history of a character with names of important events and associations.

04 Interrupting A Citizen's Life

Flux Interruption

- 5 **War.** The homeworld is being devastated by military operations.
- 4 **Natural Disaster.** The homeworld is suffering extensive natural disaster.
- 3 **Environmental Change.** The homeworld is experiencing extensive ecological change.
- 2 **Personal Disaster.** The Citizen has suffered a terrible personal loss.
- 1 **Personal Discontent.** The Citizen is discontent with his personal situation.
- 0 **Personal Mission.** The Citizen has a significant personal unfilled need.
- +1 **Fight.** The Citizen has witnessed events which prove dangerous to him.
- +2 **Exploration.** The Citizen has decided to abandon his current life.
- +3 **Economic Disaster.** The homeworld is suffering from economic upheaval.
- +4 **Social Disgrace.** The Citizen has suffered a significant social embarrassment.
- +5 **Retirement.** The Citizen has fulfilled his personal responsibilities to society on his homeworld.

02 Research Topic

Flux Topic

- 5 A Preliminary Survey of the Literature of <Major>.
- 4 Aspects of the Elementary Philosophy of <Major>.
- 3 A Detailed Bibliography of <Major>.
- 2 The Impact of Data from <WorldName> on <Major>.
- 1 Toward an Alternate Basic Theory of <Major>.
- 0 The Effects of <Minor> on <Major>.
- +1 Refuting <Professor Name>'s Theory of <Major>.
- +2 Practical <Major> on <WorldName>.
- +3 <Major> and its Impact on the Universe Today.
- +4 Our Evolving Understanding of <Major>.
- +5 Disasters in the Application of <Major>.

06 Merchant Companies

Flux Designation

- 5 <Surname> Express.
- 4 <World > Factors.
- 3 <World>-<World> Lines.
- 2 <Star > Agency.
- 1 < Letters> Lines.
- 0 <Surname > Shipping.
- +1 < World> Transporters.
- +2 <Satellite > Lines.
- +3 <Surname> and Sibs.
- +4 < Letters> Trading.
- +5 <Surname > Orbital Express.

09 Agent Mission

Flux Mission

- 5 To stop piracy.
- 4 To stop counterfeiting.
- 3 To root out bank fraud.
- 2 To stop illegal cloning.
- 1 To suppress psionics.
- 0 To uncover corrupt officials and nobles.
- +1 To expose incompetence in the Navy.
- +2 To uncover fraud in the Scout Service.
- +3 To discover spies in the Bureaucracy.
- +4 To discover project secrets at <MegaCorp>.
- +5 To destroy the databanks at <World>.

11 Noble Intrigues

Flux Event

- 5 The < Element > Affair.
- 4 The < World > Scandal.
- 3 The < Satellite > Ring.
- 2 The Judgment Against <Surname>.
- 1 The Exile to <World>.
- 0 The < Surname > Commission.
- +1 <Surname>'s Palace.
- +2 <Surname>'s Return.
- +3 <Surname>'s Misconduct.
- +4 <Surname>'s Secret Exile.
- +5 The Assassination of <Surname>.

Select the table appropriate for the specific career. The result provides a component for the individual's life.

Spacer / Soldier / Marine Table A. Create a unit name for a character. Reservists create a separate Reserve unit.

Spacer / Soldier / Marine Table B. Create one Battle name for each Service Ribbon.

07a Spacer Units

Flux	Designation
-5	<1-digit> Joint Battle Squadron
-4	<Star> Fleet Headquarters
-3	<World> Cruiser Squadron
-2	<1-digit> Escort Squadron
-1	<3-digit> System Defense Wing
0	<4-digit> Ortilery Squadron
+1	<2-digit> Reserve Fighter Wing
+2	<2-digit> Attack Squadron
+3	<City> Defense Squadron
+4	<Province> Support Squadron
+5	Special Long Range Squadron

08a 12a Soldier or Marine Units

Flux	Designation
-5	Joint <World> Lift Infantry Regiment
-4	<Province> Grav Tank Regiment
-3	<City> Ortilery Regiment
-2	<Number 1-digit> Artillery Regiment
-1	<Number 3-digit> Lift Cavalry Squadron
0	<Number 4-digit> Armored Infantry Regiment
+1	<World> PKF [Peace Keeping Force]
+2	<Number 2-digit> Admin Battalion
+3	<City> Support Battalion
+4	<Province> Transportation Battalion
+5	Special Rifle Battalion

10a Rogue Scheme

Flux	Scheme
-5	Promoting a foolproof project to terraform <World>.
-4	Acquiring control of the major industry on <World>.
-3	Hijacking the <World> Express.
-2	Faking a Land Grant to the <World> Copper Mines.
-1	Selling fake antique portraits of Nobles.
0	Selling a powerful but flawed starship armor formula.
+1	Selling a plan to filter atmosphere taint from <World>.
+2	Selling weapons in the conflict on <World>.
+3	Selling battle-dead clones as labor sophontoids.
+4	Selling war surplus parts repackaged as new.
+5	Enticing investors with a promise of nobility.

Life Events-2

Enhance the history of a character with names of important events and associations.

07b Spacer Service Battles

Flux	Name
-5	The Scrubbing of <World>
-4	The Bombardments at <Star>
-3	The Ortilery Campaign a <Satellite>
-2	The Skirmishes at <Gas Giant>
-1	The Pursuits at <Star>
0	The Battle of <Satellite>
+1	The Relief of <World>
+2	The Quarantine of <Star>
+3	The Siege of <Satellite>
+4	The Disaster at <World>
+5	The Sieges of <Gas Giant>

08b 12b Soldier or Marine Service Battles

Flux	Name
-5	The Campaign on <World>
-4	The Bloody Campaign In <City>
-3	The Retreat from <Province>
-2	The Assault On <World>
-1	The Defense of <Star>
0	The Trench War at <Province>
+1	The Undeclared War at <World>
+2	The PK Operations In <City>
+3	The Mistake at <Gas Giant>
+4	The Final Victory at <World>
+5	The Battle of <City>

10b Rogue Masquerade

Flux	Masquerade
-5	Citizen with family ties to the nobility.
-4	Scholar with secret research in Artificial Intelligence.
-3	Entertainer who knows all the big stars.
-2	Craftman with access to thousands of masterpieces.
-1	Scout with the coordinates of the Golden Worlds.
0	Spacer veteran of the <Star> anti-pirate campaign.
+1	Soldier veteran war hero with an SEH.
+2	Agent tracking down a Rogue on <World>.
+3	Noble exiled unfairly.
+4	Star Marine officer once bodyguard to the Emperor.
+5	Functionary on vacation.

Secrets-1

Create descriptions of any secrets the character has acquired.

01 Craftsman

Flux	Description
-5	A key and a map.
-4	<Sourceworld> for an anti-corrosive finish.
-3	A list of Masterpieces in an Imperial warehouse.
-2	An Imperial Credit printed on ordinary paper.
-1	A finely crafted Target Rifle.
0	Packet of seeds marked "Fountain of Youth" Plant.
+1	An AAB Archive Access code.
+2	A detailed 4NA scan of a sophont species.
+3	The location of a grove of <material> trees.
+4	A wafer with knowledge to construct a Jump-6 drive.
+5	A sample of a super glue.

02 Scholar

Flux	Description
-5	A reference to an unobtainable scholarly paper.
-4	A sample from a long-ago field expedition.
-3	A report on the biology of life on <World>.
-2	Chemical samples from <World>.
-1	The secret handwritten memoirs of Cleon I.
0	A detailed Anglic-<Language> vocabulary.
+1	The <World> Book of Wisdom.
+2	Detailed readings predicting flare timing for <Star>.
+3	A planetquake predictor.
+4	The secret location of the <World> Psionic Institute.
+5	Computer access codes for University of <World>.

03 Entertainer

Flux	Description
-5	A previously unknown script by a famous playwright.
-4	A book banned by the Imperial bureaucracy.
-3	The fabled never-released epic video by <Writer>.
-2	Handwritten Ultimate Melody (some wrong notes?).
-1	The location of <Entertainer's> secret mansion.
0	Samples of a paint of intense color.
+1	Smell Artist <Name>'s private recipe book.
+2	Studio notes for the Image Artist <Name>.
+3	Samples of sound responsive paint.
+4	A subliminal influence projector.
+5	A detailed operations plan for a Touring Company.

04 Citizen / Functionary

Flux	Description
-5	An approved real estate transaction form.
-4	The location of the Psionics Institute of <World>.
-3	A set of old 3D entertainment posters.
-2	A dress worn by the Empress.
-1	A data wafer with an encryption code scribbled on it.
0	Ownership documents for a company on <World>.
+1	A set of rare early empire coins.
+2	An unidentified genetic profile.
+3	A claim tag for a locker at <World> Starport.
+4	A small stasis capsule.
+5	Misfiled ownership papers for property on <World>.

05 Scout

Flux	Description
-5	Co-ordinates for a world beyond the frontier.
-4	The location of a First Empire advanced depot.
-3	A high quality communicator.
-2	Orbit details for a comet in the <Star> system.
-1	The suppressed report on the Disaster at <World>.
0	Location of a wrecked battleship.
+1	Location of a permanent storm on <World>.
+2	A technique that increases Power Plant output 20%.
+3	The only copy of a report on faulty Scout ship drives.
+4	Scout Service bulletin interdicting <Star> System.
+5	A simple device that disables Maneuver drives.

06 Merchant

Flux	Description
-5	A blank certificate for <skill>.
-4	Encryption key creation formulas for <Merchant>.
-3	A face image of a pirate from <Subsector>.
-2	A bearer bank account number on <World>.
-1	A cargo shipment storage claim number.
0	A ship share certificate marked "Special".
+1	A clicker that seems to open every ship it visits.
+2	An image of <World> starport before its renovation.
+3	A wafer marked <Date> <World>.
+4	Detailed plans for the <World> Starport.
+5	Confidential ship schedules for <Company>.

Secrets-2

Create descriptions of any secrets the character has acquired.

07 Spacer

Flux	Description
-5	A gun imager from a Zhodani fighter.
-4	A prototype hull breach patch.
-3	Precise performance specifications on Jump Drives.
-2	Secret bulletin on naval patrols in <Subsector>.
-1	An item stock number not in the central catalog.
0	Co-ordinates of a rogue world in deep space.
+1	Images of atrocities committed on <World>
+2	An Aslan warrior's personal dagger.
+3	A Vargr officer's uniform cap.
+4	A captured corsair banner.
+5	The navigation module from a Zhodani frigate.

08 Soldier

Flux	Description
-5	After Action Report for the <Battle>.
-4	Contingency plan for an invasion of <World>
-3	Strange Zhodani automatic pistol.
-2	An anti-matter artifact (in a magnetic capsule).
-1	Co-ordinates on an unexplored world.
0	The location of a fabled lost temple on <World>.
+1	A seawater-stained shirt flecked with gold.
+2	The co-ordinates of a ruined Tech-Z world.
+3	A strange surly self-aware computer.
+4	A chip with a programmable virus.
+5	A combat drug that restores Sanity.

09 Rogue

Flux	Description
-5	A Human DNA sample and personality scan.
-4	A subliminal effect image.
-3	Images of a secret Imperial starship.
-2	A marketing plan for a recreational fad.
-1	A 10,000 share certificate for a corporation.
0	A small rock with strange engraved markings.
+1	An antique bracelet dating from the Long Night.
+2	Fourteen copies of a real estate report on <World>.
+3	The master password to a data backup facility.
+4	The location of a secret Nuclear Weapons depot.
+5	Time and place co-ordinates several years from now.

10 Agent

Flux	Description
-5	A deck plan map of the Duke's yacht.
-4	Lock schematic for the vault at the Bank of <World>.
-3	The co-ordinates of a "graveyard of lost ships."
-2	A complete set of false identity papers.
-1	A J-Drive-crippling 4D virus.
0	A memo filled with account numbers.
+1	The script for a potential hit play.
+2	Blueprints for an experimental navigation system.
+3	The password to an account at the Bank of <World>.
+4	StdDGR-16 Standard Disposable Gauss Rifle -16
+5	A shipyard priority building code.

11 Noble

Flux	Description
-5	A dossier on the Baron of <World>.
-4	A false patent of nobility for the Baron of <World>.
-3	A high priority code for Army procurement.
-2	Plans for a starport upgrade at <World>.
-1	A formula for a potent chemical weapon.
0	An heirloom set of goblets from the First Imperium.
+1	A crudely drawn map labeled <World>.
+2	A detailed family tree for the Marquis of <World>.
+3	A 4D virus.
+4	A bio-sample marked <World> Anagathic?
+5	Sophont skull tagged <World> 430k years?

12 Marines

Flux	Description
-5	A Marine dress dagger with a secret compartment.
-4	Fusion-Gun Specification Manual stamped "Secret".
-3	A battle language dictionary.
-2	Evidence of battlefield atrocities.
-1	A controller for a Cutter.
0	Personnel directory of Star Marine Detachment 501.
+1	A wafer with Fighting-12.
+2	The location of an abandoned Rule of Man depot.
+3	Location of a First Empire Senior Dreadnought.
+4	An unusual bio-scanner.
+5	A Zhodani combat banner.

Record and preserve the details of a Human character using this Character Card T5-001.

CHARACTER CARD				UPP		Str	Dex	Edu	Int	Edu	Soc
Name											
Breathes			Gender		Birthdate		Birthworld				
Service Experience						Homeworld					
Career Experience					Personal Equipment			Term01			
								Term02			
								Term03			
Characteristics SDEIES		Senses VHST		Skills				Term04			
C1 Str 2D=		Energy Vision V-16-RGB						Term05			
C2 Dex 2D=		Vibration Hearing H-16-9382						Term06			
C3 End 2D=		Volatiles Smell S-16-3						Term07			
C4 Int 2D=		Contact Touch T-16-3						Term08			
C5 Edu 2D=		Aware Aware String						Term09			
C6 Soc 2D=		Percept Percept String						Term10			

Human

T5-001

CHARACTER CARD (Back)				DNA=		Str	Dex	Edu	Int	Edu	Soc																																	
Sophont Descriptor																																												
Education or Training			Physical Aging		Mental Aging																																							
			Overview HBS-T-AN-LN-N																																									
<table border="1"> <tr><td>Sound</td><td>Certifications</td></tr> <tr><td>G</td><td></td></tr> <tr><td>F</td><td></td></tr> <tr><td>E</td><td></td></tr> <tr><td>D</td><td></td></tr> <tr><td><<C</td><td></td></tr> <tr><td><<B</td><td></td></tr> <tr><td><<A</td><td></td></tr> <tr><td><<9</td><td></td></tr> <tr><td><<8</td><td></td></tr> <tr><td><<7</td><td></td></tr> <tr><td><<6</td><td></td></tr> <tr><td>5</td><td></td></tr> <tr><td>4</td><td></td></tr> <tr><td>3</td><td></td></tr> <tr><td>2</td><td></td></tr> </table>			Sound	Certifications	G		F		E		D		<<C		<<B		<<A		<<9		<<8		<<7		<<6		5		4		3		2		Symmetry Bilateral									
			Sound	Certifications																																								
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4																																												
3																																												
2																																												
Head-Brain-Senses										San																																		
Torso										Light																																		
Limbgroup1 Arms with Hands										D																																		
Limbgroup2 none										U																																		
Limbgroup3 Legs										S																																		
Limbgroup4 none										P																																		
Tail										B >>																																		
None										G >>																																		
Skeleton										R >>																																		
Bony Interior										C																																		
Skin			Fluids			Species Scent																																						
Skin			Blood			HUM-																																						
						Organic																																						
						Int=		Edu=																																				
										I																																		
										F																																		
										X																																		

Human

T5-001

Record and preserve the details of a non-Human character using this Character Card T5-002.

CHARACTER CARD			UPP			Str	C2	C3	Int	C5	C6	
Name												
Breathes		Gender	Birthdate		Birthworld							
Service Experience					Homeworld							
Career Experience				Personal Equipment				Term01				
								Term02				
								Term03				
Characteristics		Senses		Skills				Term04				
C1 Str Str D=		Energy Vision String						Term05				
C2 Dex Agi Gra D=		Vibration Hearing String						Term06				
C3 End Sta Vig D=		Volatiles Smell String						Term07				
C4 Int Int D=		Contact Touch String						Term08				
C5 Edu Tra Ins D=		Aware Aware String						Term09				
C6 Soc Cha Cas D=		Percept Percept String						Term10				

Non-Human

T5-002

CHARACTER CARD (Back)			[] NA=			Str	C2	C3	Int	C5	C6	
Sophont Descriptor												
Education or Training		Physical Aging		Mental Aging								
		Overview										
		Symmetry										
Sound G F E D C B A 9 8 7 6 5 4 3 2		Head								San		
		Torso								Light		
		Limbgroup1								D		
		Limbgroup2								U		
		Limbgroup3								S		
		Limbgroup4								P		
		Tail								B		
		Skeleton				Species Scent				G		
		Skin		Fluids		Organic				R		
										C		
								A				
								N				
								I				
								F				
								X				

Non-Human

T5-002

SHIP SHARES

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 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

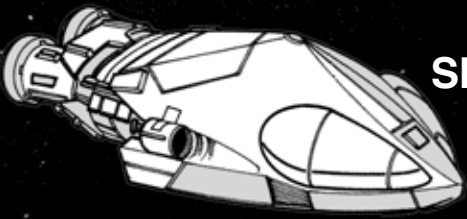


Corvette
any
ex-Navy
Officer **3**
Ship
Shares



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

FAME

Fame is the degree of recognition or respect which society in general (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.

Expressing Fame. Fame is stated in levels noted as Fame-<level>. A world famous entertainer has Fame-9. A Fame-9 entertainer probably has name recognition anywhere on the world on which he performs.

CALCULATING FAME

Current Fame for an individual is based on a variety of accomplishments

Armed Forces

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

* Enlisted has no Fame.

Nobles

Base Fame from Chargen

Other Sources

Scholar	=Rank	
Scholar	=Publications	
Scholar	Award Winning Pubs	x 3
Craftsman	Masterpieces	x 3
Scout	Discoveries	x 4
Merchant	=Rank	
Merchant	Ship Owner	= 1D
Agent	=Commendations	
Rogue	Successful Schemes	x 2
Rogue	Failed Schemes	x 3

If NO other eligibility, 1D

xN = N Fame points per occurrence.

For example, Rogue receives 3 points per Failed Scheme.

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 Bozeman seems to get wounded every term; after four terms, he has Wound Badge-4 (and a prosthetic eye).

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	System
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

The Fame Flux Event.

Any character may choose (once during Character Generation or after adventuring begins) to add Flux to Fame.

Fame

MEDALS

Risk and Reward Rolls for Soldiers, Spacers, or Marines determine receipt of medals. If the Reward Roll Succeeds, subtract the Reward Roll from the Controlling Characteristic (ignore any Mods) and consult the Medals Table.

XS	Exemplary Service
MCUF	Meritorious Conduct Under Fire.
MCG	Medal for Conspicuous Gallantry
SEH	Starburst for Extreme Heroism
SEH	with Diamonds

MEDALS TABLE

C-R	Medal Description
1	XS
2	XS
3	MCUF
4	MCUF
5	MCUF
6	MCG
7	MCG
8	SEH
9	SEH
10	*SEH*
11	*SEH*
12+	*SEH*

*C-R = the Controlling Characteristic (without Mods) minus the Reward Die Roll (for Soldier, Spacer, or Marines).

For example, Eneri Dinsha 777B77 currently has Strength as his Controlling Characteristic. In Character Generation, his Reward Die Roll is 3 C-R= 7-3 = 4. He receives an MCUF Medal.

COMMENDATIONS

Commendation is determined by the Risk and Reward Rolls for Agents.

If the Reward Roll Succeeds, the subtract Reward Roll from the Controlling Characteristic (ignore any Mods) and record the Commendation in the format shown on the Commendation Table.

<Service> Commendation-N

N= C-R = the Controlling Characteristic (without Mods) minus the Reward Die Roll (for Agents).

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 the character's job, his 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 provide specific advantages in use of the related skills and in acquiring experience.

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 stated as 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 (but are not required). 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.

Life Pursuit: Analyst

John Smith is an Analyst in his real world occupation and wants his character Eleri Dinsha to be an Analyst. The referee defines a Life Pursuit to meet the need.

Life Pursuit
Analyst [Skill]
[Skill]. Intelligence or Education. C+S=12.
In game terms, an Analyst gathers information over time and distills it into specific conclusions and recommendations.

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 requires $C+S=12+(3-1)=14$. 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.

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 that a character can succeed at specific tasks. Expressed in the format 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). The Trade skills are tested at Labor halls, the Sciences are tested at Universities, Military skills are tested at Army (or Mercenary) bases. Naval skills are tested at Navy bases.

The Tests. The standard tests for Certificates specify the Skill being tested and its associated Characteristic (specified by the Referee).

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 Experienced Certificate (Absolute 1 hr)
Staggering (5D) < Characteristic + Skill

Cautious. Since the "test" is probably time-limited, a character may not declare it Cautious.

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 Easy Flux Mod on Certificate Test

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 Astrogration?" Instead, he asks to see the character's Astrogration 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 Astrogrator 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 Astrogration 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, Astrogrator- 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).

Record and preserve the genetic details of any character using this Genetics Card T5-004.

1	GENETICS													
2	Family Name													
4	Individual Name			Gender			1FE	Individual Name			Gender			2MA
5	UPP Current	C1	C2	C3	C4	C5	C6	C1	C2	C3	C4	C5	C6	UPP Current
6	UPP Genetic													UPP Genetic
7	UPP Dominance													UPP Dominance
8	Individual Name			Gender			3NB	Individual Name			Gender			4
9	UPP Current	C1	C2	C3	C4	C5	C6	C1	C2	C3	C4	C5	C6	UPP Current
10	UPP Genetic													UPP Genetic
11	UPP Dominance													UPP Dominance
13	Individual Name			Gender			5	Individual Name			Gender			6
14	UPP Current	C1	C2	C3	C4	C5	C6	C1	C2	C3	C4	C5	C6	UPP Current
15	UPP Genetic													UPP Genetic
3	UPP Dominance													UPP Dominance

Genetics

T5-004

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.

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

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

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.

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 though mutation or geneering.

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, 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

GENETIC TERM EXAMPLES

	C1	C2	C3	C4	C5	C6
Genetic Profile=	S	D	E	I	E	S
DNA=	3	2	4	6	X	X
Die Rolls=	4	6	5	4	5+6	6+6
UPP=	7	8	9	A	B	C

This table shows 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 Cha

* Caste and Charisma may be Genetic or Non-Genetic.

(or may not) be genetic.

Education C5, Training C5, Social Standing C6, and Charisma C6 are not genetic.

If the character has Caste and it is marked 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 Eneri 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.

HUMAN AND ALIEN DNA

Gender	Genetic Component					
Solitaire	1NA	--	--	--	--	--
Dual	--	2NA	--	--	--	--
FMN*	--	2NA	--	--	--	--
EAB	--	--	3NA	--	--	--
Group**	1NA	2NA	3NA	4NA	5NA	6NA

* because the Neuter does not participate.

** dependent on the number of participating Genders.

The Genders are further detailed in Sophonts.

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 character 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. Some examples are shown below, and 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.

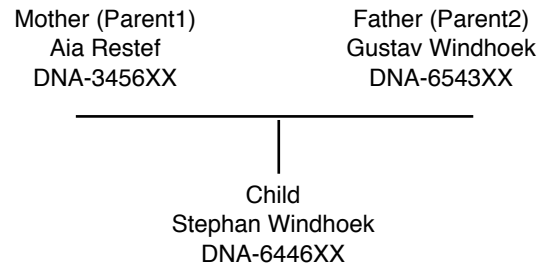
CREATING HUMAN OFFSPRING

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-6₂4₁4₂6₁XX (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. Thus, 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).

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 radi-

ation 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 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

HOW MANY OFFSPRING?

Flux	Genders					
	1	2	3	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	Multiple	Multiple
+2	Child	Child	Child	Multiple	Multiple	Multiple
+3	Child	Child	Multiple	Multiple	Multiple	Multiple
+4	Multiple	Multiple	Multiple	Multiple	Multiple	Multiple
+5	Many	Many	Many	Many	Many	Many

* All Genders, not participating Genders.

Litter= Good Flux. Multiple= 1D infant. Many= Hundreds.

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 characteristics for a species create the Genetic Profile. The human Genetic Profile is 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 interspecies fertility is chimera.

Interspecies fertility creates offspring which share some of the details of each species, including 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 Infection. Disease bacteria (and other microbes) 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). Bacteria can infect a species if they both have the same Genetic Profile. The result is a disease

for the victim organism. It follows that a species is usually immune to infection from a bacteria that does not share the same Genetic Profile.

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.

Viral Infection. A virus can infect a species if they both (the virus and the species) have the same Genetic Profile. Virus with an alien Genetic Profile cannot infect an organism.

INHERITANCE

Special 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.

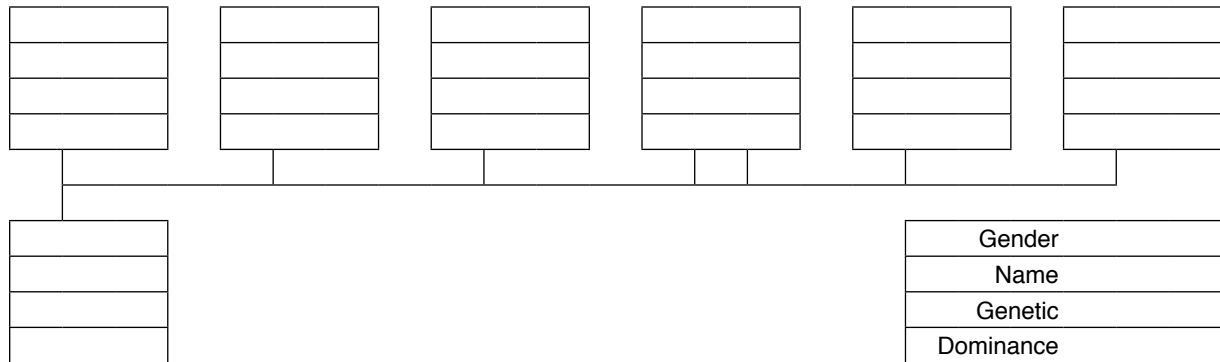
THE GENETIC PROFILES

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

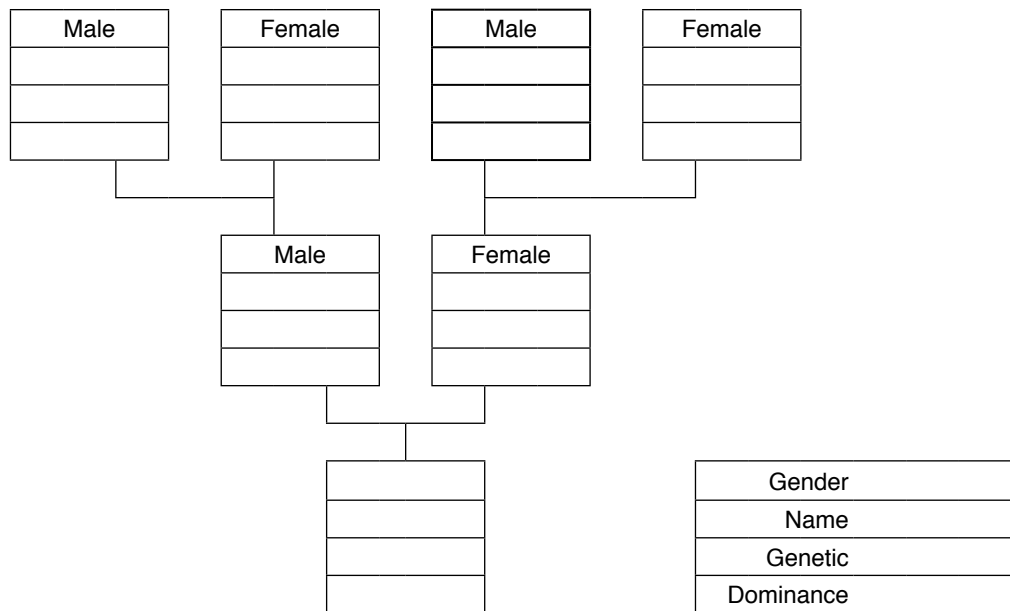
Solo	Gender Two	Gender Three	Gender Four	Gender Five	Gender-Six	Gender Alt One	Gender Alt Two	Gender Alt Three	Strange
Female	Male	Neuter	Egg Donor	Activator	Bearer	Gender Alt Four	Gender Alt Five	Gender Alt Six	Bizarre

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.

CREATING CLONES

A clone is a duplicate of an existing sophont (the pattern). Cloning duplicates the genetic values of the pattern and dice create the remainder of each characteristic.

For example, for a human pattern the Genetic Characteristics and their values are known (or can be determined). These values form the base for clone creation.

For each characteristic, the remaining dice are rolled normally. Non-genetic characteristics have a value of zero (for example, C5=Education or C5=Training).

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.

Natural Variation. A clone is not identical to its pattern. The natural variation added to the gene means that a final characteristic can be much different from the original's characteristics.

CREATING A CLONE

A human (or sophont) clone can be created from available information.

Required Information. SCC for humans (or sophont). UPP, skills, and knowledges for a specific human (or sophont). Genetic Profile for a specific human (or sophont).

Natural Clone

C1= DNA + 1D (or as required for the sophont).
C2= DNA + 1D (or as required for the sophont).
C3= DNA + 1D (or as required for the sophont).
C4= DNA + 1D (or as required for the sophont).
C5= 2D (or as required for the sophont).
C6= Soc = Parent. Cha or Cas generated per CharGen.

Gender= random.

Personality= new with this person.

Offspring Clone

C1= DNA + 1D (or as required for the sophont).
C2= DNA + 1D (or as required for the sophont).
C3= DNA + 1D (or as required for the sophont).
C4= DNA + 1D (or as required for the sophont).
C5= 2D (or as required for the sophont).
C6= Soc = Parent. Cha or Cas generated per CharGen.

Gender= the same as the original. Complex circumstances or geneering may allow gender to be different.

Personality= new with this person.

Relict

C1= DNA + 1D (or as required for the sophont).
C2= DNA + 1D (or as required for the sophont).
C3= DNA + 1D (or as required for the sophont).
C4= implanted from original.
C5= implanted from original.
C6= implanted from original.

Gender= is the same as the original.

Personality= implanted from original = C4 C5 C6.

The Relict has the same personality C4 C5 C6 as the original, including skills and knowledges. It has the same memories as the original, but only to the date of the personality recording.

If this relict were somehow released before being implanted with the original's personality, it would have

C4 Int = Genetic C4.

C5 Edu =0 or Tra =0 or Ins = Genetic Ins.

C6 Soc =0 or Cha =0 or Cas =0.

Guest

C1= DNA + 1D (or as required for the sophont).
C2= DNA + 1D (or as required for the sophont).
C3= DNA + 1D (or as required for the sophont).
C4= edited implant from original.
C5= edited implant from original.
C6= edited implant from original.

Gender= same as the original.

Personality= edited. It usually has the same personality C4 C5 C6 as the original, including skills and knowledges. Typically, memories have been removed.

Med Clone

C1= DNA + 1D (or as required for the sophont).
C2= DNA + 1D (or as required for the sophont).
C3= DNA + 1D (or as required for the sophont).
C4= 0
C5= 0
C6= 0

Gender= same as the original.

Personality= none (usually)

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.

Meds. 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 Dantionite 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 has 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 Eneri'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 liv-

ing 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.

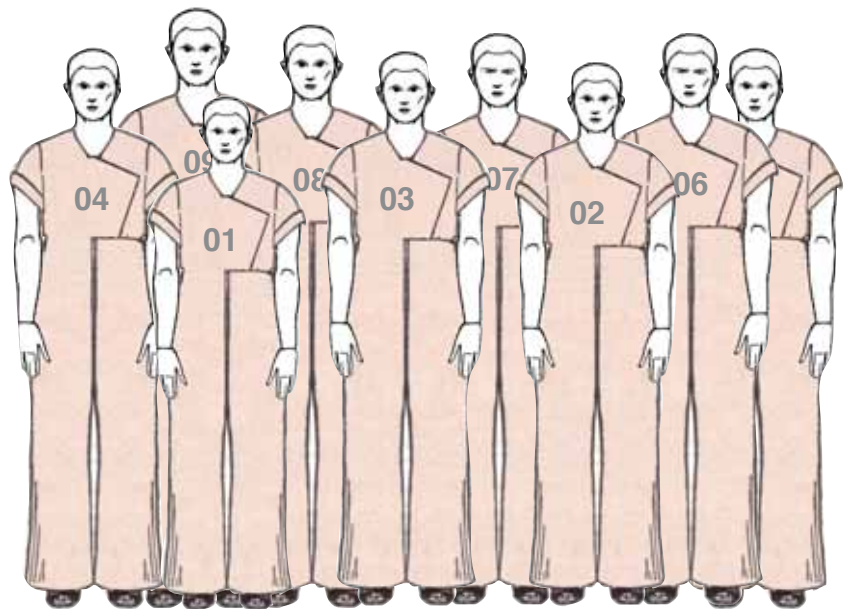
MEDS

(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 Stage 3 and then used to provide replacement parts.

THE NINE CLONES OF FILIS TEN

Who?	Filis = 777777 Genetic=3333XX
Clone01	444777 < minimum
Clone02	455777
Clone03	484777
Clone04	599777
Clone05	566777
Clone06	685777
Clone07	757777
Clone08	884777
Clone08	899777
Clone09	999777 <maximum

Nine randomly generated clones of Filis Ten (includes the minimum and maximum possible UPPs)



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 brain-scan 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 brain-scan 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 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.

THE TECHNOLOGY OF CLONING

	TL	Cloning
High	12	Personality Recording And Editing
Vhigh Tech	13	Cloning. Forced Growth. Wafer Technology
	14	Geneering.
	15	
Xhi	16	Artificial Intelligence

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.

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
 - 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

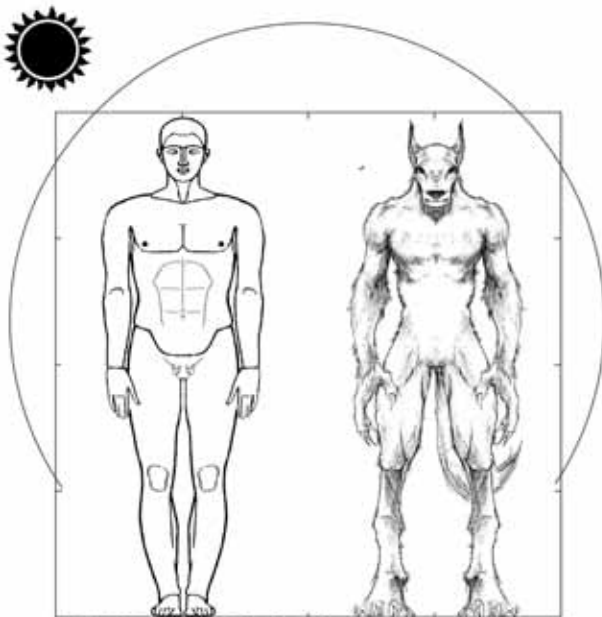
is the result of interspecies fertility producing offspring which share details of each species. Offspring may be non-viable or sterile. If viable and non-sterile, it breeds true with other viable, non-sterile individuals.

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, 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?

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 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 (human sophontoid) has the general human body structure, but makes use of a 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

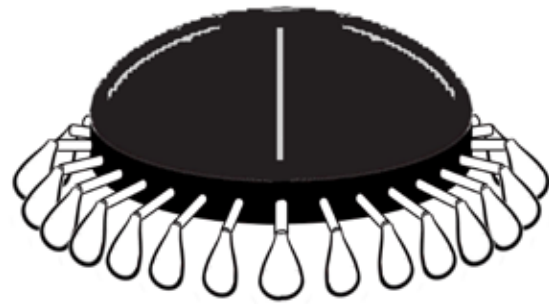
Semi-Organics can be injured in the same way as other biological beings can.

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. Sophontoids are manufactured. Various



HOW THEY BUILD SYNTHETICS

Naasirka Regina (a well-known synthetics manufacturer) has identified a market 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. A semi-organic body is designed 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 is designed to take nutrient from a nest fixture and to deposit waste in the pouch.

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).

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 basic education or training consisting of a total of 12 skill levels (for batch sophontoids) or 18 skills (for premium sophontoids) distributed across any number of skills and knowledges. Sophontoids which do not meet this level of quality or achievement are terminated as substandard (or sometimes sold as surplus, or 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.

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 a manufactured semi-organic brain.

Identifying Marks and Control Codes

Local law level and culture determine the markings and control codes for sophontoids.

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.

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. A human character rolls for C1 C2 C3 C4 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.

Batch-Produced Sophontoids

The factory routinely produces sophontoids in batches

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	

of about 100 based on market orders or perceived market needs.

Identify the market need for the sophontoid (for example, laborer, servant, soldier).

Determine the total number of dice rolled for characteristic C1 C2 C3 C4 for the sophont. Multiply that number by 3.5 for the total points available for characteristics. Distribute those points among the characteristics based on the market need.

Select one or more skills (based on market need) and allocate a total of 12 skill levels among those skills.

Determine the identifying markings and control codes for the batch and apply them to the sophontoids.

Premium Sophontoids

The factory produces high quality sophontoids in batches of about 10 based on specific orders.

Identify the market need for the sophontoid (for example, astrogator, librarian, bodyguard).

Determine the total number of dice rolled for characteristic C1 C2 C3 C4 for the sophont. Multiply that number by 3.5 and add 10 for the total points available for characteristics. Distribute those points among the characteristics based on the market need.

Select one or more skills (based on market need) and

allocate a total of 18 skill levels among those skills.

Determine the identifying markings and control codes for the batch and apply them to the sophontoids.

Randomly Encountered Sophontoids. Any randomly generated sophont can conceivably be a sophontoid.

Calculating Costs

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. So a sophontoid with Strength 8, Dexterity 8, Endurance 8, and Intelligence 5 has a base cost of $8 \times 8 \times 8 \times 5 = \text{MCr } 2.5$. A sophontoid with Strength 15, Dexterity 15, Stamina 15, and Intelligence 5 has a base cost of $15 \times 15 \times (15 \times 2) \times 5 = \text{MCr } 33.7!$

Raw Materials. The cost of raw materials is 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's added on to the base cost.

SOPHONTOID COST

$$\text{KCr} = \text{C1} * \text{C2} * \text{C3} * \text{C4}$$

Use Agi /2, Vig /2
 Gra /2 Sta *2

The 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 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.

DICE TABLES FOR TASKS

Title	Task Difficulty or Purpose	Abbreviation
1D	Easy	EAS
2D	Average	AVE
+D - D	Flux	Flux
3D	Difficult	DIF
4D	Formidable	FOR
5D	Staggering	STA
6D	Hopeless	HOP
7D	Impossible	IMP
8D	Beyond Impossible	BEY
9D	Hasty Beyond Impossible	Hasty BEY
10D	Double Hasty Beyond Impossible	2Hasty BEY
C+S	Characteristic Plus Skill	C+S
Char	Select Random Characteristic	
Special	Various Special Throws	
0-9, 1-9	Random Numbers 0-9, 1-9	
Many	Many Dice (more than 10)	
Flux	Standard, Good Flux, and Bad Flux	

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 stated in the text of published adventures; they may be provided in the game rules; sometimes they may need to be defined by the referee.

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.

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.

Duration. Duration may be included where the time element is important (such as deadlines or inexorable circumstances).

Special Results. Results of tasks may result in 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

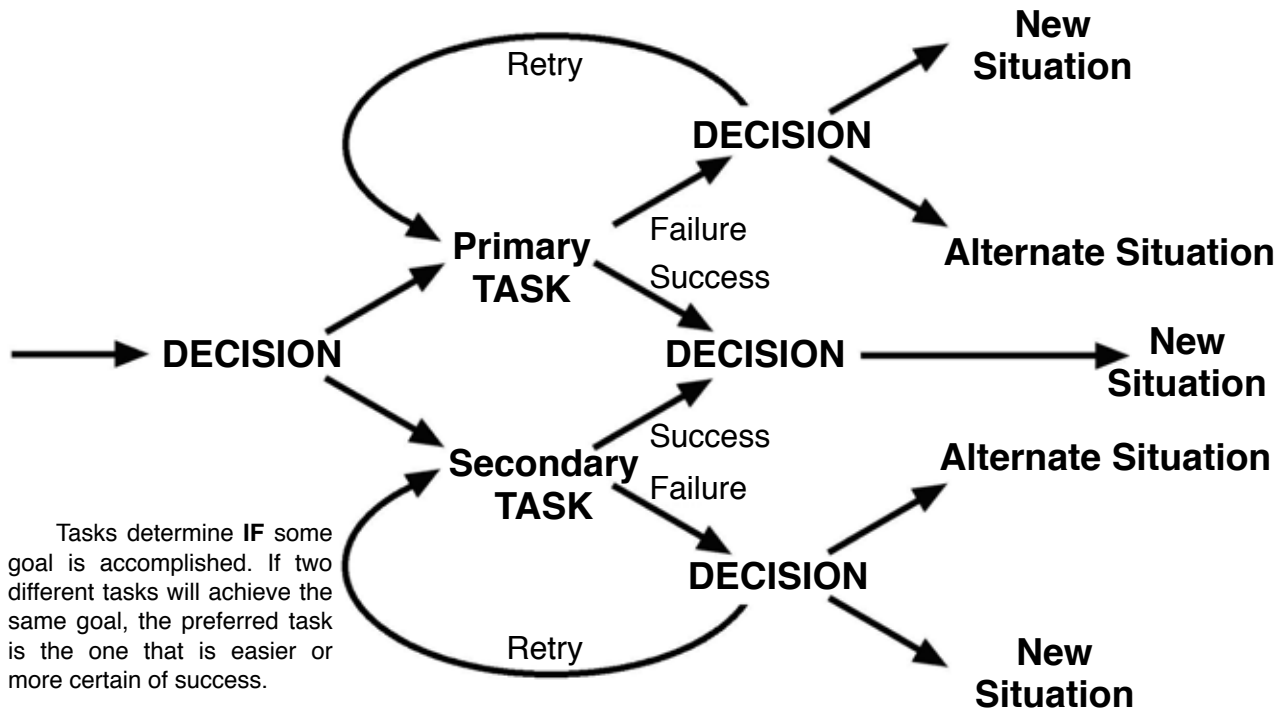
Arcane Tasks akin to tricks or special knowledge,

Uncertain Tasks in which the exact outcome of the task remains in doubt, and

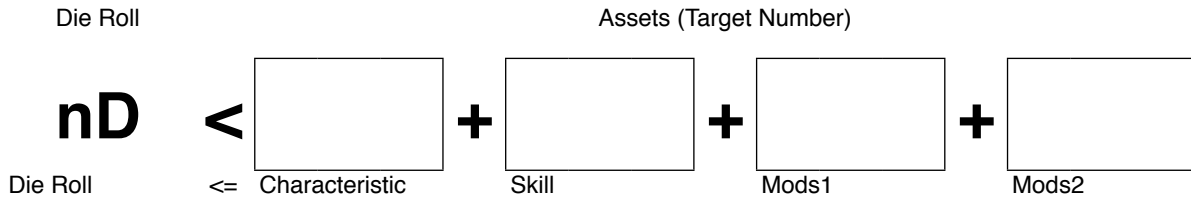
Tests and Certifications reflecting academic or aptitude tests of proficiency.

Special Circumstances such as divided attention or multi-tasking, and consequences.

THE TASK CYCLE



THE TASK FORMAT



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.

UNIVERSAL TASK FORMAT

Task Phrase:
To accomplish an important activity (duration).

- Task Statement:**
- Difficulty (nD) < Assets
 - Difficulty (nD) < Char
 - Difficulty (nD) < Char +Mods1
 - Difficulty (nD) < Char +Mods1 +Mods2
 - Difficulty (nD) < +Skill
 - Difficulty (nD) < +Skill +Mods1
 - Difficulty (nD) < +Skill +Mods1 +Mods2
 - Difficulty (nD) < Char +Skill
 - Difficulty (nD) < Char +Skill +Mods1
 - Difficulty (nD) < Char +Skill +Mods1 +Mods2

TASK DIFFICULTIES

	Difficulty Level	Dice	Hasty	Cautious
Eas	Easy	*		
Eas	Easy (default skill-0)	1D	2D	1D
Ave	Average	2D	3D	1D
Dif	Difficult	3D	4D	2D
For	Formidable	4D	5D	3D
Sta	Staggering	5D	6D	4D
Hop	Hopeless	6D	7D	5D
Imp	Impossible	7D	8D	6D
Bey	Beyond Impossible	8D	9D	7D

Difficulty levels may be increased in Hasty or decreased in Cautious tasks.

* Usually automatic.

Task Comments:
appropriate comments about the task.

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 incor-

poration 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

When a task is necessary, the referee tells the players the required skill and characteristic and difficulty level. The players (those whose characters are present in the specific situation) discuss who will attempt the task. The player behind the character identifies the skill and characteristic levels, 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, Eleri 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

THE MASTER MODS TABLE

A compilation of commonly used Mods and their associated terms is provided to help in standardizing the Mods that player expect.

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.

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.

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

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 Electronics-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 (al-

ways =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.



To Force Open A Stuck Hatch
Average (2D) < Str
No Skill Involved.

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.

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 compo-

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.

nents. 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 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 (for example, roll two extra dice against FN in fighting situations).

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 de-

creased difficulty (there is no Extra Cautious provision).

Uncertainty (detailed later in this chapter) 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 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 +Conceal

Cooperative (3 Conceal).

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 opposition 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 brawl.

Difficult (3D) < Str +Brawling

Opposed (up to 4). Resolves the brawl in one task.

All losers receive 2D hits. The winner is unscathed.

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 2D 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 + Brawling

Opposed (up to 6). Resolves one round of the brawl.

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 low 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 performed as Cautious, the number of Uncertain dice does not change.

Arcane Tasks

An Arcane task may be attempted only by the owner of

the specific task. 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.

An Arcane task represents an ability (or a potential ability) to do a specific, special act not easily 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.

An Arcane task is a trick, a special procedure, or a process not generally available to other characters.

For example, jump drives of most starships spend a variable time in jump (generally between 150 and 185 hours). The Engineer on a Beowulf-class Free Trader 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.

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) < (Skill + Characteristic)
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.

Many tools are assumed in the course of describing the task... weapons, levers, screw drivers. Strange tools, or situ-

ations where tools may not be present should be addressed in the comments line.

SPECTACULAR RESULTS

Sometimes the results of a task are Spectacular: the outcome is more than "You succeed." Or "You fail." Spectacular may be positive or negative.

A spectacular result implies three things:

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.

Spectacular Success

A task result may be almost perfect. Spectacular Success 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 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 six-limbed 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 (which makes it succeed, 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 ev-

ery 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

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.

(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 simple and straightforward.

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 modifiers 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 usually 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 retains (and must always be aware of) a responsibility to 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

A task rationally considers the probability that a character can successfully undertake some action. That probability depends 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 that the task will be successful.

For example, the interaction of skill and characteristic in a Difficult (3D) task which requires 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 increases the chance of accomplishing the task to 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.

Using A Default Skill. The skill involved 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. Although skills can be

received in a variety of ways, one level of skill represents roughly one year of training or experience. A person with Skill-1 has received about one year of exposure to and use of the skill. A person with Skill-8 has about eight years of such exposure. How much has actually been learned or is usable depends on the specific situation, the task being resolved, and on the associated characteristic.

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

The ultimate purpose of tasks is to determine if characters can be successful in accomplishing activities that they believe are necessary to their plans. When tasks fail, or when they fail repeatedly, the characters (and the players behind them) must search in role-playing fashion for tasks at which they can succeed.

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 Actions

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.**

Immediate Action

Immediate Action is the trained automatic response to a problem, without regard to diagnosis or probable cause.

Soldiers, mechanics, technicians, and clerks all respond to an equipment malfunction by performing Immediate Action.

When a weapon, device or component fails or malfunctions, identify the appropriate skill and

Check Skill (2D)

Success makes the severity of the malfunction or damage Easy 1D and the device remains operable.

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 the 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 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 ($Dex\ 7 + Small\ Craft-3 = 10$, 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 a 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 an advantage in the ensuing dogfight.

Three begins maneuvering ($Dex-3 + Small\ Craft\ -3 = 6$; he rolls 7 and fails. His opponent with $Dex-7 + Small\ Craft-3 = 10$ rolls 7 and 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 ($Dex\ 11 + Small\ Craft-3 = 14$; 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 ($Dex\ 11 + Small\ Craft-3 = 14$; 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, and Personals	Many Knowledges		
35 Skills	7 Starship Skills	Default Skills	Animals	Heavy Weapons	
		Admin	Rider	Artillery	
		Advocate	Artist	Teamster	Launcher
		Animals	Athlete	Trainer	Ordnance
		Athlete	Author		WMD
		Broker	Comms	Driver	
		Broaucrat	Computer	ACV	Pilot
	Comms	Driver	Automotive	Small Craft	
	Computer	Fighter	Grav	Spacecraft ACS	
	Counsellor	Turrets	Legged	Spacecraft BCS	
	Designer	Mechanic	Mole		
	Diplomat	Steward	Tracked	Seafarer	
	Driver	Vacc Suit	Wheeled	Aquanautics	
	Explosives			Grav	
	Fleet Tactics	Talents	Engineer	Boat	
	Flyer	Compute	Jump Drives	Ship	
	Forensics	Empath	Life Support	Sub	
	Gambler	Hibernate	Maneuver Drive		
	High-G	Hypno	Power Systems	The Sciences	
	Hostile Environ	Intuition		Archeology	
JOT	Math	Fighter	Biology		
Language	MemAware	Battle Dress	Chemistry		
Leader	Memorize	Beams	History		
Liaison	MemPercept	Blades	Linguistics		
Naval Architect	MemScent	Exotics	Philosophy		
Seafarer	SemSight	Slug Throwers	Physics		
Stealth	MemSound	Sprays	Planetology		
Strategy	Morph	Unarmed	Psonianology		
Streetwise	Rage		Psychohistory		
Survey	SoundMimic	Flyer	Psychology		
Survival		Aeronautics	Robotics		
Tactics	Personals	Flapper	Sophontology		
Teacher	Carouse	Grav			
Trader	Query	LTA	Specialized		
Vacc Suit	Persuade	Rotor	Career: Academia		
Zero-G	Command	Winged	Career: Army		
			Career: Navy		
	Intuitions	Gunner	Career: <Name>		
	Curiosity	Bay Weapons	World: Capital		
	Insight	Ortillery	World: Regina		
	Luck	Screens	World: <Name>		
		Spines	[others are possible]		
		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 presents all available skills in one chart.

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, 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.





Weapons Skills

A variety of weapon and combat skills are included in this chapter. The information presented in this chapter deals primarily with the skills in areas other than combat.

The details of personal combat are covered in Fighting.
The details of space combat are in Space Combat.

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, an individual with an appropriate skill is experienced in the repair and maintenance of specific devices, and he understands the basic principles of the devices. 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 Burris 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 the instrument. On the TL-9 vehicle, the manuals would tell him the appropriate diagnostic codes which would self-repair the instrument. The value in his skill, independent of tech level, lies in 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, Pilot, Seafarer).

Acquisition of these skills (except Language as explained in that entry) follows a standard pattern: the character initially learns a subset of the skill, and only later expands this understanding to the full skill (see Language).

The first two times a character receives one of these

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

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.

If a character receives a Knowledge directly (perhaps in an ANM School) he increases that Knowledge, but not the corresponding 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 he 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 (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.

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.

Knowledges may be reduced by circumstance, but once acquired, it can never be reduced to less than 0.

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 (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 (7 terms) with Knowledge Egareva-6. After a lifetime of adventuring, Dinsha retired to Egareva at age 62. He finds his knowledge of his homeworld (6 minus 8 =) Egareva-0 is severely out of date.

The Sciences. Some characters can learn a specific Science through the Education process (maximum =6).

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 skills. An Engineer with Drives-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). 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.

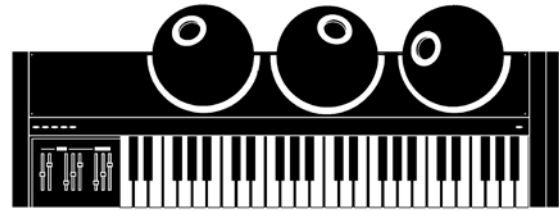
The Personals

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 Instruments

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 directly to issuing direct orders, paraphrased as "I Require You To Do X." Its goal is a specific 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 in the current session and cannot be accumulated.

Curiosity relates to the serendipitous acquisition of information.

Insight relates to the processing of information.

Luck relates to forcing favorable outcomes.

MODIFICATIONS (MODS)

The charts include more than 30 columns of Mods (from -5 to +5) addressing a wide variety of situations. When Mods are required, the Referee may consult the tables and impose one or two of them, as dictated by the current situation.



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 related to Bureaucrat and Leader. 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.

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 is able to provide reasonable advice to others 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

Actor, Admin, Advocate, Animals

others, primarily in a legalistic setting. Counsellor typically provides assistance in personal or interpersonal matters.

ANIMALS

Animals is skill in working with animals: to 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 Rider, Teamster, and Trainer.

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 which serve as beasts of burden, whether as 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.
Difficult (3D) < Tra + Trainer
The animal accepts the trainer as its master. It will en-

gauge 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 plus one level at year end. 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 used as a skill.

Notice that Trainer is the equivalent of Educator 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 Animal Tamer). Animals is a relatively one-way communication

between the character and the subject.

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.

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

Art Forgery

Art forgery is a deliberate copy of an existing work, or a 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).

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 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 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 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)

Animals, Artist, Astrogator

The dice for difficulty of the interstellar jump calculation equals the distance in parsecs (Jump-1 difficulty is 1D; Jump-6 Difficulty is 6D).

To manually confirm jump-1 calculations (24 hours).
Average (2D) < Edu + Astrogator
Uncertain (1D).

To manually confirm jump-5 calculations (24 hours).
Hopeless (6D) < Edu + Astrogator
Uncertain (1D).

Math (the Talent) is a Mod on Astrogation tasks.

The difficulty of manually confirming the jump calculation is one level higher than the automated calculation difficulty.

For example, Ank Dinsha 888888 Astrogation-3 is plotting out his ship's jump to the next system two parsecs away. Jump-2 makes it an Average 2D task; it has 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.

Astrogation calculations are based on Drive Potential (Jump Number in parsecs) and is the number of dice required for the task.

Fantastic drives all have performance based on Drive Potential. For example, when Astrogating a 30-parsec Hop, Drive Potential =3; the difficulty is Difficult (3D).

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.

Related Skills. Astrogator is space-based and involves charting courses for interplanetary and interstellar craft; it is a tedious and laborious undertaking, even when aided by computers and sensors. Navigator is concerned with direction finding and world surface travel. Survey is world-based, and involves understanding observing and identifying obvious and unobvious details of the terrain.

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. The individual knows 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: developing 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 help improve a character's chance of success at various physical activities.

Ordinary Physical Barriers. Barriers are expressed qualitatively (low, high, very high) rather than quantitatively (1 meter high, 2 meters high). The qualitative description produces a Mod which makes the task more difficult.

Qualitative Mods for Height or Width are provided in the Mods table in Tasks.

To vault a wall
Average (2D) < Str + Athlete

To vault a Very High wall
Average (2D) < Str + Athlete
Must include the Very High Mod.

Eneri Dinsha (777777 Athlete-0), running from a squad of enforcers, comes upon a 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 to succeed. He rolls 5 and clears the fence.

He immediately encounters a second Very High fence, higher than the first, and he is no longer running. He needs to roll (Str = 7 plus no Mod for Running plus Very High = -3) = 4 or less to succeed.

To leap a trench
Average (2D) < Str + Athlete

To leap Very Wide trench
Average (2D) < Str + Athlete
Must include the Very Wide Mod.

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.

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 Flux and ranges from -5 Derivative to +5 Truly Inspired.

An ordinary person can roll for an Idea once every quarter. An Author can roll for an idea once per week.

Ideas are provided in the Mods table in Tasks.

To write a novel (one year).
Formidable (4D) < Int + Author + Idea + Mod2

To write a newspaper article (several hours)
Difficult (3D) < Int + Author + Idea + Mod2

To write an advertisement (an hour)
Average (2D) < Int + Author + Idea + Mod2

Author is about creating (entertaining) stories.

Author Tasks. Author tasks benefit from information available in the mind of the writer.

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 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 adequate components are available 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, Magnetism, 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 trade 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.

Athlete, Author, Biologics, Broker, Bureaucrat

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.

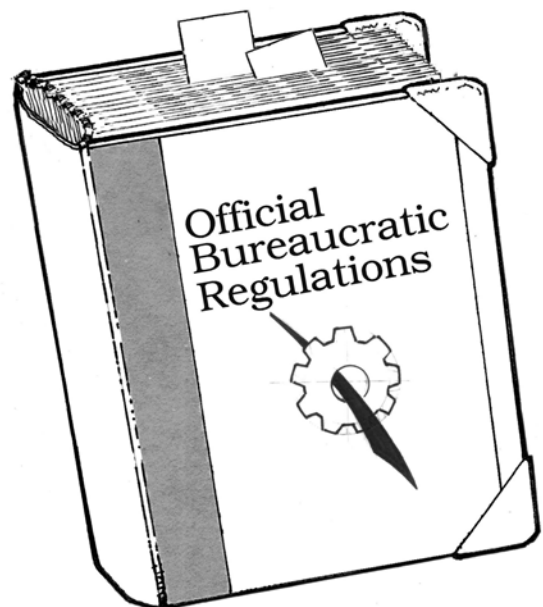
BUREAUCRAT

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 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. Admin is related to Bureaucrat and Leader. 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.

CHEF

Chef (Cook, Shugili, Food Artist, and Osmancer) is the ability in the culinary arts.

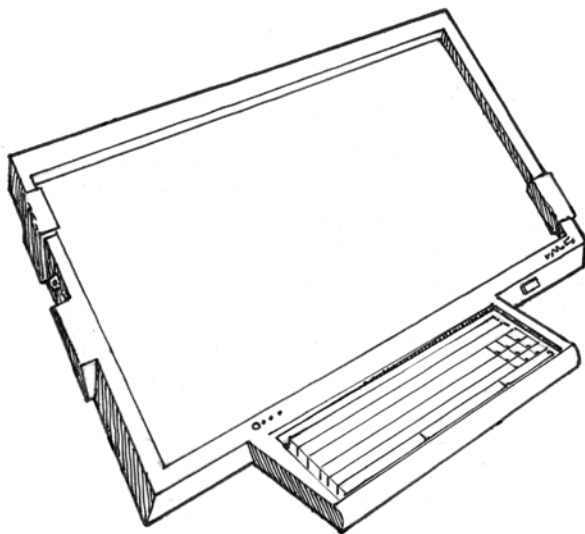
Chef is expertise in food preparation, including the ability to conceive and create tastes and smells for a variety of audiences.

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 and 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.

To retrieve a specific file
Difficult (3D) < Int + Computer

Bureaucrat, Chef, Comms, Computer, Counsellor

Computer skill is about information processing: information capture, manipulation, storage, and retrieval.

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.

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 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. 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.

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) < Ins + 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. An individual with Craftsman can use it to 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 is building a crossbow; she has

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. The 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 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.

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 5% 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.

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.

EVALUATING QREBS

	Difficulty	Char	Skill
Q Quality	3D	C5	Craftsman or Trader
R Reliability	4D	Ins	Craftsman or Trader
E Ease of Use	2D	C2	Craftsman or Trader
B Burden	2D	Str	Craftsman or Trader
S Safety	2D	Int	Craftsman or Trader

Dance styles vary across the universe. For obscure styles, the task needs to reflect its distance from the current territory.

To identify a dance by ethnic or regional origin
Hopeless (6D) < Edu + Dancer + (Dance) Fame
Dancer is optional 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 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 (which 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

Counsellor, Craftsman Dancer, Designer, Diplomat

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 involves 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 in **Traveller** situations, 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 each organization for future use. This DH 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).

The Diplomacy Handbook represents established policy constraints imposed by functionaries in the upper levels of the Diplomatic Service (and ultimately governmental rulers). If the Mod it produces is negative, the DH is often called hidebound and conservative; if the Mod is positive, the DH is considered 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, but is

VEHICLE TYPES

ACV. Air Cushion Vehicle. Hovercraft.
Legged. Walker.
Mole.
Tracked. Treaded.
Wheeled. Off Road Wheeled. Road Only Wheeled.
Grav. Lifter.

handicapped by the Diplomatic Corps' DH -4 (and its unusually restrictive set of regulations). She, however, is able to work behind the scenes for an exchange of favors with the other side (Admin-2, Bureaucracy-3 as Mods), essentially countering the negatives of the DH.

Related Skills. Liaison and Diplomat are related skills. Liaison is skill in informal coordination of relationships between different cultures or organizations. Diplomat is skill in formal negotiation between governments or large 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.

Knowledge is the Basis of Driver Skill. The first two times a character receives Driver (typically in character generation), he instead acquires one of the Skill's contained Knowledges.

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.

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.

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.

Characters with Driver are qualified to operate most ground vehicles.

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 operation.

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 electronics 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.

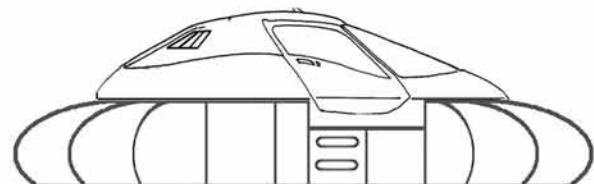
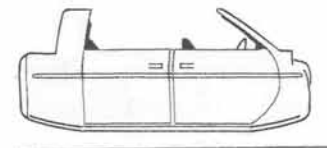
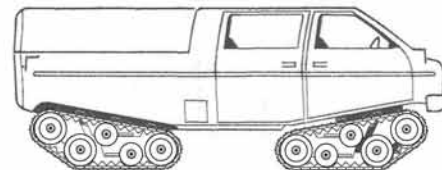
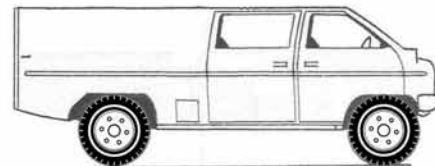
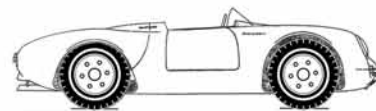
Characters with Engineer are capable of proper operation, adjustment, and maintenance of starship maneuver drives, jump drives, and power systems. The person who does this work is called an Engineer (if an officer) or Drive Hand (if not an officer).

Some ships and craft are small enough that they do not require an Engineer. In such cases, the drives are auto-

Diplomat, Driver Electronics, Engineer

mated. Although those ships' operation does not require an Engineer (or Drive Hand) to be always present, the services of an Engineer are necessary for maintenance and overhaul.

Governing Characteristics. Engineering is divided into four distinct areas: Maneuver Drives (M-Drives and G-Drives), Jump Drives (J-Drives), and Power Plants (P-Plants), and Life Support.



The governing characteristic for Engineering depends on the component being serviced.

Maneuver Drives	Int
Jump Drives	Edu
Power Plants	Str
Life Support	Dex

Drive Operation Tasks. 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

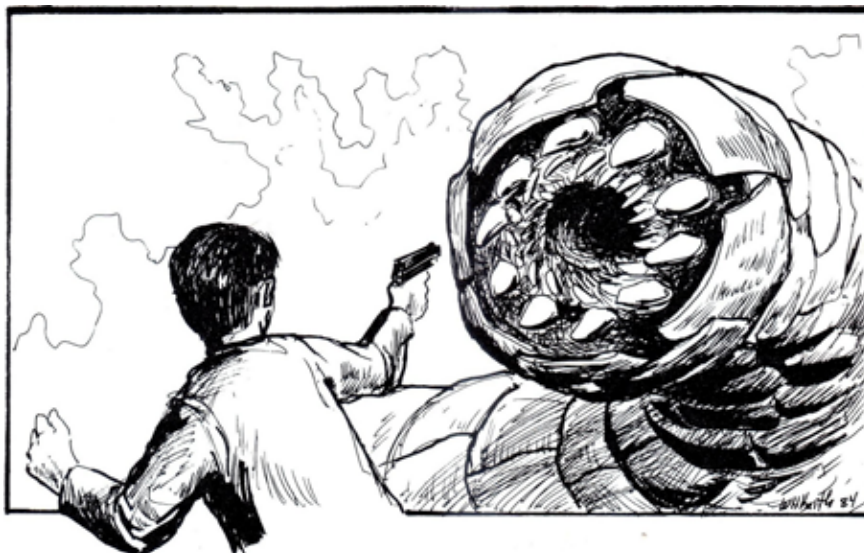
Diagnosis and Repair. The individual's skill and experience allows him to reach basic conclusions about drives, their function, and whether it is functioning properly (or if not, the probable cause of the fault). The individual can attempt to repair engineering equipment which he has previously diagnosed 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 (also called Fighting) is skill in conflict resolution through violence.

Characters with Fighting 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.

Fighting 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 Fighting-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.

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 weap-

ons 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. 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.

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 a familiarity with sophisticated tools of Fluidics and how to use them 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.

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 is skill in the operation of flying craft. It includes

Engineer, Explosives Fighter, Fleet Tactics, Fluidics, Flyer

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.

Types of Flyers

The use of Flyer skill requires knowledge on a specific type.

Flapper. Ornithopter. Aircraft which fly making use of 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 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.

AIRCRAFT TYPES

Flapper. Ornithopter.

LTA. Lighter-Than-Air. Dirigible. Blimp. Airship.

Rotor. Rotary Wing. Helicopter.

Wing. Fixed Wing. Plane.

Grav. Lifter.

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).

FORENSICS

Forensics (Forensic Science, Investigation) 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

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 scout-

ing 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. The task must be repeated.

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). Game master shifts the fire and indicates if it hit or missed.

To call 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.

Situational Analysis. The individual is able to observe and analyze gambling games and evaluate them for their degree of risk and for their legitimacy.

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).

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.

Flyer, Forensics, Forward Observer Gambler, Gravitics

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 un-



skilled worked). The ten Trades are Biologics, Craftsman, Electronics, Fluidics, Gravitics, Magnetics, 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.

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. Essentially all characters have Turret-0.

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**. The weapons in a Turret 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: larger than Bay Weapons, but falling short of the power of Spines.

Screens are protective or defensive devices installed on a ship.

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. 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).

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

HEAVY WEAPONS TYPES

Artillery
Launchers
Ordnance
WMD

than those carried by a single person, and include Launchers, Artillery, Ordnance, and WMD (Weapons of Mass Destruction).

Heavy Weapons are usually used against tar-

gets 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.

Weapon Use. The individual can operate Heavy Weapons. The skill is used in personal combat.

Weapon Repair. Gun Combat skill is sufficient to allow basic repairs to weapons (primarily 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 any destructive or

WMD Weapons of Mass Destruction is any weapon intended to produce indiscriminate area killing or destructive effects. WMDs include biological and infectious agents, chemical and poison weapons, radiation, and nuclear weapons.

Soldier Skills. Heavy Weapons is one of the Soldier skills: Fighter, Forward Obs, Heavy Wpns, 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).

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.

GUNNERY TYPES

Bay Weapons
Ortillery
Screens
Spines
Turrets

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 functioning 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

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).

Native Language is Default Language. A character's native language in **Traveller** is, by default, 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.

Additional Languages. When Language is received, 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, with 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.

Recording Languages A Character Knows: Record this skill as Language (Specific). For example, Language (Spanish) or Language (Gonk).

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.

Gravitics, Gunner Heavy Weapons, Hi-G, Hostile Environ Language

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.

TYPICAL LANGUAGES

Language	Users	Description
!kee:	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 trade.
Gvegh	Vargr	The most commonly encountered Vargr language, spoken by most Vargr.
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.

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. High-G, Hostile Environment, 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 attempt 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. Admin is related to Bureaucrat and Leader. 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. Leader is the ability to express power without regard to position within an organization.

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 and Diplomat are related skills. Liaison is skill in informal coordination of 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, Magnetism, 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 difficult the treatment task is. **Diagnosis** details how difficult the task of defining the illness is.

Palliative Treatment. Until the Medic succeeds in Di-

Hostile Environment

Jack Of All Trades

Leader, Liaison

Magnetism, Mechanic, Medic

agnosis, 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.

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 ($= \text{roll } 1D = 3 =$) 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 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

TYPICAL MUSICAL INSTRUMENT TYPES

Guitar	Keyboard	Trumpet	Violin
Banjo	Piano	Trombone	Cello

Other instruments are also possible

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.

Knowledge Knowledge Skill. The first time a character receives Musician, he receives Knowledge-1 in a specific Musical Instrument and Musician-0. The second time, he receives Knowledge-1 in a specific Musical Instrument (or Knowledge-2 in the previous instrument) and Musician-0. The third time, he receives Musician-1.

All subsequent receipts of Musician can be taken as Musician 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 selected 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. Astrogator is space-based and involves

charting courses for interplanetary and interstellar craft; it is a tedious and laborious undertaking, even when aided by computers and sensors. Navigator is concerned with world surface travel. Survey is world-based, and involves understanding observing and identifying obvious and unobvious details of the terrain.

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.

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.

Medic, Musician Naval Architect, Navigator Photonics, Pilot, Polymers

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.

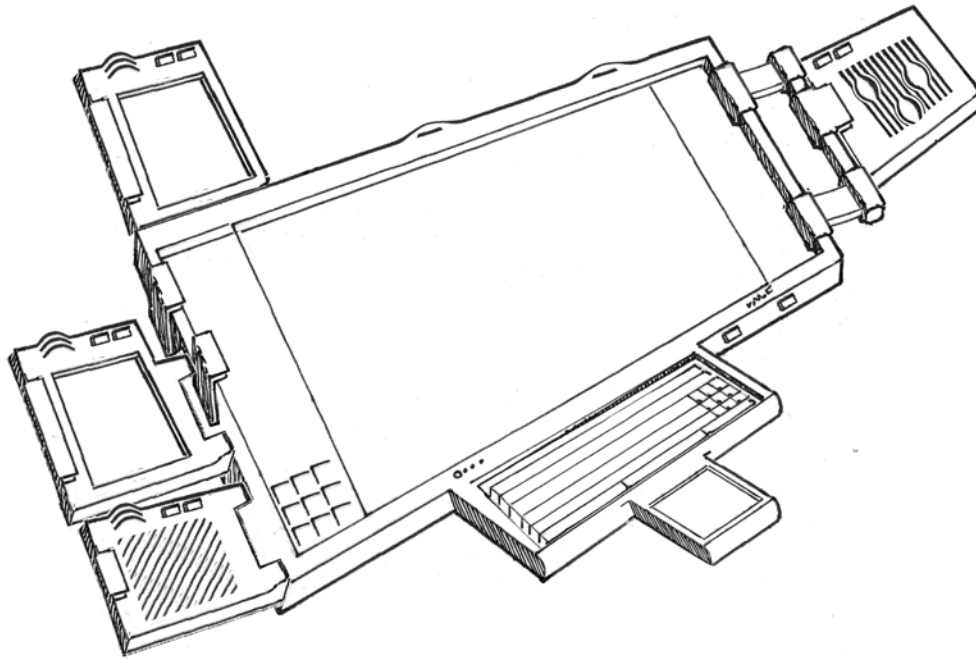
Diagnosis and Repair. The individual's skill and experience allows him to reach basic conclusions about Polymers equipment and whether it is functioning properly (or if not, the probable cause of the fault). The individual can attempt to repair Polymers equipment which he has previously diagnosed as malfunctioning.

Construction. The individual can assemble Polymers components into operating pieces of equipment (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. Chemistry and Polymers 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 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 with 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. 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.

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 ordillery.

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 ordillery.

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 tasks under combat conditions, including bridge-building, placing and clearing minefields, building defenses, and constructing roads and bases.

Soldier Skills. Sapper is one of the Soldier skills: Fighter, Forward Obs, Heavy Wpns, 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.

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.

WATERCRAFT TYPES

Boat.

Submarine. Submersible.

Ship.

Grav.

Ship. A large watercraft suitable for operation in oceans and seas, including the ocean or sea portion of shore ter-

Polymers, Programmer, Recon, Sapper, Seafarer, Sensors, Stealth

rain. 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.

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).

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 the needs of the employer.

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.

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 char-

acter 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. The character enters a World Hex and proceeds to populate 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 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 a Map of the Local Hexes in the Terrain Hex.

Related Skills. Astrogator is space-based and involves charting courses for interplanetary and interstellar craft; it is a tedious and laborious undertaking, even when aided by computers and sensors. Navigator is concerned with world surface travel. Survey is world-based, and involves understanding observing and identifying obvious and unobvious details of the terrain.

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

Stealthm Steward, Strategy Streetwise, Survey, Survival Tactics

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 in conflict situations.

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. 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.

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

EVALUATING QREBS

		Difficulty	Char	Skill
Q	Quality	3D	C5	Trader or Craftsman
R	Reliability	4D	Ins	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

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) < Ins + 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).

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. 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.

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 problem)
Average (2D) < Dex + Vacc Suit

To patch a vacc suit (major problem)
Difficult (3D) < Dex + Vacc Suit

Other Equipment. Vacc suit skill is also usable with res-

Tactics, Teacher, Trader

Vacc Suit

Zero-G

Immediate Action

The Trades

pirators, 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

IMMEDIATE ACTION

Immediate Action is the trained automatic response to a problem, without regard to diagnosis or probable cause.

Soldiers, mechanics, technicians, EMTs, and clerks all respond to an equipment malfunction by performing Immediate Action.

When a weapon, device or component fails or malfunctions, identify the appropriate skill and

Check Skill (2D)

Success makes the severity of the malfunction or damage Easy 1D and the device remains operable.

A result of 12 is automatic failure.

First Aid

Immediate Action as applied to injuries is First Aid. If successful, the process can avoid extensive Medical process of diagnosis and treatment.

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, Craftsman, 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 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

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.

Maneuver Drive (M-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

Power System is the Knowledge associated with the operation of fusion (and other) power generating plants.

Psionics 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 is the scientific study of 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 Knowl-

edge 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 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.

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).

The Knowledges

Sprays is the Knowledge associated with the use, maintenance, and repair of personal spray weapons.

Sub (Submarine, Submersible) 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) is the Knowledge associated with the operation of fixed wing aircraft.

WMD (Weapons of Mass Destruction) is the Knowledge associated with the targeting, operation, and maintenance of the Weapons of Mass Destruction.

World is the general Knowledge associated with <World>.



Which of these coins has value beyond its denomination?

The Duchess Margaret 25 credit piece?

The one-credit coin dated more than a thousand years ago?

The Bank of Sylea Cr10 issued the year Strephon assumed the Iridium Throne?

Or is it one of those coins underneath?

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>
Difficult (3D) < Int + Compute

To scan accounting documents to calculate values
Difficult (3D) < Int + Compute

Success and Failure. Success completes the task and provides the results. Failure halts the task half way through. The task can be restarted to complete the current text scanning.

Fatigue. Using Compute can be taxing. Check C3 after each task: failure advances C3 to its next stage (Optimal becomes Ordinary; Ordinary becomes tired; Tired becomes Sleepy).

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

COMPUTE: ACCURACY VERSUS SPEED

Difficulty	Speed	Errors	Search Size
1D Easy	1 sec	1 in 100,	3 pages
2D Average	1 min	1 in 100	9 pages
3D Difficult	2 min	1 in 1,000	27 pages
4D Formidable	3 min	1 in 10,000	81 pages
5D Staggering	5 min	1 in 100,000	243 pages

Speed = per page.

Errors = missed references or ignored values.

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.

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 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 user of Hypno may 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; each failure reduces Intuition by minus 1 (but to no less than 1); each success raises it +1 (but not to exceed its true value).

The Talents

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

Astrogation. Math is a Mod for Astrogator 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.

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 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.

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

MemPercept (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 (a violent storm).

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

Master Mods Tables

The Master Mods Tables provide quick, convenient inspiration to the Referee in search of information, potential choices, or basic task mods.

01 TYPICAL MODS

Flux	Environ	Touch	Sound	Smell	Light	Pain	Truth	Flux
-5	Frigid	Frigid	--	--	--	--	GAEWK *	-5
-4	Vcold	VCold	--	--	--	Numb	Unsettling	-4
-3	Cold	Cold	Faint	--	Dim	--	Obviously False	-3
-2	Chilly	Chilly	Whisper	Subliminal	Obscured	Normal	False	-2
-1	Cool	Cool	Soft	Subtle	Hazy	Normal	Not Quite	-1
0	Nice	Normal	Talking	Ordinary	Visible	Normal	Ordinary	0
+1	Warm	Warm	Loud	Fragrant	Bright	Discomfort	Good Enough	+1
+2	VWarm	VWarm	Shout	Pungent	VBright	Stinging	True	+2
+3	Hot	Hot	Cacaphony	--	UBright	Painful	Obviously True	+3
+4	Vhot	VHot	--	Overwhelming	Blinding	VPainful	Epiphany	+4
+5	Scalding	Scalding	--	--	Burning	Unbearable	Absolute Truth	+5

*GAEWK (Gawk!) Goes Against Everything We Know.

02 TYPICAL MODS

Flux	Visibility	Respect*	Attitude	Conformity	Imagination	Beauty	Flux
-5	Contact	Ignored	Unenthusiastic	Conformist	Idiotic	Repulsive	-5
-4	Reading	Utter Contempt	--	--	Foolish	Ugly	-4
-3	Talking	--	Unsupportive	--	VDull	VUnattractive	-3
-2	Vshort	Distaste	--	Collectivist	Dull	Unattractive	-2
-1	Short	--	Indifferent	--	Pedestrian	VPlain	-1
0	Visible	Peer	--	Balanced	Ordinary	Plain	0
+1	Medium	--	Interested	--	Sharp	Cute	+1
+2	Long	Acknowledgement	--	Individualist	Clever	Pretty	+2
+3	Vlong	Admiration	Supportive	--	VClever	VPretty	+3
+4	Distant	Absolute Respect	--	Egotist	Creative	Beautiful	+4
+5	Vdistant	Idolization	Enthusiastic	Narcissist	Genius	Stunning	+5

*= Soc1 minus Soc2

03 TYPICAL MODS

Flux	Walking	Driving	Highway	Vilani	NewSpeak	Anglic	Flux
-5	--	Stuck	Stuck	La Gasep	Worst*	Worst	-5
-4	--	--	--	Khiba	2+UnGood	Atrocious	-4
-3	--	Stop and Go	--	Dulamas	PlusUnGood	Very Bad	-3
-2	Crawl	VSlow	Creeping	Ga Gasep	Ungood	Worse	-2
-1	Stroll	Slow	Lagging	Gasep	HalfUnGood	Bad	-1
0	Walk	Drive	Cruise	Ligtar	--	Average	0
+1	Trot	Fast	Fast Lane	Kaar	HalfGood	Good	+1
+2	Run	VFast	Vfast Lane	Biilem	Good	Better	+2
+3	Sprint	Racing	Grid Control	Ga Kaar	PlusGood	Very Good	+3
+4	--	--	Speeding	Lamas	2+Good	Excellent	+4
+5	--	--	--	La Kaar	Best*	Best	+5

*Technically Ungrammatical

00 MASTER MODS INDEX

No.	Table	Table	Table	Table	Table	Table	Table	No.
1	Environ	Touch	Sound	Smell	Light	Pain	Truth	1
2	Visibility	Respect*	Attitude	Conformity	Imagination		Beauty	2
3	Walking	Driving	Highway	Comparatives:	Vilani	NewSpeak	Anglic	3
4	Gravity	Typical BR	Typical DH	Idea	Comm Environ	Logic	Weather	4
5	Rewards*	Speed	Speed	Encounter	Time In Jump	Commercial	Naval	5
6	Emotional	Degree	Potential	Brand Names	Brand Names	Brand Names	MegaCorps	6
7	TL Low	TL High	TL Vhigh	TL Extreme	Multiples	Fractions	Evidence	7
8	Careers	Friends	Order/Chaos	Good/Evil	Sounds	--	--	8
9	Probability	Severity	Imminence	Humaniti	Major Races	Sophonts		9
10	Barrier Height	Barrier Width	Stability	Xeno-Medicine	Wounds	Severity	Diagnosis	10
11	Gravity	Acceleration	Environ	Zero-G	BTSD Wound	Damage	Mods	11
12-13	Companies	Q R E B S	Primary Products					

04 TYPICAL MODS

Flux	Gravity	Typical BR	Typical DH	Idea	Comms Environ	Logic	Weather	Flux
-5	World=0	General	Formidable	Derivative	Jammed	Indeterminate	Extremely Bad	-5
-4	World=1	SuSAG	Challenging	Boring	Equip Fault	Fuzzy	Very Bad	-4
-3	World=2-3	Tukera	Very Unstable	Dull	Equip Glitch	Meaningless	Worse	-3
-2	World=4-5	Sharushid	Unstable	Uninspired	Interference	False	Bad	-2
-1	World=6	--	Shaky	Unoriginal	Static	Probably False	Inconvenient	-1
0	Normal	Ordinary	Stable	Ordinary	Good	Logical	Neutral	0
+1	World=8	--	--	Novel	Very Good	Probably True	Fortuitous	+1
+2	World=9	--	--	Ingenious	Excellent	True	Good	+2
+3	World=A	--	--	Innovative	Clear	Self-Referential	Better	+3
+4	World=B	--	--	Imaginative	Very Clear	Unsolvable	Very Good	+4
+5	World=C	--	--	Truly Inspired	Crystal Clear	Paradoxical	Extremely Good	+5

05 TYPICAL MODS

Flux	Rewards	Speed	Speed	Encounter Range	Time In Jump	Commercial Breakout	Naval Breakout	Flux
-6	--	5 kph	Creep	--				-6
-5	Insulting	10 kph	Crawl	Contact		- 10 hours	- 5 hours	-5
-4	Insensitive	20 kph	Xslow	VShort		- 8 hours	- 4 hours	-4
-3	--	30 kph	Vslow	Short		- 6 hours	- 3 hours	-3
-2	--	50 kph	Slow	Medium		- 4 hours	- 2 hours	-2
-1	--	100 kph	Standard	Long		- 2 hours	- 1 hour	-1
0	Token	300 kph	Cruise	Vlong	168 hours	no variation	no variation	0
+1	--	500 kph	Fast	Distant		+ 2 hours	+ 1 hour	+1
+2	--	700 kph	Vfast	VDistant		+ 4 hours	+ 2 hours	+2
+3	--	1000 kph	Sonic	Orbit		+ 6 hours	+ 3 hours	+3
+4	--	2000 kph	Ssonic	--		+ 8 hours	+ 4 hours	+4
+5	Incredible	3000 kph	Hsonic	--		+10 hours	+ 5 hours	+5

Typical Jump takes 168 hours plus or minus

06 TYPICAL MODS

Flux	Emotional	Degree	Potential	Brand Names	Anglic Names	Vilani Brands	MegaCorps	Flux
-5	Distress	Utmost	Terrible	Loamer	Glump	Naa	General	-5
-4	Hate	Extreme	Extremely Bad	Sloeph	NNA	Kakna	GsbAg	-4
-3	Fear	Major	Very Bad	Cerlan	Peerless	Seleni	Delgado	-3
-2	Surprise	Significant	Bad	Boron	Consolidated	Lanuur	Hortalez	-2
-1	Unease	Minor	Poor	Neol Sibs	Dorado	Khush	SuSAG	-1
0	Blank	Trivial	Ordinary	Engolia	Acme	Ushum	Makhid	0
+1	Calm	Minor	Possible	Kosinar	Ponii	Ganun	Zirunkarish	+1
+2	Surprise	Significant	Good	JPG	Golden	Shakashdir	Sharushid	+2
+3	Courage	Major	Very Good	Vereos	Official TAS	Sebiilem	Naasirka	+3
+4	Love	Extreme	Extremely Good	Tyxagon Corp	Iridium	Agbar Urdim	LSP	+4
+5	Delight	Utmost	Wonderful	Starling	715 Corp	Karak	Instellarms	+5

07 TYPICAL MODS

Flux	TL Low	TL High	TL Vhigh	TL Extreme	Multiples	Fractions	Evidence	Flux
-5	TL 0	TL 5	TL A	TL N	--	Almost None	Inconceivable	-5
-4	TL 1	TL 6	TL B	TL P	--	One-Quarter	Impossible	-4
-3	TL 2	TL 7	TL C	TL Q	--	One-Third	Some Scintilla	-3
-2	TL 3	TL 8	TL D	TL R	--	Three-Eighths	--	-2
-1	TL 4	TL 9	TL E	TL S	--	Almost Half	Possible	-1
0	TL 5	TL A	TL F	TL T	Individuals	Half	Preponderance	0
+1	TL 6	TL B	TL G	TL U	Groups	More Than Half	Probable	+1
+2	TL 7	TL C	TL H	TL V	Hundreds	Five-Eighths	Substantial	+2
+3	TL 8	TL D	TL J	TL W	Thousands	Two-Thirds	Convincing	+3
+4	TL 9	TL E	TL K	TL X	10,000	Three-Quarters	Clear and Convincing	+4
+5	TL A	TL F	TL M	TL Y	100,000	Almost All	Beyond The Shadow of a Doubt	+5

08 TYPICAL MODS

Flux	No.	Careers	Friends	Order/Chaos	Good/Evil	Sounds	Flux
-6	1	Citizen	--	--	--	--	-6
-5	2	Scholar	Nemesis	Pure Chaos	Pure Evil	--	-5
-4	3	Entertainer	Enemy	Chaos	Evil	--	-4
-3	4	Craftsman	--	Chaotic	Evil	--	-3
-2	5	Scout	--	Chaotic	Evil	Earpiece	-2
-1	6	Merchant	--	Neutral	Neutral	Whisper	-1
0	7	Spacer	--	Neutral	Neutral	Talking	0
+1	8	Soldier	Acquaintance	Neutral	Neutral- -	Lecture	+1
+2	9	Agent	Fair Weather	Orderly	Good- -	Shout	+2
+3	10	Rogue	Friend	Orderly	Good- -	Distress	+3
+4	11	Noble	Fast Friend	Orderly	Good -	Many In Distress	+4
+5	12	Marines	Close Friend	Orderly	Pure Good	Gunshot	+5
+6	13	Functionary	--	--	--	Thunder	+6

09 TYPICAL MODS

Flux	Probability	Severity	Imminence	Humaniti*	Major Races	Sophonts*	Flux
-6	Impossible	None	Distant Future	Ilthanan		Hlanassai	-6
-5	Highly Improbable	Trivial	Centuries	Thaggeshi		Gurvin	-5
-4	Improbable	Negligible	Lifetime	Loeskalth		Ahetaowa	-4
-3	Highly Unlikely	Very Minor	Generation	Answerin	Hivers	Ael Yael	-3
-2	Unlikely	Minor	Decades	Suerrat	Aslan	Llellewlowy	-2
-1	Not Likely	Mild	Years	Solomani	Solomani	Vegans	1
0	50/50	Temporary	Months	Human	Human	Bwaps	0
1	Possible	Strong	Weeks	Vilani	Vilani	Virushi	+1
2	Likely	Major	Days	Zhodani	Vargr	Eshaar Ashah	+2
3	Probable	Severe	Hours	Geonee	K'kree	Mirani	+3
4	Very Probable	Very Severe	Minutes	Azhanti		Satha	+4
5	Almost Certain	Devastating	Seconds	Vlazhdumecta		Jgd-il-Jadg	+5
+6	Certain	Total	Now	Floriani		Lhshana	+6

* this list is incomplete.

10 TYPICAL MODS*

Flux	Barrier Height	Barrier Width	Stability	Xeno-Med*	Wounds	Severity	Diagnosis	Flux
-5	Formidable	Formidable	Formidable	Illogical	Vheavy	Intense	5D VObscure	5D -5
-4	Challenging	Challenging	Challenging	Obscure	Heavy	Critical	4D Obscure	4D -4
-3	Very High	Very Wide	Very Unstable	Very Strange	Common	Serious	3D VDifficult	3D -3
-2	High	Wide	Unstable	Strange	Light	Fair	2D Hard	2D -2
-1	Barrier	Barrier	Shaky	Uncommon	Slight	Good	1D Ordinary	1D -1
0	Ordinary	Ordinary	Stable	Ordinary	Scratch	Scratch	0 Easy	0

* use Bad Flux.

11 TYPICAL MODS

Flux	Gravity	Acceleration	Environ	Zero-G	Wound	Damage	Mods	Mods	Flux
-6					6D Disastrous	6D Near Total			-6
-5	Crushing	Crushing	Chaotic	Chaotic	5D Very Heavy	5D Very Heavy			-5
-4	Extreme	Extreme	Disorienting	Disorienting	4D Heavy	4D Heavy		-	-4
-3	Crippling	Crippling	Disrupting	Disrupting	3D Common	3D Common	Hvy Armor		-3
-2	VStrong	VStrong	Swirling	Fluxing	2D Light	2D Light	Armored		-2
-1	Strong	Strong	Bothersome	Abnormal	1D Slight	1D Surface	Lt Armor	Evade	-1
0	Normal	Normal	Normal	Normal	Scratch (1 pt0	Scratch (1 pt)	Typical	Typical	0

* use Bad Flux

12 TYPICAL MODS

Flux	MegaCorporations	Q	R	E	B	S	Primary Products	Flux
-5	General	-2			+1	-1	Starships. Small Craft. Heavy Machinery	-5
-4	GsbAg		-1	+1			Military Equipment.. Small Arms. Artillery.	-4
-3	Delgado				-1	+1	Heavy Equipment. Information Technology.	-3
-2	Hortalez		-1				Banking. Financial Products. Investments.	-2
-1	SuSag	-1					Chemicals. Pharma. Synthetics.	-1
0	Makhid				-1		Information Technology. Computers.	0
+1	Zirunkariish	+1					Banking. Investments. Insurance.	+1
+2	Sharurshid		+1				Trading. Merchantile Services.	+2
+3	Naasirka	+2			+2		Computers. Robotics. Software. Transport.	+3
+4	LSP		+2		-1	-1	Heavy Equipment. Starships. Armaments.	+4
+5	Instellarms			-1		+1	Military Equipment. Labor. Robotics.	+5

13 TYPICAL MODS

Flux	Common Brands	Q	R	E	B	S	Primary Products	Flux
-5	Loamer		-2				Wafers	-5
-4	Sloeph					-2	Pharma. Sanity Meds.	-4
-3	Cerlan				-2		Pharma. Meds.	-3
-2	Engalia		-1				Starport Services.	-2
-1	Neol Sibs		0				Entertainment.	-1
0	Boron	0					Generic Products.	0
+1	Kosinar		0				Consumer Weapons and Armor.	+1
+2	JPG			+1			Foods. Snacks.	+2
+3	Vereos				+2		Computers	+3
+4	Tyxagon Corp					-2	Artificial, Ersatz, Substitute Products, especially consumables.	+4
+5	Starling			+2			Information Technology. Software.	+5

For example, Captain **Eitan Lagash** of the **Wilderness Traveller** and First Officer **Aia Resteff** have arrived at Glisten Belt Highport on their way rimward. After offloading their cargo and handling some details, they pay a visit the Lone Star.

1. Aia Bungles The First Encounter

They enter and look around. There is an Aslan male in the corner and they identify him as a likely patron. Aia approaches him: "We're looking for a patron to hire us."

She wants to persuade him to charter the **Wilderness Traveller**.

RESOLVING THE PERSONAL

Purpose	Persuade	<u>3</u>	D
Strategy	Appeals To	<u>3</u>	
Tactic	Logic	x <u>2</u>	
Laws		<u> </u>	
Mod1		<u> </u>	
Mod2		<u> </u>	
Target No=		6	

She has to roll 6 or less on 3D. She rolls 10 and fails. The Aslan laughs at her.

4. Lagash Asks Some Questions

Lagash steers the conversation toward information gathering. He asks about the worlds rimward of Glisten.

RESOLVING THE PERSONAL

Purpose	Query	<u>2</u>	D
Strategy	Appeals To	<u>4</u>	
Tactic	Familiarity	x <u>2</u>	
Laws	Similarity	+ <u>1</u>	
Mod1		<u> </u>	
Mod2	Camerade-2	+ <u>2</u>	
Target No=		11	

He has to roll 11 or less on 2D; he rolls 7 and succeeds.

David tells him several stories about trade on worlds to rimward.

2. The Captain Steps In

Captain Lagash finally sees a likely prospect. He introduces himself.

"Excuse me. Hi. I'm Lagash on the Wilderness Traveller. We're heading rimward into the Hierate, which is new territory for us. Can I buy you a beverage and talk for a few minutes?"

RESOLVING THE PERSONAL

Purpose	Carouse	<u>1</u>	D
Strategy	Discussion	<u>3</u>	
Tactic	Culture	x <u>2</u>	
Laws	Similarity	+ <u>1</u>	
Mod1		<u> </u>	
Mod2		<u> </u>	
Target No=		7	

Lagash has to roll 7 or less on 1D. He rolls 3. The two seem to get along well. He learns they are both Star Marine veterans and the prospect's name is David Myers. Success awards Cameraderie-1

5. Lagash Asks for Referral Chip

Myers knows merchants in the rimward territories. Lagash escalates to Persuade and asks for a referral chip.

RESOLVING THE PERSONAL

Purpose	Persuade	<u>3</u>	D
Strategy	Charming	<u>5</u>	
Tactic	Flattery	x <u>2</u>	
Laws	Similarity	+ <u>1</u>	
Mod1		<u> </u>	
Mod2	Camerade-2	+ <u>2</u>	
Target No=		13	

He has to roll a 13 or less on 3D. He rolls 15 and fails. Maybe he was too aggressive, or didn't explain himself well enough. Or maybe David doesn't like giving referrals

3. The Captain Continues

The two talk for a while. He introduces Aia to David. Everyone has a good time.

RESOLVING THE PERSONAL

Purpose	Carouse	<u>1</u>	D
Strategy	Active Listen	<u>4</u>	
Tactic	Culture	x <u>2</u>	
Laws	Similarity	+ <u>1</u>	
Mod1		<u> </u>	
Mod2	Camerade-1	+ <u>1</u>	
Target No=		9	

He has to roll a 9 or less on 1D, and success is automatic. He learns Myers imports premium Aslan textiles. Captain Lagash adds Cameraderie-1 for a total of Cameraderie-2.

6. Lagash Asks Again

Lagash is undeterred: he continues about how helpful a referral would be. He asks David to Please Reconsider.

RESOLVING THE PERSONAL

Purpose	Persuade	<u>3</u>	D
Strategy	Charming	<u>5</u>	-1
Tactic	Culture	x <u>2</u>	
Laws	Similarity	+ <u>1</u>	
Mod1	Reconsider?	<u> </u>	
Mod2	Camerade-2	+ <u>2</u>	
Target No=		11	

He has to roll a 11 or less on 3D. He rolls 6 and David codes the Captain a chip. OR

He rolls 16. Myers again says no. Lagash and Aia excuse themselves.

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.

Each Personal is generated with 2D; but with escalating Difficulties: Carouse 1D, Query 2D, Persuade 3D, and Command 4D.

Check <Personal>

Check Personal is resolved by noting the appropriate Personal and any Mods. Roll the appropriate number of dice: if the result is equal to or less than the Personal plus Mods, 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 a convincing activity. Some action by the Target is necessary, and Persuade is the Actors attempt to make that happen. Extreme examples of Persuasion may be 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 Table.

The Laws of Similarity

Social interaction is enhanced when the speaker demonstrates 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 Fighting 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." He taps on the glass to get the clerk's attention.

The Referee rolls 2D each for the Clerk's Carouse (= 5), Query (= 9), Persuade (= 7) and Command (=8) and keeps these values behind the screen.

The clerk comes to the window, "We're closed. Come back tomorrow."

Gustav asks "Can you help me?" Check Query (=9). Query (Difficulty = 2D) Gustav rolls 6. Gustav rolls 11. The Clerk slams the window shut.

Or

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.

THE INTUITIONS

Related to the Personals are the three **Intuitions**: Insight, Luck, and Curiosity. Characters from time to time are awarded values for these Intuitions in the current session (they cannot be accumulated).

The Procedure

At the beginning of the current game session, the Referee may decide to use the Intuitions. Each player rolls 2D (ties reroll). The highest roll receives Insight. The second highest receives Curiosity. The lowest receives Luck.

Each Intuition can be used by its character as desired in the current session

Check Insight. The character can see (or puzzle out) correct action, which usually expresses itself as a question: "Why don't we try (blank)?"

Roll 2D. If the result is equal or less than Insight, the proper course of action reveals itself to the character.

Check Curiosity. The character wonders about the nature of objects or the environment, which usually expresses itself as a question: "Why is that (blank)?"

Roll 2D. If the result is equal or less than Curiosity, the nature of the object becomes apparent.

Check Luck. The character is naturally lucky. When a negative event occurs, he has a chance that it will miss him. "Just lucky I guess." Luck applies to its holder: it cannot be shared or transferred to others.

Roll 2D. If the result is equal or less than Luck, the negative event does not happen.

PERSONAL INTERACTIONS

Tactics

Purpose	Strategy		Interests	Enemies	Logic	Authority	Morality	Culture	Emotion	Indebted	Payment	Begging	Politeness	Flattery	Referral	Familiarity	Insult	Pain
1D 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	x2				
2D Query	Enjoyment	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	x2				+4*
	Force of Will	5			x2	x2	x2	x2	x2			no					x2	+6*
3D Persuade	Discussion	1			x2	x2	x2	x2	x2						x2	x2	no	- 6
	Active Listen	2																- 6
	Appeal To	3			x2		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*
4D Command	Active Listen	1																- 6
	Appeal To	2			x2		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	x2			- 4*
	Angry	5		x3	x2	x2	x2	x2	x2	x2							x2	+6*

RESOLVING THE PERSONAL

THE FIVE LAWS	Carouse	Query	Persuade	Command
1 Similarity	+1	+1	+1	
2 Superiority		+1	+2	+3
3 Inferiority		+1	+2*	
4 Comfort	+2	+1	+1	
5 Violence		+1	+2	+3

*if Begging, Flattery, or Politeness.

The **Five Laws** are a series of statements governing Personals.

Similarity. Similar people cooperate.

Superiority. Superiors command.

Inferiority. Inferiors use politeness, flattery, and begging.

Comfort. Comfort helps cooperation.

Violence. Force and threats of force compel obedience.

Purpose	Persuade	3	D	Select A Purpose
Strategy	Charming	5		Select A Strategy
Tactic	Flattery	x 2		Select A Tactic
Laws	Similarity	1		Apply the best applicable Law
Mod1	Cameraderie-2	+2		Apply up to 2 Mods, as available.
Mod2				

Target No= **13** Roll against the 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 an outside source 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 Fighting 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.

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:

Q	R	E	B	S
Quality	Reliability	Ease-Of-Use	Burden	Safety
QUA	REL	EOU	BUR	SAF
=2D -2	=Flux	= Flux	= Flux	=Flux

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, a Vacc Suit Q= 5 is an average Quality piece 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 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 piece of equipment: 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, anti-corrosion packaging, no energy cells installed) have Reliability Downgrades suspended.

Using Reliability

Reliability is the probability that an object will fail. When circumstances (The Daily Roll) indicate a Potential Bad Day, an object has the potential of 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 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.

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. It 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 also be inserted while the Filter Mask is being used.

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 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 its 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 alphabets 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).

But Every Day?

No. QREBS can be safely ignored most of the time. In fact, the average QREBS value is 0 = no effect.

WHY USE QREBS?

The most common roll for any QREBS value is 0 (5 for Quality). The 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 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 vehicles and 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.

QREBS-1

THE QREBS EQUIPMENT EVALUATION SYSTEM

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 (pronounced "krebs") system evaluates pieces of equipment for five essential characteristics: Quality, Reliability, Ease Of Use, Bulk (or Burden) and Safety.

Objects. Any item which is subject to QREBS is called an object. It may alternatively be called 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 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.

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 Reliability for the object 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 dependability of an object.

Reliability = Flux.

Reliability degrades -1 per Period.

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.

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.

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.

Reliable / Unreliable

EaseOfUse / HardToUse

Bulky / Compact

Safe / Hazardous

QREBS-2

IMPLEMENTING QREBS

Any object can be evaluated for QREBS using a simple procedure.

MOARN. There is no need to determine QREBS for every object or device. Evaluate objects only as really necessary.

CALCULATING QREBS

Q	R	E	B	S	Wa	P
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

Flux	Current	Antique	Artifact	Surplus	Experi
- 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.

QREBS-3

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.

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 \leq 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 \leq Flux
A dangerous mishap may injure the user/operator.

Destructive Mishap if Safety \leq 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

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

A character 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 bio-chemical) 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 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). 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).

Resolving a Vision Action at Range=2 uses 2D.

In Contact

When senses operate in contact (Touch, Smell), range is ignored and the Action is based on 2D.

THE REFEREE VERSUS THE CHARACTER

There are two important elements in administering the use of the senses.

Use the Senses Only When Necessary

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

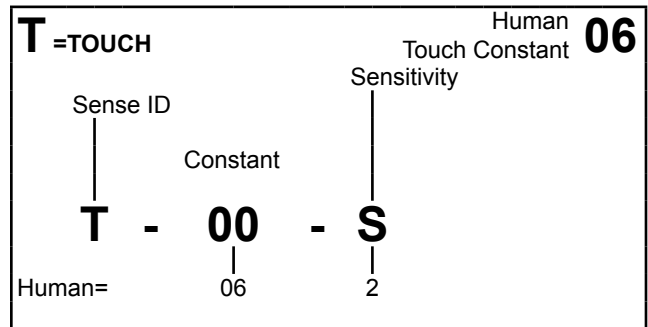
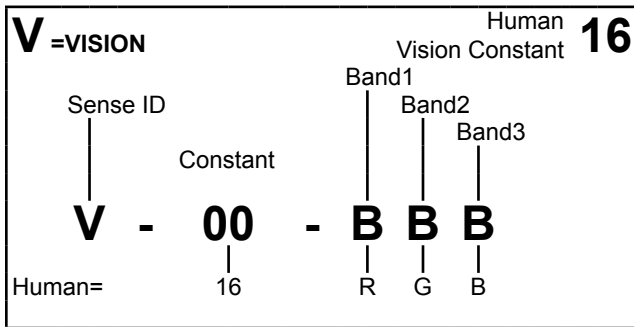
Techniques are available that allow the Referee to conceal what he knows.

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 have no readings 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.

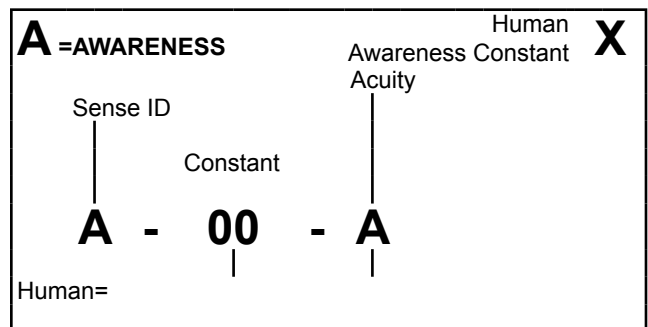
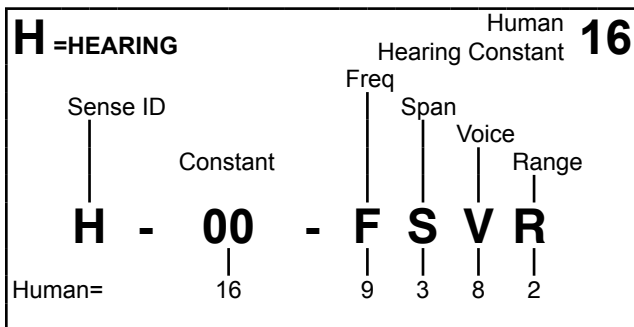
The Process. The Sense Process is the way characters investigate their surroundings.

THE SENSE ACTIONS



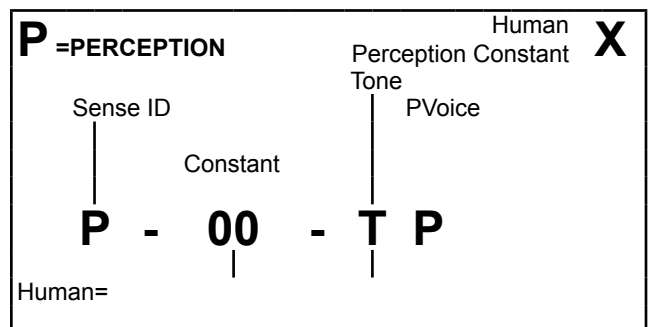
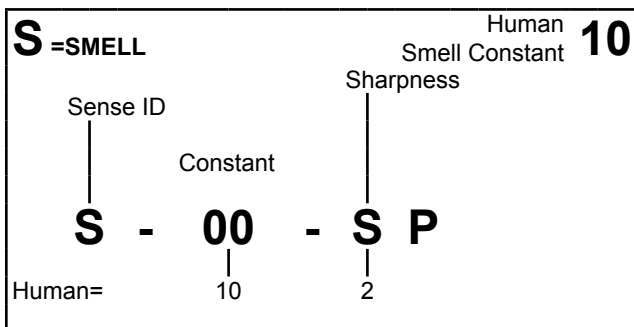
nD To Notice an Object
< Constant + Benchmark + Mod + Mod

2D To Notice an Texture
< Constant + Benchmark + Mod + Mod



nD To Notice an Sound
< Constant + Benchmark + Mod + Mod

nD To Notice an Field
< Constant + Benchmark + Mod + Mod



2D To Notice an Scent
< Constant + Benchmark + Mod + Mod

nD To Notice an Aura
< Constant + Benchmark + Mod + Mod

RANGES

Range=	0	1	2	3	4	5	6	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

VISION BENCHMARKS

	Contact	Reading	Talking	Vshort	Short	Medium	Long	Vlong	Distant	Vdistant
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 BENCHMARKS

	Contact	Reading	Talking	Vshort	Short	Medium	Long	Vlong	Distant	Vdistant
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

AWARENESS BENCHMARKS

Mass										
Electric										
Magnetic										
	Contact	Reading	Talking	Vshort	Short	Medium	Long	Vlong	Distant	Vdistant
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

PERCEPTION BENCHMARKS

Thought										
Life										
	Contact	Reading	Talking	Vshort	Short	Medium	Long	Vlong	Distant	Vdistant
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

Vision 1

Range Vision

0

Contact

R

Reading
0.5 m



T

Talking
1.5 m



1

Vshort
5 m



2

Short
50 m



3

Medium
150 m



4

Long
500 m



5

Vlong
1000 m



6

Distant
5 km



The Horizon

7

Vdistant
50 km



8

Orbit
500 km



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 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."

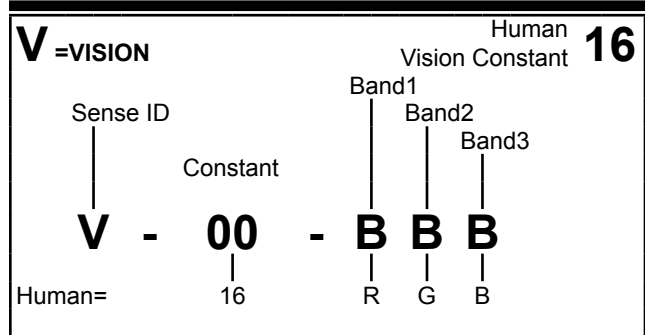
Option2. Eneri rolls 21. The referee tells him: "The landscape looks fairly common. Some flats, a few rocks, some hills off in the distance." He's probably not looking very hard.

Eneri can go back inside because there's nothing to see.

Or he can keep looking and try again.

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
< Constant + Benchmark + Mod + 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.

Vision 2

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. Someone with 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
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.
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 VII	Extreme Infra Red.
4000	Z	Zir	T7 VII	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 Infrared). **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 the equivalences for everyday usage 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.

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 1

0	Hearing	
Contact		
R		
Reading		
0.5 m		
T		
Talking		
1.5 m		
1		
Vshort		
5 m		
2		
Short		
50 m		
3		
Medium		
150 m		
4		
Long		
500 m		
5		
Vlong		
1000 m		
6		
Distant		
5 km		
The Horizon		
7		
Vdistant		
50 km		
8		
Orbit	not possible	
500 km		

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 HEARING 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.

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. He 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 crowded and noisy. Background Noise Mod= -12. He must roll 16-1-12 = 3 or less on 1D. He rolls 5, and can't make out anything.

Outside, it starts to rain.

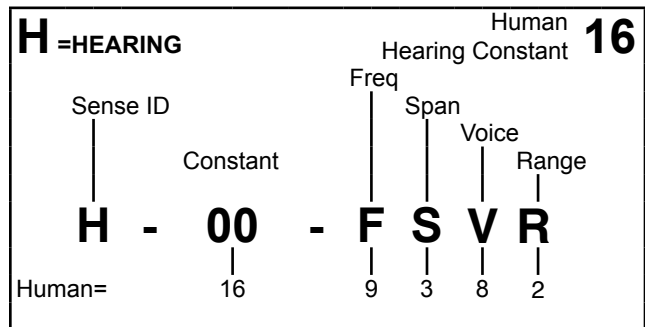
There is a clap of thunder about a kilometer away. Hearing Constant= 16. Benchmark = Sound Minus Range = 6 - 5 = +1. The Lone Star has background noise = -3.

The player rolls 5D. 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 clap of thunder. It's obvious; there's no need to roll. They hear the thunder.

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; a sophont with Hearing 20 has better hearing; one with Hearing 12 has worse hearing.

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.

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 $F=8$, $\text{Freq} = 2^8 = 256$). 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	Description
-9	1	2	2 ¹	C d delta
-8	2	4	2 ²	C th theta
-7	3	8	2 ³	C a alpha
-6	4	16	2 ⁴	C 0 beta
-5	5	32	2 ⁵	C 1 gamma
-4	6	64	2 ⁶	C 2 Human audible.
-3	7	128	2 ⁷	C 3
-2	8	256	2 ⁸	C 4 Middle C
-1	9	512	2 ⁹	C 5
0	A	1,000	2 ¹⁰	C 6
+1	B	2,000	2 ¹¹	C 7
+2	C	4,000	2 ¹²	C 8 Human audible.
+3	D	8,000	2 ¹³	C 9
+4	E	16,000	2 ¹⁴	C10 Dog whistle
+5	F	32,000	2 ¹⁵	C11
+6	G	64,000	2 ¹⁶	C12
+7	H	128,000	2 ¹⁷	C13
+8	J	256,000	2 ¹⁸	C14
+9	K	524,288	2 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 = 2⁹ 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 2⁶ (= 64) Hz to 2¹² (= 4000) Hz.

Voice= 9. The human voice is centered on Voice=9 = 2⁹ 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 2⁷ (= 128) Hz to 2¹¹ (= 2000) Hz. The Human Male is about one octave lower.

Hearing 2

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=1. 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.

F=2. Theta Waves. Induces hypnotic or trance suggestive states. After 5 minutes, a Personal against the subject may include Mod = Good Flux.

F=3. Alpha Waves. Induces relaxation states. After 5 minutes, the subject is Sleepy.

F=4. 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=5. Gamma Waves. Induces heightened productivity. After 5 minutes, subject is Optimal for 1 hour, followed by a return to previous attention level.

TECHNOLOGY

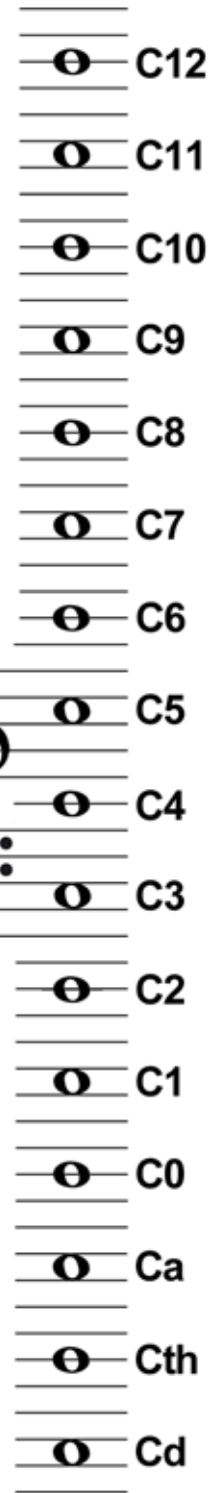
Many devices input, process, and output sound. A Hearing Device is identified with a Hearing String and may include an enhanced Hearing Constant, a Rang Mod, and alternate sound input and output.

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.

MUSICAL PITCH

Musical Pitch. Pitch is best understood in a musical format. The pitch levels shown correspond 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.



Smell 1

Type	Smell
0	
Odorless	
1	
Slight	
2	
Aromatic	
3	
Strong	
4	
Intense	
5	
Overwhelming	
Variants	
H	
Harmful	
E	
Exotic	

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.

A sophont with the sense of smell has a nose and can smell. A sophont without the sense of smell is smellblind or anosmic.

Smells may originate far away, but they are sensed based on their intensity at the nose (the sensing location)

THE SMELL CONCEPT

The Smell Action is the referee's opportunity to present sense information to a character. When the character indicates he is trying to smell what he can ("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.

For Example

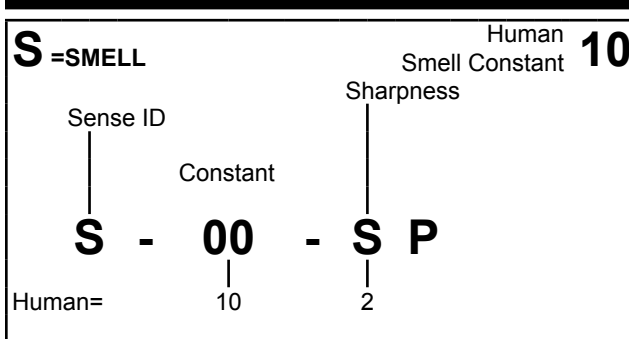
Human Eneri Dinsha S-08-1 steps out of his scout ship.

There is a forest fire upwind, but out of sight. The smell intensity at Eneri's location is Slight = 1.

Smell Constant = 10. Benchmark = Intensity = +1. There are no Mods.

The referee hands the player 2D and says "Roll." He must roll 10 +1 = 11 or less on 2D to scent of forest fire in the air.

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

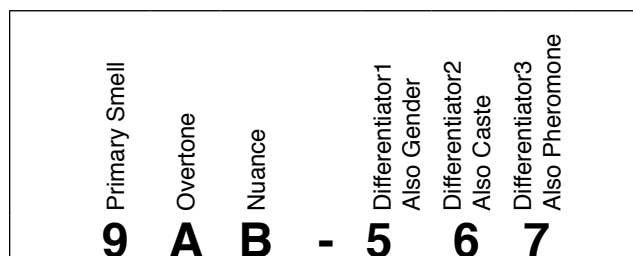
Range. Roll 2D.

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 based on the Master Mods table (as applicable). Higher Mods are better.

UNIVERSAL ODOR PROFILE



The Universal Olefactory 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.

Sharpness is the maximum number of digits in the UOP that the individual can try to sense.

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. The Scent of a chemical or being indicates that 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 1 or 2 Range Bands).

Identifiers

Most Scents have no effect other than as a marker. Some have specific effects.

Gender Identifier. Each Race 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 Race includes in its definition Caste Identifiers for each Caste (if the Race has Caste). When the Smell of a Scent has been identified, the individual also knows the Caste Identifier (if present and applicable).

If the Race 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. These effects are independent of the Scent.

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-5 scent ABC-10K inflicts Poison-10.

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.

Smell 2

PHEROMONES

A variety of pheromones exist, although they are not necessarily produced by 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.

Pheromones impose a variety of effects on the subject based on the Descriptor.

THE PHEROMONE CATALOG

CodeValueDescriptor

1	1	blank
2	2	blank
3	3	blank
4	4	blank
5	5	blank
6	6	blank
7	7	blank
8	8	blank
9	9	blank
A	10	blank
B	11	Trail Marker
C	12	Alarm
D	13	Opposite Gender Attractor
E	14	Fear
F	15	Repellant
G	16	Soother
H	17	Gender Balancer
J	18	Caste Balancer
K	19	Caste Determiner
L	20	Gender Change Trigger
M	21	Caste Change Trigger
N	22	Blinder
P	23	Smell Blinder
Q	24	Royalty Marker
R	25	Universal Compeller
S	26	Dread
T	27	Courage
U	28	Shun
V	29	Berserk
W	30	Scatter
X	31	Paralyze
Y	32	Freeze
Z	33	Rally
0		Undefined

Touch 1

UNDERSTANDING TOUCH

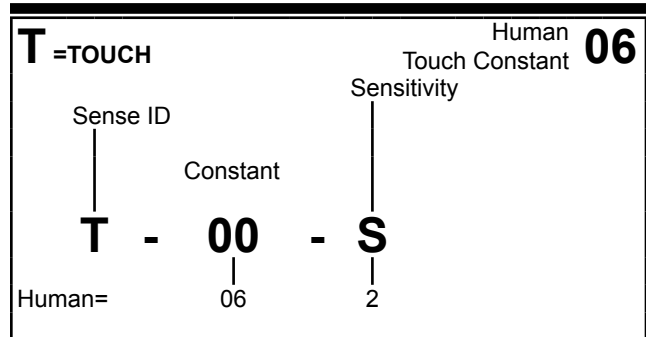
The sense organ for touch is the skin in general, but specifically manipulators (hands for humans; other manipulators for other sophonts). They feel contact with objects and feed the information to the nervous system.

All sophonts have a sense of touch.




THE TOUCH CONCEPT


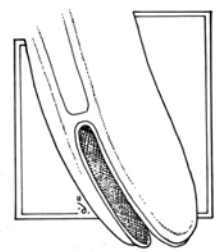
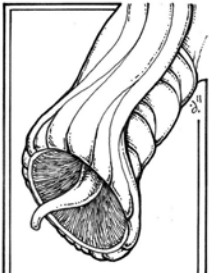
The Touch Action is the referee's opportunity to present sense information to a character. When the character indicates he is trying to feel a texture or a surface ("What does this surface feel like?" or "Are there any seams, or cracks?"), the referee resolves the Touch Action based on the Touch Constant, Sensitivity, and other details.

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

		
<p>Hand. Two opposed groups of one or more moderately flexible digits, capable of holding an object.</p>	<p>Paw. Several unopposed moderately flexible digits which can grasp and hold an object.</p>	<p>Tentacle. One or more flexible digits capable of entwining or coiling together or in opposition.</p>

		
<p>Grasper. Three or more mutually opposed flaps or digits capable of clamping an object between them.</p>	<p>Gripper. Two opposed groups of relatively inflexible flaps or digits capable of clamping an object between them.</p>	<p>Socket. A hollow rimmed with muscle capable of holding an object within it, with or without an internal digit.</p>

Range. Roll Dice.

Touch. The Touch Constant for the Race (Human = 06). Higher numbers are better; a sophont with Touch 20 has better touch sensitivity; one with Touch 04 has worse.

Benchmark. Object Texture (.

Adjust and Comment. Mods based on circumstances from the Master Mods table (as applicable). Higher Mods are better.

Sensitivity. Sensitivity is the number of times the character may retry before deciding there is nothing of interest.

MANIPULATOR MODS

Manipulator	Grip Mod	Touch Mod
Hand	0	0
Paw	-2	-1
Tentacle	+1	0
Grasper	0	-2
Gripper	+2	-1
Socket	-1	-3

For Example

Human explorer Darren Buck T-06-3 is exploring a ruined structure. He runs his hand along a stone wall. There are Faint carvings in the surface. Touch Constant = 6. Benchmark = Faint = -2. Mods = 0.

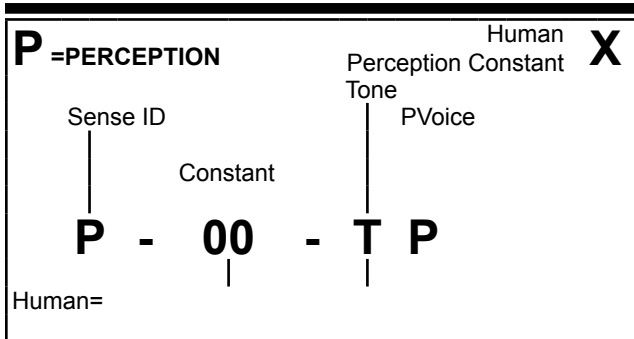
The referee hands the player 2D and says "Roll." He must roll 6 - 2 = 4 or less on 2D.

Option1. Darren rolls 12. The referee tells him: "There doesn't seem to be much there."

Option2. Darren rolls 3. The referee tells him: "The surface feels like etched figures, strange writing, like its obscured by years of dirt."

Perception senses the auras which surround living things, and which have special characteristics when surrounding intelligence.

Perception 1



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.

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).

THE PERCEPTION CONCEPT

The Perception Action is the referee's opportunity to present sense information to a character. When the character indicates he is trying to sense what he can ("I am concentrating on life signs or thoughts" or "I am trying to sense anything unusual"), the referee resolves the Perception Action based on the Perception Constant, Range, Object Size, and other details.

Once an object is noticed, an observing character continues to see it until it moves out of range or somehow becomes hidden.

nD To Notice an Aura
 < Constant + Benchmark + Mod + Mod

Range. Roll Dice equal to R= Range.

Perception. The Perception Constant for the Race (Humans do not have Perception). Higher numbers are better: a sophont with Perception 20 has better perception; one with Perception 12 has worse perception.

Benchmark. Object Size minus Range.

Mods. Mods based on circumstances from the Master Mods table (as applicable). Multiple Thoughts or Emotions of the same type use the Multiples Mod. Higher Mods are better.

For Example

Sophont Sir Glibern Dashash P-24-33 is preparing for the evacuation of Efate, shredding files and destroying technical equipment. The Zhodani invasion is imminent.

A missile strike hits Windrose City, some 50 km away R=7. Thousands of people die in a matter of minutes = Multiple Death Throes = Size 8.

Perception Constant = 16. Benchmark = Size minus Range = 8 - 7 = +1. 100,000 victims = +5.

The referee hands the player 7D and says "Roll." He must roll 24 +1 +5 = 30 or less on 6D to notice the death throes. He rolls 24. He feels the pain of thousands of people dying. A couple minutes later, the building shakes and he hears a loud sound in the distance.

PERCEPTION BENCHMARKS

	Contact	Reading	Talking	Vshort	Short	Medium	Long	Vlong	Distant	Vdistant
Thought										
Life										
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

Awareness 1

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 metal 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.

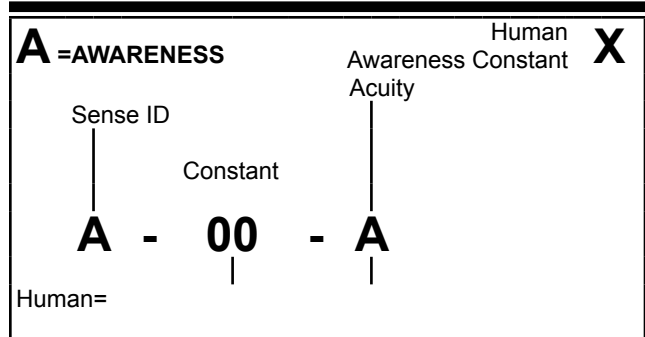
False Colors. Awareness is mapped to the mental image using mind generated false colors Mag and Lek. They are perceived as transparent colors which do not illuminate or reflect. They are perceived despite intervening objects (more or less). To the extent they are not absorbed or attenuated, they create a kind of xray vision.

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.

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.



nD To Notice an Field
 < Constant + Benchmark + Mod + Mod

Range. Roll Dice equal to R= Range.

Vision. 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

Mass										
Electric										
Magnetic										
	Contact	Reading	Talking	Vshort	Short	Medium	Long	Vlong	Distant	Vdistant
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

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").

THE UNSEEABLE COLORS: MAG AND LEK

Code	Name	Character
L	Lek	Color associated with Electric Fields
H	Mag	Color associated with Magnetic Fields

Code. The single letter abbreviation for this color.

Name. The name of this color.

Character. Brief description of this color.

One of the great challenges to Aware artists is the reproduction in paint or pigment of the appearance of Lek and Mag.

Awareness 2

For Example

Sophont Norhin Sakdili A-20-1 (but 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 flickering Lek from the ship's alternating current circuits, and of scattered Mag glows from magnetic devices.

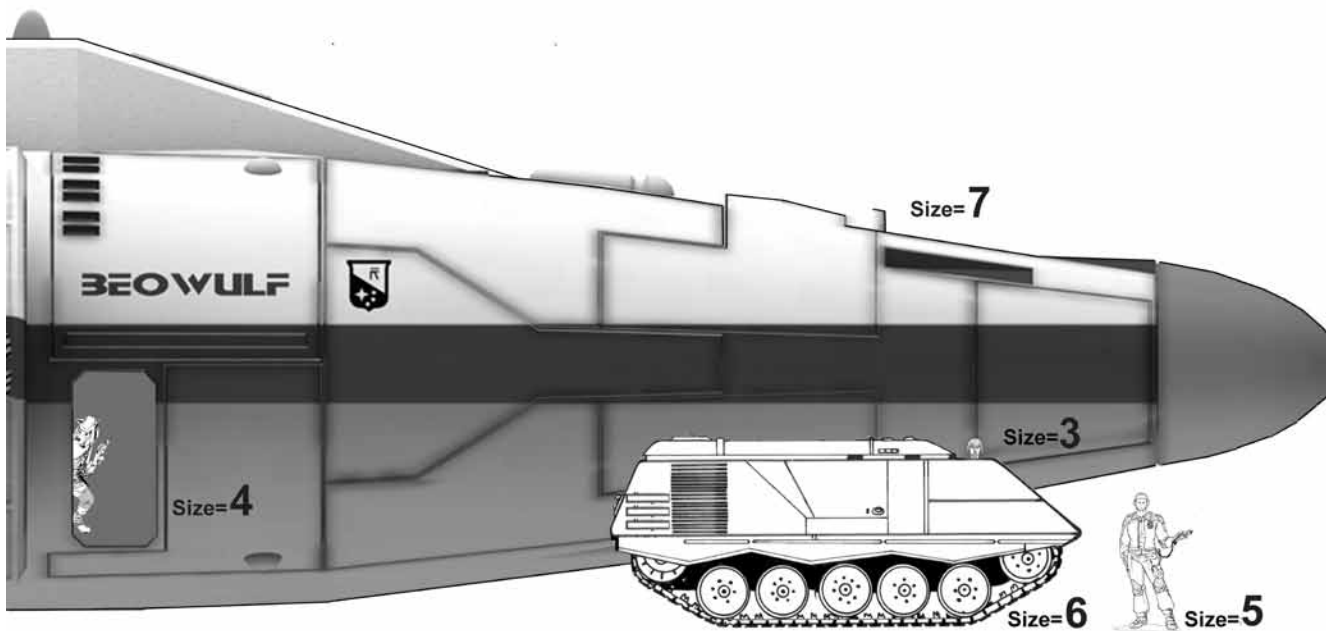
There is a storm near the horizon Range=6 and a flash of lightning Size=7.

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." Norhin 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."



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).

Understanding Speeds. Humans (and most sophonts) Walk at Speed=1 and Run at Speed=2. The full array of Speeds is shown on the Vehicles Speed Chart.

Personal Combat

Conflicts 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 which give a feeling of authenticity without slavish adherence to exact formulas. 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 storms, blizzards, falls, collisions, and other mishaps.

THE ELEMENTS OF A FIGHT

A fight includes the following elements:

The Encounter Situation

A situation is an encounter. 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 the player-characters operated by the players. The opposition is non-player characters controlled by the referee. The participants are defined by their UPPs along with the weapons, armor, and protection they are using or have available.

The Terrain. The location and its important characteristics are the terrain. Terrain can provide concealment to hide fighters from the enemy, and cover to protect them from enemy attacks. Terrain also serves to constrain or channel movement by either side. Terrain naturally includes Environment: vacuum, storm, dust, visibility, and gravity.

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 a 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 their actions: gathering up the dead, helping the wounded, occupying the territory they have won, or fleeing the enemy to a place of safety.

SCALE

Fighting is based on variable distance in Range Bands, variable time in Rounds, and approximate Size for Objects.

Distance Scale

Physical location for Fighting is tracked using Scaled Range Bands. Each Band is numbered and corresponds to a specific physical distance and to a benchmark object.

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 expressed in Range Bands.

Time Scale

Combat takes place in Rounds. Some seem like seconds; some seem like hours. Some pass without anything happening; others are flurries of activity. Various activities are specified in terms of rounds: movement, reloading, weapons use.

At the end of combat, count the number of Rounds that

GUNMAKER, ARMORMAKER, AND VEHICLEMAKER

The Maker Series allows referees and players to design and produce weapons, armor, and vehicles for use in the Traveller Combat System.

GunMaker produces weapons from low tech blades to high-tech plasma guns, and provides their range, cost, combat effects, and other details.

ArmorMaker produces armors and protections from simple bullet-proof vests to powered armor, and provides their cost, protective abilities, and other details.

VehicleMaker produces ground and air vehicles and provides their cost, performance, and combat effects.

USING TPCS AND STAMP

The **Traveller Personal Combat System** is designed for fast-moving combat action.

The player reviews the
The player selects a
He makes an
He
If the attack succeeds, he determines if it
If the attack penetrates, he determines

SITUATION including location, weapons, and opponents.
TARGET.
ATTACK.
MOVES.
PENETRATES armor (or **OVERWHELMS** protection).
wounding, injury, or damage.

have passed and equate them generally to minutes (thus, a fight taking ten Rounds probably took about ten minutes).

An armory of pre-generated weapons is also provided.

ATTACK! IS A TASK

Difficulty (and the number of Dice rolled) is determined by Range. The Target Number is the Attacker's Characteristic plus Skill (and applicable Knowledges) plus the Apparent Size of the Target, and any applicable Mods.

Difficulty. Range determines the Difficulty of the Attack! and 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).

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).

The Fighting Number. The (for the most part) unchanging assets for an attacker are his C+S Characteristic plus Skill plus Knowledges. This value, because it is often constant during a combat round, is called the FN Fighting Number.

Characteristic. The appropriate characteristic associ-

ated with the task. Gun attacks typically use the Attacker's Dexterity. Attackers with Grace or Agility use that characteristic at half value.

Skills (and Knowledges). The skill (and/or knowledge) associated with the weapon being used for the attack. Even characters with no other appropriate skill or knowledge have the default skill Fighting-0 and may attempt an Attack!

S-R Apparent 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 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 which 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.

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.

Cautious. The Attack Task can be declared Cautious and reduced one level of Difficulty. For the task to be Cautious, the attacker must identify a target and do nothing during a combat round; in the next combat round (if the Target is still identified) the attack may be made.

Hasty. The Attack task may be declared Hasty and increased one level of Difficulty. The attack is resolved before the Target resolves its attacks; if the Hasty attack hits (but not necessarily wounds or damages) the Target abandons its Attack for the combat round.

THE FIGHTING TASK

Die Roll

$$nD < \boxed{} + \boxed{} + \boxed{} + \boxed{}$$

Assets (Target Number)

=Range C+S Speed S-R Mods
If <1 Char+ Size - Range
use 1D Skill If <0 no attack.

The Fighting Task is the central activity in combat. Difficulty is based on Range to the Target. Mods are applied as necessary.

TPCS In Action - An Attack

Die Roll

$$2D < \boxed{13} + \boxed{0} + \boxed{5-2} + \boxed{0}$$

Assets (Target Number)

=Range C+S Speed S-R Mods

Rogue (and sometimes bounty hunter) Zolomion Shoul 777777 Fighting-4 Slug Thrower-2 armed with Revolver encounters Morio, an old enemy, on the streets of Startown. Short Range R=2. Zolomion opens fire. C+S= 7+6= 13. Speed=0. S-R= 5-2 = 3. Mods= 0. The Target Number is 13+3= 16. He must roll 16 or less on 2D. He hits his target.

Applicable Mods. The Attack is also affected by a variety of possible Mods based on environment, movement of the Attacker, movement of the Target, and other factors.

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.

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) which 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 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 half his Cover Mod (= -1).

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 (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 solid brick wall, he carefully peeks around the corner (Cover Mod -2), spots a target, and prepares to return fire; his attack will be subject to Cover Mod -2.

Technological Means

Concealment can sometimes be defeated by technology. Concealment may defeat vision or vision sensors, but 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.

Size Modification

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 minus 1).

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.

TPCS In Action - Another Attack

Die Roll Assets (Target Number)

$$4D < \boxed{14} + \boxed{0} + \boxed{5-4} + \boxed{0}$$

=Range C+S Speed S-R Mods

Baron Joseph Hemdian 99988C Fighting-3 Slug Thrower-2 armed with Rifle finds himself in a firefight with native tribesmen. Long Range R=4.

Baron Hemdian opens fire. C+S= 9+5= 14. Speed=0. S-R= 5-4= 1. Mods= 0. The Target Number is 14+1= 15. He must roll 15 or less on 4D (about a 54% chance).

TPCS In Action - Another Attack

Die Roll Assets (Target Number)

$$3D < \boxed{11} + \boxed{0} + \boxed{5-3} + \boxed{0}$$

=Range C+S Speed S-R Mods

Sergeant Jon Locke 888747 Fighting-1 Slug Thrower-2 armed with Rifle finds himself in a firefight with Darrian Mercenaries. Medium Range R=3.

Sergeant Locke opens fire. C+S= 8+3= 11. Speed=0. S-R= 5-3= 2. Mods= 0. The Target Number is 11+1= 12. He must roll 12 or less on 3D (about a 74% chance).

THE THREE ATTACK TYPES

There are three basic types of personal combat attacks.

Aimed Fire is deliberate with careful use of the weapon.

The assumed mode of attack is Aimed Fire. The attacker must be not (personally) moving although he may be in a moving vehicle.

Aimed Fire is the most accurate type of attack; however, the attackers are stationary and more vulnerable.

AutoFire is multiple operations of the weapon involving less accuracy.

The attacker is using a weapon capable of burst, automatic, or continuous fire. The attacker may be at Speed=0 or Speed= 1. AutoFire adds 1D to the Fighting Task (increasing its difficulty one level).

AutoFire inflicts two additional D of Damage if it penetrates armor or protection.

SnapFire is multiple unaimed operations of the weapon with significantly less accuracy. The attacker is using a weapon capable of burst, automatic, or continuous fire. The attacker may be at Speed=0 or Speed= 1. SnapFire adds 2D to the Fighting Task (increasing its difficulty two levels).

SnapFire inflicts one additional D of Damage if it penetrates armor or protection.

The Tactics Mod. Characters with Tactics 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 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.

The Tactics Mod Value equals the Character's C5 plus Tactics minus 2D. It is calculated when a battle begins and remains the same throughout the course of the battle.

It is possible for the Tactics Mod to be negative, in which case it is useless for the battle.

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: $8 + 4 - 2D$. he rolls 7 ($= 12 - 7 = +5$). he has a Tactics Mod= 5 for the duration of the battle.

PENETRATION

A successful Attack (a hit) must penetrate the Target's

TPCS In Action - Armor and Protection

Lieutenant Michael Bishop 765977 Fighting-2 Slug Thrower-2 armed with Rifle is wearing (AM) BS-11 Advanced Medium Battle Suit-11 Ar=20 In=15 when he is attacked by a Zhodani soldier with a Flame Projector-11 Heat-3 Pen-3. The successful attack inflicts Heat-3 = 11 which cannot overwhelm In=15 and Pen-3 = 14 which does not defeat Ar=20. The Lieutenant is unharmed.

Armor (or overwhelm its protection) before any damage can be inflicted.

Armor has an Armor Value AV.

Protection has a Protection Value PV. Protection includes all forms of Protection except Armor: EMCage, Flashproof, Radproof, Soundproof, PsiShield, Insulated, and Sealed.

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. (Lt) BA-11 Light Battle Armor-11 has Ar= 32. It will absorb 32 hits before any effect is passed to the wearer. It's Insulation In= 12 will absorb deflect 12 hits by Heat (or Cold) before any effect is passed through to its wearer.

If the Hits applied against Armor exceed Ar=, then the Armor's protective ability is destroyed for the remainder of the combat situation. Remaining hits are applied to the wearer.

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.

INJURY, WOUND, AND DAMAGE

Attacks produce a variety of injuries, wounds, and damage against their targets.

NPC Effects

Attack effects against non-player characters rarely require detailed results: what matters is if the target can continue to resist or attack, or if it is simply eliminated from the battle.

If a non-player target is hit and receives injury of 10 or more, it is out-of-action. It cannot participate in the rest of the battle. Ignore injury of 9 or less.

If a non-player object or vehicle is hit and receives damage of 10 or more, it is out-of-action. It cannot participate in the rest of the battle. Ignore damage of 9 or less.

Detailed Effects

During combat, Attack effects against player characters impose specific short-term results on player characters.

At the moment of injury, these detailed effects reduce

TPCS In Action - Armor and Protection

Zho Lieutenant Tsian Shqretsadsva B68B77 Fighting-2 Slug Thrower-2 armed with Rifle is crouching behind a wall providing Ar=30 In=30 when he is attacked by an Imperial soldier with a Flame Projector-11 Heat-3 Pen-3. The successful attack inflicts Heat-3 = 11 which cannot overwhelm In=30 and Pen-3 = 14 does not defeat Ar=30. The Lieutenant is unharmed.

the use of characteristics or senses, or may render the character unconscious.

Detailed effects remain until they expire or until the end of the combat situation.

Long Term Effects

Once combat is over, the consequences of any injury, wounding, or damage must be determined.

HIT SYSTEM V0

Previous editions of **Traveller** have included a direct Hit versus Characteristic wounding mechanism which is still useful in some circumstances.

Hits (injury, damage) points are applied to the target's (defending character's) strength, dexterity, and endurance on a temporary basis. Each die rolled (for example, each of the two dice rolled in a hit result of 2D) is taken as a single wound or group of hits, and must be applied to a single characteristic. The wounded player may decide which physical characteristic receives specific wound points in order to avoid or delay unconsciousness for as long as possible.

The first wound received by any character, however, can be sufficient to stun or daze him or her, and is handled differently. This first wound is applied to one of the three physical characteristics (C1 C2 C3) randomly. If that characteristic is reduced to zero, then any remaining hits are then distributed to the other physical characteristics on a random basis. As a result, first blood may immediately incapacitate or even kill.

When any one characteristic is reduced to zero by wounds, the character is rendered unconscious. When two have been reduced to zero, the character has been seriously wounded. When all three have been reduced to zero, the character is dead. Once a characteristic has been reduced to zero, further points may not be applied to it; they must be applied to other (non-zero) characteristics.

Unconscious characters (one characteristic reduced to zero) recover consciousness after ten minutes (10 combat rounds) with all three physical characteristics temporarily placed at a value half way between full strength and the wounded level. The individual has sustained minor wounds. For example, a character with a Strength ==8 and wounded to Strength ==4 (and rendered unconscious through the zeroing of another characteristic) becomes Strength=6 when he regains consciousness, and remains so until recovered. Round fractions in favor of the character. A return to full strength for the character requires medical attention (a medical kit and an individual with at least Medical-1) or three days of rest.

Unconscious characters with two characteristics reduced to zero are seriously wounded and recover consciousness after three hours. Their characteristics remain at the wounded level (or 1, whichever is higher). Recovery is dependent on medical attention (a medical facility and an individual with Medical-3; recuperation to full strength without medical attention is not possible).

WHO GOES FIRST?

The central concept of Initiative is: "Who Goes First?" and by resolving that, 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 situation is a standoff. There are no attacks or movement; the referee declares "New Round!"

If neither side has Leader, the dispute may be resolved with Tactics. If neither side has Tactics, this resolution is not possible.

Random Action. If disputed Initiative cannot be resolved, the Referee may randomly offer the Initiative to some specific participant. If he declines, here are no attacks or movement; the referee declares "New Round!" and another participant is offered the Initiative.

Holding Back. It is possible that neither side actually wants to start fighting. If, within a reasonable time (a few seconds) neither group declares that it is moving or attacking, the referee declares "New Round!" and a new combat round begins.

First Attacker

The first one to attack suffers Mod +1 in any Attack against him in the Round. The fact that he made himself visible by the attack increases his vulnerability during the current combat round. On the other hand, if the First Attacker succeeds, his Target cannot fire in the current Round.

In small engagements, First Attacker can overwhelm a Target and repeatedly attack without consequence. In large engagements, the First Attacker may succeed against his target, but become the easy target for all the other enemy.

First Attacker is applied anew every round.

THE COMBAT ROUND

COMBAT ROUND OVERVIEW

Combat is resolved in **Rounds**. A Round is one complete set of five STAMP phases or steps. This sequence repeats with each new Combat Round.

Combat Round = about 1 Minute

Some Combat Rounds seem like seconds; some seem like 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 (a ten Round fight probably took about ten minutes).

THE FIVE COMBAT ROUND PHASES			S T A M P Situation - Target - Attack - Move - Penetrate	
1	S	SITUATION	Attacker notes his weapon, evaluates the Situation and how it affects his options.	Attacker may change Weapon.
2	T	TARGET	Attacker identifies a Target, determines Range, Size, and Target Mod.	
3	A	ATTACK	Attacker uses (fires, shoots) his Weapon and rolls To Hit.	Attack is against a single Target. (but Suppression engages multiple Targets).
4	M	MOVE	Attacker Moves or performs an important Action. He may change Status.	Attacker may Move even if Hit.
5	P	PENETRATE	Hits (from Attack) are checked for Penetration of Armor or Protection. Note damage, wounding, or injury.	

Which Side Goes First?

STAMP governs the actions of each participant in combat. Each of the Phases is completed by everyone involved before play can proceed to the next Phase. It helps for the Referee (or someone in charge) to call out "End Of <Phase Name> Phase!" when every one is done.

Controlling Who Goes When.

Within each Phase, everyone participates (targets, attacks, moves) more-or-less at the same time. Nevertheless, it helps for participants to play in some sequence. Someone must volunteer to go first; if no one volunteers, the Referee says, "Everyone hesitates. Next Phase."

First Attacker

The first participant to make an attack in the Attack step is subject to the First Attack Mod +1; every attack against the First Attacker is slightly easier. If the attack by the First Attacker succeeds, that Target cannot fire in the current Attack step.

Suppression

Any AutoFire may be allocated to Suppression. The attacker specifies Suppression. It attacks every enemy who makes an attack during the Round, but may not initiate an attack.

Situation S

Target T

1	S	SITUATION	Attacker notes his weapon, evaluates the Situation and how it affects his options.	Attacker may change Weapon.
2	T	TARGET	Attacker identifies a Target, determines Range, Size, and Target Mod.	

THE SITUATION

Combat is the use of violence or force to achieve goals, while supported by weapons and equipment, and within an environment which may promote or obstruct victory.

Goals. Combat participants must never lose sight of their goals. There is no point in continuing combat if its goals are no longer obtainable. Each participant should review as part of the situation what specific current goals are in play.

Environment. Combat takes place in a specific environment with terrain features, atmospheric qualities, and various obstacles and resources.

Equipment. Combatants have access to some sort of equipment which may support their efforts.

Weaponry. Combatants have a variety of weaponry and munitions which support their activity.

The Situation Check

In the Situation Phase each Attacker briefly reviews his resources. At a minimum, the Situation Check reviews:

Current Weapon. The Attacker may change Weapon in this Phase.

Health and Wound Status. The Attacker implements any changes in health and wound status including emergency first aid.

Comrades. The Attacker notes other Attackers who support him, or who he may need to support.

Targets. The Attacker notes current and any possible Targets.

Goals. The Attacker reviews the current combat goals and evaluates if they are attainable.

TARGETTING

Identify a Target with the sense rules, or sensors.

Determine **Range**

Determine **Size**

Determine **Target Mods**

Targets can be identified and assigned specific information, including Size, Range, and Mods.

When an Attacker identifies a Target, he then knows the Range between him and it, its Size, any Mods available.

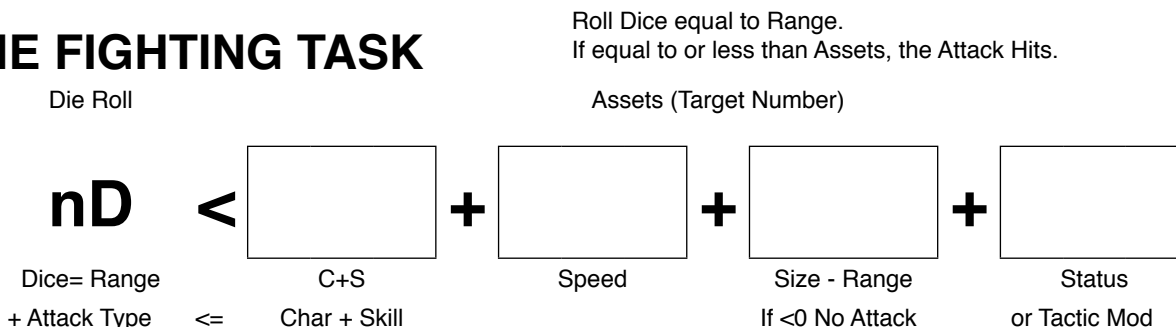
A Attack

ATTACK OVERVIEW

Fighting is governed by the **Fighting Task**: an Attacker shoots a weapon at a Target and resolves the Fighting Task to determine if the shot Hits or Misses. If it Misses, the process ends; if it Hits, the Attacker determines (in the Penetration Step) if it penetrates Armor or Protection, and then determines damage.

The **Fighting Task** takes into account:
 The Attacker's Characteristic and Skill.
 The Target's Speed and Evasion status.
 The Target's Size modified by Range.
 Penalties for AutoFire and SnapFire.

THE FIGHTING TASK



Roll Low: The Fighting Task succeeds if the Die Roll is equal or less than the total of all Assets.

ATTACK TYPE	Aimed	AutoFire	SnapFire
	0	+1 D	+2 D
Required Speed=	0	0 or 1	0 or 1 or 2
Difficulty=		+1 D	+2 D
Damage=		+2 D	+1 D

Aimed is deliberate with careful use of the weapon.

AutoFire is multiple operations of the weapon involving less accuracy.

SnapFire is multiple unaimed operations of the weapon with significantly less accuracy.

STATUS MOD

	Stealthy	Evading	Normal	Unaware	Oblivious
	-2	-1	0	+1	+2
Speed=0,1	any	any	any	any	any

Stealthy is careful movement and positioning.

Evading is rapid, random movements; zig-zags.

Normal is standard fighting stance; crouching.

Unaware is a non-fighting stance; standing.

Oblivious is a non-fighting stance; easily surprised.

TARGET SPEED MOD	Still=0	Walking=1	Running=2
People	0	-1	-2
Vehicles		(use Speed)	

Speed for individual humans is restricted to Still, Walking, or Running.

Vehicles use the Speed Table. **Vehicle** Speed is Negative (the vehicle is harder to hit). But, a Vehicle moving directly Toward or Away From the Attacker (then Mod = 0).

TARGET SIZE (SIZE - RANGE)

For Attack calculations, Target Size is Size minus Range. A Size-5 Object at Range=5 has TSM=0.

If TSM is less than 0, the Target cannot be attacked.

If Vehicle is behind something, or a person is prone, reduce Size by 1.

Concealment may also be applied to Target Size.

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

Move M

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.

CHARACTER MOVEMENT

Bands 0-1-2

A Character (minimum Speed=1) can move one Band per Round between Bands 0 - 1 - 2.

Bands 3-4-5

A Character (minimum Speed=2) can spend Rounds equal to the destination Band and then move one Band between Bands 3 - 4 - 5 in the Movement Phase of that final counted Round.

Band 6

A Character at Range Band 6 or greater cannot change Range during a battle.

RANGE BANDS

Range	Vision
0 Contact	
1 Vshort 5 m	
2 Short 50 m	
3 Medium 150 m	
4 Long 500 m	
5 Vlong 1000 m	
6 Distant 5 km	
The Horizon	

VEHICLE MOVEMENT

Bands 0-1-2

A Vehicles cannot move closer than Range Band 3 unless it is directly approaching the Attacker. It may move one Band per Round between Bands 0 - 1 - 2.

Bands 3-4-5-6

A vehicle at Speed=2 can spend Rounds equal to the destination Band and then move one Band between Bands 3 - 4 - 5 in the Movement Phase of that final counted Round.

A Vehicle at Speed=3 or greater can move one Range Band per Round.

FLYERS

A Flyer may maintain Range unchanged (the equivalent of Hover or Circling).

Understanding Sizes

Most people are Size=5. A child or half-hidden person is Size=4. A head or a limb is Size=3. A small control sensor, or an eye, is Size=1. 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 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).

Understanding Speeds. Walking is Speed=1; Running is Speed=2. More Speeds are on the Vehicles Speed Chart

P Penetrate

Injury

PENETRATE OVERVIEW

IF an Attack Hits a Target (in the Attack Phase), the effects of the Hit are determined in the Penetrate Phase.

IF the Attack penetrates all Armor and Protection, it then inflicts injury, damage, or wounds.

AGAINST ARMOR

1D per Weapon Effect= Injury
If Injury exceeds Armor Value, reduce:
Armor Value
RadProof
SoundProof all = Zero
Insulated
Sealed

Apply Injury Exceeding Armor to Target. For example, Bullet-2 inflicts 2D against Armor-6. Roll 2D (=7): the Armor and listed Protections are Destroyed. The Target receives 1 Hit.

AGAINST PROTECTIONS

1D per Weapon Effect= Damage
If Damage exceeds Protection Value:

(Protection is Unaffected)

Apply Damage Exceeding Protection to Target. For example, Stench-2 inflicts 2D against Sealed-8. Roll 2D (=12), subtract Sealed-8. The Protection is temporarily Overwhelmed; the target receives 4 Hits.

HIT EFFECTS ON ARMOR AND PROTECTION

Code	Effect	Must Penetrate	Or Must Overwhelm	Armor	EMCage	Flashproof	Radproof	Soundproof	PsiShield	Insulated	Sealed	Type	Injures Beings
A	Corrode	Armor		<input type="checkbox"/>								Hit	= Hits to C1 C2 C3
B	Bullet	Armor		<input type="checkbox"/>								Hit	= Hits to C1 C2 C3
C	Slash	Armor		<input type="checkbox"/>								Cut	= Hits to C1 C2 C3 per turn
D	Blast/Blow	Armor		<input type="checkbox"/>								Hit	= Hits to C1 C2 C3
E	EMP		EMCage		<input type="checkbox"/>							Fry	= Ablind for 1D turns
F	Frag	Armor		<input type="checkbox"/>								Hit	= Hits to C1 C2 C3
G	Gas		Sealed								<input type="checkbox"/>	Suff	= Hits to C3 C4 C5
H	Hot		Insulation							<input type="checkbox"/>		Heat	= Hits to C1 C2 C3 C4
I	Infection		Sealed								<input type="checkbox"/>	Hit	= Hits to C1 C2 C3
J	Psi		PsiShield						<input type="checkbox"/>			Stun	= Unconscious for 1D Turns
K	Burn	Armor		<input type="checkbox"/>								Hit	= Hits to C1 C2 C3
L	Elec		Insulation							<input type="checkbox"/>		Hit	= Hits to C1 C2 C3
M	Magnetic		()									Stun	= Unconscious for 1D Turns
N	Bang		SoundProof					<input type="checkbox"/>				Deaf	= Deaf for 1D Turns
O	Stench		Sealed								<input type="checkbox"/>	Stun	= Unconscious for 1D Turns
P	Pain	Armor	Sealed	<input type="checkbox"/>							<input type="checkbox"/>	Stun	= Unconscious for 1D Turns
Q	Cold		Insulation							<input type="checkbox"/>		Freeze	= Hits to C1 C2 C3 C4 C5
R	Rad		RadProof				<input type="checkbox"/>					Hit	= Hits to C1 C2 C3
S	Sound		SoundProof					<input type="checkbox"/>				Stun	= Unconscious for 1D Turns
T	Poison		Sealed								<input type="checkbox"/>	Hit	= Hits to C1 C2 C3
U	Flash		Flashproof			<input type="checkbox"/>						Blind	= Blind for 1D Turns
V	Vacc		Sealed								<input type="checkbox"/>	Suff	= Unconscious for 1D Turns
W	Wound	Armor		<input type="checkbox"/>								Hitt	= Hits to C1 C2 C3
X	Pen	Armor		<input type="checkbox"/>								Hit	= Hits to C1 C2 C3
Y	Grav		()									Hit	= Hits to C1 C2 C3
Z	Tranq		Sealed								<input type="checkbox"/>	Stun	= Unconscious for 1D Turns

= Attack may be stopped by this Armor or Protection. Otherwise, the Armor or Protection is ignored.

Must Penetrate. The act of Penetrating destroys Armor. The Armor value is reduced to Zero.

Must Overwhelm. The act of Overwhelming bypasses a protection. The Protection value is unchanged.

For example, an EMP Projector hits with EMP-3. The Target has protection Cage=5. A successful attack rolls 3D (=10) for Fry against the Target. Cage stops 5 of the 10; the Target receives Fry=5 against its Electronics; a person with Awareness receives Ablind-5. An ordinary human would be unaffected.

Damage

Penetrate P

PENETRATE OVERVIEW

IF an Attack Hits a Target (in the Attack Phase), the effects of the Hit are determined in the Penetrate Phase.

IF the Attack penetrates all Armor and Protection, it then inflicts injury, damage, or wounds.

AGAINST ARMOR

1D per Weapon Effect= Injury
If Injury exceeds Armor Value, reduce:
Armor Value
RadProof
SoundProof all = Zero
Insulated
Sealed

Apply Injury Exceeding Armor to Target. For example, Bullet-2 inflicts 2D against Armor-6. Roll 2D (=7): the Armor and listed Protections are Destroyed. The Target receives 1 Hit.

AGAINST PROTECTIONS

1D per Weapon Effect= Damage
If Damage exceeds Protection Value:

(Protection is Unaffected)

Apply Damage Exceeding Protection to Target. For example, Stench-2 inflicts 2D against Sealed-8. Roll 2D (=12), subtract Sealed-8. The Protection is temporarily Overwhelmed; the target receives 4 Hits.

HIT EFFECTS ON ARMOR AND PROTECTION												Type	Damages Objects
Code	Effect	Must Penetrate	Or Must Overwhelm	Armor	EMCage	Flashproof	Radproof	Soundproof	PsiShield	Insulated	Sealed		
A	Corrode	Armor		<input checked="" type="checkbox"/>								Hit	Yes
B	Bullet	Armor		<input checked="" type="checkbox"/>								Hit	Yes
C	Slash	Armor		<input checked="" type="checkbox"/>								Cut	Yes
D	Blast/Blow	Armor		<input checked="" type="checkbox"/>								Hit	Yes
E	EMP		EMCage		<input checked="" type="checkbox"/>							Fry	Electronics. Inop for Rounds = Fry.
F	Frag	Armor		<input checked="" type="checkbox"/>								Hit	Yes
G	Gas		Sealed								<input checked="" type="checkbox"/>	Suff	---No Effect
H	Hot		Insulation							<input checked="" type="checkbox"/>		Heat	Inoperable for Rounds = Heat.
I	Infection		Sealed								<input checked="" type="checkbox"/>	Hit	---No Effect
J	Psi		PsiShield						<input checked="" type="checkbox"/>			Stun	---No Effect
K	Burn	Armor		<input checked="" type="checkbox"/>								Hit	Yes
L	Elec		Insulation							<input checked="" type="checkbox"/>		Hit	Yes
M	Magnetic		()									Stun	Magnetics. Inop for Rounds = Stun.
N	Bang		SoundProof					<input checked="" type="checkbox"/>				Deaf	---No Effect
O	Stench		Sealed								<input checked="" type="checkbox"/>	Stun	---No Effect
P	Pain	Armor	Sealed	<input checked="" type="checkbox"/>							<input checked="" type="checkbox"/>	Stun	---No Effect
Q	Cold		Insulation							<input checked="" type="checkbox"/>		Freeze	Inop for Rounds = Cold.
R	Rad		RadProof				<input checked="" type="checkbox"/>					Hit	Yes
S	Sound		SoundProof					<input checked="" type="checkbox"/>				Stun	---No Effect
T	Poison		Sealed								<input checked="" type="checkbox"/>	Hit	---No Effect
U	Flash		Flashproof			<input checked="" type="checkbox"/>						Blind	---No Effect
V	Vacc		Sealed								<input checked="" type="checkbox"/>	Suff	---No Effect
W	Wound	Armor		<input checked="" type="checkbox"/>								Hitt	---No Effect
X	Pen	Armor		<input checked="" type="checkbox"/>								Hit	Yes
Y	Grav		()									Hit	Gravitics. Inop for Rounds= Hits.
Z	Tranq		Sealed								<input checked="" type="checkbox"/>	Stun	---No Effect

= Attack may be stopped by this Armor or Protection. Otherwise, the Armor or Protection is ignored.

Must Penetrate. The act of Penetrating destroys Armor. The Armor value is reduced to Zero.

Must Overwhelm. The act of Overwhelming bypasses a protection. The Protection value is unchanged.

For example, an EMP Projector hits with EMP-3. The Target has protection Cage=5. A successful attack rolls 3D (=10) for Fry against the Target. Cage stops 5 of the 10; the Target receives Fry=5 against its Electronics; a person with Awareness receives Ablind-5. An ordinary human would be unaffected.

INJURY

INJURY OVERVIEW

Injury or Damage in excess of those stopped by Armor or Protection is applied to the Target.

For **Non-Player** Characters and Equipment, make a simple assessment of Out-Of-Action if Injury or Damage is 10+.

For **Player** Characters and Equipment, assess detailed Injury and Damage as necessary.

Non-Player Character Injury =	10+	= Out-Of-Action (ignore Injury 9 or less)
Non-Player Object Damage =		= Out-Of-Action (ignore Damage 9 or less)
CHARACTER HIT LOCATION		CHARACTER OBJECT HIT LOCATION
	Location	2D Location
If Injury is Hits or Cuts, Consult Hit Location Table	Head	2 Comms
	Head	3 Cargo
	Left Arm	4 Sensors
For other Injury, go directly to Injury Table	Right Arm	5 Protections
	Torso	6 Life Support
	Torso	7 Locomotion
	Torso	8 Power Source
	Left Leg	9 Body Panels
Automatic Severity= 1	Right Leg	10 Weaponry
	Graze	11 Navigation
	Graze	12 Computer
Automatic Severity= 1		

INJURY	(to Characters)		
Effect	Injury	Inflicts	
Flash	Blind	Blind for Rounds = Injury	
Slash	Cut	Total Cuts / 3 = Wound Severity	
Bang	Deaf	Deaf for Rounds= Injury	
Cold	Freeze	Unconscious if Check C3 fails*	
EMP	Fry	Ablind for Rounds = Injury	
Hot	Heat	Unconscious if Check C3 fails*	
Pen	Hit	Total Hits / 2 = Severity	
B-Bullet	Hit		
Wound	Hit		
A-Corrode	Hit		
Blast/Blow	Hit		
Frag	Hit		
Burn	Hit		
Rad	Hit		
Elec	Hit		
Infection	Hit		
Poison	Hit		
Grav	Hit		
Pain	Stun		Unconscious for Rounds = Injury.
Psi	Stun		
Stench	Stun		
Tranq	Stun		
Magnetic	Stun		
Sound	Stun	Unconscious if Check C3 fails*	
Gas	Suff		
Vacc	Suff		

*Mod -1 per Round of this Injury.

DAMAGE	(to Vehicles and Equipment)		
Effect	Damage	Inflicts	
Slash	Cut	Total Cuts / 3 = Severity	
EMP	Fry	Inoperable for Rounds = Fry.	
Rad	Fry	Total Hits / 2 = Severity	
Hot	Heat		
Cold	Freeze		
Pen	Hits		
Bullet	Hits		
Corrode	Hits		
Blast/Blow	Hits		
Frag	Hits		
Burn	Hits		
Elec	Hits		
Grav	Hits		
Magnetic	Hits		
Bang			No Effect
Flash			
Gas			
Infection			
Pain			
Poison			
Psi			
Sound			
Tranq			
Vacuum			
Stench			
Wound			

Round Fractions Down.

HIT AND INJURY LOCATIONS

VEHICLE HIT LOCATIONS

Comms	2
Cargo	3
Sensors	4
Protections	5
Life Support	6
Locomotion	7
Power Source	8
Body Panels	9
Weaponry	10
Navigation	11
Computer	12

Use this table for vehicles.

SOPHONT HIT LOCATIONS

A Head	2
A Head	3
C LG-2	4
D LG-1	5
B Torso	6
B Torso	7
B Torso	8
E LG-3	9
F LG-4	10
G Tail	11
G Tail	12

This table for non-humans.

HUMAN HIT LOCATIONS

A Head	2
A Head	3
C L Arm	4
D R Arm	5
B Torso	6
B Torso	7
B Torso	8
E L Leg	9
F R Leg	10
G Graze	11
G Graze	12

Use this table for humans.

BIOLOGICAL HIT LOCATIONS

Brain	2
Senses	3
Circulation	4
Skeleton	5
Respiration	6
Skin	7
Digestion	8
Elimination	9
Muscle	10
Skin	11
Skin	12

Use this table for Infections.

The Battle Damage charts show useful alternatives to these tables based on object size and function.

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

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.

THE TYPES OF PROTECTION

Eight distinct types of Protection (including Armor) are available.

Armor. Absorbs impact and resists penetration.

Cage. Blocks electrical and magnetic fields/effects.

FlashProof. Transparent components darken when exposed to high intensity light.

Insulated. Resists temperature differentials and electric charges. Heatproof. Coldproof. Electric insulated.

PsiShield. Resists psionic events.

RadProof. Resists nuclear radiation.

Sealed. Resists gas or liquid penetration. Waterproof. Airtight. Vacuum proof.

SoundProof. Resists sound penetration.

Protection is in points. If, in a single attack, Hits exceed Protection, the excess is applied as Damage to the target.

THE TYPES OF DAMAGE

Nine different forms of Damage are possible.

Blind= Blind for 1D Turns.

Cut= Hits to C1 C2 C3 per Turn.

Deaf= Deaf for 1D Turns.

Freeze= Hits to C1 C2 C3 C4 C5.

Fry= Hits to Electronics. Ablind for 1D Turns.

Heat= Hits C1 C2 C3 C4.

Hit= Hits to C1 C2 C3.

Stun= Unconscious for 1D Turns.

Suff= Hits to C3 C4 C5.

Specials: Grav damages Gravitic devices. Mag damages Magnetic devices.

Hits to Characteristics are applied randomly and in Dice amounts

Per Turn= The same results are applied each turn until first aid or medical attention.

HIT EFFECTS ON ARMOR AND PROTECTION

Code	Effect	Must Penetrate	Or Must Overwhelm	Armor	EMCage	Flashproof	Radproof	Soundproof	PsiShield	Insulated	Sealed	To Inflict
A	Corrode	Armor		☐								Hit = Hits to C1 C2 C3
B	Bullet	Armor		☐								Hit = Hits to C1 C2 C3
C	Slash	Armor		☐								Cut = Hits to C1 C2 C3 per turn.
D	Blast/Blow	Armor		☐								Hit = Hits to C1 C2 C3
E	EMP		EMCage		☐							Fry = Hits to Electronic. Ablind.
F	Frag	Armor		☐								Hit = Hits to C1 C2 C3
G	Gas		Sealed								☐	Suff = Hits to C3 C4 C5
H	Hot		Insulation							☐		Heat = Hits C1 C2 C3 C4
I	Infection		Sealed								☐	Hit = Hits to C1 C2 C3
J	Psi		PsiShield						☐			Stun = Unconscious for 1D Turns.
K	Burn	Armor		☐								Hit = Hits to C1 C2 C3
L	Elec		Insulation							☐		Hit = Hits to C1 C2 C3
M	Magnetic		()									Stun = Unconscious for 1D Turns.
N	Bang		SoundProof					☐				Deaf = Deaf for 1D Turns.
O	Stench		Sealed								☐	Stun = Unconscious for 1D Turns.
P	Pain	Armor	Sealed	☐							☐	Stun = Unconscious for 1D Turns.
Q	Cold		Insulation							☐		Freeze = Hits to C1 C2 C3 C4 C5
R	Rad		RadProof				☐					Hit = Hits to C1 C2 C3
S	Sound		SoundProof					☐				Stun = Unconscious for 1D Turns.
T	Poison		Sealed								☐	Hit = Hits to C1 C2 C3
U	Flash		Flashproof			☐						Blind = Blind for 1D Turns.
V	Vacc		Sealed								☐	Suff = Hits to C3 C4 C5
W	Wound	Armor		☐								Hit = Hits to C1 C2 C3
X	Pen	Armor		☐								Hit = Hits to C1 C2 C3
Y	Grav		()									Hit = Hits to C1 C2 C3.
Z	Tranq		Sealed								☐	Stun = Unconscious for 1D Turns.

☐ = Attack may be stopped by this Armor or Protection. Otherwise, the Armor or Protection is ignored.

Must Penetrate. The act of Penetrating destroys Armor. The Armor value is reduced to Zero.

Must Overwhelm. The act of Overwhelming bypasses a protection. The Protection value is unchanged.

For example, an EMP Projector hits with EMP-3. The Target has Cage=5. A successful attack rolls 3D (=10) for Fry against the Target. Cage stops 5 of the 10; the Target receives Fry=5 against its Electronics; a person with Awareness receives Ablind-5. An ordinary human would be unaffected.

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.

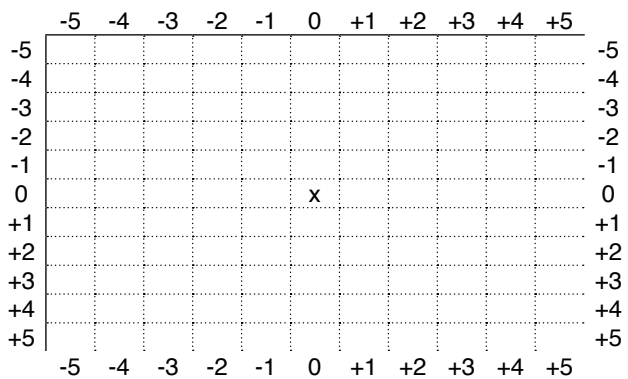
The shot may deviate from a direct hit: roll Flux twice: once for vertical deviation and once for horizontal deviation.

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

He 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

Grenade

Military Explosions

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.

Flash-Bang

Military Explosions

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.

Sixty-Sec

Military Explosions

R=	Proximity	1D-1	Blast	Bang	Frag	Flash
1	Hit	0	1	2	1	
2	Near Miss	1		1		
3	Miss	2				

Alternative Grenade. Attacks as Grenade after a delay (thrown in Turn=1; screams its message all through Turn=2; explodes in Turn=3). Grenade screams (in local language):

"I AM A 60-SECOND GRENADE, 59, 58, 57...." Every individual who hears it Check San.

IED

Military Explosions

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.

Artillery Shell

Military Explosions

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 an incoming attack by distant artillery.

Ortillery Shot

Military Explosions

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).

AF Warhead

Military Explosions

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.

AA Warhead

Military Explosions

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.

Hvy AA Warhead

Military Explosions

R=	Proximity	1D-1	Blast	Bang	Frag	Pen
1	Hit	0	2	2	1	10
2	Near Miss	1	1	1		
3	Miss	2				

Heavy Anti-Armor Warhead (upgraded in effects) attacks tanks and vehicle armor.

Land Mine

Military Explosions

R=	Proximity	1D-1	Blast	Bang	Frag	Flash
1	Hit	0	2	3	10	1
2	Near Miss	1	1	2	2	
3	Miss	2		1		

Land Mine attacks individual who moves into the same Range Band.

AA Land Mine

Military Explosions

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.

A successful attack by these weapons does not necessarily mean 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

N PLAGUE “NI” Biological Weapon

R=	Proximity	Versus		----- Inflicts -----	
		1D-1	Infect	Infect	Poison
0	Contact	0	3	6	1
1	Contact	1	3	4	
2	Touch	2	3	2	
3	Miss	3+	0		

Ni is a contact bio-weapon. It degrades 1 per month.

D PLAGUE “DA” Biological Weapon

R=	Proximity	Versus		----- Inflicts -----	
		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.

R RAD POINT SOURCE “RUUN” Nuclear Weapon

R=	Proximity	Versus		----- Inflicts -----	
		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.

Kh RADIATION “KH” Nuclear Weapon

R=	Proximity	Versus		----- Inflicts -----	
		1D-1	Rad	Rad	
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.

G POISON GAS “GALI” Chemical Weapon

R=	Proximity	Versus		----- Inflicts -----		
		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.

Z POISON GAS “ZALA” Chemical Weapon

R=	Proximity	Versus		----- Inflicts -----		
		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.

T CROWD CONTROL GAS “TAT” Chemical Weapon

R=	Proximity	Versus		----- Inflicts -----		
		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.

V CONTACT POISON “VON” Chemical Weapon

R=	Proximity	Versus		----- Inflicts -----	
		1D-1	Poison	Poison	Tranq
0	Contact	0	3	5	6
1	Contact	1	3	4	3
2	Touch	2	3	1	1
3	Miss	3+	0		

Von is a surface contaminant. It does not degrade.

A successful attack by these weapons does not necessarily mean a Direct Hit. Roll 1D-1 and implement the noted Effects instead. A result which is off the table has no effect.

R= distance from the release point (assumes a random targeting in the area).

Versus= Weapon attacks as stated against armor and protection. If it overwhelms the protection, use **Inflicts=**.

R=	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

NUCLEAR WEAPONS

Suitcase

R=	Proximity	1D-1	Blast	BFE*	Burn	Rad
0	Direct Hit	0	30	30	30	30
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
6	Miss	6				

Suitcase is a portable nuclear weapon.

Tactical

R=	Proximity	1D-1	Blast	BFE*	Burn	Rad
0	Direct Hit	0	50	50	50	50
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
6	Miss	6				

Tactical is a typical battlefield nuclear weapon.

Dirty Tactical is the same weapon with intentional radioactive contamination = 4x Rad.

Strategic

R=	Proximity	1D-1	Blast	BFE*	Burn	Rad
0	Direct Hit	0	100	100	100	100
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
6	Miss	6				

Strategic is a typical strategic nuclear weapon.

*BFE = Bang, Flash, and EMP each in this amount.

*BF= Bang and Flash each in this amount.

Many Dice. Many of the results on these Tables can be implemented more quickly using the Many Dice Rules.

R= distance from the release point (assumes a random targeting in the area).

Versus= Weapon attacks as stated against armor and protection. If it overwhelms the protection, use **Inflicts=**.

R=	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

Massive Explosion

R=	Proximity	Sz-1D	Blast	BFE*	Rad	Burn
0	Direct Hit	5	100	100	100	100
1	Hit	6	90	20	10	30
2	Hit	7	40	15	10	20
3	Vnear Miss	8	30	10	10	10
4	Near Miss	9	10	5	5	5
5	Far Miss	10	5	1	1	1
6	Miss	11				

Assumes Missile-5 Warhead.

Sz-1D is Missile Size minus 1D.

Missiles-4-5-6-7 Warheads inflict Massive Explosion.

Missile-5 is the Benchmark for effects.

Missile-4 inflicts one-tenth damage.

Missile-6 inflicts double damage.

Missile-7 inflicts triple damage.

Non-Nuke ignore EMP and Rad.

Explosive (non-Nuke) inflicts one-tenth damage.

AM Anti-Matter inflicts triple damage.

Effects in Space

Weapons in Vacuum inflict Blast at one-tenth Effect.

Bang=0 if in space or vacuum.

Notice, for example, that a Direct Hit by a Suitcase Nuke inflicts 180D in various Damage (30D each for Blast, Bang, Flash, EMP, Burn, and Rad).

Using These Tables

A successful attack by these weapons does not necessarily mean a Direct Hit. Roll 1D-1 (or Missile Size - 1D for Massive Explosion) and implement the noted Effects instead.

For example, a Tactical (Nuke) attack succeeds. Nevertheless, there is a chance that the center of its effects may be at some distance. Roll 1D-1 (= 1-1) = 0, or essentially the same as a Direct Hit.

Or, Roll 1D-1 (6-1) = 5: a Far Miss with still potential lethal effects.

The table result R=6 is shown for completeness.

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					
	E	Ellipsoid					
	F	Thin-Low					
	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	TC
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	TC
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	Rad-1-2-3			Otherwise quite distant.	
Fallout	Rad-1-2-3					

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.

D Diagnosis Severity. Determine the difficulty of diagnosing the problem.

R Repair Severity. Determine the difficulty of repairing 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 (which may not be obvious). Difficulty = Diagnosis Severity.

To diagnose why this object doesn't work.

Uncertain (Difficulty minus 3).

Anyone may try to diagnose a fault.

Difficulty (nD) < Int + Skill + Diagnostic Tools

Uncertain (Difficulty minus 1).

Mod +1 for each successive diagnosis attempt.

LET'S FIX IT!

Based on the 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 the next Repair Severity +1.

PICKING A SKILL

Characters can volunteer that their particular skill applies to the diagnosis and repair. Obviously wrong skills can be dismissed (the character says: "I don't understand this thing."). Proper or appropriate skills are used (with negative Mods as appropriate).

USEFUL SKILLS

- Biologics
- Craftsman
- Electronics
- Fluidics
- Gravitics
- Magnetics
- Mechanic
- Photonics
- Polymers
- Programmer
- Medical

L1 DAMAGE LOCATION -1

2D	Vehicle	Ship	Hvy Wpns	Armor	Anatomical	Biological
2	Comms	Bridge	Controls	Controls	Head	Brain
3	Cargo	Hold	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	Locomotion	Drives	Barrel	Legs	Torso	Skin
8	Power Source	Power Plant	Power	Power	Torso	Digestion
9	Body Panels	Hull	Frame	Torso	Limb Group-3	Elimination
10	Weaponry	Weaponry	Ammunition	Manipulators	Limb Group-4	Muscle
11	Navigation	Astrogation	Mechanism	Navigation	Graze	Skin
12	Computer	Computer	Computer	Computer	Graze	Skin

L2 DAMAGE LOCATION -2

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

DR SEVERITY

1D	How Severe?
1	Easy 1D
2	Average 2D
3	Difficult 3D
4	Formidable 4D
5	Staggering 5D
6	Hopeless 6D

Immediate Action (Damage Control)

For any malfunction, identify appropriate skill and

Check Skill (2D)

Success converts Severity to Easy 1D and the device remains operable (but a result of 12 is automatic failure).

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 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.

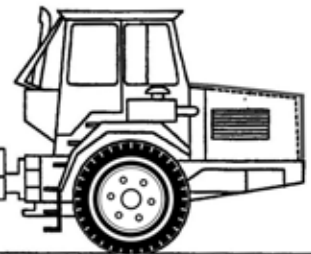
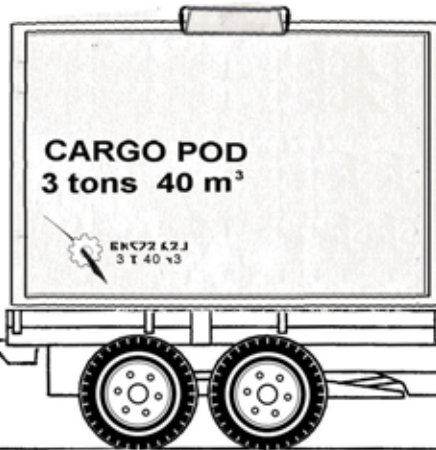
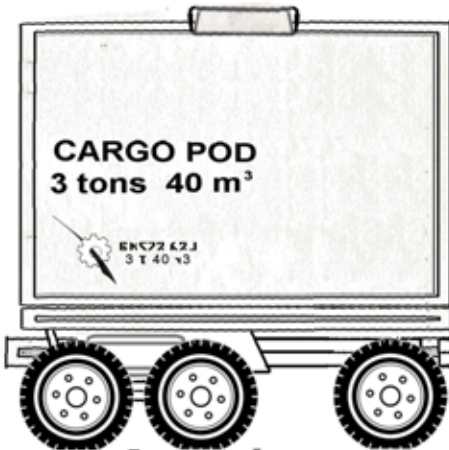
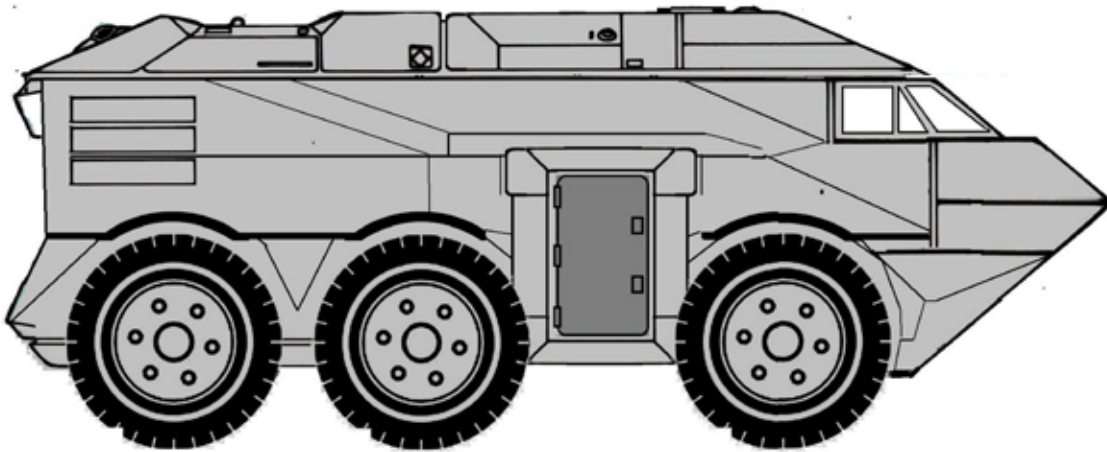
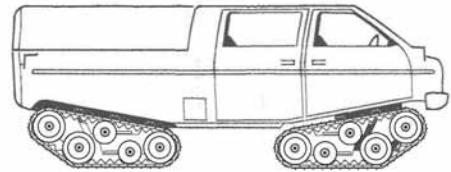
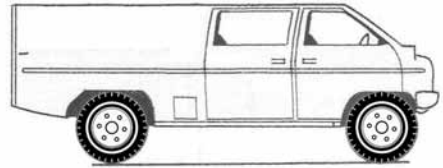
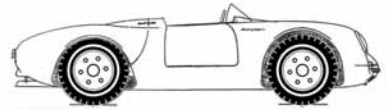
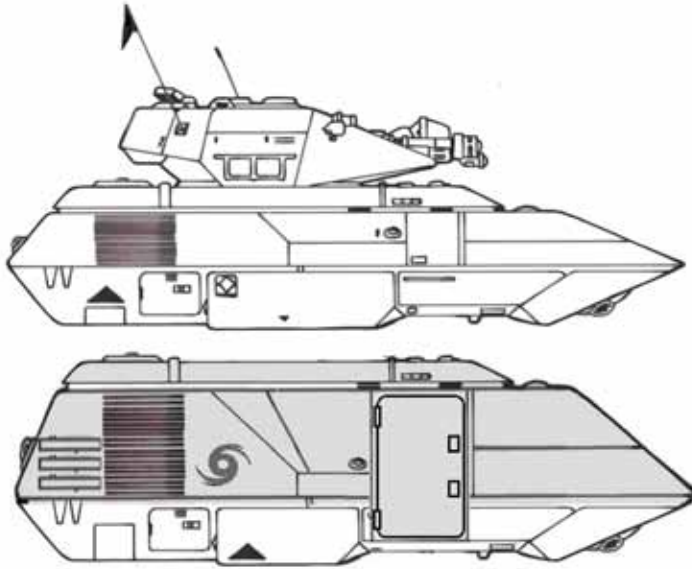
Damage applies to equipment.

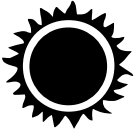
BTSD MODS

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.



	Vehicle Name
	Model _____ LongName (Bulk - Motive - Mission - Type -User - TL)

Vx: VEHICLE EXTENSION

	Tons	Speed	Load	Stage	Environ	Endurance	QREBS	Options
Vx:	Tons=	Speed=	Load=					

The basic information required to use a vehicle.

Wx: WEAPON EXTENSION

	Range	Cost	Mass	QREBS	Effect1	Effect2	Effect3
Wx:	R=	Cr	kg				

The basic information required to use a weapon mounted on a vehicle.

VEHICLE HIT LOCATIONS

Paste any **Traveller** vehicle image here.

Include a human figure for scale.

Comms	2
Cargo	3
Sensors	4
Protections	5
Life Support	6
Locomotion	7
Power Source	8
Body Panels	9
Weaponry	10
Navigation	11
Computer	12

Use this table for vehicles.

ARMOR / PROTECTION

Armor	
Cage	
FlashProof	
RadProof	
SoundProof	
PsiShield	
Insulated	
Sealed	

COMMENTS

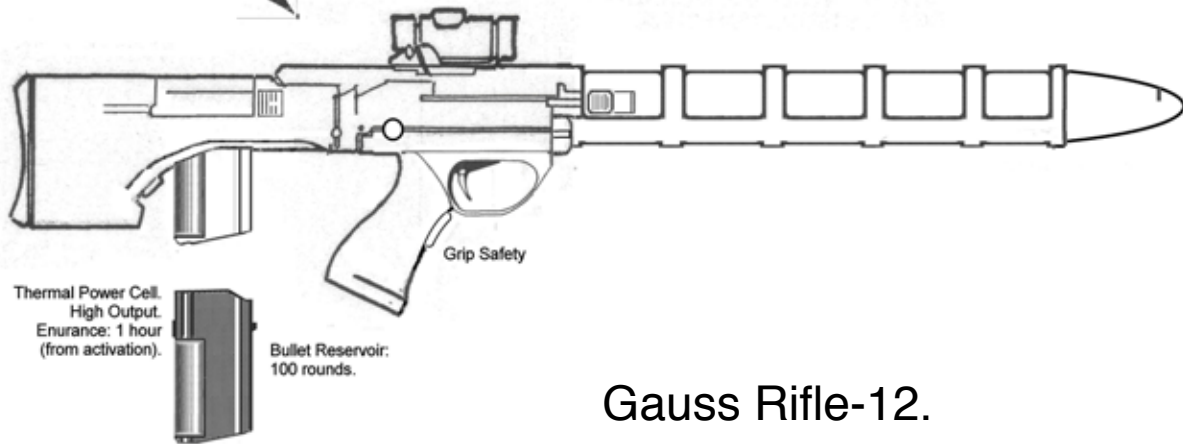
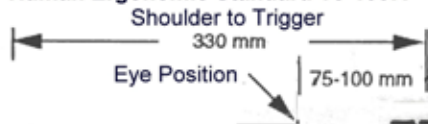
Q	R	E	B	S	Period	Age

Human Ergonomic Standard T5-100:1



Precision Hunting Carbine-11.

Human Ergonomic Standard T5-100:1



Gauss Rifle-12.

Advanced Magnum Revolver-8.



The Armory

A continuing challenge for adventurers is seeking out 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 gaint. 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).

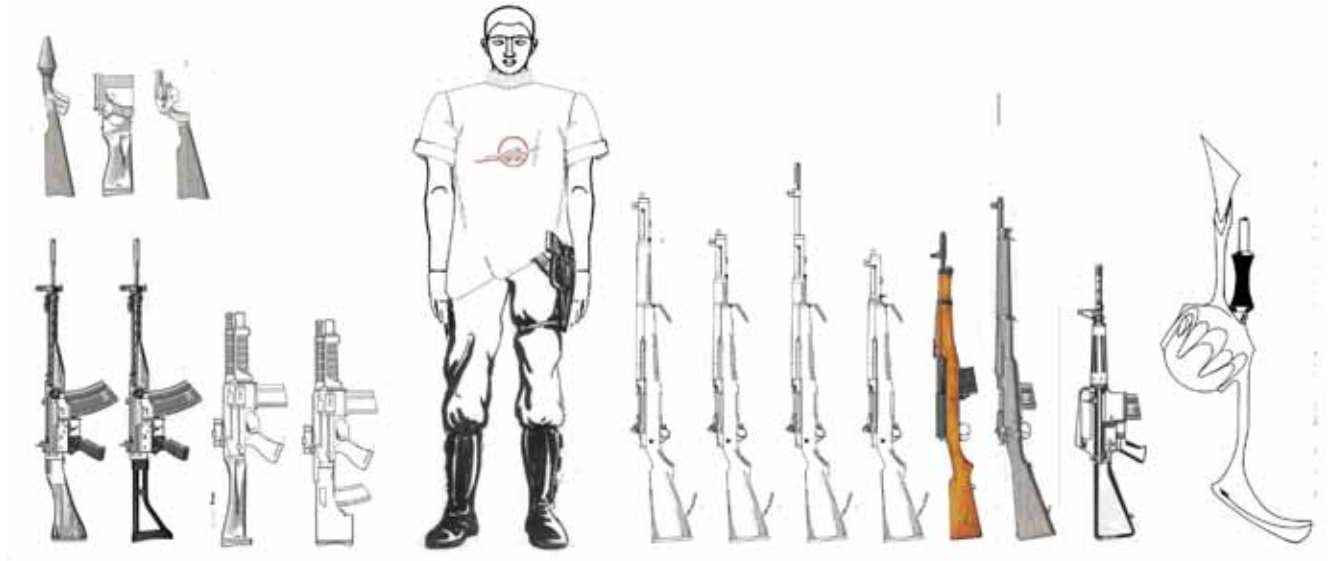
"What's in here? Plasma Gun Man Portable-12. These are still new in the crate. See if there are any BattleDress crates. How are we going to get this stuff back to the ship?"

TYPICAL WEAPONS AVAILABILITY

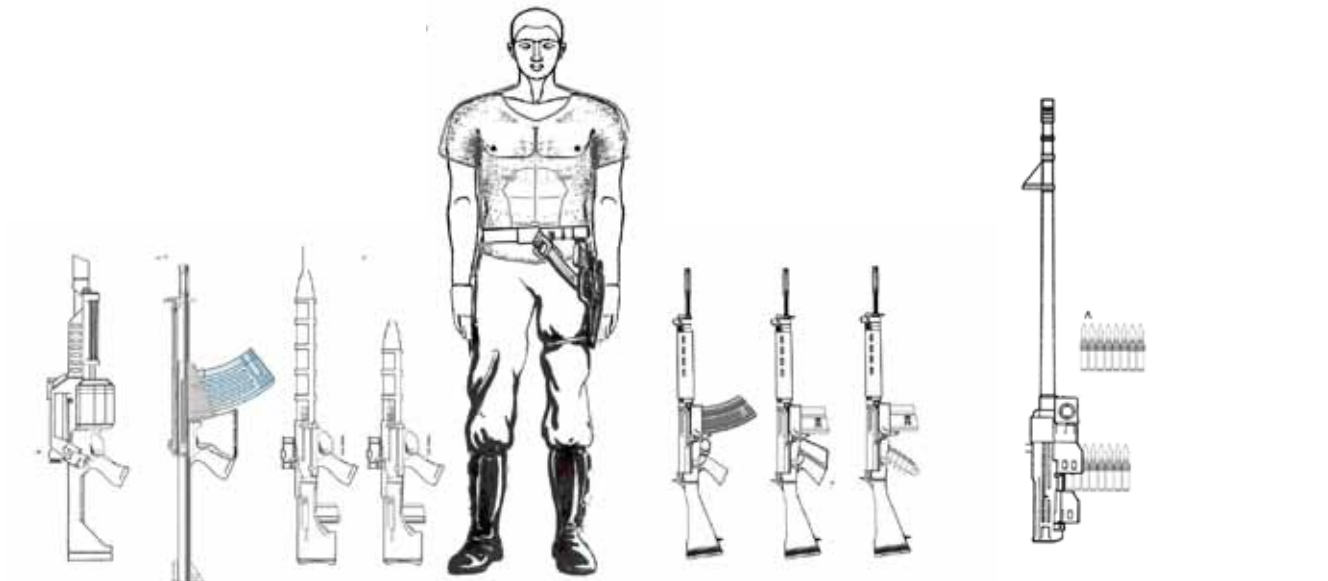
Location	Contents
Weapons Shop	10 different Rifle 10 different Pistol 3 different Shotgun
Armory	10 identical Rifle 5 identical Pistol 2 different Gun 2 different Projectors or Launcher
Cache	10 identical Rifle 5 identical Pistol 2 different Remote Weapon 1 Designator and 1 Launcher
Property Disposal	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: Sonic Projector-12 with shoulder stock option. VRF Snub Pistol-8 with shoulder stock option. Snub Re-
 volver-5 with shoulder stock option.

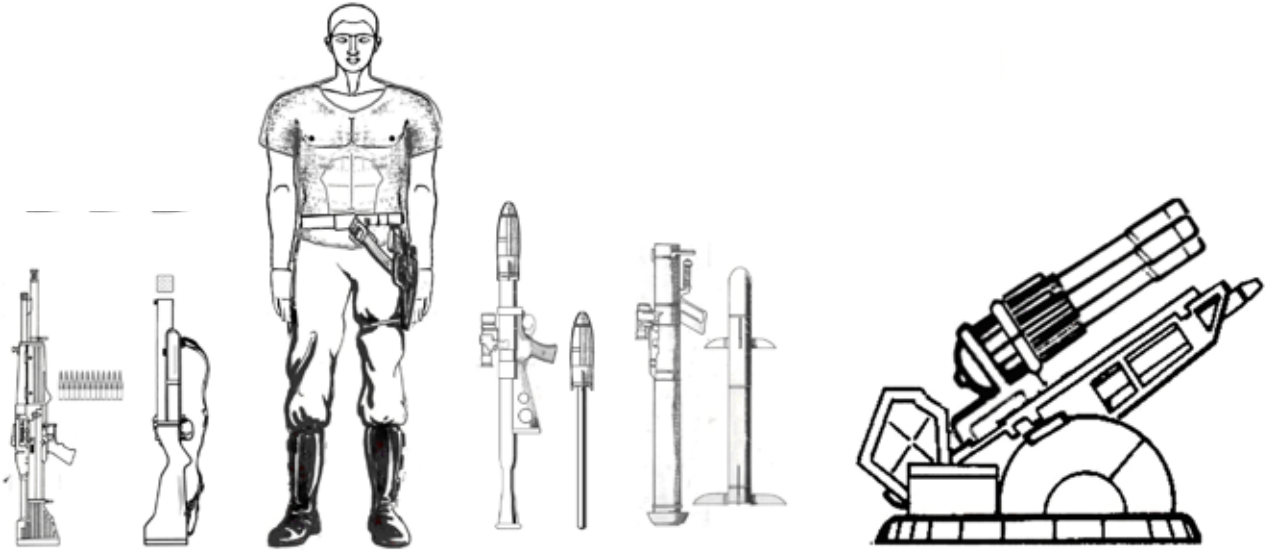


Left to Right: Battle Rifle-6. Battle Rifle-6 with folding stock option. Grenade Multi-Launcher-9. Advanced Combat Ri-
 fle-10. [typical human]. Basic Rifle-5. Snub Rifle-6. Sniper Rifle-6. Basic Carbine-5. Alternate Rifle-5. Early Rifle-4. Early Battle
 Rifle-5. Alternate Light Combat Rifle -10 (Hiver).

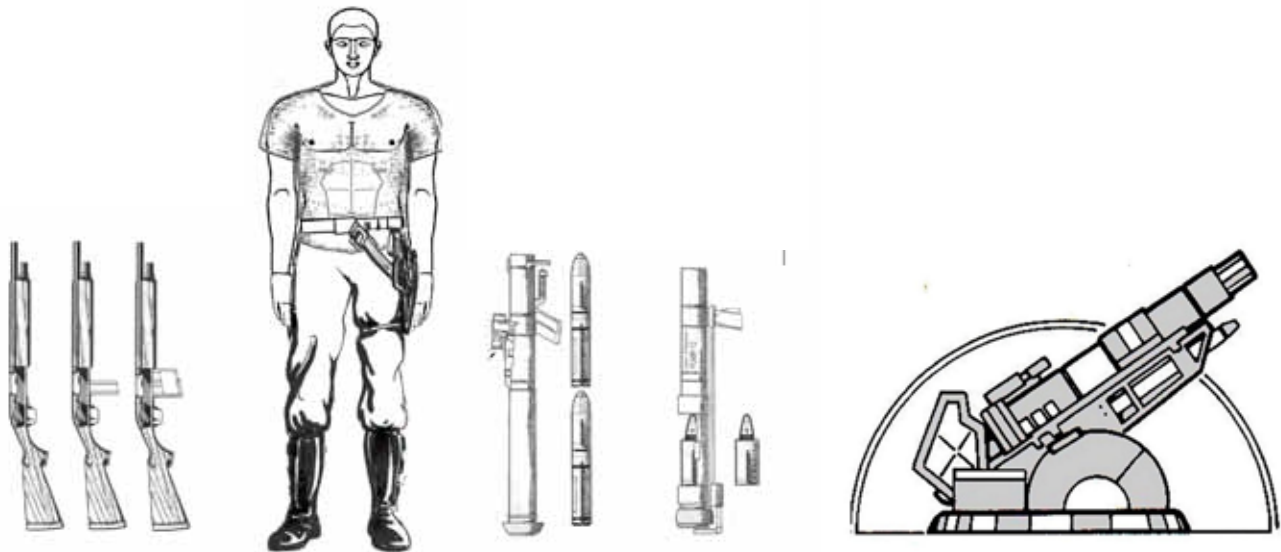


Left to Right: Heavy Grenade Multi-Launcher-9. Recoilless Combat Rifle-8. Gauss Rifle-12. Gauss Carbine-12. [typical
 human]. Combat Rifle-7. Combat Rifle-7 with Grasper controls. Combat Rifle-7 with Tentacle controls. Basic Heavy Machine-
 gun-6.

Weapons 02



Lower 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)

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=3 Cr400 3 kg Bullet -1
XC-3	Experimental Carbine -3 R=2 Cr1600 6 kg Bullet -1
PC-6	PC-6 Poison Dart Carbine -6 R=4 Cr1200 1.8 kg Poison -2 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
GMP-6	Gun Man Portable -6 R=5 Cr5000 9 kg Pen-2
GaC-7	Gatling Crewed -7 R=4 Cr8000 40 kg Pen-3
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 Cr16200 5.7 kg Bullet -4
ABR-9	ABR-9 Advanced Battle Rifle -9 R=5 Cr800 3.2 kg Bullet -5
ABC-9	ABC-9 Advanced Battle Carbine -9 R=5 Cr640 2.4 kg Bullet -4
ACR-10	ACR-10 Advanced Combat Rifle -10 R=3 Cr1300 2.8 kg Frag -4 Bullet -2
ACC-10	ACC-10 Advanced Combat Carbine -10 R=3 Cr1040 2.1 kg Frag -4 Bullet -1
AC-7	AC-7 Assault Carbine -7 R=4 Cr600 2.4 kg Bang -1 Blast -2 Bullet -1
GC-12	GC-12 Gauss Carbine -12 R=3 Cr1200 2.7 kg Bullet -3
MsIL-7	MsIL-7 Missile Launcher -7 R=6 Cr3000 17 kg Pen-2 Frag -3
RAML-8	RAML-8 RAM Grenade Launcher -8 R=6 Cr3000 8 kg Blast -2 Frag -3
GmL-9	GmL-9 Grenade Multi-Launcher -9 R=4 Cr3000 8 kg Blast -2 Frag -3
ShPj-9	ShPj-9 Shock Projector -9 R=2 Cr600 0.5 kg Pain -2 Elec -2
FPj-8	Fire Projector -8 R=2 Cr600 0.9 kg Pen-1 Burn -2
APj-9	Acid Projector -9 R=3 Cr900 1 kg Pen-2 Acid-3
SPj-12	Stench Projector -12 R=2 Cr360 0.4 kg Stench -2
LD-12	Laser Designator -12 R=5 Cr4000 12 kg Pen-2 Burn -3

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

GunMaker

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.

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 ordi-

narily or otherwise encountered.

A Designator marks or illuminates potential targets so that other weapons may attack them.

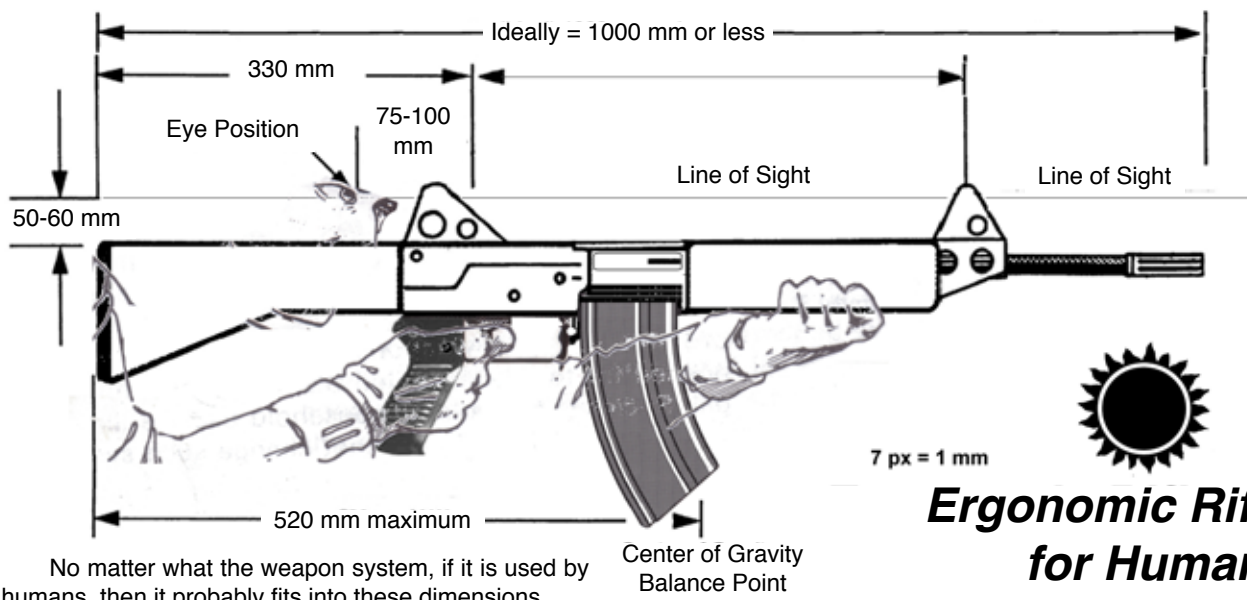
A Launcher ejects or launches self-propelled projectiles at a target.

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.



No matter what the weapon system, if it is used by humans, then it probably fits into these dimensions.

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.					

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 un-

derstanding 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:

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 and D2, and H3 and D3, 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 the 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 Weapons 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:

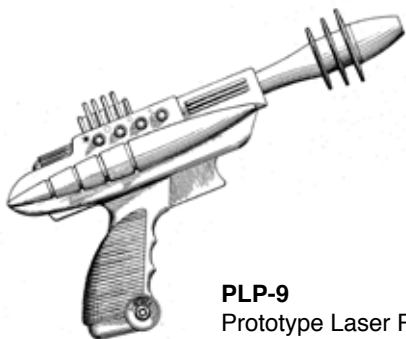
Type (or SubType), Descriptor, Burden, and Stage.

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.



PLP-9
Prototype Laser Pistol-9



ExAcRe-6
Experimental Accelerator Revolver-6

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 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).



ImP-6
Improved Pistol-6

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 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. 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-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 Missile. The weapon launches a missile which attacks Tanks or other Armor. For example, Anti-Tank Missile Multi-Launcher.

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, Assault 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 approximately 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.

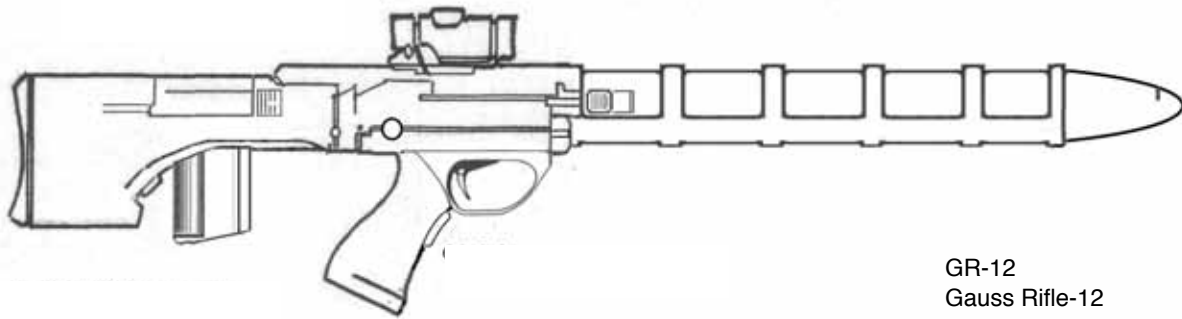
Rad. The weapon projects radiation effects at the target. For example, Rad Projector.

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.



GR-12
Gauss Rifle-12

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 strong 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 the standard weapon and thus easier to carry, but at a reduction in range.

Magnum (applies only to Pistols and Revolvers). The Pistol or Revolver is heavier than standard and has 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.

Heavy. The weapon is extremely heavy, but has longer range and inflicts greater damage.

Vlight (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.

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.

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.

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

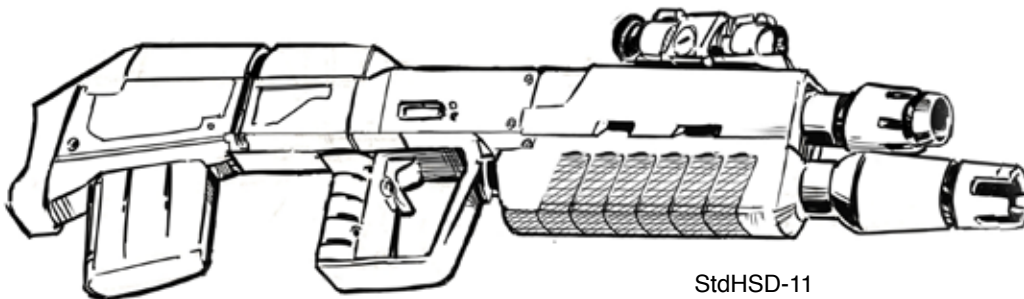
Any acquired weapon is ordinarily assumed to be QREBS=00000 (with no effects under QREBS system).

If the Weapon Design System imposes any QREBS elements (for example, B= -2), that imposed element applies to the weapon.

As Issued. A weapon with only the imposed QREBS elements is considered 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.

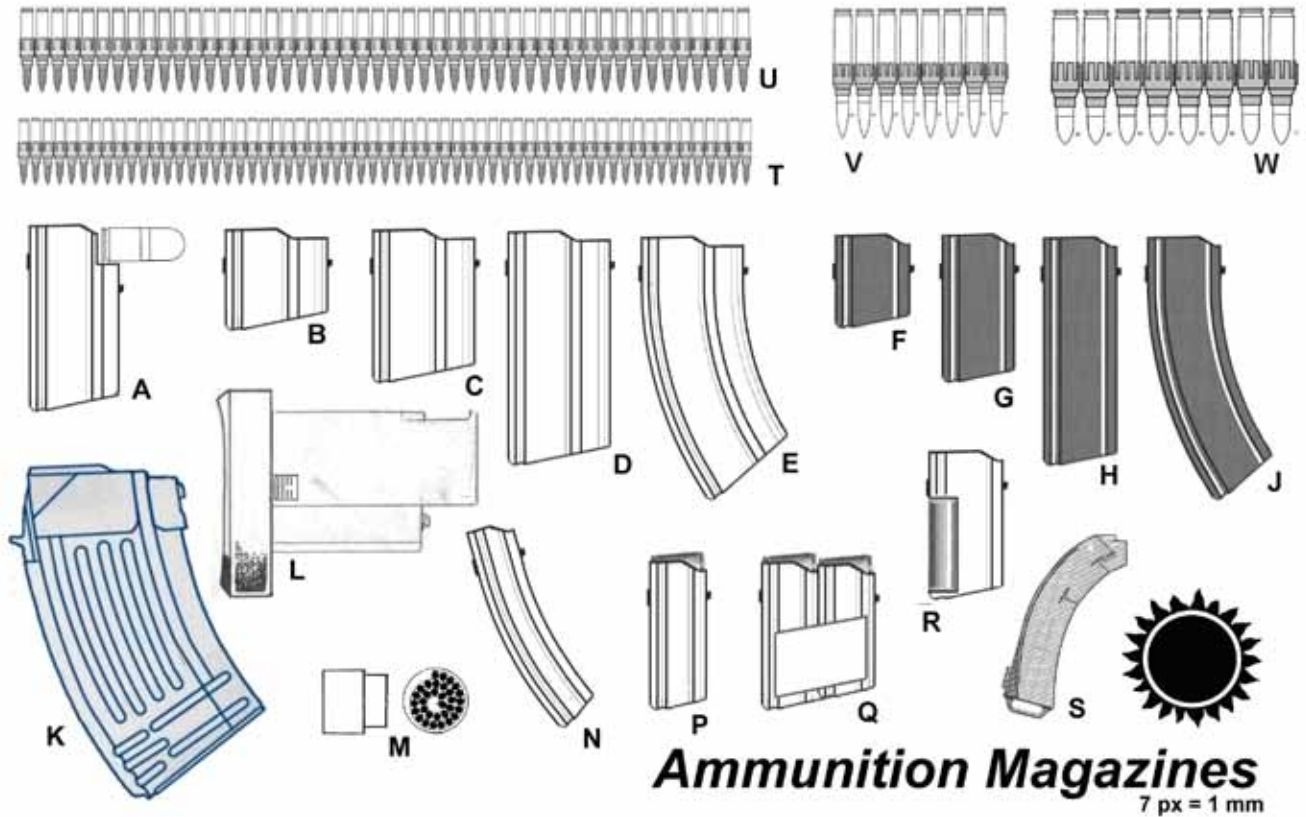
For example, Captain Sir Mark Poles has acquired a Prototype Vheavy Gauss Carbine with QREBS Burden +5. The other elements are all zero. In an attempt to have a better weapon, he specifies it is Used. The Referee rolls for all five QREBS elements. -1 +2 -3 -4 -1. The -4 brings the existing Burden down to +1. The Used weapon becomes QREBS -1 +2 -3 -1 -1. Sir Mark is better served by looking for a better weapon.



StdHSD-11
Standard Heavy Sonic Designator-11

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.

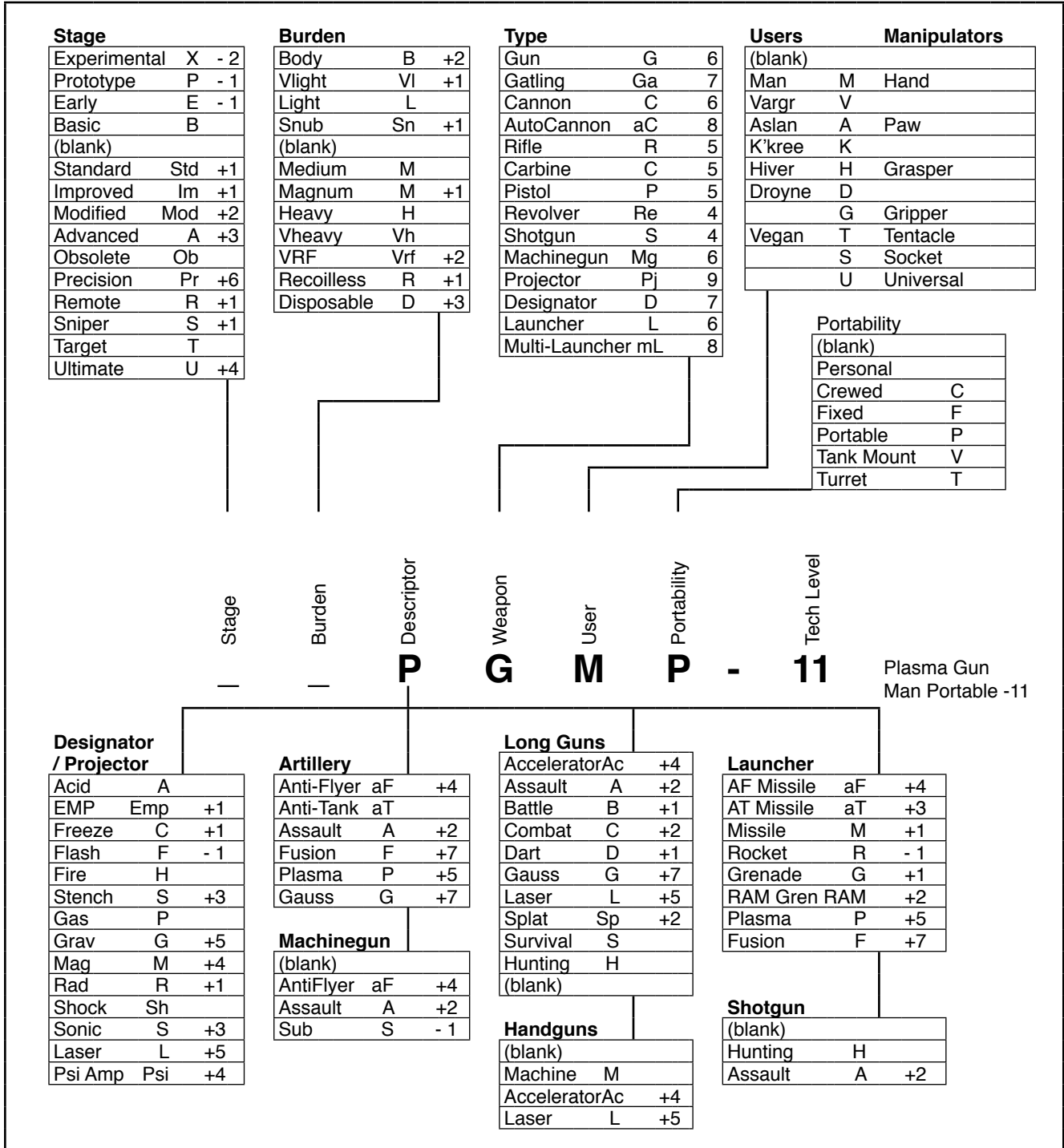
Typical Magazines for Typical Weapons

- 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 Vheavy Carbine Magazine (= 12 rounds).
- L. 5 mm Bullpup Cassette (= 200 rounds plus 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 (the archaic .50 caliber) Machinegun Ammunition

Weapons

Decode the elements describing weapons using this chart.

GunMaker 01



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.

WEAPONS MANUFACTURER

Manufacturer		
Surface or Orbital Factory?	TL	Law Level

WEAPONS

Q	R	E	B	S
---	---	---	---	---

Chart	Item	Description	Model	TL	Range	Mass	Burden	H1	D1	H2	D2	H3	D3	KCr	Cr
														,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)
<input type="text"/>	<input type="text"/>

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 the Category and Type of Weapon from this Chart.

GunMaker 03

CATEGORIES

Category	Code	Type	TL	Range	Mass	qrBs	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	Bullet	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 is determined by other details of the weapon.

TL= Tech Level. qrBs= Burden or Bulk. H1= First Hit Type. D1= First Hit Dice.

EFFECTS, ARMOR, AND DAMAGE

Code	Type	Effect	Type
A	Corrode	Armor	Hit
B	Bullet	Armor	Hit
C	Cut	Armor	Cut
D	Blast/Blow	Armor	Hit
E	EMP	EMCage	Fry
F	Frag	Armor	Hit
G	Gas	Sealed	Suff
H	Hot	Insulation	Heat
I	Infection	Sealed	Hit
J	Psi	PsiShield	Stun
K	Burn	Armor	Hit
L	Elec	Insulation	Hit
M	Magnetic		Stun
N	Bang	SoundProof	Deaf
O	Stench	Sealed	Stun
P	Pain	Armor+Sealed	Stun
Q	Cold	Insulation	Freeze
R	Rad	RadProof	Hit
S	Sound	SoundProof	Stun
T	Poison	Sealed	Hit
U	Flash	Flashproof	Blind
V	Vacc	Sealed	Suff
W	Wound	Armor	Hit
X	Pen	Armor	Hit
Y	Grav		Hit
Z	Tranq	Sealed	Stun

WEAPONS SKILLS AND CHARACTERISTICS

Based on Weapon Used:	Skill	Characteristic
Portable	BattleDress	+ Dexterity
Fixed, Tank Mount	Artillery	+ Intelligence
Laser, Fusion, Plasma	Beams	+ Dexterity
Gun, Gatling, Cannon, Autocannon	Artillery	+ Intelligence
Launcher	Launcher	+ 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, Martial Arts	Unarmed	+ Strength
Designator	Fwd Observer	+ Dexterity
Fires Bullets (and not otherwise assigned)	Slug Thrower	+ Dexterity

WEAPON RANGES

Range	Distance	Benchmark
0	contact	contact
1	Vshort	5 meters
2	Short	50 meters
3	Medium	150 meters
4	Long	500 meters
5	Vlong	1000 meters
6	Distant	5 km
7	Vdistant	50 km
8	Orbital	500 km
9	Far Orbit	5000 km

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.

Category	Code	Descriptor	TL	Range	Mass	greBs	H2	D2	H3	D3	Hits (v1)	Cr
Artillery	aF	Anti-Flyer	+4	=6	x6.0		Frag	1	Blast	3	4	x 3.0
(includes	aT	Anti-Tank		=5	x8.0		Pen	3	Blast	3	6	x 2.0
Guns, Cannon,	A	Assault	+2	=4	x0.8		Bang	1	Blast	2	3	x 1.5
AutoCannon,	F	Fusion	+7	=4	x2.3		Pen	4	Burn	4	8	x 6.0
Gatling)	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 Guns		(blank)			x1.0							
(includes	Ac	Accelerator	+4		x0.6		Bullet	2			2	x 3.0
Rifles, Carbines)	A	Assault	+2	=4	x0.8		Bang	1	Blast	2	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
Handguns		(blank)			x1.0							
(includes	Ac	Accelerator	+4		x0.6		Bullet	2			2	x 3.0
Pistols, Revolvers)	L	Laser	+5	=4	x1.2		Burn	2	Pen	2	4	x 2.0
	M	Machine		=3	x1.2		Bullet	2				x 1.5
Shotguns		(blank)			x1.0							
	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
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
	S	Sub	-1	=2	x0.3		Bullet	-1			-1	x 0.9
Spray Designators	A	Acid		=3	x1.0	+1	Acid	2	Pen		4	x 3.0
And Projectors	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
	S	Stench	+3	=2	x0.4		Stench	1-2-3			1-2-3	x 1.2
Exotic	Emp	EMP	+1	=3	x1.0		EMP	1-2-3			1	x 4.0
Designators	F	Flash	-1	=2	x0.5		Flash	1-2-3			2	x 1.5
And Projectors	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
	S	Sonic	+3	=2	x0.6		Sound	1-2-3	Bang	1-2-3	2-4-6	x 1.1
Launchers	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

	Code	Descriptor	TL	Range	Mass	qreBs	Misc	D	Comment	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		x 2.0
	Lt	Light	0	-1	x0.7	-1		-1		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	
A		Advanced	+3	0	x0.8	-2		2		x 2.0
Alt		Alternate	+1	1	x1.1	0		2		x 1.1
B		Basic	0	0	x1.3	0		0		x 0.7
E		Early	-1	-1	x1.7	+1		0	EOU - 2	x 1.2
X		Experimental	-2	-1	x2.0	+3	R=- 2	0		x 4.0
Im		Improved	+1	0	x1.0	0	R=+2	1	EOU + 2	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	-1	-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	+1	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
UI	Ultimate	+4	0	x0.7	-2	R= +2	2		x 1.4	
Users		(blank)	0	0	x1.0	0	EOU= 0			
	M	Man	0	0	x1.0	0	EOU= 0			
	V	Vargr	0	0	x1.0	0	EOU=- 1			
	A	Aslan	0	0	x1.0	0	EOU=- 2			
	K	K'kree	0	0	x1.3	+2	EOU= 0			
	H	Grasper	0		x1.0	0	EOU= -1		Includes Hivers.	
	P	Paw	0		x1.0	0	EOU= -1		Includes Aslan.	
	G	Gripper	0		x1.0	0	EOU= -2			
	T	Tentacle	0		x1.0	0	EOU= -2		Includes Vegans.	
	S	Socket	0		x1.0	0	EOU= -2			
	U	Universal	0		x1.1	+1	EOU= -1		Usable by ANY manipulator.	
	<S>	Sophont							(insert appropriate information)	

Calculate Portability

						Min Mass	Max Mass		Portability
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 *
	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	+1	0	x1.0	0	1,000	100,000	F Fixed

* or Semi-Portable

06 GunMaker

Special Effects

Specific weapons have distinct capabilities or effects depending on the weapon type, descriptor, and other elements.

		Recoil	Loud	Flash	Heat	Vacc	UW	CQ	
Burden	Recoilless	No	-	-	-	-	-	No	
	Snub	Yes	-	-	-	-	R=1	Yes	
	Vheavy	Hi	-	-	-	-	-	-	
	VRF	Hi	-	-	-	-	No	No	
Descriptor	Accelerator	No	-	-	-	-	No	-	
	Acid	No	-	-	-	-	R=0	-	
	AF Missile	No	Loud	Bright	Hot	-	No	No	
	AT Missile	No	Loud	Bright	Hot	-	No	No	
	AT Rocket	No	Loud	Bright	Hot	-	No	No	
	Dart	No	-	-	-	-	R=1	-	
	EMP	No	-	-	-	-	-	-	
	Fire	No	-	Bright	Hot	-	No	-	
	Flash	No	-	Bright	-	-	R=3	-	
	Freeze	No	-	-	-	-	R=0	-	
	Fusion	Hi	-	Bright	Hot	-	R=2	-	
	Gas	No	-	-	-	No	No	-	
	Gauss	Yes	-	Mag	-	-	No	-	
	Grav	No	-	-	-	-	-	-	
	Grenade	Yes	-	-	-	-	R=1	-	
	Laser	No	-	Bright	-	-	R=2	-	
	Mag	No	-	Mag	-	-	-	-	
	Missile	No	-	Bright	Hot	-	No	-	
	Plasma	Hi	-	Bright	Hot	-	R=2	-	
	Poison Dart	No	-	-	-	-	R=1	-	
	Poison Gas	No	-	-	-	No	No	-	
	Psi Amp	No	-	-	-	-	-	-	
	Rad	No	-	-	-	-	R=1	-	
	RAM Gren	No	Loud	Bright	Hot	-	R=1	-	
	Rocket	No	-	Bright	Hot	-	No	-	
	Shock	No	-	Bright	Hot	-	R=0	-	
	Sonic	No	Loud	-	-	No	R=1	-	
	Splat	Yes	-	-	-	-	No	-	
	Spray/ Stench	No	-	-	-	No	No	-	
	Trang	No	-	-	-	No	No	-	
	Type	AutoCannon	Hi	Vloud	-	-	-	No	No
		Cannon	Hi	Vloud	-	-	-	No	No
Carbine		Yes	Loud*	-	-	-	No	-1	
Designator		Yes	-	-	-	-	-	-3	
Gatling		Hi	Vloud	-	-	-	No	No	
Gun		Hi	Vloud	-	-	-	No	-3	
Launcher		No	-	-	-	-	-	-3	
Machinegun		Yes	Loud	-	-	-	No	-3	
Multi-Launch		No	-	-	-	-	No	-3	
Pistol		Yes	Loud*	-	-	-	No	+2	
Projector		No	-	-	-	-	-	-	
Revolver		Yes	Loud*	-	-	-	No	+2	
Rifle		Yes	Loud*	-	-	-	No	-5	
Shotgun		Yes	Loud	-	-	-	-	-3	

* But Not Laser.

THE HIERARCHY OF SPECIAL EFFECTS

Special effects are unusual positive or negative consequences of the weapon design.

Recoil

Recoil disorients a user in Zero-G situations. Hi-recoil disorients.

Yes = weapon has recoil.

Hi = weapon has high recoil.

No = weapon has no recoil and is preferred in Zero-G situations.

Loud

Some weapons make a loud noise when operated (all weapons are Silent in Vacuum).

Loud = Bang-1. Weapon can be silenced (by attachment of a separate Silencer).

Vloud = Bang-2. Weapon cannot be silenced.

No entry = The weapon is silent.

Flash

Some weapons emit a flash when operated.

Bright = Flash-1. Weapon flash is Bright (across all vision bands).

Mag = Mag-1. Weapon flash is Mag.

No entry = Weapon has no flash.

Heat

Some weapons get hot in operation.

Hot = weapon emits heat.

No entry = weapon emits no heat.

Vacc

Some weapons don't work in Vacuum.

No = weapon unusable in Vacuum.

No entry = Vacuum has no effect.

UW (UnderWater)

Some weapons don't work underwater.

No = cannot be used Underwater.

Range=N is the maximum range the weapon may be used underwater.

CQ (Close Quarters)

Some weapons cannot be used in close quarters (typically inside buildings and starships).

No = unusable in Close Quarters.

Yes = preferred in Close Quarters.

N (any Number) = EOU Mod for this weapon 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	QREBS
a	Low Signature- Visual. Camouflaged	Mod -2 for Visual Detection.	-1 S
b	Low Signature Metal. Plastic Construction.	Mod -4 for Metal Detection.	-1 S
c	Quiet. Silenced.	Converts Loud to Quiet.	-1 E
d	Folding Stock. Collapsing Stock. Close Quarters.	Mod +2 for EOU in Close Quarters.	-2 R
e	Stable Platform. Gyroscopic. Shoulder Stock for Pistols.	Reduces Difficulty 1D.	-1 E
f	Flash Suppressor Visual.	Mod -4 Visual Detection in Darkness.	-1 B
g	Hot Environment Adapted. Insulated.	Mod +3 Reliability in Hot Environment.	-3 E
h	Corrosive Environment Adapted. Anti-Corrosion Coating.	Mod +3 Reliability in Corrosive Environment.	-3 E
i	Cold Environment Adapted. Insulated.	Mod +3 Reliability in Cold Environment.	-3 E
j	Amplification or Magnification Sights.	Increase Maximum Range +1*	-2 E
k			
l			
m			
n			
o	Locked to Key.	Usable only if in possession of Key.	-2 R
p	Locked To User.	Usable only by Current Identified User.	-2 R
q			
r-	Sight Input is []	V- Vision H-Sound S-Smell	
s-	Sight Display Output is []	T-Touch A-Awareness P-Perception	
t-			
w			
x	Sensor Acquisition and Tracking of Target.	Specify Sensor. Used with Type: Guns only.	
y			
z			

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. It may include a magnification element. Selection of an Option requires QREBS Mod as well.

* Changes Range to one Range Band closer.

08 GunMaker

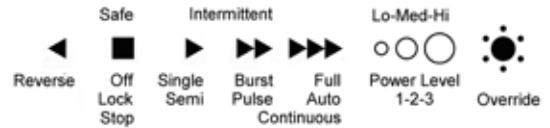
Controls

The capabilities of weapons are reflected in their controls. These charts determine the controls to be expected on weapons.

WEAPON CONTROL MARKINGS

Type	Off	Single	Burst	Full	P1-P2-P3	Override
Gun	Off	Single	-	-	-	Override
Gatling	Off	-	Burst	Full	-	Override
Cannon	Off	Single	-	-	-	Override
Autocannon	Off	-	Burst	Full	-	Override
Rifle or Carbine	Off	Single	-	-	-	-
Pistol or Revolver	Off	Single	-	-	-	-
Shotgun	Off	Single	-	-	-	-
Machinegun	Off	-	Burst	Full	-	-
Launcher	Off	Single	-	-	-	Override
MultiLauncher	Off	Single	Burst	-	-	Override
Designator	Off	-	-	Full	P1-P2-P3	Override
Projector	Off	Single	-	-	-	Override
Descriptor	Off	Single	Burst	Full	P1-P2-P3	Override
Accelerator	Off	-	Burst	-	P1-P2-P3	-
Acid	Off	-	-	-	-	-
AF or AT Missile	Off	-	-	-	-	-
Anti-Flyer	Off	-	Burst	Full	-	-
Anti-Tank	Off	-	-	-	-	-
Assault	Off	-	Burst	-	-	-
Battle	Off	-	-	-	-	-
Combat	Off	-	-	Full	-	-
Dart	Off	Single	-	-	P1-P2-P3	-
EMP	Off	-	-	-	P1-P2-P3	-
Fire	Off	-	-	-	P1-P2-P3	-
Flash	Off	-	-	-	P1-P2-P3	-
Freeze	Off	-	-	-	P1-P2-P3	-
Fusion	Off	-	-	-	-	-
Gauss	Off	-	Burst	-	-	-
Grav	Off	-	-	-	P1-P2-P3	-
Grenade	Off	Single	-	-	-	-
Hunting	Off	-	-	-	-	-
Laser	Off	-	Burst	-	P1-P2-P3	-
Mag	Off	-	-	-	P1-P2-P3	-
Missile	Off	Single	-	-	-	-
Plasma	Off	-	-	-	-	-
Poison Gas	Off	-	-	-	P1-P2-P3	-
Psi Amp	Off	-	-	-	P1-P2-P3	-
Rad	Off	-	-	-	P1-P2-P3	-
RAM Grenade	Off	-	-	-	-	-
Rocket	Off	-	-	-	-	-
Shock	Off	Single	-	**	P1-P2-P3	-
Sonic	Off	Single	-	**	P1-P2-P3	-
Splat	Off	-	-	-	-	-
Stench	Off	-	-	-	P1-P2-P3	-
Sub	Off	Single	Burst	Full	-	-
Survival	Off	-	-	-	-	-

** Called Continuous.



WEAPON CONTROL OPERATION

The following weapon controls are available.

Off. The weapon is inactive. This control is a safety. Manipulating it again turns the weapon on. A mishap is impossible if this control is Off.

Single. The weapon fires one shot per pull of the trigger.

Burst. The weapon fires three shots per pull of the trigger.

Full. The weapon fires shots until the trigger is released. For some weapons marked **, manufacturers call this “continuous” instead.

P1-P2-P3. The weapon has three settings for power level. The standard level is P1 and corresponds to 1D damage in each of the possible damage types for the weapon.

Power Level P2 corresponds to 2D damage; the user must roll Quality or less to avoid weapon malfunction.

Power Level P3 corresponds to 3D damage; the user must roll Quality or less TWICE to avoid weapon malfunction.

Override. The weapon has a battlefield override. If the weapon malfunctions, this control will force it to function, although damage may result.

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 Laser to Rifle adds P1-P2-P3 to become Off-Single-Burst-P1-P2-P3.

Creating Guns

Most personal and military weapons can be created using this chart

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		
	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
2D	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	
	2 Sophont	Socket
	3 Droyne	
	4 Vegan	Tentacle
	5 Vargr	Universal
2D	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	1 Guns
	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	2 Rifles
	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	Shotgun 4	4 Shotguns
	2 Assault	2		
	3 Hunting	0		
	4 Hunting	0		
	5 Assault	2		
	6 <blank>	0		
1D	1 <blank>	0	Machinegun 4	5 Machineguns
	2 Anti-Flyer	4		
	3 Assault	2		
	4 Sub	-1		
	5 Sub	-1		
	6 <blank>	0		
1D	1 AT Missile	4 Launcher	6	6 Launchers
	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	Projector 7	0 Projectors 7 Designators
	3 EMP or Rad	1		
	4 Fire	3		
	5 Flash	1		
	6 Freeze	1		
	7 Grav or Laser	5		
	8 Mag	4		
	9 Psi Amp	4		
	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.

WEAPONS MANUFACTURER

Manufacturer Naasirkaa-Regina Industries		
Surface or Orbital Factory? Surface	TL 11	Law Level 9

WEAPONS

Q	R	E	B	S
---	---	---	---	---

Chart	Item	Description	Model	TL	Range	Mass	Burden	H1 H2	D1 D2	H3	D3	KCr ,000	Cr ,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	Man	M										
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 <u>describe</u> 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 <u>use</u> a weapon.					

Big Weapons

Oversize and Titan armor require Oversize and Titan weapons.

GunMaker 11

BIG WEAPONS

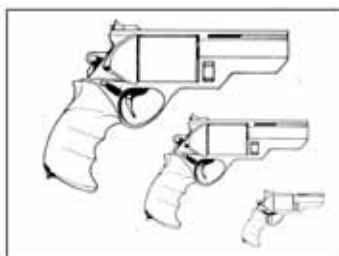
The majority of weapons are manufactured as Standard, and the weapon creation system produces Standard size weapons. Appropriate automated and CNC manufacturing systems allow the production of upsized weapons for Oversize and Titan Sophonts, Robots, and Armor. Upsized weapons can be produced for all 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.

12 BladeMaker

Creating Blades

Blade and cutting weapons can be assembled from the components shown here.

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	=C1	2D	200
Medium Blades	GBK	Great Big Knife	6	1	6		Cuts	2	Pen	=C1	2D	900
	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
Long Blades	OC	Officers Cutlass	5	1	1		Cuts	2			2D	400
	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	=C1	2D	500
	V	Vibro-Blade	10	1	0.5		Cuts	2			2D	900
		Mace	2	1	4		Cuts	1	Blow	=C1	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. Broadsword-4 . Star Marine Officer's Cutlass-5 (EQU+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.

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 FI Ra So Ps In Se

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.											

Cost. The cost of the Armor in Credits.

Mass. The mass (more-or-less the weight) of the Armor 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, Morphic, 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).

ARMOR TYPES

		Morphic		Non-Morphic	
		Braced	Unbraced	Braced	Unbraced
Power	Powered	Dress	Armor	Unit or Item	
	Unpowered	impractical	Suit		

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 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 is 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=00000 (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 accessories or modifications.

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, 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. 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.

Mail. A flexible metal shirt providing basic protection against most attacks.

Mesh. 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.

Cloth. A heavy duty body suit tailored from ballistic cloth. **Quilt.** An improved version of Cloth.

Plate. A protective unit of personal body armor constructed of ceramic or metal plates (often articulated to allow movement or flexibility).

Ablat. Ablat is 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. A 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. A basic cold weather clothing unit.

Heavy Coat. A more effective cold weather clothing unit.

The Breathers

The Breathers provide protection or support in strange atmospheres.

Respirator. A small compressor allowing breathing in Air-3 (Vthin Atmosphere). Also called a Compressor.

Filter. A 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. 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 the appropriate breathing gases (for example, Air-4, Air-8) for the user. This apparatus can be used underwater.

Breather. An apparatus which removes waste gases and recycles breathing gases to the user. The

Rebreather. An improved version of the Breather for better performance and efficiency.

Gill. A 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. An 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. An 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. A basic reflective sheet which protects against Hot or Cold.

Fire Shield. An enhanced Thermal Blanket which also protects against fire.

Rescue Ball. A collapsed protective structure providing shelter in emergency situations. The ball will hold and support four individuals for a week.

Desert Cloak. A basic fabric article of clothing which provides a degree of protection against the desert environment.

SKILLS AND KNOWLEDGES

The operation of armor systems is governed by a variety of skills and knowledges.

BattleDress governs Dress and Armor.

Vacc Suit governs Suits.

Legged (a Knowledge under Driver) governs most Units.

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 as (7). 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, “These are loaded with 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.

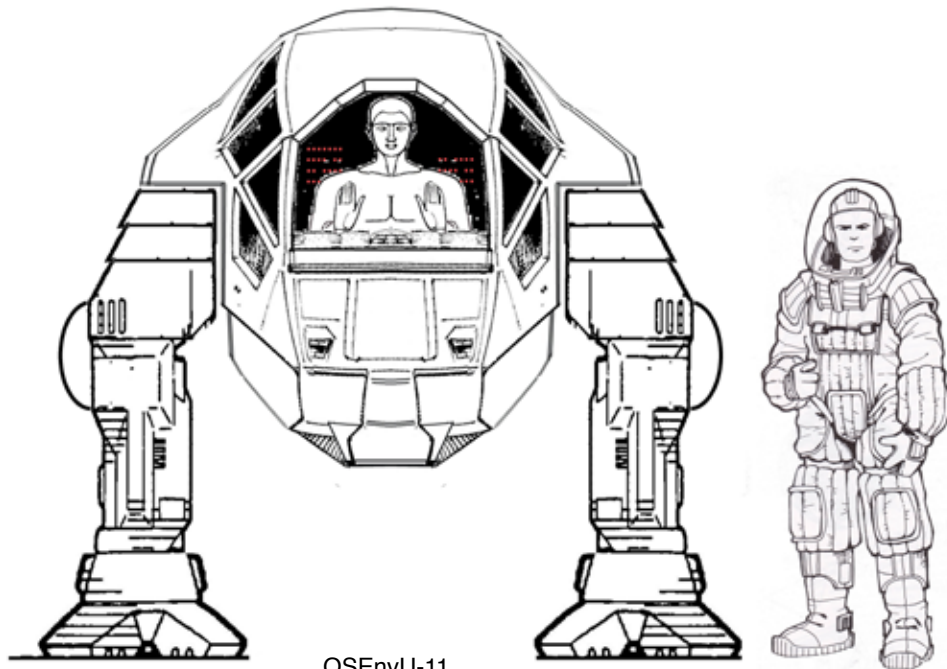
qrEbs= -2.

“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?

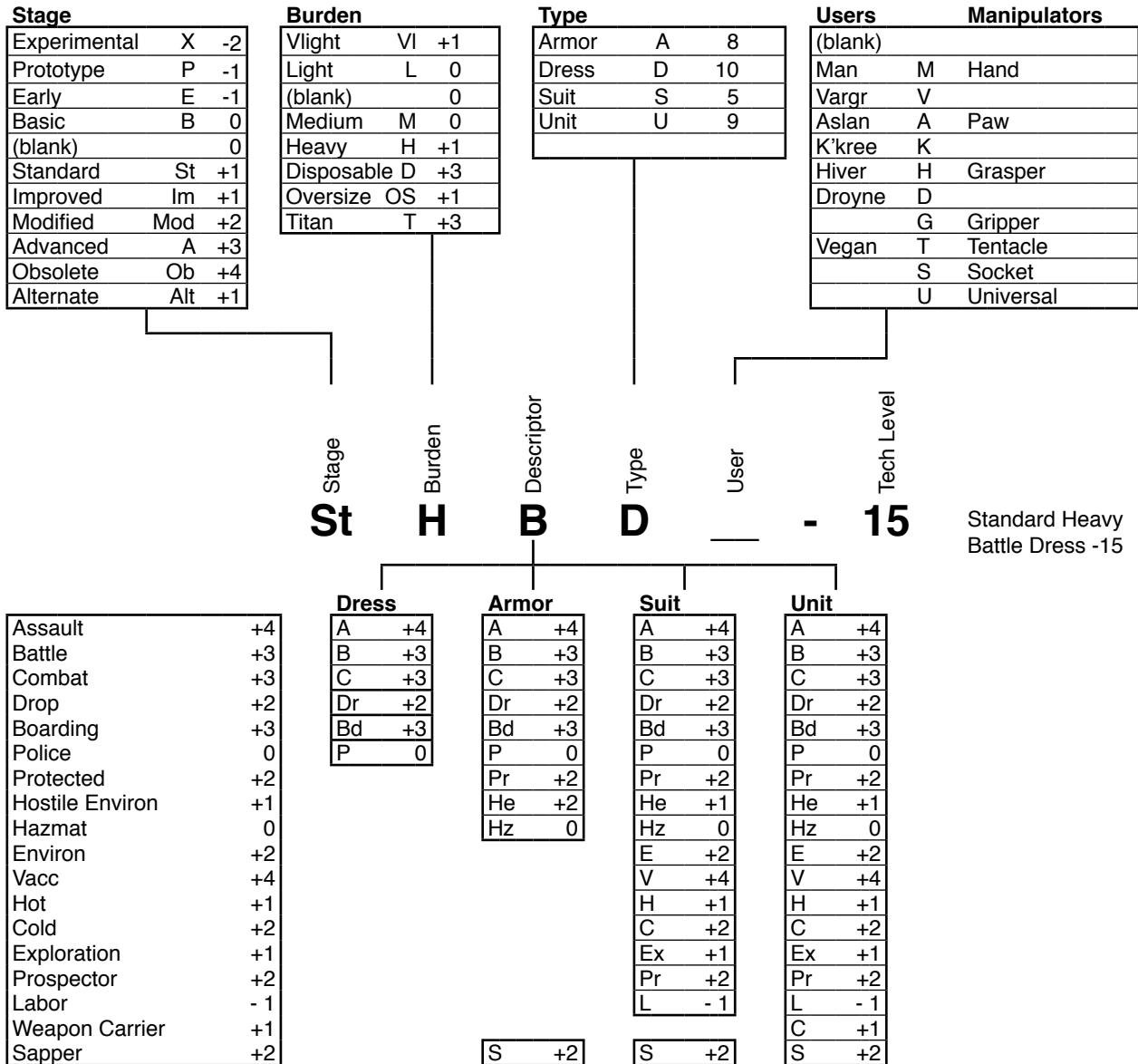


OSEnvU-11

Armor

Decode the elements describing armor using this chart. Quick-Create Armor by selecting elements and totalling the associated TL values.

ArmorMaker 01



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 armor is the minimum level required for manufacture.

ARMOR MANUFACTURER

Manufacturer		
Surface or Orbital Factory?	TL	LL

ARMOR

Q	R	E	B	S
---	---	---	---	---

Chart	Item	Model	Tech Level	Mass	Armor	Cage	FlashProof	RadProof	SoundProof	PsiShield	Insulated	Sealed	KCr ,000	Cr ,000
4	Item													
	Descriptor													
	Burden													
	Stage													
	User													
5	Controls													
	Sensors													
	Comms													
	Power & LS													
	Add-Ons													
	QREBS=													
	Totals													

ARMOR DESCRIPTION

Model	LongName (Stage-Burden-Descriptor-Type-User-Portability-TL)
<div style="border: 1px dashed black; height: 20px; width: 100%;"></div>	
The basic information required to <u>describe</u> ARMOR.	

AX: ARMOR EXTENSION

Cost	Mass	QREBS	Ar=	Ca=	Fl=	Ra=	So=	Ps=	In=	Se=
Ax: Cr	kg									
The basic information required to <u>use</u> a weapon.										

USERS: Specify the Intended Sophont User.

Armor

Decode the elements describing armor using this chart.

ArmorMaker 03

Code	Type	TL	Mass	Ar=	Ca=	Fl=	Ra=	So=	Ps=	ln=	Se=	Comment	Cr
------	------	----	------	-----	-----	-----	-----	-----	-----	-----	-----	---------	----

The Basic Body Armors

J	Jack	1	1	1	5	-	-	-	-	-	4	-	50
Ma	Mail	4	3	2	6	-	-	-	-	-	-	-	400
M	Mesh	7	2	1	10	-	-	-	-	-	2	-	150
K	Cloth	8	2	1	14	-	-	-	-	-	6	-	250
Q	Quilt	9	1	1	18	-	-	-	-	-	9	-	600
P	Plate	6	4	1	22	-	-	-	-	-	-	B=+2	900
A	Ablat	9	2	3	12	-	-	-	-	-	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	3	12	-	-	-	-	-	-	-	100
aSh	Advanced Shield	8	2	2	14	-	8	-	-	-	-	-	400

The Breathers

Protects against:

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	Compressor/Respirator	5	1	-	4	-	-	-	-	-	12	Air-3	100
R	Compressor/Respirator	8	1	-	8	-	-	-	-	-	12	Air-3	100
R	Compressor/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

Helmets and Head Protection-

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	Psionic Shield Helmet	12	1	3	-	-	-	4	15	-	-	-	3000
-	Shemagh	2	-	-	2	-	-	-	-	2	-	-	10
-	Beret	4	-	-	-	-	-	-	-	-	-	-	10

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.

	Code	Type	TL	Mass	Ar=	Ca=	Fl=	Ra=	So=	Ps=	Lc=	Se=	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	2	1	2	2	
Descriptor	0	(blank)	0	1	1	1	1	1	1	1	1	1		x 1
	Wpn	< > Carrier	1	2	8	1	1	1	1	1	1	1		x 3
	A	Assault	4	1.5	2	2	2	2	2	2	2	2		x 3
	B	Battle	3	2.5	5	5	5	5	5	5	5	5		x 5
	B	Boarding	3	1.2	4	1	4	1	2	1	1	3		x 4
	C	Cold	2	0.2	1	1	1	1	1	1	6	1		x 0.2
	P	Combat	3	2	4	4	4	4	4	4	4	4		x 4
	C	Combat Environ	7	2.5	7	4	5	5	5	1	5	5		x 6
	D	Drop	2	3	8	1	8	1	8	1	1	8		x 3
	En	Environ	2	0.5	4	4	4	1	4	1	20	10		x 1.5
	Exp	Exploration	1	1	5	1	1	1	5	1	8	8		x 7
	Haz	Hazmat	0	1.3	2	6	6	6	6	1	12	12		x 9
	HE	Hostile Environ	1	1.2	8	1	1	8	1	1	8	12		x 8
	H	Hot	1	0.3	2	7	5	5	5	1	5	5		x 0.6
	L	Labor	-1	0.7	1	1	1	1	1	1	6	6		x 4
	P	Police	0	0.6	3	1	5	1	1	1	1	2		x 1.7
	Pr	Prospector	2	2	2	2	1	1	1	1	3	5		x 6
	Pr	Protected	2	2	2	2	2	2	2	1	3	4		x 7
	S	Sapper	2	1.2	5	6	6	1	6	1	8	8		x 7
	V	Vacc	4	1	5	5	0	1	1	1	5	5		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

	Dress	Armor	Suit	Unit	OS/ Titan
Comms	c	c	b	a	--
Sensors	h	h	h	h	--
Controls	q	q	p	r	Wafer
Power	7	3	1	3	--

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
	g	Relay Option	
Sensors	h	Basic	
	i	Additional	
	j	Direct	
	k	Enhanced1	
	l	Enhanced2	
Controls	m	Enhanced3	
	n	Self	
	p	Feedback	
	q	Manual	
	r	Wafer	Requires WJ
	s	AutoPilot	
Other	t	Fine Control	C2 +3
	u	Reflec	Plus Visible Mod
	v	Spot Armor	
	w	PsiShield	
	x	Stealthy	Minus Vis Mod
	y	Stamina	C3 = Stamina
Power /LS	0	Not Applicable	
	1	Day	
	3	Days	
	7	Week	
	9	Extended	

Install options only if not standard equipment.

DRAWBACKS

Options have no cost. For each Option added, 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).

Table 1 Minor Drawbacks (only once)

1	Cramped.	C3 -1.	
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.

Table 2 Drawbacks

1	Vibration.	C3 -1	
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.

Table 3 Major Drawbacks

1	Faulty Manipulator Joints.		Reduce C2 Half.
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

Table 4 Ultimate Drawbacks

1	Strange Internal Harmonics.		Check San daily.
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

		Dress	Armor	Suit	Unit	OverSize	Titan
C1	Strength	x 10	x 10	x 1	x 10	x 100	x 1000
C2	Dexterity Agility Grace	-2	- 2	- 2	- 2	- 4	- 4
C3	Endurance Vigor Stamina	-1	-2	-3	0	--	--
	Skill=	BattleDress	BattleDress	Vacc Suit	Legged	--	--
	Maximum Speed=	2	1	1	2	2	2

The performance of a system depends on the Characteristics of the operator.

06 ArmorMaker

Random Creation

Most armor can be created using this random creation table.

	USER	MANIPULATOR
2D	2 <S1>	Socket
	3 Droyne	Socket
	4 Vegan	Tentacle
	5 Vagr	Universal
	6 <blank>	Hand
	7 Man	Hand
	8 <blank>	Hand
	9 Aslan	Paw
	10 Hiver	Grasper
	11 K'kree	Gripper
	12 <S2>	Gripper

2D	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
1D	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
1D	1 Basic	Reflec
	2 Additional	Spot Armor
	3 Direct	PsiShield
	4 Enhanced1	Stealthy
	5 Enhanced2	Stamina
	6 Enhanced3	Reactive

	DESCRIPTOR	ITEM
1D	1 Assault	1 Dress Powered. Morphic, Braced
	2 Battle	
	3 Boarding	
	4 Combat	
	5 Drop	
	6 Police	

2D	2 Assault	2 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	

3D	3 Boarding	3 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	

3D	3 Drop	4 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

ARMOR

Q R E B S

Chart	Item	Model	Tech Level	Mass	Armor	Cage	FlashProof	RadProof	SoundProof	PsiShield	Insulated	Sealed	KCr ,000	Cr ,000
4	Item													
	Descriptor													
	Burden													
	Stage													
	User													
5	Controls													
	Sensors													
	Comms													
	Power & LS													
	Add-Ons													
QREBS=														
Totals														

ARMOR DESCRIPTION

Model	LongName (Stage-Burden-Descriptor-Type-User-Portability-IL)
<input type="text"/>	<input type="text"/>
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.										

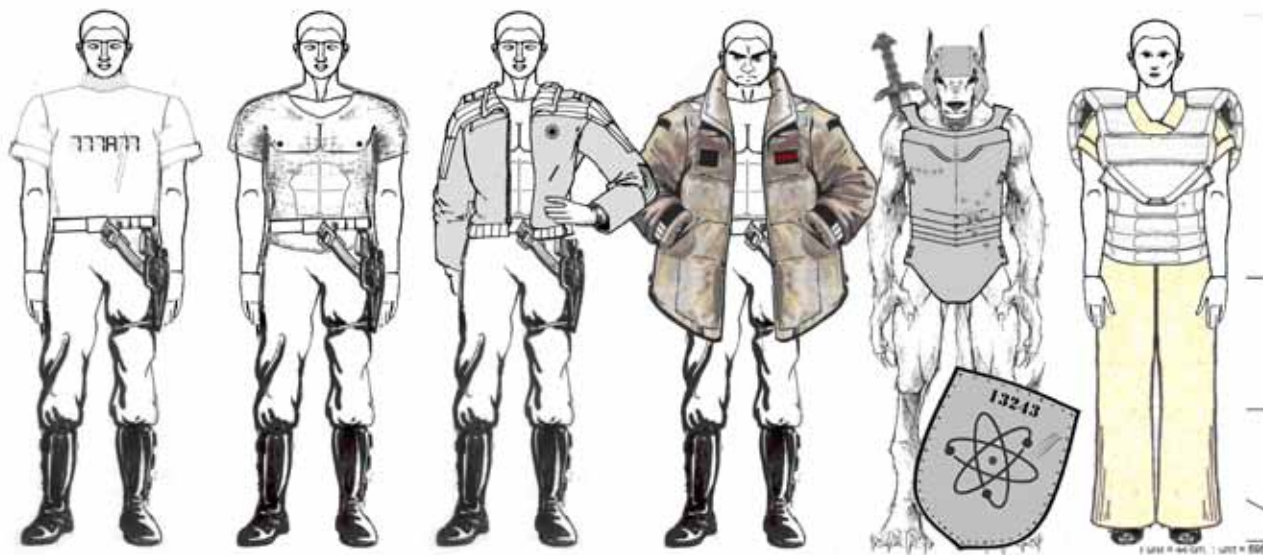
USERS

Specify the Intended Sophont User.

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).

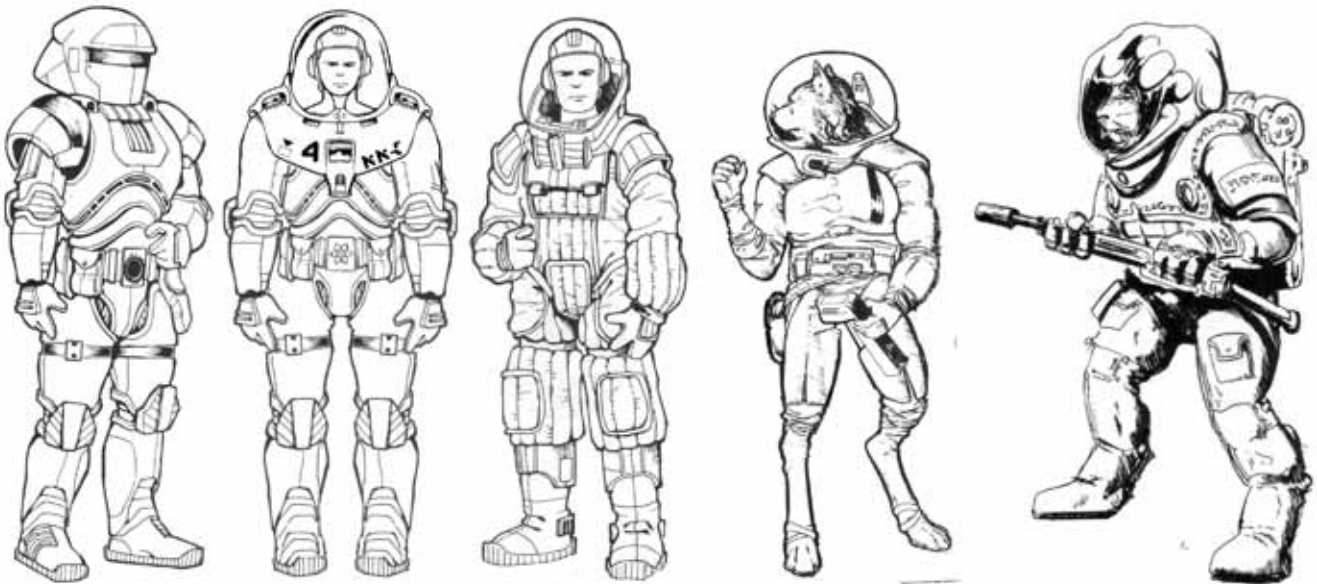


Left to Right: Beret. Full Helmet with Visor-8. Crew Helmet-9. Psionic Shield Helmet-12. Desert Scarf / Shemagh-2. Military Helmet-4. Military Helmet-4 (Vargr). Desert Cloak. Respirator-5 (K'kree).

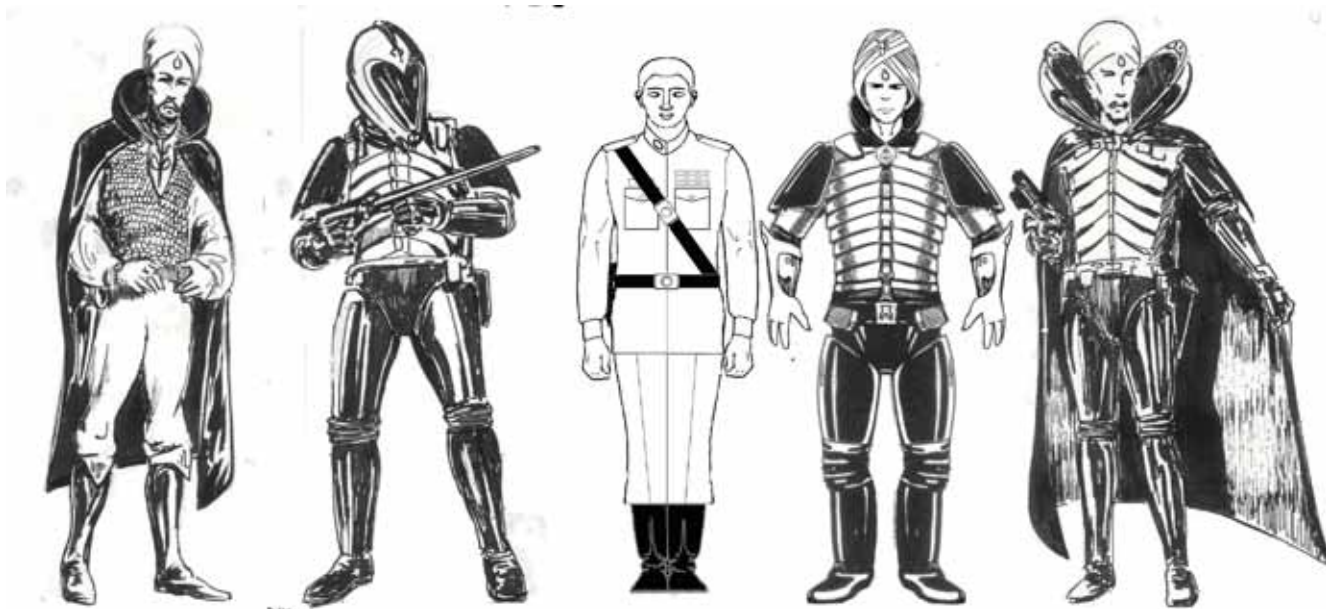
More Armor Catalog

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).



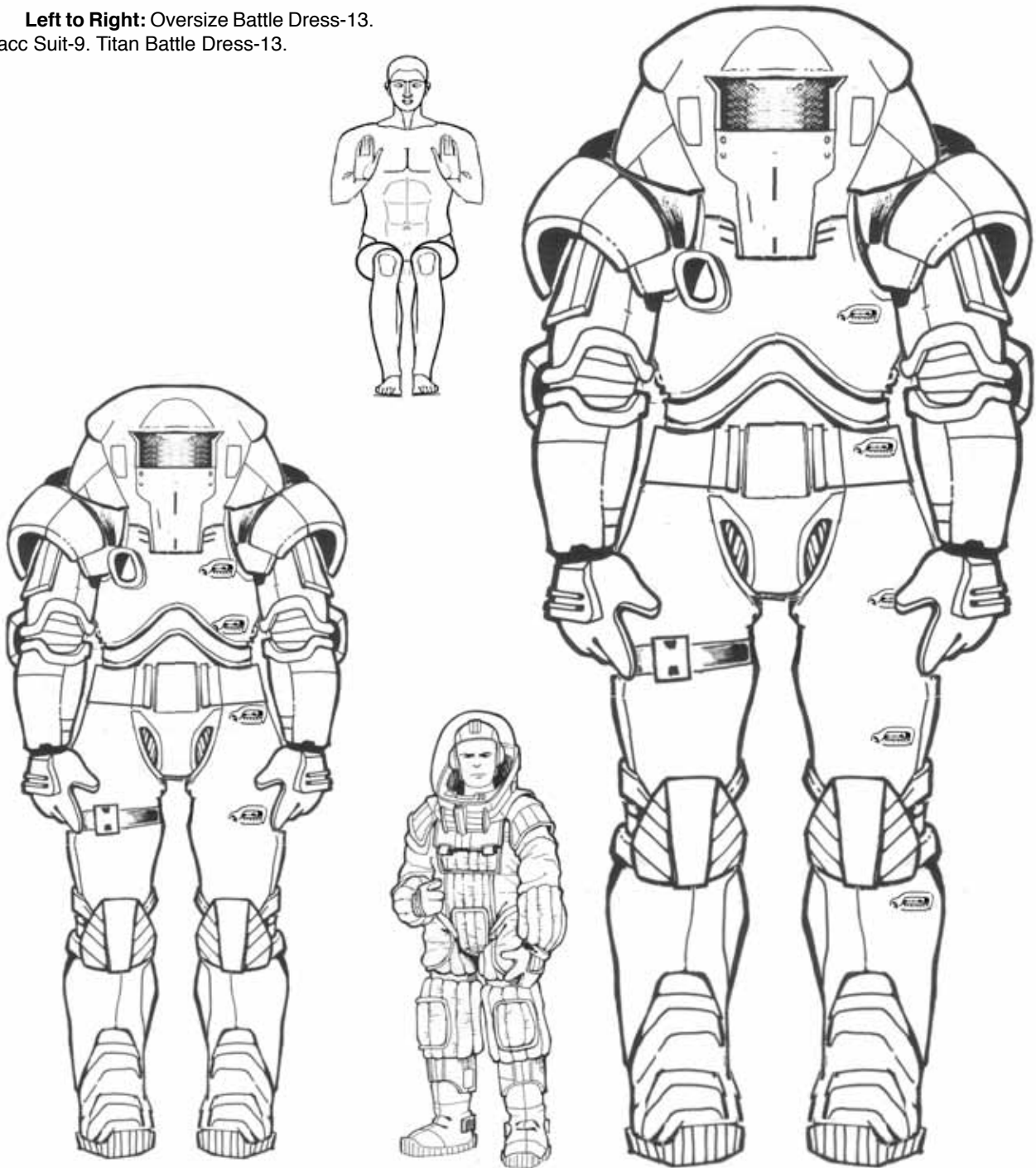
Left to Right: Zhodani Noble (street clothes; no armor). Combat Armor-11 (Zhodani with characteristic clamshell helmet). Zhodani Intendant (military uniform). Battle Armor-11 (Zhodani with characteristic clamshell helmet and Ablat cape).

10 ArmorMaker

Yet More Armor

Typical armor examples provide insights into the armor generation system.

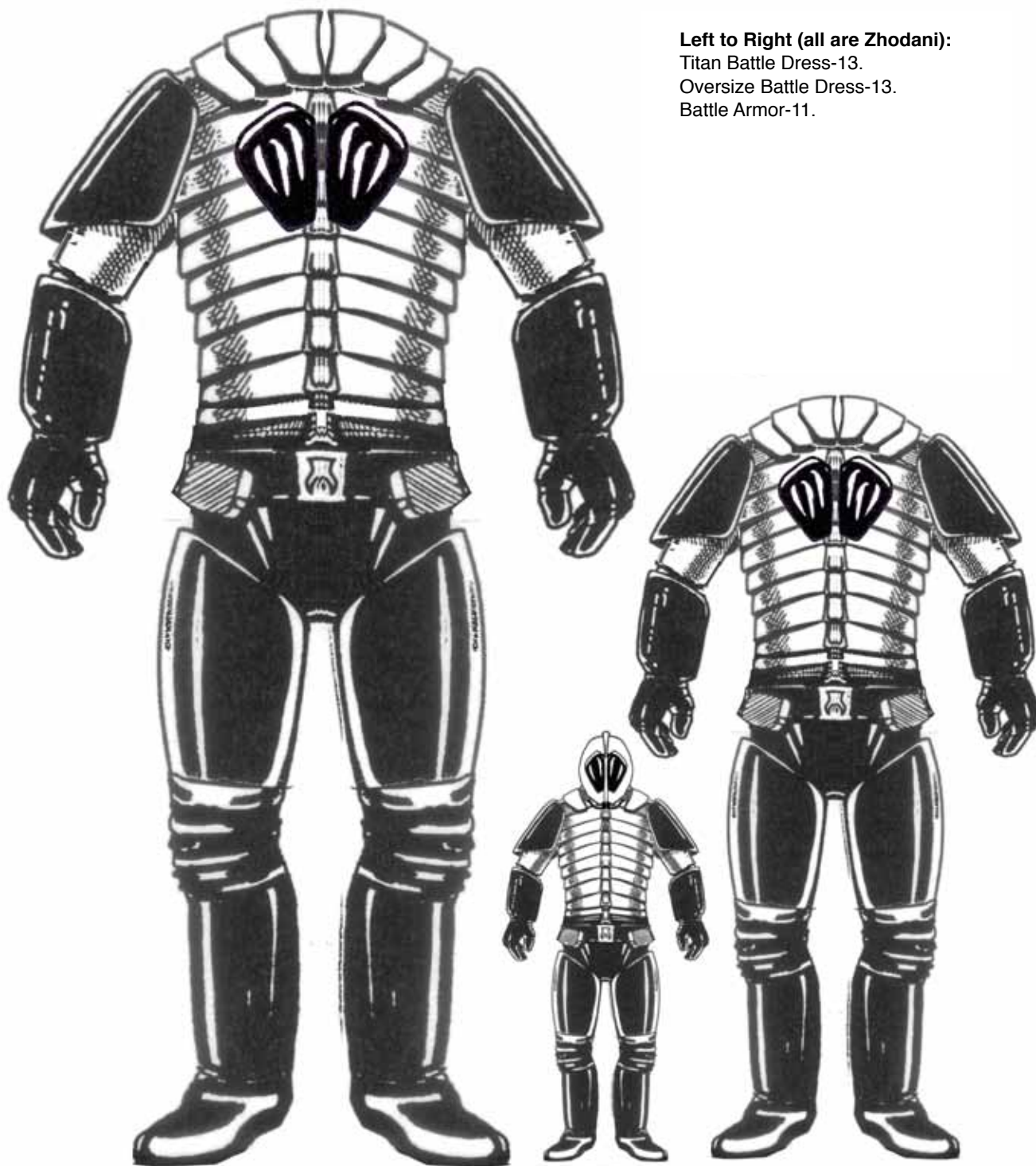
Left to Right: Oversize Battle Dress-13.
Vacc Suit-9. Titan Battle Dress-13.



Still Yet More Armor

Typical armor examples provide insights into the armor generation system.

ArmorMaker 11

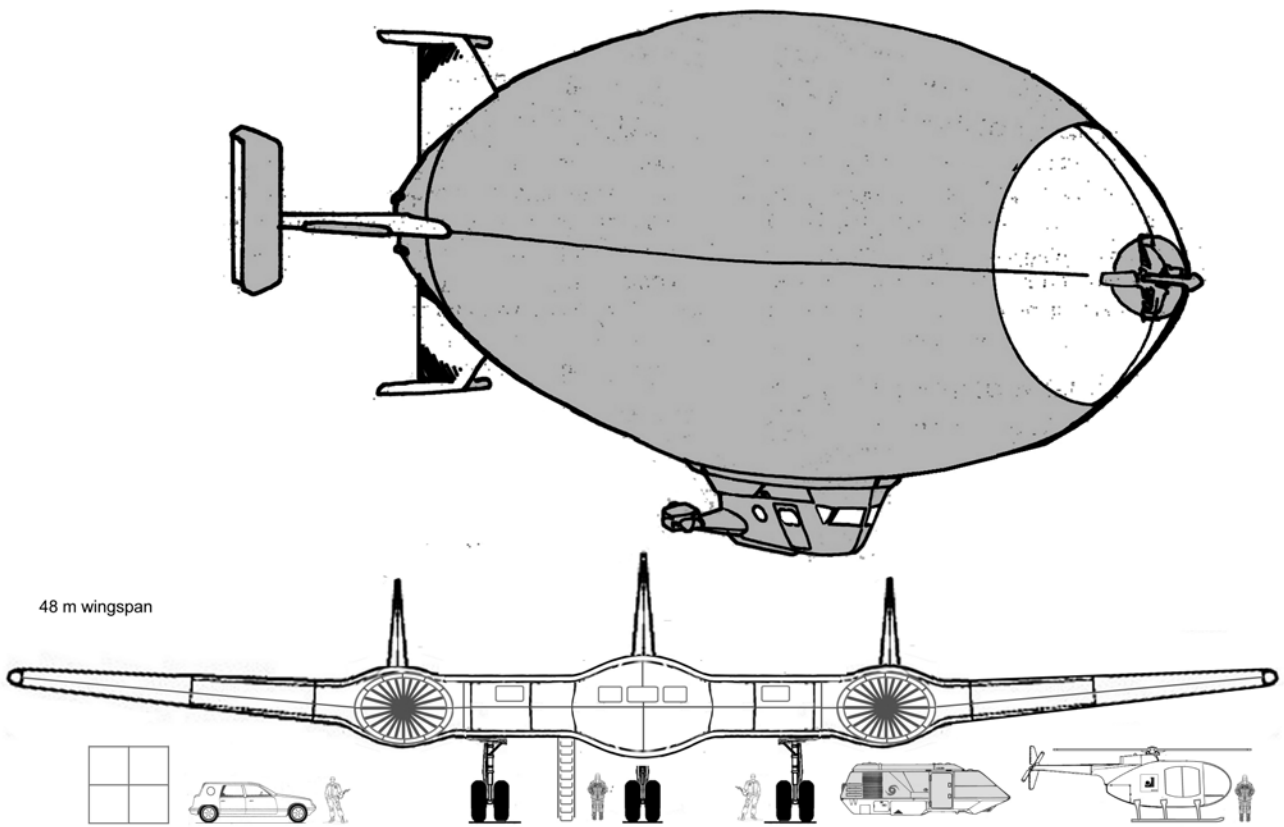


Left to Right (all are Zhodani):

Titan Battle Dress-13.

Oversize Battle Dress-13.

Battle Armor-11.



48 m wingspan

Top. Blimp-9.

Left to Right. Cargo Pod (shown end on = 3 meters wide by 3 meters high). Wheeled GroundCar-4. GCarrier-10. Helicopter-9. Transport Aircraft-8 (Flying Wing). Blimp-9.

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.

VEHICLE DESCRIPTION

Model	LongName (Bulk - Motive - Mission - Type - User - TL)
<div style="border: 1px dashed black; height: 20px; width: 100%;"></div>	
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.											

The Armor Extension

Most vehicles have some form of Armor. The Armor values 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.

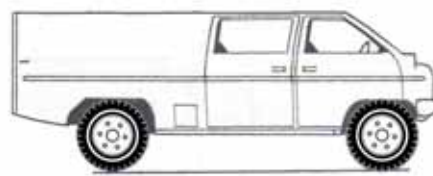
A Tank carries a turret or vehicle-mounted major weapon, strong or extensive armor and protections.

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

AX: ARMOR EXTENSION

	Cost	Mass	QREBS	Ar=	Ca=	Fl=	Ra=	So=	Ps=	In=	Se=
Ax:	Cr	kg									
The basic information required to use armor.											



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.

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, gyrodynes). 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 Ve-

hicles; 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.

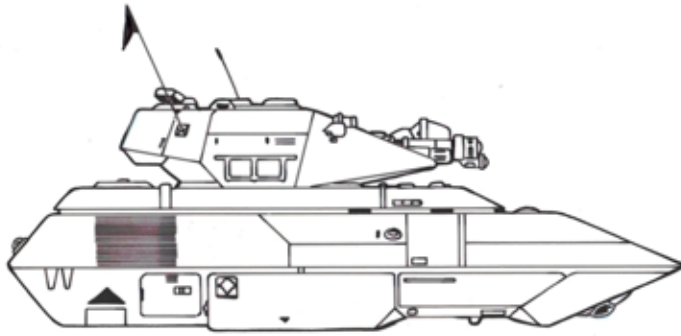
Ground Vehicle Locomotion

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 pres-



sure 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 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

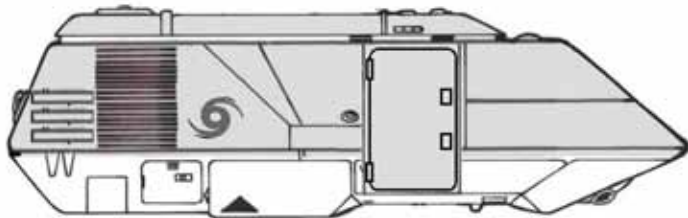
Stage is the spectrum of effects based on the technological product development cycle.

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 stor-



age batteries.

Advanced. The vehicle is significantly better than the standard version, and features additional features and efficiencies. The vehicle is powered by a Fusion Module.

Early. The vehicle is a preliminary design with the bugs not yet worked out. The vehicle is powered by a Fusion Module.

Improved. The vehicle features small improvements. The vehicle is powered by a Fusion Module.

Alternate. The vehicle uses an alternate technology for some or all of its functions. The vehicle is powered by a Fusion Module.

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=00000 (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.

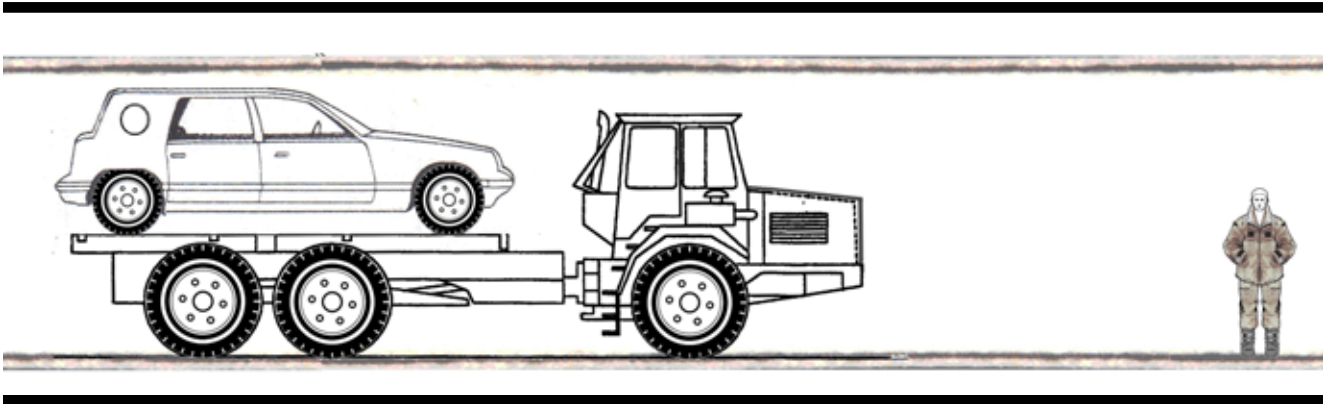
THE CARGO MODULE

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, manipulator, 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. Open channel 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.

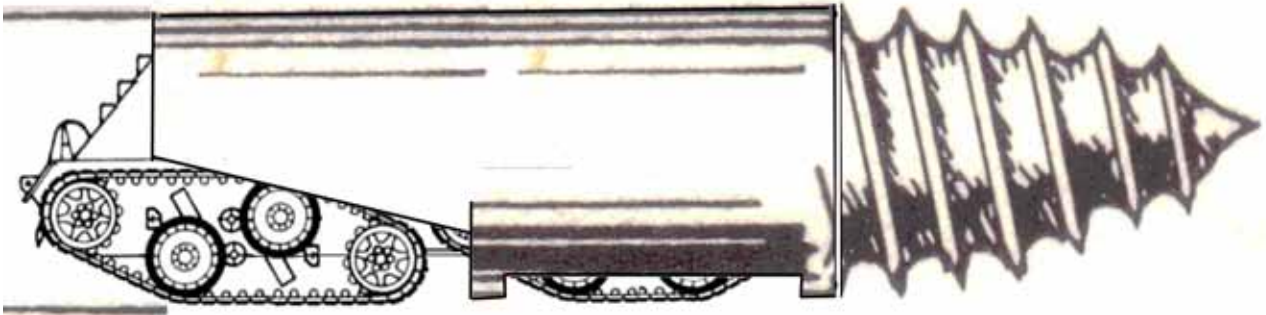
STOL. The Flyer (usually Winged) is modified to enable it to use shorter runways. The Flyer can use an Airport one size smaller than that normally required. Available on Heavy or smaller Flyers.

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 a passenger.

Standard or larger can carry operators and passengers equal to tonnage.

But, A Tank has a crew equal to its tonnage divided by 2.

Supply vehicles can carry passengers equal to five times cargo capacity (in tons).

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.

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.

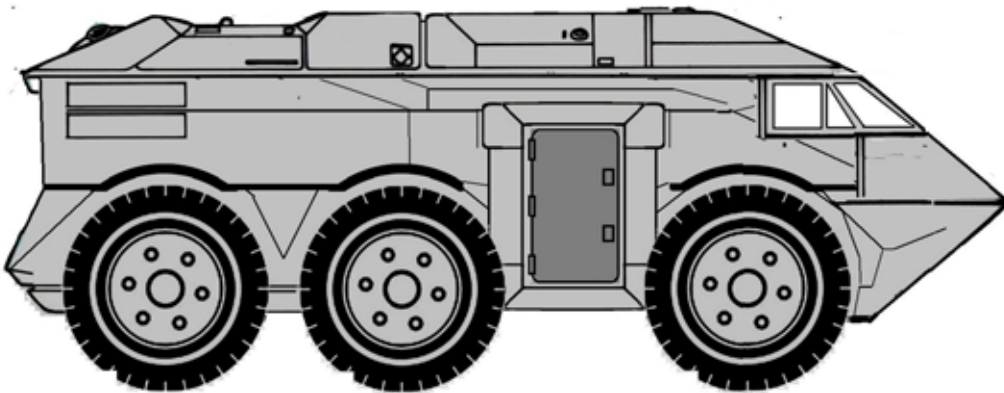
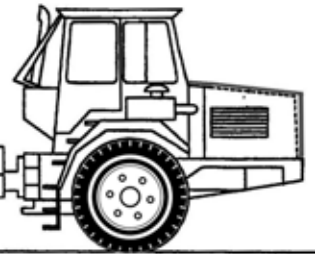
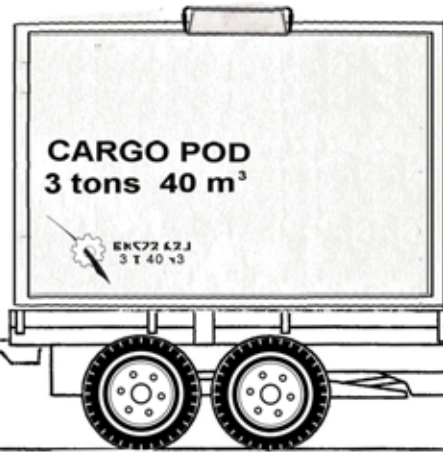
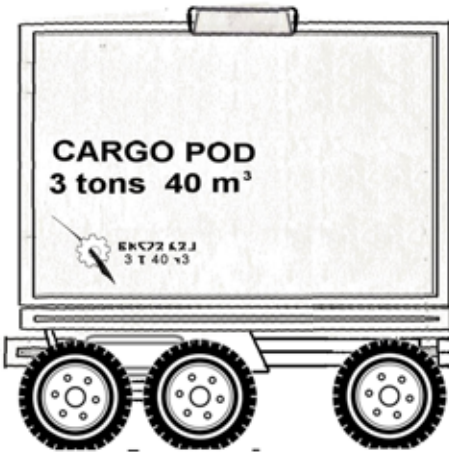
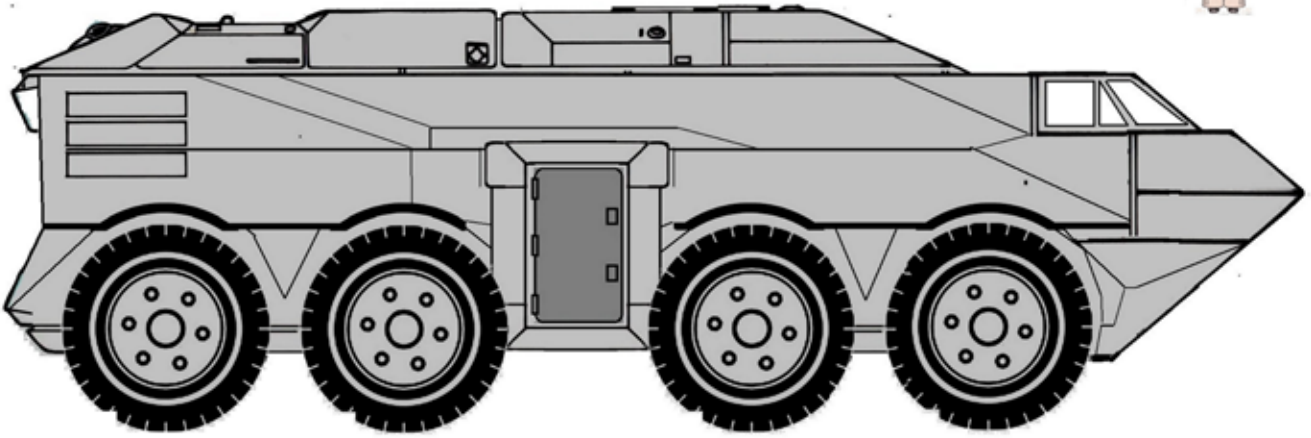
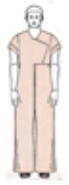
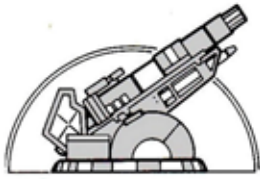
Most winged flyers require a specified or dedicated landing ground.

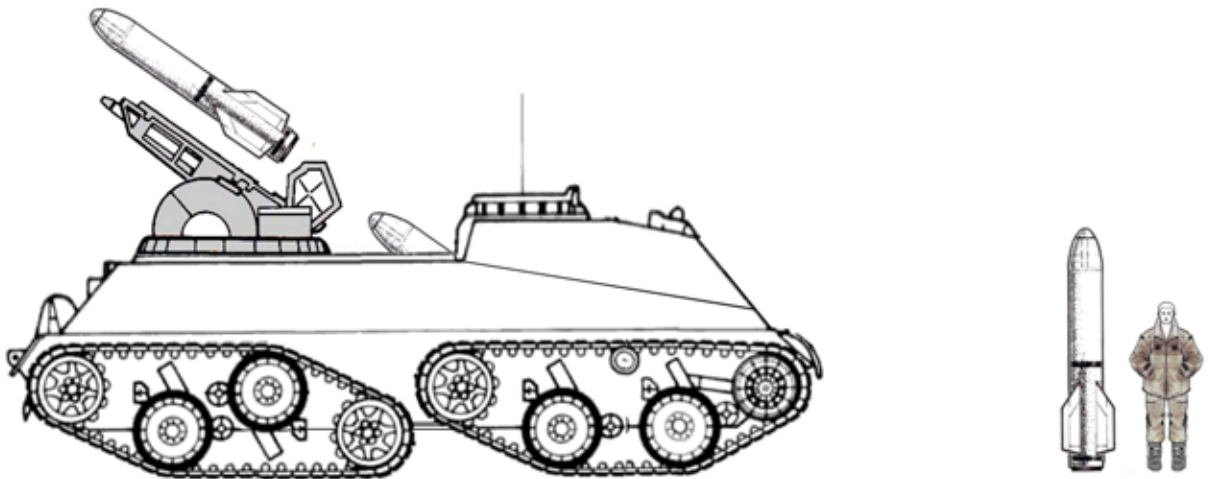
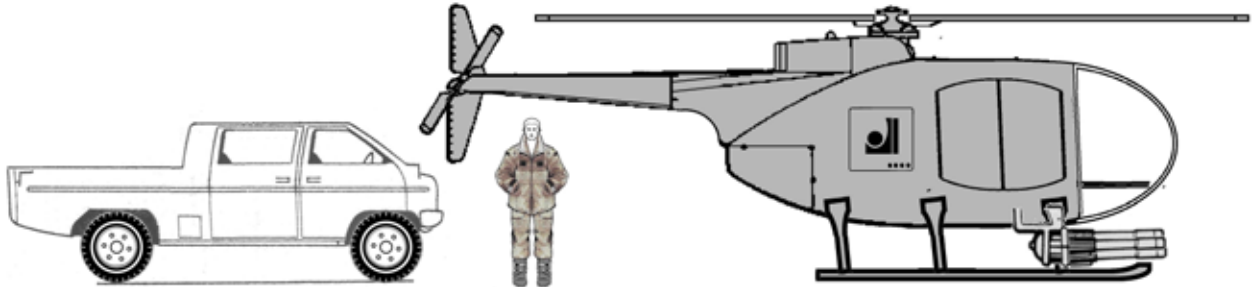
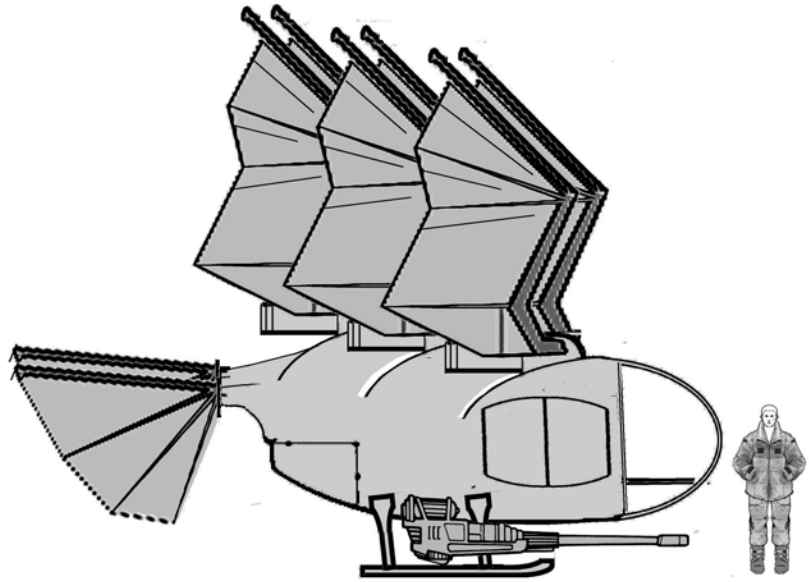
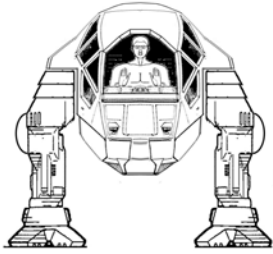
A Landing Ground can accept any Winged Flyer equal or less than its Bulk (a Medium Landing Ground can accept Medium, Light, or Vlite flyers).

AIRPORTS AND LANDING GROUNDS

Size	Terrain	Type	Length	Facilities	Which Flyers?	Additional Locations?
1	91	AirPad		None	Non Wing.	City. Suburb. Town. Archology. 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	Archology.
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.

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.

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).

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

Task	Difficulty	Char	C+S
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

Task	Difficulty	Char	C+S
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

Task	Difficulty	Char	C+S
Routine Sailing	Easy 1D	C2	6
*Disallowed Terrain	Staggering 5D	C2	
*Speed +1	= Difficulty +1		
*Evasive	= Difficulty +1		
*Rough Seas	= Difficulty +1		

SPACEFLIGHT

Task	Difficulty	Char	C+S
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

Task	Difficulty	Char	C+S
Shutdown	Easy 1D	C2	6

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						Lifters	G-Drive	M-Drive
Terrain	People	Wing	Flap	Rotor	LTA	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								
Terrain	People	Boat	Ship	H-Foil	Sub			
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	Ellipsoid																Comments	
			Vacc	Vthin	Thin	Standard	Dense	Exotic	Corrosive	Insidious	Dense High	E1	E2	E3	E4	Thin	Low			
250,000 km	11	Satellite	0	0	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	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	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	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	0	0	
30 km	6.8	Mid8	0	0	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	0	0	
12 km	6.4	Mid4	0	0	0	1	2	2	2	2	2	1	0	0	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	0	0	
5 km	6	Mid	0	1	2	4	4	4	4	4	4	2	1	0	1	0	1	0	1	
1000 m	5	Airspace5	0	1	2	4	6	6	6	6	6	4	4	2	0	2	0	2	2	
500 m	4	Airspace4	0	2	4	6	8	A	A	A	A	6	4	2	1	2	1	2	2	
150 m	3	Airspace3	0	2	4	6	8	A	A	A	A	6	4	2	1	2	1	2	2	
50 m	2	NOP	0	2	4	6	8	A	A	A	A	6	4	2	1	2	1	2	2	
5 m	1	Near Surface	0	2	4	6	8	A	A	A	A	6	4	2	1	2	1	2	2	Typical Grav Altitude
1.5 m	T		0	2	4	6	8	A	A	A	A	6	4	2	1	2	1	2	2	
0.5 m	R		0	2	4	6	8	A	A	A	A	6	4	2	1	2	1	2	2	Typical Lifter Altitude
Surface	0	Surface	0	2	4	6	8	A	A	A	A	6	4	2	1	2	1	2	2	
500 m	-4	Chasm Rim	0	2	4	6	8	A	A	A	A	6	4	2	1	2	1	2	2	
1000 m	-5	Chasm Wall	1	4	6	8	A	A	A	A	A	8	6	4	2	4	2	4	4	
5 km	-6	Chasm Floor	2	4	6	8	A	A	A	A	A	8	6	4	2	4	2	4	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	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	Distinct sublevels within Range=7.
100 km	7.2	Upper2	Yes	No	No	No	Yes	Yes	Yes	
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

This 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	3		<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	2	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	1	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	T	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	R	Waves	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>									1 if Waves
Surface	0	Surface													
0.5 m	-R	Wading													Beast Swimmers
1.5 m	-T	Fording													Beast Swimmers
5 m	-1	Pond													1 Beast Swimmers
50 m	-2	Thermocline	<input type="checkbox"/>												5 Pond Bottom
150 m	-3	Shelf	<input type="checkbox"/>	<input type="checkbox"/>											15 Continental Shelf
500 m	-4	Lake Bottom	<input type="checkbox"/>	<input type="checkbox"/>											50 Lake Bottom
1000 m	-5	Deep Lake	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>				<input type="checkbox"/>					100 Deep Lake
5 km	-6	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	-7	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	-8	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	-9		<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?

On This Table:

= 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.

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

BEASTPOWER

Beastpower is a standardized evaluation of the power of the engine or motor in a vehicle.

ONE BEASTPOWER=

$$BP = \text{Tons} \times (\text{Speed}^3)$$

Beastpower is used to compare 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		.01	.2	.3	.6	1							
1 lan	.01	.1	.3	.6	1.2	2	3	5	7	10	13	17	22
1 emthree	.08	.6	2	5	9	16	26	38	54	75	99	129	164
1 roup	.1	.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:

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, a Speed-3 Vheavy ATV reads Beastpower on the Speed 4 (= Speed-3 +1) column.

UNITS OF MEASURE

Tons are 13.5 cubic meters for vehicles.
For beasts and beast-drawn vehicles, 1 ton (normally a measure of volume) is also equal to 1000 kg in a wheeled cart on level ground.

Half-Lan	= 0.005 tons	= 50 liters.	= typicalhuman
1 Lan	= 0.01 ton	= 1 centiton	
1 Emthree	= 0.075 ton	= 1 cubic meter = 1000 liters	
1 Roup	= 0.1 ton	= 1 deciton	
1 Cube	= 0.25 ton	= 1 quarter ton	
1 Sq	= 0.5 ton	= half-ton	

One Human = 0.2 to 0.3 BP

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	Speed	Alt Speed	kph	Air	Water	Land	Land	Gravitics	Damage	Speed
0	Not Moving	Still								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 Meteroric	Meteor	40,000						256 D	16

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	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 typical (Size=100 or less) occupants.

FLYER RANGE BAND MOVEMENT

Flyers can move one surface Range Band per Round.

The actual Range to a Flyer with Altitude and Range is the greater of the two: a Flyer at Vlong Range R=5 and Altitude= NOP = 2 is at Range=5 for combat purposes.

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

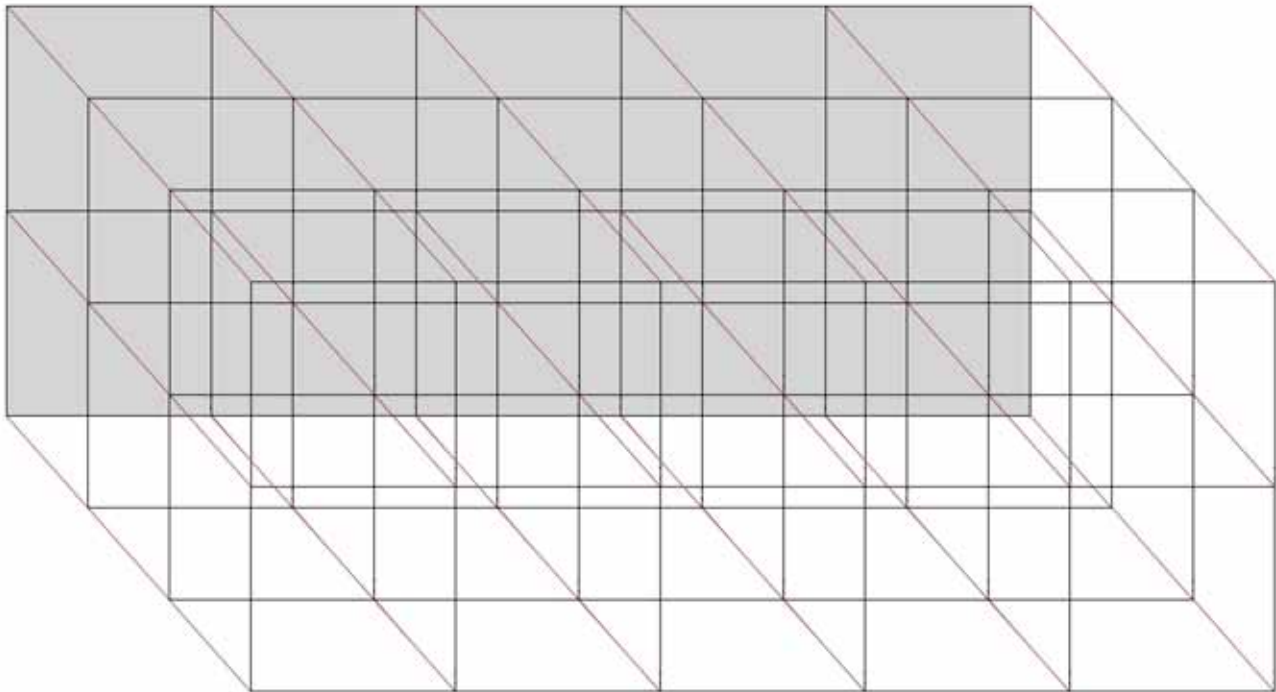
Dimensions should be reasonably compact; adjust them as necessary. Ignore wings and wing tonnage.

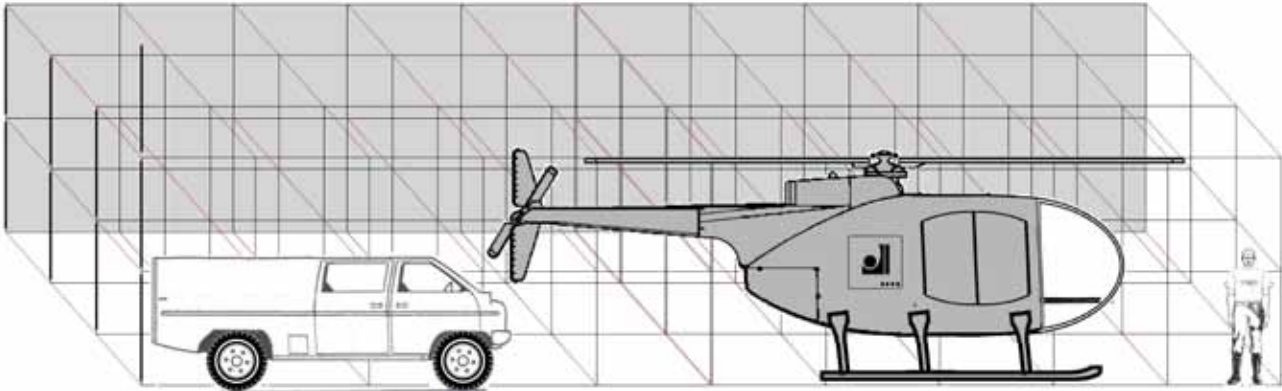
THE DESIGN BOX

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

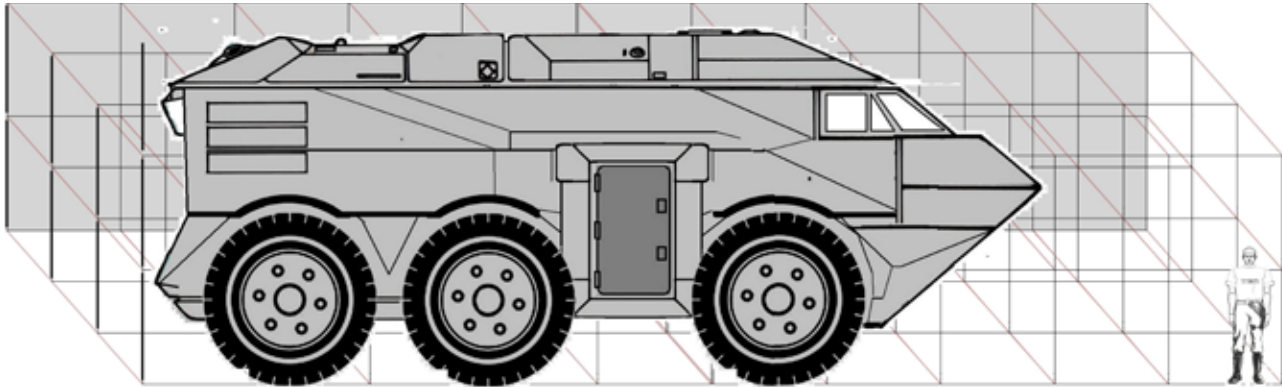
Tons	----- Meters -----			----- Squares -----		
	Length	Width	Height	Length	Width	Height
0.25	1.5	1.5	1.5	1	1	1
0.50	3.0	1.5	1.5	2	1	1
0.75	4.5	1.5	1.5	3	1	1
1	3	3	1.5	2	2	1
1	6	1.5	1.5	4	1	1
2	6	3	1.5	4	2	1
3	9	3	1.5	6	2	1
4	12	3	1.5	8	2	1
5	7.5	3	3	5	2	2
6	9	3	3	6	2	2
7	10.5	3	3	7	2	2
8	12	3	3	8	2	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



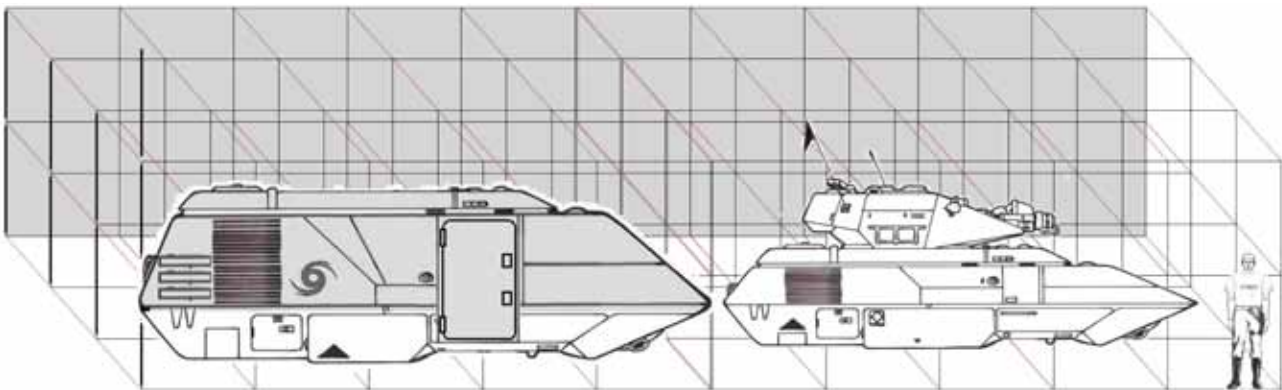


The panel truck placed on the Design Box fills roughly 3 squares long, 2 squares wide, and 1 square high (= $3 \times 2 \times 1 = 6$ cubes = 1.5 tons). A Van-Utility-Wheeled with Option: Light is approximately 1.5 tons.

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.

G			Tech Level	Tons	Speed	Load	Armor	Cage	FlashProof	RadProof	SoundProof	PsiShield	Insulated	Sealed	Note	KCr
Ground Vehicles		Code	Descriptor													,000
A Type	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 Mission	-	(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
C Motive	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**.

M			Tech Level	Tons	Speed	Load	Armor	Cage	FlashProof	RadProof	SoundProof	PsiShield	Insulated	Sealed	Note	KCr
Military Vehicles		Code	Descriptor													,000
A Type	T	Tank	9	5	3	-	50	10	10	10	20	0	20	20	NoteT	700
	C	Carrier	8	4	4	2	40	10	10	10	20	0	20	20	NoteC	500
	V	Vehicle	7	2	5	1	30	10	10	10	20	0	20	20	NoteV	300
B Mission	-	(blank)	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	W	Weapon	-	+2	--	-	-	-	-	-	-	-	-	-	NoteV	100
	T	Troop	-	+1	--	-	-	-	-	-	-	-	-	-	-	--
	S	Supply	-	+3	-1	+1	-10	-	-	-	-	-	-	-	-	--
	R	Recon	-	-1	+1	-	-10	-	-	-	-	-	-	-	-	-
C Motive	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.

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 and Boats 11

F Flyers	Code	Descriptor	Tech Level	Tons	Speed	Load	Armor	Cage	FlashProof	RadProof	SoundProof	PsiShield	Insulated	Sealed	Note	KCr
																,000
A Type	F	Flyer														
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		x1
C 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	LTA	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.

Light-Thin-Atmosphere. LTA final tonnage equals 10x the calculated tonnage.

W Water Craft	Code	Descriptor	Tech Level	Tons	Speed	Load	Armor	Cage	FlashProof	RadProof	SoundProof	PsiShield	Insulated	Sealed	Note	KCr
																,000
A Type		Ship	5	1000	4	600	10	0	0	0	0	0	0	0		1,000
		Sub	6	100	4	60	20	0	0	0	0	0	0	20		1,000
		Boat	5	10	4	6	5	0	0	0	0	0	0	0		100
		Grav	10	/5	4	**										x2
B Motive		Standard														
		Unpowered	- 3		0											/2
		Hovercraft	6	x2	5	3										200
C Mission		Cargo			-1											
		Patrol	+2		+1		x2									
		Explorer	+2											x2		
		Transport														

Quality = 5+Motive TL minus Actual TL. ** = No Change.

12 Vehicle 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
D Bulk	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
E Stage		Fossil	-2	+2			-10				-10				Note1	
		PowerCell	-1	+1	-2	-2	-5				-5				Note1	10
		Renewable	-1	+1	-1	-1									Note1	20
		Yearly	-2	+1	-1	-1										20
		Early	-1	+1			-10				-10					10
		Standard	0	0												
		Improved	+2	-1			+10				+10					20
		Advanced	+4	-2	+1	+1	+20				+20					40
F Environ		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
G Options		High Powered	+1	+1	+1	-1										100
		Slave	+1	-1												10
		Remote	+1	-2												20
		Weapon Mount	-			-1										
		Luxury	-											Q= 4		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
ground		OffRoad	-													30
ground		Mole	+1	x3	=1									Note 2.		400
water		HydroFoils	+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.

14 Vehicle FillForm

The character of vehicles can be changed with the addition of 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.

VEHICLE MANUFACTURER

Manufacturer		
Surface or Orbital Factory?	TL	Law Level

Q R E B S

VEHICLES

Chart	Item	Code	Descriptor	Tech Level	Tons	Speed	Load	Armor	Cage	FlashProof	RadProof	SoundProof	PsiShield	Insulated	Sealed	KCr ,000	Cr ,000
10-11	A Vehicle																
	B Mission																
	C Motive																
12	D Bulk																
	E Stage																
	F Environ																
	G Option1																
	G Option2																
	G Option3																
13	H Endur																
	Range																
	QREBS=																
	Totals																

VEHICLE DESCRIPTION

Model	LongName (Bulk - Motive - Mission - Type - User - TL)
<p>The basic information required to <u>describe</u> a vehicle.</p>	

VX: VEHICLE EXTENSION

	Tons	Speed	Load	Stage	Environ	Endur	QREBS	Options
Vx:								
<p>The basic information required to <u>use</u> a vehicle.</p>								

Vehicle Hitform

VEHICLE DESCRIPTION

Model	LongName (Bulk - Motive - Mission - Type - User - TL)
The basic information required to <u>describe</u> a vehicle.	

VX: VEHICLE EXTENSION

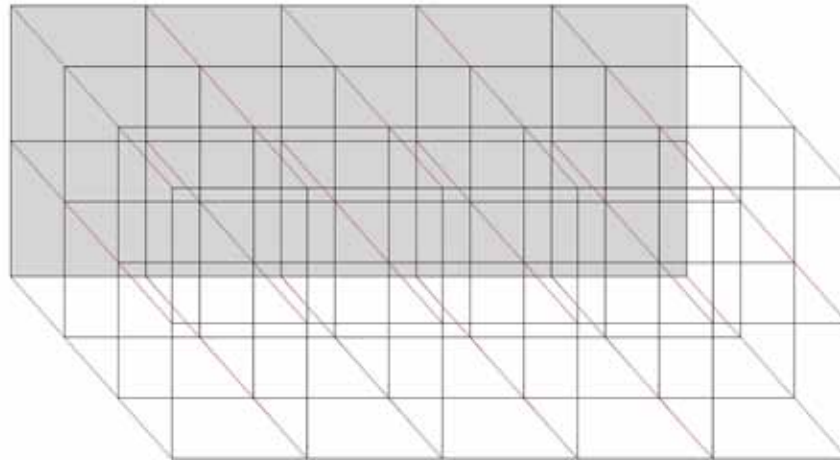
	Tons	Speed	Load	Stage	Environ	Endur	QREBS	Options
Vx:								
The basic information required to <u>use</u> a vehicle.								

WX: WEAPON EXTENSION

	Range	Cost	Mass	QREBS	Effects
Wx:	R=	Cr	kg	B=	
The basic information required to <u>use</u> a weapon.					

HIT LOCATIONS

Comms	2
Cargo	3
Sensors	4
Protections	5
Life Support	6
Body Panel	7
Power Source	8
Locomotion	9
Weaponry	10
Navigation	11
Computer	12

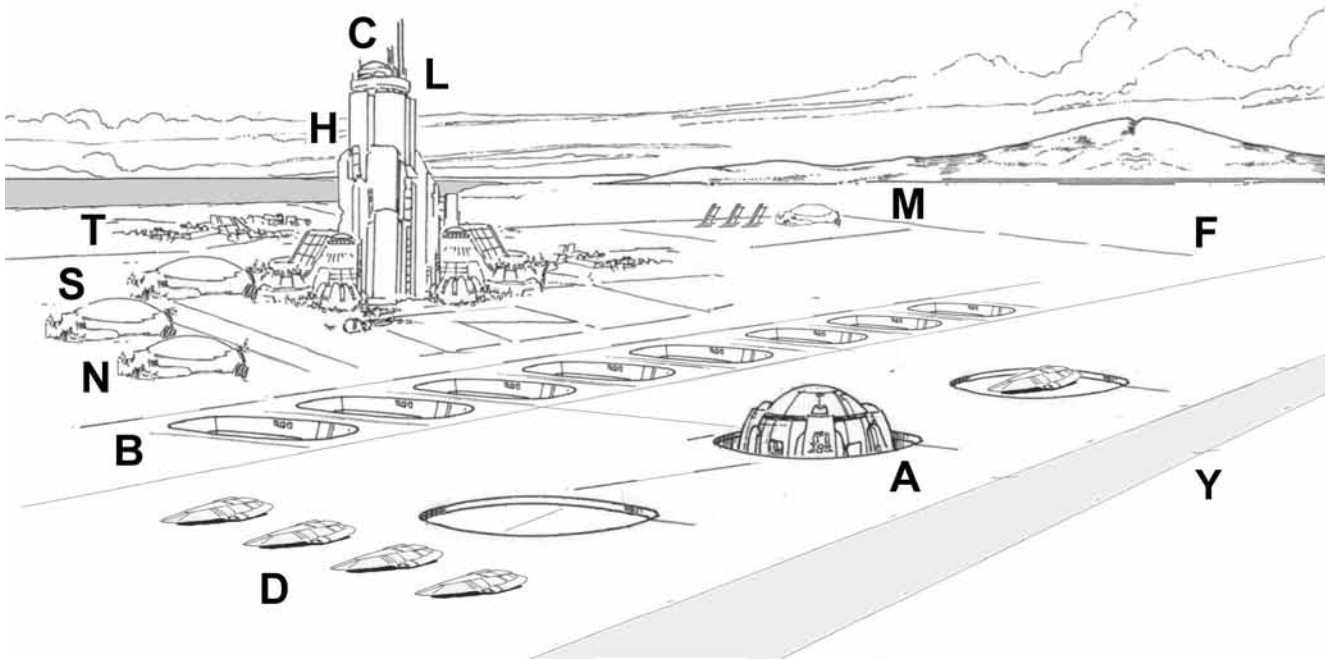


Paste any **Traveller** vehicle image here.

Include a human figure for scale.

AX: ARMOR EXTENSION

	Cost	Mass	QREBS	Ar=	Ca=	Fl=	Ra=	So=	Ps=	In=	Se=
Ax:	Cr	kg									
The basic information required to <u>use</u> Armor.											



A TYPICAL STARPORT CLASS A

The Elements of a Typical Starport

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. 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 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. Fa-

cilities 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 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

STARPORTS AND SPACEPORTS

A Excellent Starport
B Good Starport
C Routine Starport
D Poor Starport
E Frontier Starport
X No Starport

F Routine Spaceport
G Poor Spaceport
H Primitive Spaceport
Y No Spaceport

STARPORT AVAILABILITY

Every world with a starport has a surface location (a 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.

Asteroid Mainworlds have a Beltport instead.

highport. This designation is a poor cousin to starport type B.

G. Poor Quality Installation. Unrefined 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.

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 toler-

able, 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 (an 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. A starport may be located in an asteroid or planetoid belt. The typical name for a belt starport is Beltport.

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 spaceports are often established in support of farming projects, mining projects, or small colonies.

The distinction between a starport and a spaceport is minor, and based on facilities; 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

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		4D Hours
E	Frontier	No	No	No	Beacon		
X	None	No	No	No	No		

SPACEPORTS ON 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.

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 use of their lifters in order to make a smooth, relatively slow approach along designated approach corridors. To deal with ships with disabled lifters, or for ships which use wings or lifting surfaces, the landing pad includes long, broad runways.

For highports and beltports, this is a designated holding area with traffic control.

Sensor Arrays. The starport includes a variety of sensors to detect 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.

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.

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.

The 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 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

THE ELEMENTS OF THE STARPORT

The Basic Elements

Beacon
Landing Pad and Runways
Sensor Arrays
Traffic Control Facility
Auxiliary Traffic Control Facility

The Terminal

The Concourse
Freight Docks
Customs and Immigration
The Cargo Market
Accommodations
Data Terminals
Message Center
Emergency Medical

Peripheral Facilities

Starport Defense Establishment
Scout Base
Naval Base
Consulates
System Defense Field
Shipyards
Repair Shops
Transport Hub
Industry

Unofficial Facilities

The Scout Lounge
The Hiring Hall
The Lone Star
The Traveller's Aid Society
Startown

memories; on yet others, they are librarians.

Message Center. Access to communications, including 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.

Starport Defense Establishment (SDE). In addition to security personnel (who function as police), a starport may have an SDE (with a military function).

The SDE exists to defend the starport against threats of 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 local perceived threats to a starport by observing the size and equipment of the LDE.

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 re-

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 are:

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 insulate this world, to the maximum extent possible, from outside influences.

To meet the minimum requirements for maintaining interstellar trade.

pairs 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

A starport has an organizational structure which includes 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 (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.

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 several 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 predators 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 interdiction: 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 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, or they may be corrupt and self-serving.

MANY DIFFERENT STARPORTS

Starports vary in the way they provide their services. Major influences on them include the 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 belt-port. The starport may be an improved planetoid or a free-standing station.

Stormworlds. If a world has an exceptionally turbulent atmosphere, most traffic may choose to call at the Highport and shuttle 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 STARPORT VISIT

A ship entering a star system leaves jump space approximately 100 stellar diameters out. The approach to the starport takes perhaps a day, during which the appropriate radio contact and identification procedure completed.

At the world, the ship completes a landing maneuver while in voice and data contact with the local space traffic controller.

Once at the surface, the ship settles into its assigned landing bay. Cargo and freight are offloaded and passengers debark.

The ship spends several days at the starport loading cargo and freight and booking passengers. During the time, the crew splits its efforts between maintenance and recreation.

When leaving the starport, the ship coordinates with traffic control and leaves the starport for orbit. From orbit, it maneuvers to 100 planetary diameters out. When it reaches this safe jump point, it then enters jump space en route to its next destination.

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.

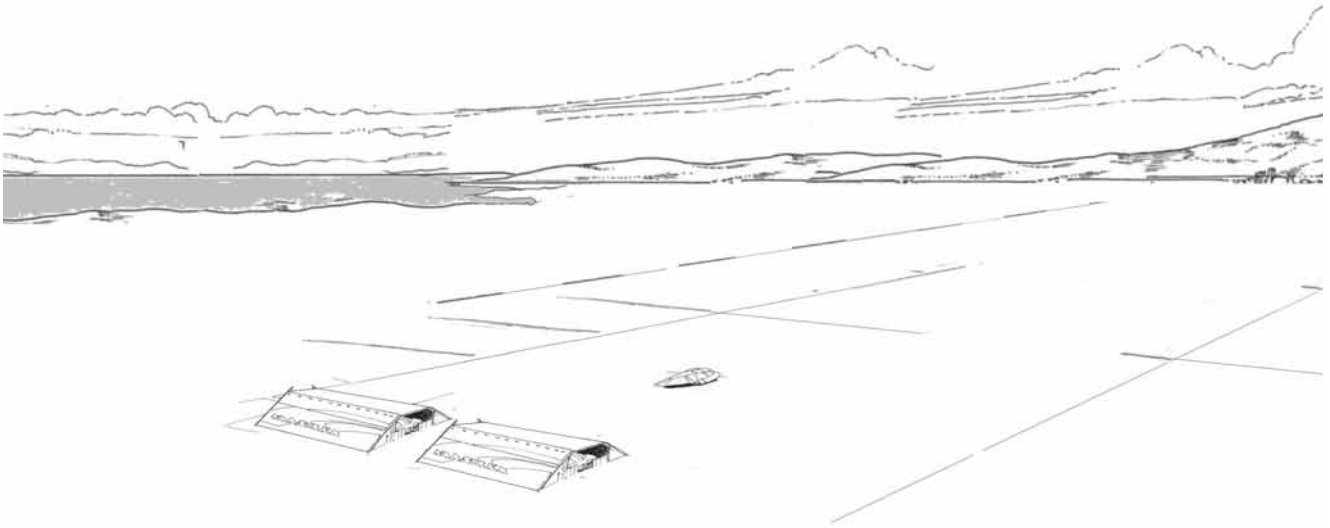
DISTRIBUTION OPERATIONS

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 Rhylanor'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 would be shipped by truck, transport line, air, or even boat to the southern continent.

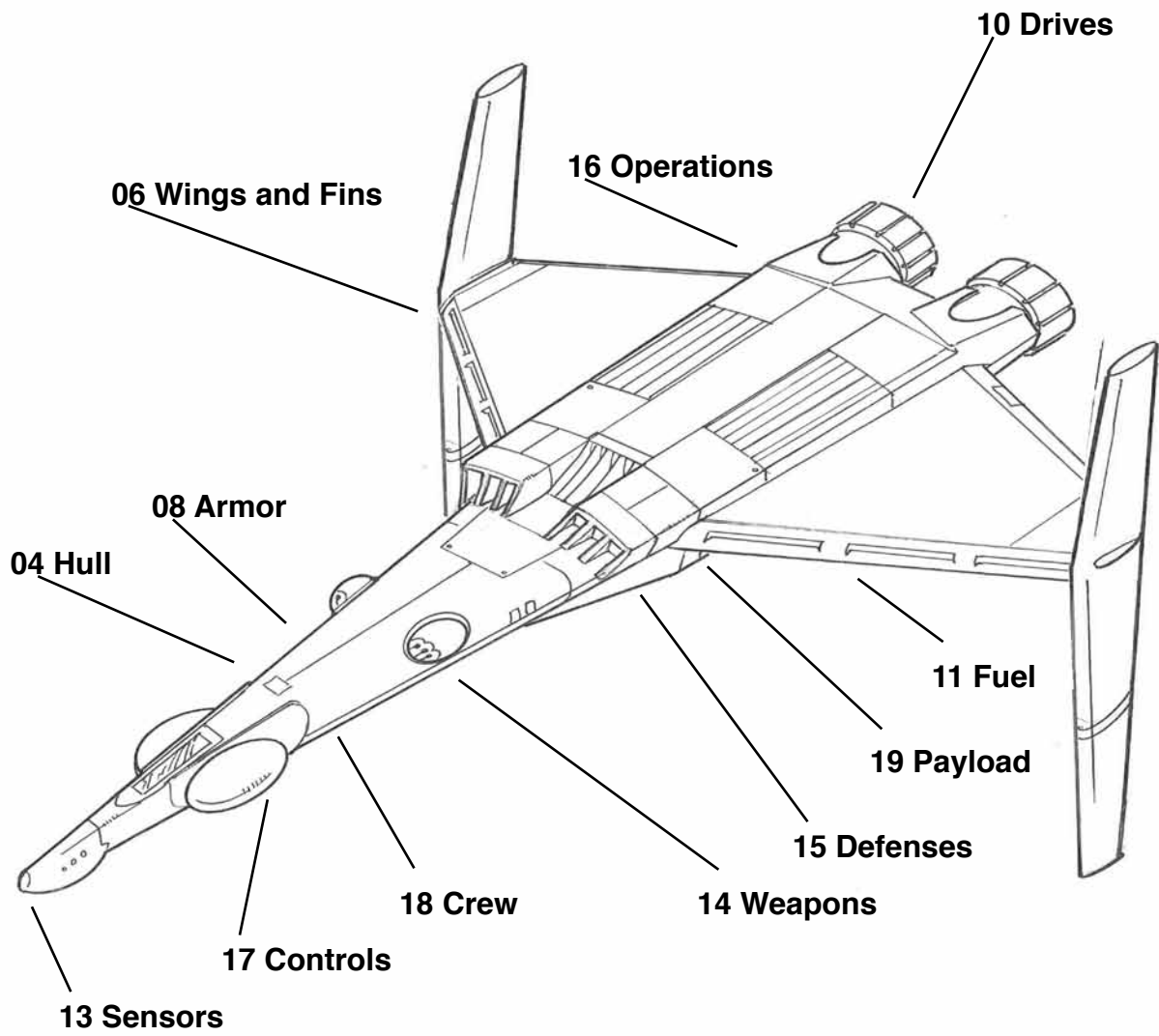
Taking delivery in orbit, the company sends (or hires) a cutter to pick them up in orbit and deliver them directly to the warehouse. The process saves time and effort for everyone involved.



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 for cargo.



Lurushaar Kilaalum Class Corvette E-EA53

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. Small Craft and Battle Class Ships use other (and different) design systems.

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 to accomplish 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 is 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.

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.

Life Support. A ship has equipment to maintain environment, atmosphere, liquids, and food.

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.

Controls and Crew. A ship is equipped with a set of controls and positions for crew members to operate them. The abilities of the crew 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 23) manage the Naval Architecture Process. Begin with Chart 01 (the Checklist) and proceed through the process which it describes. The player who is designing the ship is variously referred to as the naval architect or the 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 and ShipSheet.

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 (CHARTS 22 AND 23)

The two-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. Print a copy of the two-page Fillform and enter information as needed. Preserve a clean completed copy of the FillForm as a record of the ship design.

Fillform Columns

The Fillform is divided into numbered sections corresponding to the governing charts. Within each section, labelled columns call for specific information.

Component. The Component column records the identity of the mechanism. A simple name or code is sufficient as long as it adequately identifies the item.

QREBS provides the specific values for the component based on Tech Level Stage Effects.

Code records the specific identifier for the mechanism.

Sq Squares notes the deck plan squares the mechanism requires. If not specified, one Ton requires two Squares. The number of Squares per ton may also vary for ships designed for non-humans.

CP Control Panels records the Control Panels for the mechanisms. This information is inserted based on the Controls chart.

TL Tech Level records the Tech Level of the mechanism. No entry is required if TL is the standard for the ship. Record variant TLs in order to determine various Tech Level Stage Effects.

Tons records the tonnage a mechanism or installation occupies in the hull.

MCr and **KCr** record the specific costs of the mechanisms.

01 THE CHECKLIST

The Ship Design Checklist details the process and sequence 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 intended to explore new star systems will be different from a ship designed for naval attacks.

Basic Terms

The descriptive terms for missions for ACS class ships have specific meanings. At the same time, the terms may be broadly interpreted, and individual understandings of the terms may vary.

The following terms apply consistently to ship missions.

Freight. Goods carried for a fee. Ownership remains with the shipper.

Cargo. Goods owned by the shipowner and carried in anticipation of sale at a high price at the destination.

Passengers. Individuals who travel on a ship in exchange for a fee.

Crew. Operating personnel on a ship.

Staff. Individuals performing non-operating functions on a ship (for example, scientists on a Lab Ship).

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 Mis-

sion. 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 - 07 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 Configuration, Tonnage, Fittings, and Jump Fields.

The Hull Creation Process

Create a Hull in the following steps.

A. Select a Configuration. Configuration states the performance characteristics of the hull, including Friction, Agility, Stability, Maximum G Acceleration, and G Enhancement.

B. Select a Hull Size. Hull size indicates the tonnage and volume of the hull. The Hull may be divided into more than one component; if so, select any necessary component hulls or subhulls.

C. Select Component Hulls. Some ships may include multiple Hulls. It is possible to add one or more Sub hulls and one or more Pods to the original Hull.

D. Select a Hull Structure. Structure states the basic nature and construction technique used for the hull.

E. Add Fittings. Fittings provide for flotation, landing gear, and wings for increased performance in atmosphere.

F. Add Jump Fields. If the ship will be fitted with a jump drive, add the required Jump Field mechanism.

G. Note Interference. If a ship has an installed Jump Readiness Option, calculate safe Jump Distance.

HULL CONFIGURATION

Hulls can be produced in seven different configurations, each with its own unique advantages and restrictions. The Hull Configurations chart details each configuration.

Operational Considerations for Configuration

Hull configurations provide useful abilities and inflict some restrictions.

Cost. Configuration governs the basic cost of a Hull (the costs are shown in Chart 5 Hull Tonnage and Costs).

Friction. Configuration governs the Friction multiplier and consequent heat experienced by a Hull during re-entry.

Stability. Configuration governs the stability of a Hull when it operates in an atmosphere.

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.

Maximum G. Configuration determines the maximum G acceleration a hull can withstand structurally.

Acceleration. Airframe and Lifting Body Configurations make more efficient use of their maneuver drives in atmosphere.

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 the important differences between Airframe and Streamlined.

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 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.

The Hull Costs table provides hull tonnages and identifiers. After Configuration is selected, it provides costs (in MCr).

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.

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.

Hull Structure

Hull structure describes the construction techniques employed for specific ship. A variety of construction techniques is possible, each with its own benefits and drawbacks.

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

Hardpoints and Firmpoints

	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 Firmpoint
Internal Ordnance		discharge 1 ton /turn

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. FeN has a defined value without regard to TL.

Armor values are detailed more fully on the Armor chart.

Hardpoints and Firmpoints

Hardpoints and Firmpoints are locations for the installation of weapons and defenses on hulls.

Hull 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.

Pod Firmpoints. A Firmpoint is a small Hardpoint with restricted capabilities primarily suited for pods and small craft.

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 is normally mounted in a 1-ton turret and 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 installation on 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 accepts any installation with a mount requirement of a half ton or less (achieved by designating a mount and reducing its World Range R=).

Hardpoints and Firmpoints may be distributed throughout the structure, or they may be clustered together.

The hardpoint and firmpoint allowances provides a practical limit to the number of weapons (or other devices) which can be installed on a ship.

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 when it rests on a world surface.

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. 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 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 specific 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.

The Armor Value for a layer stops hits in space combat and from environments. Any event imposing hits is stopped if the imposed hits are equal to or less than the AV for the layer. If the attacking hits exceed the layer AV, then 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).

Homogeneous Layers. Multiple Layers of identical Armor are summed to one AV equal to the total of the Layers.

For example, a TL-12 ship with 4 Layers of Organic-12 has a total AV=48.

Non-Destructive Effects. Some effects (EMP, Rad) are non-destructive. The effect penetrates Armor without destroying it.

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.

Stealth. A coating of specialized absorbent materials provides protection against sensors.

09 THE DRIVE FORMULAE

The tables for Drives are calculated using the Drive Formulae, which are presented on one page for convenient reference.

10 - 11 - 12 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, a ship may be equipped with 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, a ship may be equipped with a Jump-Drive-A and a Jump Drive-B. Or, it may be equipped with a Jump Drive N2 (which is two Jump Drive-N yoked together).

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).

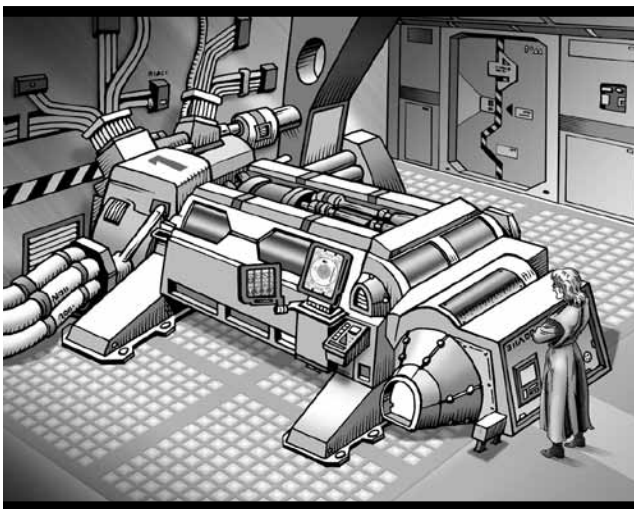
10 STARSHIP DRIVES

Starships require drives to move and power systems to provide them energy.

Drives are divided into three categories:

Interplanetary Drives 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 type of 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 (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.

Fuel for the Power Plant is stored in fuel tanks. The actual tankage installed is based on Naval Architecture decisions and the various fuel requirement formulae.

Power For Maneuver Drives. Fuel equal to 1% of the Hull will support operations of a Maneuver Drive at any performance level for one month.

Power For NAFAL. Fuel equal to 1% of the Hull will support operations of a NAFAL Drive at any performance level for one month.

Centralized Power. Fuel equal to 1% of the Hull will support the Power Plant providing Centralized Power for one month.

Jump Fuel. Fuel equal to 10% of Hull times the Jump in parsecs is required at the initiation of Jump.

For example, a 1,000-ton ship with a Maneuver-1 required 10 tons of Maneuver Fuel per month of intended operation. Adding NAFAL-2 adds 20 tons of NAFAL fuel per month of intended operation. Adding a Jump Drive-3 adds 300 tons of Jump Fuel per intended Jump-3.

Power Plant Standby Mode

A Power Plant providing Centralized Power can operate in Standby Mode. It provided minimal power sufficient to operate basic systems while consuming 10% of normally required fuel.

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 slugs. AM slugs are available at many TL 16 or greater Class A starports.

AM Fuel Creator. Ships venturing beyond normal supply sources may need to manufacture their own AM Slugs.

An AM Fuel Creator converts vast amounts of Hydrogen fuel to anti-matter. The process is tedious and fuel intensive. Channelling fuel through an AM Creator (1000 tons in three days: 14 tons an hour) creates one AM Slug.

For example, the 1200-ton LR Scout *Argo* stops in a system to restock its AM Plant. Landing near a lake on a suitable world, it begins processing water as fuel for its Power Plant and over the course of month produces ten AM slugs (one every three days).

Some ships carry multiple AM Creators and operate them in tandem.

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 supports the total power requirement for any Jump Drive of equivalent Drive Potential.

Charging. A Collector absorbs its charge while its canopy is deployed.

Canopy Operation

The canopy is an extendable framework covered with particle attractive media. The canopy is too fragile to withstand acceleration, they must be stowed when the ship accelerates. The canopy is easily contaminated by atmosphere; it can be effectively deployed only in vacuum.

Deploying The Canopy. A stowed or stored canopy can be deployed in about an hour. Deployment positions the canopy to best absorb exotic particles.

Collecting. A deployed canopy requires about a week to become fully charged. Once fully charged, it remains so while deployed, and for about a day after being stowed. A canopy can become partially charged: approximately one tenth charge in for each day of deployment.

Stowing The Canopy. A deployed canopy must be stowed before the ship accelerates. The process requires several (10 + Flux) hours.

Canopy Degradation. A canopy degrades with use and rapidly degrades when abused.

A canopy functions normally until it has cycled through 100 charges. Thereafter it rapidly degrades in efficiency. 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.

Once fully charged, a canopy remains fully charged while extended. A canopy is capable of charging without regard to proximity of stars or worlds.

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 requires one Rod times the Fission Potential times Hull Tonnage/100. The total Rods will supply power for a decade (assuming Centralized Power; twice as long if using Decentralized Power).

A Fission Plant cannot supply power in bursts intense enough to support Jump or Hop drive (although it can support Skip Drive).

Power Plant Standby Mode

A Fission Power Plant providing Centralized Power can

operate in Standby Mode. It provided minimal power sufficient to operate basic systems while consuming 10% of normally required fuel.

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

M	G	Z
Maneuver	Gravitic	Lifters
1000D	10D	1D

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 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

J Jump **H** Hop **S** Skip **N** 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).

Standard Jump Drives can produce any level of integer Jump equal to or less than its performance. A Standard Jump-2 drive can produce Jump-1 or Jump-2.

Experimental, Prototype, or Early Jump Drives are capable of producing only their specific rated performance. An Early Jump-2 drive can only produce Jump-2 (not Jump-1).

H HOP DRIVE

The Hop Drive is an order-of-magnitude enhancement of the Jump Drive: its base TL of 18 means that it is rarely encountered in Charted Space.

The H-Drive is installed as a drive. It requires a Power Plant with potential equal to or greater than the H-Drive.

The Hop drive consumes fuel equal to 1% of the hull volume of a ship per Hop number; For example, a 100-ton hull with a Hop Drive-A is capable of Hop-2. To accomplish Hop-2, it requires 2 tons of fuel (= 1% of hull volume times Hop-2).

The H-Drive interacts with gravity sources: a ship in hop is automatically precipitated out of jumpspace when its course brings it within about 100D of a gravity source. A ship which attempts to enter hop while less than Safe Hop Distance (typically 100D) of a gravity source may suffer a Misjump (rarely called a Mishop).

Performance. H-Drive performance is evaluated in Hops measured in tens of parsecs (Drive Potential x10 = H).

Standard Hop Drives can produce any level of integer Hop equal to or less than its performance. A Standard Hop-2 drive can produce Hop-1 or Hop-2.

Experimental, Prototype, or Early Hop Drives are capable of producing only their specific rated performance. An Early Hop-2 drive can only produce Hop-2 (not Hop-1).

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.

The S-Drive is installed as a drive. It requires a Power Plant with potential equal to or greater than the S-Drive.

The Skip drive consumes fuel equal to 1% of the hull volume of a ship per Skip number. For example, a 100-ton hull with a Skip Drive-B is capable of Skip-4. To accomplish Skip-4, it requires 0.4 tons of fuel (= 0.1% of hull volume times Skip-4).

The S-Drive interacts with gravity sources: a ship in skip is automatically precipitated out of jumpspace when its course brings it inside Safe Jump Distance (about 100D) of a gravity source. A ship which attempts to enter skip while less than Safe Skip Distance (typically 100D) of a gravity source may suffer a Misjump (rarely called a Misskip).

Performance. S-Drive performance is evaluated in Skips measured in tens of parsecs (Drive Potential x100 = S).

Standard Skip Drives can produce any level of integer Skip equal to or less than its performance. A Standard Skip-2 drive can produce Skip-1 or Skip-2.

Experimental, Prototype, or Early Skip Drives are capable of producing only their specific rated performance. An Early Skip-2 drive can only produce Skip-2 (not Skip-1).

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.

The N-Drive is installed as a drive. It requires a Power Plant with potential equal to or greater than the N-Drive.

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.

D Limit. It can only accelerate directly away from a gravity source, subject to a D limit of about one-eighth light-year (or about 51 weeks of acceleration). It can similarly decelerate only within the one-eighth light year distance (also about 51 weeks).

When coupled with an Anti-Matter Plant or a Fission Plant, it has no independent fuel requirement.

When coupled with a Power Plant, the N-drive consumes fuel equal to 1% of the hull volume of a ship per month of operation. For example, a 1,000-ton Hull-K with NAFAL Drive-K is capable of constant acceleration at 0.2G. It requires approximately 51 weeks =12 months) to reach maximum velocity. Assuming the ship will decelerate for an equal length of time in the destination system, the ship requires (1% x 1000 tons x Potential=2 x 12 months =) 240 tons of fuel to accelerate and another 240 tons of fuel to decelerate.

The N-Drive interacts with the gravity fields of local stars; it is unable to accelerate or decelerate unless it is within about one-eighth light-year of a gravity source.

Performance. N-Drive performance is evaluated in G (Drive Potential = G/10).

DRIVE EFFICIENCY

P1	Mod		Alt		Imp	Adv	Ult
	Exp	Pro	Ear	Std			
	50%	80%	90%	100%	110%	120%	130%
1	0	0	0	1	1	1	1
2	1	1	1	2	2	2	2
3	1	2	2	3	3	3	3
4	2	2	3	4	4	4	5
5	2	4	4	5	5	6	6
6	3	4	5	6	6	7	8
7	3	5	6	7	7	8	9
8	4	6	7	8	8	9	10
9	4	7	8	9	9	10	11

P1= Design Drive Potential from Drive Potential Table.
P2= Output of this table = Usable Drive Potential.

FUEL REQUIREMENTS

P1	P2	2.0		1.2		1.1		1.0		0.9		0.8		0.7	
		Exp	Pro	Ear	Std	Imp	Adv	Ult							
1	0	--	--												
1	1	--	--	1	1	1	1	1	1						
2	1	4	2.4	2.2											
2	2				2	1.8	1.6	1.4							
3	1	6													
3	2		3.6	3.3											
3	3				3	2.7	2.4	2.1							
4	2	8	4.8												
4	3			4.4											
4	4				4	3.6	3.2								
4	5													2.8	
5	2	10													
5	4		6	5.5											
5	5				5	4.5									
5	6						4	3.5							
6	3	12													
6	4		7.2												
6	5			6.6											
6	6				6	5.4									
6	7						4.8								
6	8							4.2							
7	3	14													
7	5		8.4												
7	6			7.7											
7	7				7	7									
7	8							5.6							
7	9								4.9						
8	4	16													
8	6		9.6												
8	7			8.8											
8	8				8	7.2									
8	9						6.4								
8	10							5.6							
9	4	18													
9	7		10.8												
9	8			9.9											
9	9				9	8.1									
9	10							7.2							
9	11								6.3						

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.

The expanded tables to the left provided detailed interpretations of the Drive Efficiency table.

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.

Standard Power Plant-K in Hull=D shows Design Drive Potential-5. Advanced Power Plant-K in Hull-D is 120% efficient and produces Usable Drive Potential-6. It requires 4 units of fuel as opposed to the Standard Power Plant's 5.

11 FUEL REQUIREMENTS

The various drives and power systems require fuel.

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.

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.

12 DRIVE POTENTIAL

Drive Potential relates the output of a drive or power plant and the size of the hull in which it is installed.

Two Drive Potential Tables are provided:

Drive Potential-1 provides the Design Drive Potential for any lettered Drive (left column) installed in a lettered Hull

(header row). The output is the integer Design Drive Potential P1 for TL Standard Drive.

Drive Potential-2 provides the required Drive letter to achieve a specific Potential (left column) in a lettered Hull (header row). The output is the minimum lettered Drive required.

Drive Potential is modifiable by TL Stage Effects.

13 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 (Sensor table A),
 a Mount (Sensor Mounts table C), 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.

ALTERNATE SENSOR INSTALLATIONS

	MCr	Tons	S=	R=	Mod
AR Ant Radar-9	1.5	1	7		+1
FR Ant Radar-7	1.16	0.3	2		+1
SR Ant Radar-8	1.25	0.5	5		+1
LR Ant Radar-10	2.5	2	9		+1
DS Ant Radar-11	3.5	3	12		+1
DS Bay Radar-11	26	151	12		+8
Exp AR Ant Radar-6	15	1	7		-2
Adv AR Ant Radar-12	1.5	1	7		+4

Modify Stage Effects. Tech Level Stage Effects can alter the capabilities of the installation. Cost and Mod apply to the Mount.

14 WEAPONS

Weapons and Defenses enable a ship to defend itself, to attack others, and to 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 the basic function of the installation. The Mount determines the tonnage required (larger mounts increase performance). The Control Panel allows the weapon to be controlled 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.

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

ALTERNATE WEAPON INSTALLATIONS

	MCr	Tons	S=	R=	Mod
Vd T1 Beam Laser-10	0.7	1		7	-3
Or T1 Beam Laser-11	1.1	2		8	-3
Fo T1 Beam Laser-12	1.5	3		9	-3
VI T1 Beam Laser-8	.56	.3		5	-3
Exp Vd T1 BL-7	2.5	1		7	-6
Adv Vd T1 BL-13	0.7	1		7	0
T4 BL-10	2.0	1		7	0
Adv G (SR) T4 BL-13	12.0	4	5	10	+3

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.

15 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 the Defenses table) 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 previously 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 hard-points 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.

16 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. Most ships require crew Medical skill levels equal or exceed the total number of 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.

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.

For example:

Political Officer. An officer tasked to reinforce political values among the crew. In addition to teaching and monitoring functions, a Political Officer may have 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. While a Negotiator is typically involved in economic or trade activity, he may instead have duties in other fields: military, diplomatic, cultural, or political.

Linguist. An individual tasked to research and understand languages.

Translator. An individual assigned to translate concepts and statements as a ship visits new worlds.

Other Possibilities:

Liaison Specialist. Ombudsperson. Referee. Science Officer. Cultural Officer. Broker. Trader. Priest. Polymath. Psionic Officer. Security Officer. Union Representative. Safety Officer. Polyhistor. Systems Analyst. Trouble Shooter. Supply Officer. Intelligence Officer. Strategist. Tactician. Meteorologist. Information Technologist.

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.

17 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, and control of Jump), or Steward (management of accounts).

Control Panels

Every mechanism on a ship has a Control Panel: a rudimentary input output device attached directly to the mechanism.

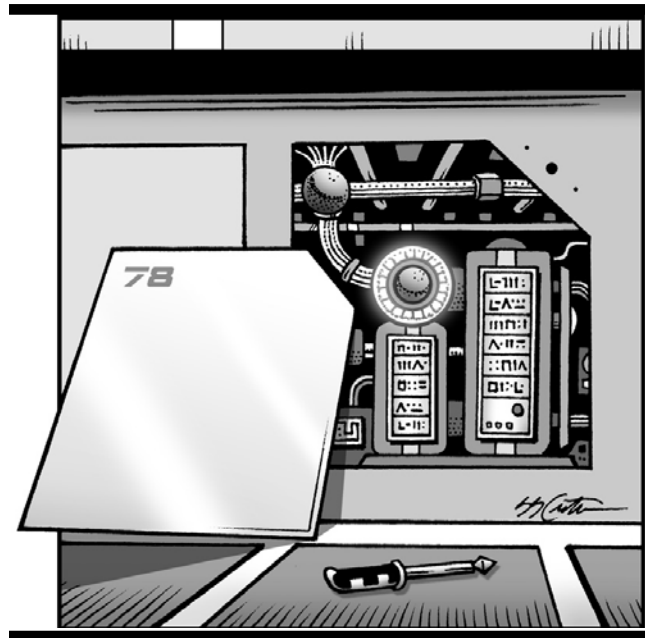
The Control Panel directly controls the device.

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. The Console is a data output device (a visual display screen adapted to the sensory needs of the user and various sound outputs) coupled with a data input device (touch and sound responsive). For specialized uses, other inputs and outputs are possible.



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 common administrative purposes. The Computer provides access to common office activities: language use, math, communications, information, and entertainment.

Public installations are often 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. 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.

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.

18 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 created with a hierarchy based on rank.

For most purposes, each console is staffed or crewed by a spacer or relatively low ranked individual. Several such consoles are supervised by the next higher rank, who are in turn supervised by higher ranks.

Naval Rank Hierarchy. The ship crew is assigned rigidly by rank. Consoles are staffed by the lowest ranks and

supervised by higher ranks. In emergencies or crises, higher ranks may be called upon to staff consoles.

Merchant Rank Hierarchy. Consoles are staffed by crew with the highest or most appropriate skills.

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).

19 PAYLOAD

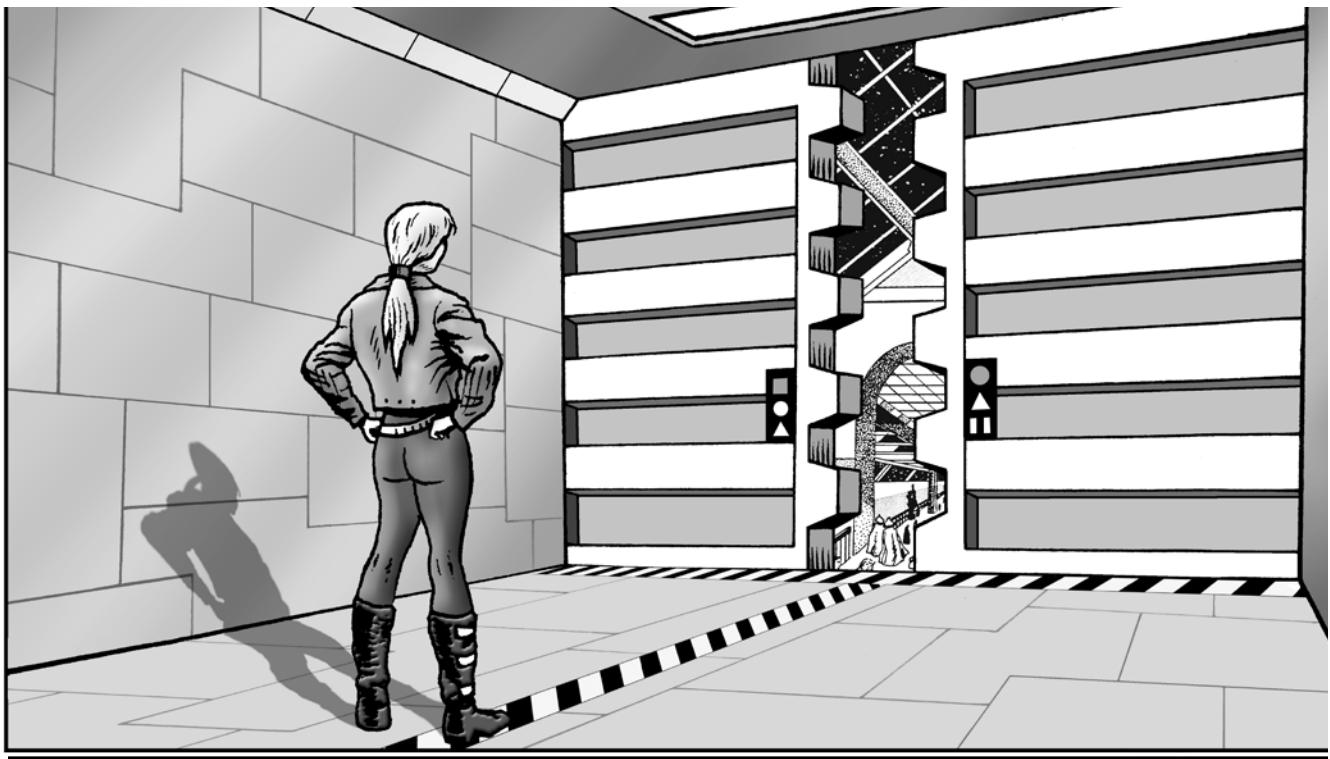
After all other requirements have been met; the remaining tonnage is payload space.

Depending on the ship mission, the naval architect may specify passenger, cargo, or other payload space.

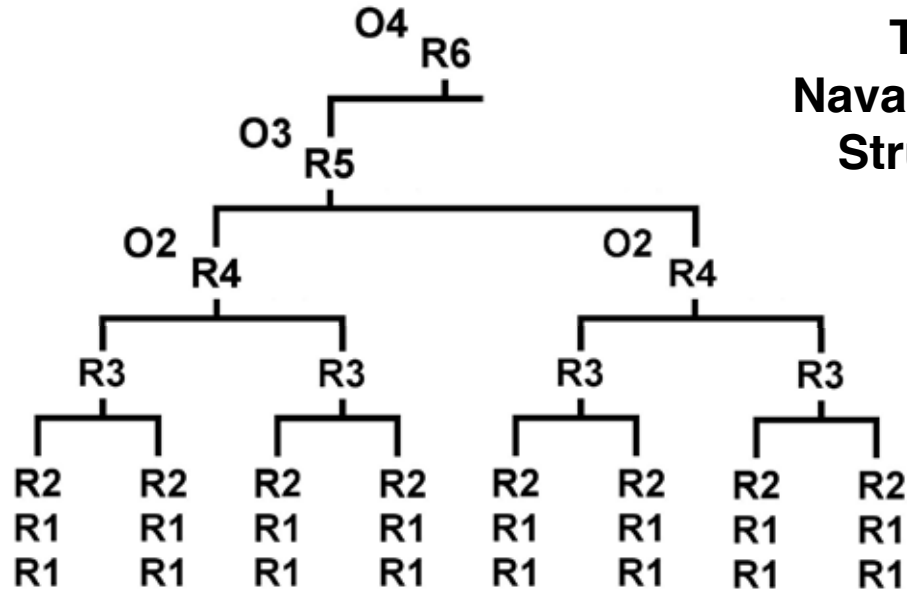
20 EVALUATING THE SHIP

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 specifica-



Typical Naval Crew Structure



tion (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

The Mod on availability of passengers and on premium pricing for passages.

Passage Demand is calculated based on the density of passengers in accommodations, and takes into account available common areas.

Using a table, the specific Passenger Demand Mod can increase (or decrease) the number of passengers that a ship attracts and passage prices.

Premium Pricing. There are standard or expected prices for various levels of passenger accommodation. An unscheduled ship (various traders carrying both passengers and freight) can post ticket pricing based on the Premium Pricing table. Passage Demand is a Mod on the table.

CREW COMFORT

The Mod on Check Sanity for individual crew members (including specialists).

Crew Comfort is calculated based on the density of crew accommodations.

Using a table, the specific Crew Comfort Mod is determined. Crew Comfort increases (or decreases) the chance of individual crew sanity crises.

CONTROL ERGONOMICS

The mod on the possibility of a ship mishap (daily).

Control Ergonomics is based on the roominess of the control structures for the ship; cramped controls are less conducive to mishap-free operation. Control Ergonomics increases (decreases) mishap chance during operations.

THE BRIDGE

The availability of consoles as control stations throughout the ship lessens the specific requirement that a central control Bridge be installed on a ship. Nevertheless, a Bridge provides needed ease of communications for the ship crew, 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.

21 THE QUICK SHIP PROFILE

The QSP provides a basic identification of the performance capabilities of a ship.

The QSP can be expanded with two extensions: the Vx Vehicle Extension, and the Cx Crew Extension.

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.

22 THE SHIP SHEET

The ShipSheet is a unique record of the starship and how damage affects it.

The ShipSheet Entries are custom-filled based on the ship designer's concepts and within the constraints of the Ship Design Rules. It is a Hit Location Table which tracks damage to the ship and facilitates determining where a specific attack impacts the ship.

A

Starship Construction

22 FillForm1

STARSHIP FILLFORM 04-13

Mission: **02** Ship Name: _____ Tons: _____

Building World: TL _____ Mission: _____

Section	Component	Comment	Q	R	E	B	S	Code	CP	Sq	TL	Tons	MCr	KCr
04	A-Configuration													
05	B-Tonnage													
06	D-Structure													
06	E-Flotation	DE												
	E-Wings / Fins	FGWV												
07	E-Fittings	J K M Z												
	F-JField	Type Strength Sale-D												
08	Layer0	AV=												
	Layer1	AV=												
	Layer2	AV=												
	Layer3	AV=												
	Layer4	AV=												
10	Coatings													
	Drive1-Power System	Potential Fuel												
	Drive2-Maneuver	Potential Fuel												
	Drive3-Interstellar	Potential Fuel												
11	Drive4-													
	Fuel Fittings													
16	Fuel Fittings	Boops Fuel Tankage												
	Operations	Life Support Small Craft												

B

Starship Construction

23 FillForm2

SENSORS WEAPONS DEFENSES 13-14-15

Ship Name: _____ Tons: _____

QSP: _____

HardPt	Unit	Mount	Stage	R=	S=	Q	R	E	B	S	Code	CP	Sq	TL	Tons	MCr	KCr	
1	0																	
2	-1																	
3	+1																	
4	-2																	
5	+2																	
6	-3																	
7	+3																	
8	-4																	
9	+4																	
10	-5																	
11	+5																	
12	-6																	
13	+6																	
14	-7																	
15	+7																	
16	-8																	
17	+8																	
18	-9																	
19	+9																	
20	-10																	
21	+10																	
22	-11																	
23	+11																	
24	-12																	
25	+12																	
Totals																		

C

Ship Name: _____

QSP= _____

Loc	C	0	1	2	3	4	5	6	Compartment	Tons
-9										
-8										
-7										
-6										
-5										
-4										
-3										
-2										
-1										
0										
+1										
+2										
+3										
+4										
+5										
+6										
+7										
+8										
+9										

-9	1	2	3	4	5	6
-8	1	2	3	4	5	6
-7	1	2	3	4	5	6
-6	1	2	3	4	5	6
-5	1	2	3	4	5	6
-4	1	2	3	4	5	6
-3	1	2	3	4	5	6
-2	1	2	3	4	5	6
-1	1	2	3	4	5	6
0	1	2	3	4	5	6
+1	1	2	3	4	5	6
+2	1	2	3	4	5	6
+3	1	2	3	4	5	6
+4	1	2	3	4	5	6
+5	1	2	3	4	5	6
+6	1	2	3	4	5	6
+7	1	2	3	4	5	6
+8	1	2	3	4	5	6
+9	1	2	3	4	5	6

Prepare the blank forms required for ship design:

A. Chart 22. FillForm1.

B. Chart 23. FillForm2.

C. ShipSheet.

Ship Design Checklist 01

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. Small Craft Mission
- V. Note (any) Vehicle Mission.

03 Confirm Mission Definition.

04 Begin Hull Creation.

- A. Select Hull Configuration.
Friction, Agility. Stability.

05 Continue Hull Creation.

- B. Select Hull Size.
- C. Subhulls and Pods (as required)

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 Armor

- A. Assign Armor Layers.
- B. Identify Armor Layer Type.
- C. Assign Anti-Layers.
- D. Assign (as required) Coating.

09 Drive Formulae.

These details are provided for reference and advanced design concepts.

10 Starship Drives (as desired).

- M. Maneuver Drive.
- G. Gravitic Drive.
- N. NAFAL Not As Fast As Light.
- J. Jump Drive.
- P. Power Plant.
- A. Anti-Matter Power System.
- C. Collector Power System.
- X. Note Drive Efficiency.

11 Fuel Requirements.

- P. Power Plant Hydrogen
 - A. Anti-Matter
 - U. Fission Plant.
 - C. Collector
- Determine fuel requirements for installed drives and systems.
- F. Fittings

12 Drive Potential.

Calculate the Drive Potential for each installed Drive.

13 Sensors.

- A. Select one or more Sensors.
- B. Apply TL Stage Effects.
- C. Select a Mount.
- D. Mod Space Sensor for S=.
- E. Mod World Sensor for R=.
- F. Install a Sensor Control Panel.

14 Weapons.

- A. Select one or more Weapons.
- B. Apply TL Stage Effects.
- C. Select a Weapon Mount.
- D. Mod Space Weapon for S=.
- E. Mod World Weapon for R=.
- F. Install a Weapon Control Panel.

15 Defenses.

- A. Select one or more Defenses.
- B. Apply TL Stage Effects.
- C. Select a Defense Mount.
- D. Mod Space Defense for S=.
- E. Mod World Defense for R=.
- F. Install a Defense Control Panel.

16 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 Medical Installations.
- F. Allocate Life Support.
- G. Assign Fuel Storage.

17 Controls

- A. Note available Control Panels.
- B. Install Consoles.
- C. Determine Staffing Level.
- D. Install Ship's Computer.

18 Crew Structure.

- A, Determine Total Crew Members.
- B. Crew Accommodation Tonnage.

19 Payload.

- A. Available Payload: Tonnage.
- B. Assign Tonnage: Passengers.
 1. High and Middle.
 2. Low and Steerage.
- C. Fitted Payload.
- D. General Cargo Payload.

20 Evaluate Ship Conditions.

- A. Crew and passenger Tonnage.
- B. Passenger Demand.
- C. Crew Comfort.
- D. Control Ergonomics.

21 Create the Ship QSP.

22 Ship FillForm Part 1.

23 Ship FillForm Part 2.

02 Starship Missions

Starships are designed to accomplish missions.
Understanding Missions. The descriptive terms for ACS ship missions have specific meanings. At the same time, they are defined to allow broad interpretation and substantial overlap.

Select a mission for the ship (or assign a mission after the ship is designed)
 State the ship mission as a one- or two- (or rarely three-) letter designation.
 Apply Mission Modifiers as needed. Mission is stated first; one or two modifiers follow.

SELECT AN ACS SHIP MISSION

A Service	B Activity	C Type	D Qualifier	E Mission	F Modifier	
Naval	Combat	Offensive	Principal	Cruiser	C	
			Major	Frigate	G	
			Minor	Corvette	E	
		Siege	Attack	Ortillery	H	
			Invasion	Assault	T	
			Defender	Sentinel	S	
		Defensive	Minor	Escort	E	
			Major	Defender	D	
			Principal	Monitor	B	
		Independent	Anti-Shipping	Corsair	P	
	Anti-Commerce		Raider	R		
	Anti-Port		Marauder	P		
	Auxiliary	Supply	Major	Transport	T	
			Minor	Barge	W	
			Resupply	Tender, Tug	T	
Information			Corvette	E		
Passenger			Liner	M		
Cargo			Merchant	R		
Commerce	Merchant	Scheduled	Cargo	Freighter	F	
			Freight	Transport	T	
			Freight	Trader	A	
		Un-Scheduled	Cargo	Packet	U	
			Passenger	Safari	K	
	Charter	Recreation	Expedition	K		
		Active	Yacht	Y		
		Luxury				
	Gov NGO Private	Non-Combat	Information	Small Goods	Courier	S
				Data Files	Messenger	S
Goods and Files				Express	X	
Exploration			First Look	Scout	S	
			Re-Look	Survey	N	
			Data Collection	Beagle	N	
			Medical Data	Med	N	
			Data Analysis	Lab	L	
			Resource Search	Prospector	J	
Bureaucratic			Inspection	Picket	P	
		Enforcement	Patrol	P		
Combat			Privateer	P		
Unclassified					Z	

SELECT MISSION MODIFIERS

Alternate, Improved, Armored.	A
Boat, Bulk, Battle.	B
Close. Carrier, Communications.	C
Defense, Defending.	D
Escort.	E
Fast, Fat, Frontier, Far.	F
Gunned, Upgunned.	G
Fuel, Tanker, Hydrogen.	H
Survey, Prospector.	J
Subsidized.	K
Long Range, LR. Exploratory.	L
Military. Militia. Motivator, Tug.	M
Naval	N
Patrol, Plus, Specialized	P
Disguised, Decoy, Mothership	Q
Recon. Rescue. Rider.	R
Slow, System. Special. Luxury.	S
Tramp. Tender. Transport.	T
Unarmed.	U
Vehicle Carrier	V
Unpowered.	W
Experimental. Special. Express.	X
Hull. Subhull. Pod. Rider.	Y
Unassigned.	Z

Multiple identical letter missions (AA or AAA) are often shown with a digit (A2 or A3).

SELECT SMALL CRAFT MISSION

Q Modifier	
Pod	P
Lifepod	A
Gig	G
Fighter	F
Launch	L
Ship's Boat	B
Pinnacle	N
Cutter	C
Shuttle	S

SELECT VEHICLE TYPE

V Modifier	
ATV	W
Tank. AFV.	T
Groundcar	C
Air/Raft	R
Winged Flyer	F
Rotor Flyer	R
Military Flyer	M
Boat, Sub	B
Truck	T
Trailer	2
ACV	A

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).

The following examples provide insights into the implementation of starship mission labels.

Fighting Ships

Fighting ships are ranked **Principal** (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 a **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 a **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: A **Corsair** attacks commercial shipping (specifically to steal its freight or cargo). A **Raider** attacks commercial shipping to destroy it. A **Marauder** attacks 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

On scheduled routes: a **Liner** carries primarily passengers, a **Freighter** carries primarily freight, a **Merchant** carries primarily cargo.

On unscheduled routes: a **Packet** carries primarily passengers, a **Transport** carries primarily freight, a **Trader** carries primarily cargo.

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 private 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 (the name implies an extremely fast vessel).

A **Corvette** is a naval courier.

Explorers

A **Scout** is a small first-in ship seeking star system basic information.

A **Survey** periodically visits known systems to gather or confirm data. A **Beagle** visits new systems to gather scientific data.

A **Med** gathers data affecting to so-phont health. A **Lab** gathers scientific data and can process it immediately.

A **Prospector** conducts planetological (and planetoidological) exploration, usually in search of 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.

The following are traditionally accepted small craft types (and suggested tonnages).

Pod (<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 primarily 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.

Pinnacle (40 tons). Mid-sized utility craft capable of landing on worlds.

Cutter (50 tons). Mid-sized multi-purpose craft.

Shuttle (90 tons). Large passenger and freight transporter capable of landing on worlds.

Understanding Starship Missions 03

Modifiers

Modifiers apply as needed.

Alternate. Substantially different from normal expectations.

Armored. Uparmored. 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. Decoy. Fitted to mislead 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. Upgunned. Firepower is a substantial addition.

Hydrogen. Fuel related.

Improved. Added performance.

Local. System. Operates within a single system.

Long Range. LR. Operates months at a time; or capable of multiple interstellar drive operation without refuelling.

Military. Militia. Supports Army or Marine operations.

Minus. Inferior capabilities.

Naval. Supports Naval operations.

Plus. Specialized. Some capability has been enhanced.

Patrol. Operates within a defined region, but without scheduled routes.

Recon. Capable of military or naval intelligence gathering.

Slow. Lower G capability.

Subhull. Component hull.

Subsidized. Operating costs are primarily paid by government.

Tender. Resupplies other ships.

Tramp. Flies unscheduled routes.

Unarmed. No weapons installed.

04 Hull Configuration

Hull Configurations constrain the appearance, structure and performance characteristics of ships.

CREATING A HULL

A. Select a Configuration and note ship performance characteristics including Friction, Agility, and Stability.

A 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

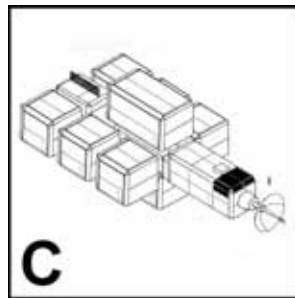
Agility. Mod on maneuver in atmosphere.

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.

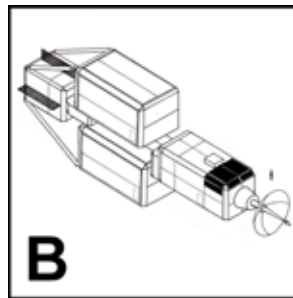
Max G. Maximum G a hull can withstand based on structural design and the limits of inertial compensators.



Cluster Hull

An accumulation of compartments and various connectors.

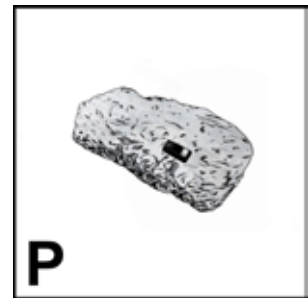
Least expensive of the hull types. Unsuitable for high acceleration; not intended for world landings.



Braced Cluster Hull

An upgraded Cluster Hull braced to allow relatively higher accelerations.

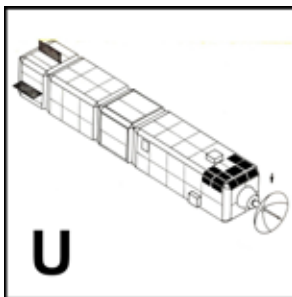
Cluster Hull upgraded to allow higher acceleration. Not intended for world landings.



Planetoid Hull

A small planetoid with a laser-tunnelled interior for drives, crew, and payload.

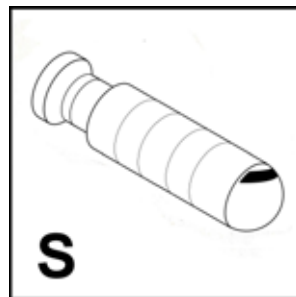
Relatively inexpensive and structurally very strong. Unsuitable for most world landings.



Unstreamlined Hull

A relatively compact hull marginally capable of entering atmosphere.

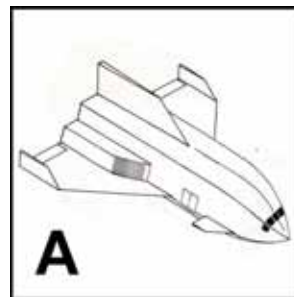
A commonly encountered hull type handicapped by its inattention to streamlining.



Streamlined Hull

A relatively compact hull crafted to support maneuver in atmospheres.

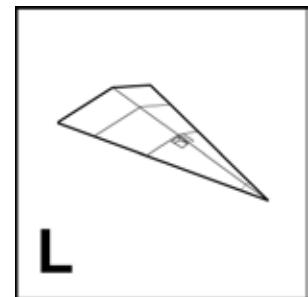
Common hull type designed for efficient atmospheric operations in addition to space travel.



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 has the effect of Wings but not Fins.

Hull Tonnage and Costs **05**

Hull Size is defined in tons with an associated cost determined by tonnage and configuration. It is possible to create a ship with more than one hull.

CREATING A HULL

B. Select a Hull Size to determine volume (and payload)

C. Select Component Hulls (Pods, Barges, or Subhulls).

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, which functions as a limit on the number of weapons that can be installed on a ship.

BUILDING BARGE AND POD HULLS

Hulls may have detachable components.

A **Pod** is a detachable unit < 100 tons.

A **Barge** is an 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 (with a 3 meter deck separation).

Deck Cubes. One cube is 0.25 tons. One ton equals four 1.5 meter cubes.

B 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.

C POD COSTS

ID	Tons	-----Configuration Costs KCr-----								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 hull to which it is attached, the least beneficial set of capabilities is used.

Jump Fields. If the parent hull has Jump Plates or Jump Grid, then the Hull Pod must have either Jump Plates or Jump Grid (but not necessarily the same).

06 Hull Fittings

Hull Structure determines the ship's construction technique and 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 is doubled.

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	D
E Submergence Hull	+	+	+	+	+	+	+	Water Landing*	6	2.0	2.0	E
F Fins	No	No	No	+	+	-	-	Increases Agility in Atmosphere.	5	0.5	0.5	F
G Folding Fins	No	No	No	+	+	-	-	Increases Agility in Atmosphere.	8	0.0	0.5	G
W Wings	No	No	No	+	+	-	-	Increases performance in Atmos.	7	2.0	1.0	W
V Collapsing Wings	No	No	No	+	+	-	-	Increases performance in Atmos.	9	1.0	2.0	V
Landing Skids (Standard)	+	+	+	+	+	+	+	Tarmac Landing	7			
K Landing Legs with Pads	+	+	+	+	+	+	+	Allows Wilderness Landing	8	1.0	1.0	K
M Landing Wheels	+	+	+	+	+	+	+	Allows Glide Landing	5	3.0	1.5	M
Z Lifters	+	+	+	+	+	+	+	Allows limited hover and move	8	--	1.0	Z

TL= Minimum TL to install fitting. *Includes Gliding Landing on Water. **Tons per 100 tons of hull. ***Mcr per 100 tons of hull. + = Installation allowed on this Configuration. - = No benefit from this installation. 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.

V. Collapsing Wings. Installed wings (and fins) can be folded or collapsed for storage, reducing required 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.

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.

Jump Fields 07

CREATING A HULL

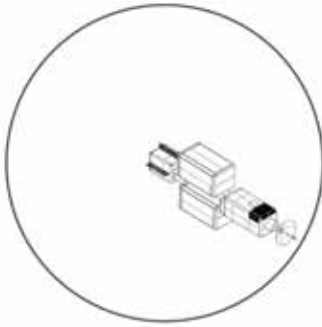
Hulls for ships with Jump Drives require a Jump Readiness option.

Jump Bubble

The **Jump Bubble** creates a spherical field around the ship and centered on the jump drive.

Jump Bubble is the default Jump Readiness option.

Difficulties. A Jump Bubble may enclose nearby debris. If the delicate balance of total ship tonnage is disrupted, there may be a jump mishap.



Jump Bubble allows a ship to vary its effective tonnage from mission to mission (which makes Drop Tanks and Variable Jump Container Ships possible).

Jump Plates

Jump Plates radiate their effects in a complex structure of small overlapping globes which enclose the hull. The result typically extends several meters beyond the hull in all directions.

Difficulties. A Jump Bubble may enclose nearby debris. If the delicate balance of total ship tonnage is disrupted, there may be a jump mishap.



A single malfunctioning Jump Plate will prevent the creation of a jump field.

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.

Jump Grid

A Jump Grid channels jump energy through a mesh of wires and cables embedded in the hull. The Jump Field closely conforms to the shape of the hull.

Difficulties. Damaged Jump Grids are difficult to repair (Jump Plates are often bolted on to repair gaps in grid coverage).



Advantages. The Jump Grid has virtually no chance of misjump due to random nearby debris.

F. Select Jump Field Capability. Choose a Jump Readiness option.

G. Safe Jump Distance. Calculate distance for safe Jump Initiation.

H. Interference. Note formula to determine if Initiation Interference occurs.

F JUMP READINESS OPTIONS

Type	Cost	Field Strength	Comment
Bubble	-	120	Installed by default.
Plates	KCr10 per Plate	110	One Plate Per 10 Hull Tons.
Grid	KCr10 per Hull Ton	100	Embedded in the Hull.

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

If a ship attempts to create a Jump Field when near a Gravity Source, interference may cause a Misjump. If Initiation Interference is greater than zero, the attempt misjumps.

$$X = S / E - (D + K) (+Flux)$$

X= Initiation Interference. If X is less than 1, there is no jump interference. Flux is optional, but if rolled, must be used.

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.

08 Armor

On The FillForm

Specify **Armor Layers**. Note **Armor Type** Code and AV=. All Armor on a ship is identical (Pods and Sub-hulls 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.

ARMOR LAYERS

Armor is determined by Structure, applied in Layers, and capable of customization 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 cost; its disadvantage 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). Tech Level Stage Effects may be necessary to allow Armor at less than its Base TL.

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 of Armor Layers.

B. Identify Armor Code, AV= and number of Layers on the FillForm.

C. (Potentially Deferred) Identify Anti-Layers on the ShipSheet.

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

Layer1 is integral to the Hull and has no tonnage cost. Each layer after the first is approximately 4% of Hull. Additional Layers are possible (down to about Layer24).

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
F FeN	- - P U - - -	--	20 =20
O Organic	C B P U S A -	12	6 =TL/2
C Charged	C B - U S - -	14	28 =TLx2

C ANTI-LAYERS

Type	Effect	Multiplier=
B Anti-Blast	vs Blast Bullet Frag	x 10
K Anti-Kinetic	vs Pen	x 10
E Anti-EMP	vs EMP	x 10
R Anti-Rad	vs Rad	x 10
	vs Heat not Organic, Polymer	x100
	vs Pressure not Organic	x 10

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
Exp	Experimental	- 3	x3	/2	F
Pro	Prototype	- 2	x2	- 4	F
Ear	Early	- 1	x2	- 3	F
Std	Standard	0	x1	0	
Bas	Basic	0	x1	- 1	
Alt	Alternate	0	x1	+1	
Imp	Improved	+1	x1	+2	+1
Gen	Generic	+1	/2	- 2	+1
Mod	Modified	+2	/2	+2	+2
Adv	Advanced	+3	/2	+3	+3
Ult	Ultimate	+4	/2	+4	+4

F= Flux. Q= Quality. AV= is calculated on the TL used. Mod applies to AV=.

For example, Polymer is Base TL=10. It can be installed on a TL-8 Hull as Prototype. Each layer is 2x tonnage; AV= (8-2 -2=) 4. Roll Flux for Quality.

Drive Formulae 09

The characteristics of various starship drives are based on the formulae shown here. The dedicated naval architect can calculate various performance details for starship drives using the formulae on this page.

DRIVE FORMULAE

Drive	Formula	Comment	Min Tons	The Variables
M Maneuver	$(H \times M / 200) \times 2 - 1$	RU	2	T Total Drive Tonnage H x DR x P + t
G Gravitic	$(H \times G / 200) \times 9$	RU	9	t Drive Tonnage Overhead a constant
N NAFAL	$H \times N \times 2 / 200$		2	H Hull Tonnage
J Jump	$H \times J \times 200) \times 5 + 5$		10	P Percentage, or Ratio H / DR
A Antimatter	$H \times A \times 1 / 200 + 30$	RU	31	D Drive Number EP / 100
C Collectors	$H \times C \times 10 / 200$		10	EP Energy Points D x 100
U Fission	$10 + H / 22$ (H/20 if H>2)			L Drive Letter D+10 in eHex
P Power Plant	$H \times P \times 3 / 200 + 1$		4	N Drive Suffix 1 unless stated
RU= Round Up. IF= Ignore Fractions.				DR Drive Rating (Potential) 2 x EP / H

G Gravitic Drive

Gravitic	$= (H \times G / 200) \times 9$	RU
G	$= (T / 9) \times 200 / H$	
EP	$= (T / 9) \times 100$	
T	$= (EP / 100) \times 9$	RU
D	$= T / 9$	
T	$= D \times 9$	

M Maneuver Drive

Maneuver	$= (H \times M / 200) \times 2 - 1$	RU
M	$= (T+1) \times 100 / H$	
EP	$= (T+1) \times 50$ RU next 100 EP	
T	$= EP / 50 - 1$	
D	$= (T+1) / 2$	
T	$= (2 \times D) - 1$	
t	$= -1$	

Exception: Drive-A (T=2, EP=100).

N NAFAL Drive

NAFAL	$= (H \times N \times 2 / 200)$	
EP	$= T \times 50$	
T	$= EP / 50$	
D	$= T / 2$	RU
T	$= D \times 2$	

Exception: Hull-A

J Jump Drive

Jump	$= (H \times J / 200) \times 5 + 5$	RU
J	$= (T-5) \times 40 / H$	
EP	$= (T-5) \times 20$	
T	$= (EP/20) + 5$	
D	$= (T-5) / 5$	
T	$= (5 \times D) + 5$	

Exceptions: odd-numbered Jump 100-ton hull.

A Power Plant

Anti-Matter	Formula	Comment
Antimatter	$= (H \times A \times 1 / 200) + 30$	RU
A	$= (T-30) \times 200 / H$	IF
EP	$= (T-30) \times 100$	
T	$= (EP / 100) + 30$	
D	$= T - 30$	
T	$= D + 30$	

C Power Plant

Collector	Formula	Comment
Collector	$= (H \times C \times 10 / 200)$	
C	$= T \times 20 / H$	
EP	$= T \times 20$	
T	$= EP / 20$	
D	$= T / 5$	RU
T	$= 5 \times D$	

P Power Plant

Fusion	Formula	Comment
Power Plant	$= (H \times P / 200) \times 3 + 1$	RU
P	$= (T - 1) \times 200 / (3 \times H)$	IF
EP	$= (T - 1) \times 100 / 3$	
T	$= (EP \times 3 / 100) + 1$	
D	$= (T-1) / 3$	RU
T	$= (D \times 3) + 1$	

U Power Plant

Fission	Formula	Comment
Fission Plant	$= 10 + H / 20$	IF
U	$= (T-10) \times 20 / H$	
EP	$= (T - 10) \times 20$	
T	$= (EP / 20) + 10$	
D	$= (T-1) / 3$	RU
T	$= (D \times 3) + 1$	

T = $(H \times J \times 5 / 200) + 5$
 T = $(1000 \times 4 \times 5 / 200) + 5$
 T = $(1000 \times 20 / 200) + 5$
 T = $(1000 / 10) + 5$
 T = 105 tons

NUMBER TO EHEX

Value	Ehex	Drive
0	0	--
1	1	A
2	2	B
3	3	C
4	4	D
5	5	E
6	6	F
7	7	G
8	8	H
9	9	J
10	A	K
11	B	L
12	C	M
13	D	N
14	E	P
15	F	Q
16	G	R
17	H	S
--	I	T
18	J	U
19	K	V
20	L	W
21	M	X
22	N	Y
--	O	
23	P	Z
24	Q	
25	R	
26	S	
27	T	
28	U	
29	V	
30	W	
31	X	
32	Y	
33	Z	

Ehex digits should be CAPS.

For example, assuming Jump-4 in a 1,000-ton Hull, compute Total Drive Tonnage T.
 J=4. H=1000

Starship Construction

10 Starship Drives

Ships can be equipped with Interplanetary and Interstellar drives, and power systems.

Drive		M	G	N	J	A	C	U	P
ID	EP	Drive	Drive	Drive	Drive	Plant	Collect	Fission	P-Plant
A	100	2	9	2	10	31	10	15	4
B	200	3	18	4	15	32	20	20	7
C	300	5	27	6	20	33	30	25	10
D	400	7	36	8	25	34	40	30	13
E	500	9	45	10	30	35	50	35	16
F	600	11	54	12	35	36	60	40	19
G	700	13	63	14	40	37	70	45	22
H	800	15	72	16	45	38	80	50	25
J	900	17	81	18	50	39	90	55	28
K	1000	19	90	20	55	40	100	60	31
L	1100	21	99	22	60	42	110	65	34
M	1200	23	108	24	65	44	120	70	37
N	1300	25	117	26	70	46	130	75	40
P	1400	27	126	28	75	48	140	80	43
Q	1500	29	135	30	80	50	150	85	46
R	1600	31	144	32	85	52	160	90	49
S	1700	33	153	34	90	54	170	95	52
T	1800	35	162	36	95	56	180	100	55
U	1900	37	171	38	100	58	190	105	58
V	2000	39	180	40	105	60	200	110	61
W	2100	41	189	42	110	62	210	115	64
X	2200	43	198	44	115	64	220	120	67
Y	2300	45	207	46	120	66	230	125	70
Z	2400	47	216	48	125	68	240	130	73
N2	2600	50	234	52	140	92	260	150	80
P2	2800	54	252	56	150	96	280	160	86
Q2	3000	58	270	60	160	100	300	170	92
R2	3200	62	288	64	170	104	320	180	98
S2	3400	66	306	68	180	108	340	190	104
T2	3600	70	324	72	190	112	360	200	110
U2	3800	74	342	76	200	116	380	210	116
V2	4000	78	360	80	210	120	400	220	122
W2	4200	82	378	84	220	124	420	230	128
X2	4400	86	396	88	230	128	440	240	134
Y2	4600	90	414	92	240	132	460	250	140
Z2	4800	94	432	96	250	136	480	260	146
MCr per ton=		2	0.5	1	1	2	0.5	1.5	1

SELECTING DRIVES

- MG Select an **Interplanetary Drive** (M, G).
- NJ Select **Interstellar Drive** (N, J)..
- ACUP Select **Power System** (A, C, U, P).
- X Note **Drive Efficiency**.

X Drive Efficiency

Drives (and Power Systems) produce 100 percent Potential (table 12) 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).

DRIVE TECH LEVEL EFFICIENCY

TL	Stage	TL	Cost	Eff	Fuel
Exp	Experimental	- 3	x10	50%	2.0
Pro	Prototype	- 2	x5	80%	1.2
Ear	Early	- 1	x2	90%	1.1
Std	Standard	0	x1	100%	1.0
Bas	Basic	0	/2	90%	1.1
Alt	Alternate	0	x1	100%	1.0
Imp	Improved	+1	x1	110%	0.9
Gen	Generic	+1	/2	90%	1.1
Mod	Modified	+2	/2	110%	0.9
Adv	Advanced	+3	x1	120%	0.8
Ult	Ultimate	+4	x2	130%	0.7

TL Stage Effects (Cost, QREBS) apply.

The Drive Potential table shows Jump Drive-K in Hull-K produces Potential 2 (in fact, any Drive Letter = Hull Letter produces Potential-2).

The Tech Level Availability table shows Jump-2 is available at TL-11.

TL-10 Early Jump Drive-K produces 90% potential = 1.8 (rounding down to 1).

TL-9 Prototype Jump Drive-K produces 80% potential = 1.6 (rounds down to 1).

TL-8 Experimental Jump Drive-K produces 50% potential = 1.

TL-12 Modified Jump Drive-T in Hull G produces 90% potential = 4.5 (rounds down to 4, but at half cost).

Tech Level Limits On Availability

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. Theoretically, a TL-5 economy can produce an Experimental G-Drive.

TECH LEVEL AVAILABILITY (Shows Maximum Potential Possible)

Drive	TL=	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	-	-	-	-	-	-	-	-	-	-
N	NAFAL	-	1	4	7	9	-	-	-	-	-	-	-	-	-
J	Jump	-	1	-	2	3	4	5	6	7	8	9	-	-	-
H	Hop	-	-	-	-	-	-	-	-	-	1	2	3	4	5
S	Skp	-	-	-	-	-	-	-	-	-	-	-	-	1	2
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

Fuel Requirements 11

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.

FUEL USAGE	P PowerPlant	U Fission Plant	A Anti-Matter	C Collector
G Gravitic	Self-Powered	Self-Powered	Self-Powered	Self-Powered
M Maneuver	included in Operations	not applicable	included in Operations	not-applicable
N NAFAL	Tons= P x H / 100 for 1 month	included in Operations*	included in Operations*	not applicable
J Jump	Tons= P x H / 10	not applicable	Slugs= P x H / 10	one full charge
H Hop	Tons= P x H / 100	not applicable	Slugs= P x H / 100	one full charge
S Skip	Tons= P x H / 1000	included in Operations	Slug= P x H / 1000	one full charge
Y Operations	Tons= P x H / 100 for 1 month**	Rods= P x H / 100 for 1 decade***	Slugs= P x H / 100 for 1 year**	not applicable
Fuel=	Liquid Hydrogen in tons	Radioactives in rods	Anti-Matter in slugs	Exotic Particles in charges
Fuel Cost=	Ton= Cr500 refined Cr100 unrefined	Rod= KCr40	Slug= KCr6	Charge= collected in canopy

Gravitic Drive: internal cold-fusion system providing required power; refuelled annually with water.

Maneuver Drive: gravity -based interplanetary drive. Supporting power source (A or P) provides energy.

Not As Fast As Light Drive: gravity-based sublight interstellar drive. Uses supporting power source (A, P, or U).

Jump Drive: interstellar drive. Uses Power System (A, P, or C) with fuel in addition to Operations fuel.

Hop Drive: interstellar drive. Uses Power System (A, P, U, or C) with fuel in addition to Operations fuel.

Skip Drive: interstellar drive. Uses Power System (A, P, or C) with fuel in addition to Operations fuel (except U).

Operations: supplies general energy requirements for life support and normal activity.

P= Potential for the Drive. H= Hull in tons. Modify fuel required by Drive Efficiency (Chart 10X).

* When NAFAL is in use, supporting Power Source consumes double fuel.

** Decentralized power; if centralized, fuel use x2. *** Centralized power; if decentralized, fuel use /2.

F FUEL COSTS AND FITTINGS

Item	Cost	TL	Comment
P Raw Fuel (Gas)	*	0	Gas= Skimmed from gas giants. *No cost except time and labor.
P Raw Fuel (Water)	*	0	Water= Pumped from oceans or lakes. *No cost except time and labor.
P Raw Fuel (Ice)	*	0	Ice= Gathered from ice caps, asteroids. *No cost except time and labor.
P Raw Fuel (Gas)	Cr100 / ton	2	Any Starport ABCD.
P Refined Fuel (Gas)	Cr500 / ton	3	Any Starport AB.
P Fuel Scoop	KCr100 / ton	8	Intakes 200 tons / hour. Intakes gas into fuel tanks.
P Fuel Intake	KCr100 / ton	8	Intakes 40 tons / hour. Sucks liquid (hull ports / hoses).
P Fuel Bin	KCr100 / ton	8	Intakes 20 ton / hour. Accepts ice solids.
P Fuel Purifier	MCr1 / ton	8	4 tons/ hour. Converts raw fuel to refined fuel.
P Transfer Pump	MCr1 / ton	10	Moves Drop Tank fuel to P-Plant in seconds. 1 ton for Tank up to 100 Tons
A Fuel Slugs	KCr60 / set	18	At many Starports AB TL 18+. = 10 Slugs. Store up to 1,000 Slugs per ton.
U Fuel Rod	KCr400 / set	8	At many Starports AB TL 8+. = 10 Rods. Store up to 200 Rods per ton.
C Canopy	=half Collector cost	14	At many Starports AB TL 14+. Replacement Collector Canopy.

12 Drive Potential

Drive Potential is the relationship between Hull Letter and Drive Letter. It determines the output performance of a specific drive.

DRIVE POTENTIAL-1 Determine Drive Potential (in table body) for a Drive (left column) installed in a Hull (top row).

Drive=	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	
A	2	1	no	no	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	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	no	no	C
D	8	4	2	2	1	1	1	1	1	no	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	no	no	E
F	9	6	4	3	2	2	1	1	1	1	1	1	no	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	no	no	G
H	9	8	5	4	3	2	2	2	1	1	1	1	1	1	1	1	1	no	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	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	1	no	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	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	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	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	1	1	P
Q	9	9	9	7	6	5	4	3	3	3	2	2	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	2	1	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	2	1	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	2	1	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	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	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	2	1	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	2	1	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	2	1	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	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	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	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	2	2	Q2
R2	9	9	9	9	9	9	8	7	6	5	5	4	4	4	4	3	3	3	3	3	3	2	2	2	2	R2
S2	9	9	9	9	9	9	8	7	6	6	5	5	4	4	4	4	3	3	3	3	3	3	2	2	2	S2
T2	9	9	9	9	9	9	8	7	6	6	5	5	4	4	4	4	4	3	3	3	3	3	3	3	3	T2
U2	9	9	9	9	9	9	8	7	6	6	5	5	5	4	4	4	4	4	3	3	3	3	3	3	3	U2
V2	9	9	9	9	9	9	8	8	7	6	6	5	5	5	4	4	4	4	4	3	3	3	3	3	3	V2
W2	9	9	9	9	9	9	8	8	7	7	6	6	5	5	4	4	4	4	4	4	4	3	3	3	3	W2
X2	9	9	9	9	9	9	8	8	7	7	6	6	5	5	4	4	4	4	4	4	4	4	3	3	3	X2
Y2	9	9	9	9	9	9	8	8	7	7	6	6	5	5	4	4	4	4	4	4	4	4	4	3	3	Y2
Z2	9	9	9	9	9	9	8	8	7	7	6	6	5	5	4	4	4	4	4	4	4	4	4	4	4	Z2

no= not possible. For example, Maneuver Drive-E (row E) in Hull-E (column E) produces Maneuver Drive Potential = 2.

DRIVE POTENTIAL-2 Determine the Drive (in table body) for a specific Potential (left column) for a Hull (top row).

Pot=	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			
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	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	2			
3	B	C	E	F	H	J	L	M	P	Q	S	T	V	W	Y	Z	N2	P2	Q2	R2	S2	T2	U2	V2	W2	X2	Y2	Z2	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	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	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	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	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	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	no	no	9		

no= not possible. For example, achieving Jump-6 (row 4) in a 1000-ton Hull-K (column K) requires Jump-Drive-V.

Sensors 13

Sensors provide ship crew with information about the ship's environment and about nearby threats. The designer selects Sensors which support the ship's mission.

INSTALLING SENSORS

For each desired Sensor:

- A. Select a **Sensor**.
- B. Apply **TL Stage Effects** to the Sensor (as desired, and consistent with the ship TL) to modify cost, performance, and QREBS.
- C. Select a **Mount** for the Sensor. Mount is TL-independent;
- D. If the Sensor has S=, it is possible to apply **Space Range Effects** to increase or decrease Space Range.
- E. If the Sensor has R=, it is possible to apply **World Range Effects** to increase or decrease World Range R=.
- F. Allocate a **Control Panel** each Sensor.
- G. Note the cost and tonnage.

Surface and Antenna sensor installations do not require hardpoints.

A SENSORS

Type	TL	Mount	S=	R=	MCR
A Activity Sensor	11	Surf		7	0.1
B Deep Radar	9	Surf		7	0.1
D Densitometer	10	Surf		7	0.1
F Field Sensor	12	Surf		7	0.1
K Analyzer/ Sniffer	9	Surf		7	0.1
L Life Detector	10	Surf		7	0.1
M Mass Sensor	8	Surf		7	0.1
P Proximeter	10	Surf		7	0.1
Y Sound Sensor	7	Surf		7	0.1
C Communicator	8	Surf	7		1.0
E EMS	12	Surf	7		1.0
G Grav Sensor	13	Surf	7		1.0
H Holovisor	18	Surf	7		1.0
J Jammer	8	Surf	7		1.0
N Neutrino Detector	10	Surf	7		1.0
Q Stealth Mask	12	Surf	7		1.0
R Radar	9	Surf	7		1.0
S Scanner	19	Surf	7		1.0
T Scope	9	Surf	7		1.0
V Visor	14	Surf	7		1.0
W CommPlus	17	Surf	7		1.0

B TECH LEVEL STAGE EFFECTS

TL	Stage	TL	Cost	Mod	Q	R	E	B	S
Exp	Experimental	-3	x10	-3	Q	-3	-3	+3	-3
Pro	Prototype	-2	x5	-2	Q	-2	-2	+2	-2
Ear	Early	-1	x2	-1	Q	-1	-1	+1	-1
Std	Standard	0	x1	0	Q	0	0	0	0
Bas	Basic	0	/2	-1	Q	0	-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	0	0	0	0	0
Mod	Modified	+2	/2	+2	Q	+2	+2	-2	+2
Adv	Advanced	+3	x1	+3	Q	+3	+3	-3	+3
Ult	Ultimate	+4	x2	+4	Q	+4	+4	-4	+4

F= Flux (varies by manufacturer). Q= Quality.
Applies to the Sensor.

C SENSOR MOUNTS

Mount	Type	Tons	Mod	Skill	MCR
T1	Single Turret	1	-3	Sensor	0.2
B1	Barbette	3	+1	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	0.5
Ant	Antenna	1	+1	Sensor	0.5
Ext	Extendable	2	+3	Sensor	1.0
De	Deployable	+2		Sensor	3.0

Deployable. In addition to Turret or Barbette costs.
Hardpoints. Each Mount occupies one Hardpoint.
Surf and Ant do not require Hardpoints.

D SPACE SENSOR RANGE EFFECTS

S=	Range	TL	Tons	Cost
2	FR Fighter Range	-2	/3	/3
5	SR Short Range	-1	/2	/2
7	AR Attack Range	0	x1	x1
9	LR Long Range	+1	x2	x3
12	DS Deep Space	+2	x3	x5

Applies to Sensors using S= Space Range.
Convert S=R-5. Applies to Mount.

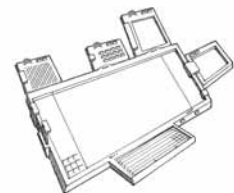
E WORLD SENSOR RANGE EFFECTS

R=	Range	TL	Tons	Cost
5	VL Vlong 1000 m	-2	/3	/3
6	D Distant 5 km	-1	/2	/2
7	Vd V Distant 50 km	0	x1	x1
8	Or Orbit 500 km	+1	x2	x3
9	Fo Far 5,000 km	+2	x3	x5
10	G Geo 50,000 km	+3	x4	x8

For Sensors using R= World Range.
Convert R=S+5. Applies to Mount.

F CONTROLS

Install a Control Panel for each Sensor.



14 Weapons

Weapons project power against adversaries and provide support for the ship's mission.

INSTALLING WEAPONS

For each desired Weapon:

- A. Select a **Weapon**.
- B. Apply **TL Stage Effects** to the Weapon (as desired, and consistent with the ship TL) to modify cost, performance, and QREBS.
- C. Select a **Mount** for the Weapon. Mount is TL-independent.
- 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.

A WEAPONS

Type	TL	Mount	R=	S=	MCr
A Particle Accelerator	11	Barbette	*7	*7	2.5
B Slug Thrower	9	Turret	7		0.2
D DataCaster	10	Turret	7		1.0
E Stasis	21	Turret	7		5.0
F Fusion Gun	12	Barbette	7		1.5
H Inducer	17	Turret	7		1.0
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	10	Barbette	7		1.0
Q Ortilery	12	Bay	7		15.0
S SandCaster	9	Turret	7		0.1
T Jump Damper	14	Barbette	7		15.0
U Tractor/Pressor	16	Barbette	7		5.0
W Disruptor	18	Barbette	7		15.0
Y Hybrid S-L-M	10	**Turret	7		1.0
C CommCaster	8	Turret		7	5.0
G Meson Gun	13	Main		7	5.0
N KK Missile	10	Bay		7	3.0
M Missile	7	Turret		7	0.2
R Rail Gun	12	Bay		7	12.0
V Salvo Rack	10	Bay		7	10.0
X AM Missile	20	Barbette		7	5.0

B TECH LEVEL STAGE EFFECTS

TL Stage	TL	Cost	Mod	Q	R	E	B	S
Exp Experimental	-3	x10	-3	Q	-3	-3	+3	-3
Pro Prototype	-2	x5	-2	Q	-2	-2	+2	-2
Ear Early	-1	x2	-1	Q	-1	-1	+1	-1
Std Standard	0	x1	0	Q	0			
Bas Basic	0	/2	-1	Q	0	-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	0	0	0	0	0
Mod Modified	+2	/2	+2	Q	+2	+2	-2	+2
Adv Advanced	+3	x1	+3	Q	+3	+3	-3	+3
Ult Ultimate	+4	x2	+4	Q	+4	+4	-4	+4

F= Flux (varies by manufacturer). Q= Quality.
Applies to the Weapon.

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.

D SPACE WEAPON RANGE EFFECTS

S=	Range	TL	Tons	Cost
2	FR Fighter Range	-2	/3	/3
5	SR Short Range	-1	/2	/2
7	AR Attack Range	0	x1	x1
9	LR Long Range	+1	x2	x3
12	DS Deep Space	+2	x3	x5

Applies to Weapons using S= Space Range.
Convert S=R-5. Applies to Mount.

E WORLD WEAPON RANGE EFFECTS

R=	Range	TL	Tons	Cost
5	VL Vlong 1000 m	-2	/3	/3
6	D Distant 5 km	-1	/2	/2
7	Vd VDistant 50 km	0	x1	x1
8	Or Orbit 500 km	+1	x2	x3
9	Fo Far 5,000 km	+2	x3	x5
10	G Geo 50,000 km	+3	x4	x8

For Weapons using R= World Range.
Convert R=S+5. Applies to Mount.

F CONTROLS

Install a Control Panel for each Weapon..



Defenses protect against attacks and environmental threats. The designer selects Defenses which support the ship's mission.

Defenses 15

INSTALLING DEFENSES

For each desired Defense:

- A. Select a **Defense**. Note that currently installed Weapons can be used in the Defense Mode.
- B. Apply **TL Stage Effects** to the Defense (as desired, and consistent with the ship TL) to modify cost, performance, and QREBS.
- C. Select a **Mount** for the Defense. Mount is TL-independent.
- D. Apply **Space Range Effects** to the Mount (as desired, and consistent with the ship TL) to modify range, or.
- E. Apply **World Range Effects** to the Mount (as desired, and consistent with the ship TL) to modify range.
- F. Allocate a **Control Panel** for Defense
- G. Note the cost and tonnage.

Defense Notes

- *Nuclear Damper requires TWO separate mounts.
- ** versus Weapon Mount (but not its fire).
- *** also Gravity-based Drives G M Z N.
- Items with AM or AB Mode are previously installed Weapons which can serve as Defenses.

B TECH LEVEL STAGE EFFECTS

TL	Stage	TL	Cost	Mod	Q	R	E	B	S
Exp	Experimental	-3	x10	-3	Q	-3	-3	+3	-3
Pro	Prototype	-2	x5	-2	Q	-2	-2	+2	-2
Ear	Early	-1	x2	-1	Q	-1	-1	+1	-1
Std	Standard	0	x1	0	Q	0			
Bas	Basic	0	/2	-1	Q	0	-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	0	0	0	0	0
Mod	Modified	+2	/2	+2	Q	+2	+2	-2	+2
Adv	Advanced	+3	x1	+3	Q	+3	+3	-3	+3
Ult	Ultimate	+4	x2	+4	Q	+4	+4	-4	+4

F= Flux (varies by manufacturer). Q= Quality. Applies to the Defense.

D SPACE DEFENSE RANGE EFFECTS

S=	Range	TL	Tons	Cost
2	FR Fighter Range	-2	/3	/3
5	SR Short Range	-1	/2	/2
7	AR Attack Range	0	x1	x1
9	LR Long Range	+1	x2	x3
12	DS Deep Space	+2	x3	x5

Applies to Defenses using S= Space Range. Convert S=R-5. Applies to Mount.

E WORLD DEFENSE RANGE EFFECTS

R=	Range	TL	Tons	Cost
5	VL Vlong 1000 m	-2	/3	/3
6	D Distant 5 km	-1	/2	/2
7	Vd VDistant 50 km	0	x1	x1
8	Or Orbit 500 km	+1	x2	x3
9	Fo Far 5,000 km	+2	x3	x5
10	G Geo 50,000 km	+3	x4	x8

For Defenses using R= World Range. Convert R=S+5. Applies to Mount.

A DEFENSES

Type	TL	Absolute vs	Mode	MCr
B Slug Thrower	9		AM	
D DataCaster	10		AM	
F Fusion Gun	12		AM	
G Meson Screen	11	G		1.0
H Tractor/Pressor				
J Mining Laser	8		AM	
L Beam Laser	10		AM	
M Missile	8		AM	
N Nuclear Damper*	12	Nukes		1.0
P Plasma Gun	10		AM	
Q Mag Scrambler	14	E. Magnetics.		1.0
R Proton Screen	19	AM		1.0
S SandCaster	9		AB	4.0
T Black Globe	16	-all-		
U White Globe	20	-all [except D]-		10.0
V Salvo Rack	10		AM	
W Grav Scrambler	17	T U		2.0
X AM Missile	20		AM	
Y Hybrid S-L-M*	10		AM AB	
Z				

C DEFENSE MOUNTS

Mount	Type	Tons	Mod	Skill	MCr
Bo	Bolt-In	1	0	Screens	1.0
T1	Single Turret	1	-2	Turret	0.2
T2	Dual Turret	1	-1	Turret	0.5
T3	Triple Turret	1	0	Turret	1.0
T4	Quad Turret	1	+1	Turret	1.5
B1	Barbette	3	+2	Turret	3.0
Bay	Bay	50	+5	Bay	5.0
LBay	Large Bay	100	+8	Bay	10.0
M	Main	200	+10	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.
Skills. Screens substitute for Turret, Bay, or Spine.

F CONTROLS

Install a Control Panel for each Defense..



16 Operations

Operations is the set of activities (other than weapons) envisioned by a ship's mission: combat, transport, research, survey, military or naval operations, or emergency relief, transport, or other activities.

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.

SHIP'S TROOPS BARRACKS

Assign (as needed) Ship's Troops quarters tonnage. 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.

A TROOP ACCOMODATIONS

Quarters	Tons	MCr
Squad Barracks	(5) 4	0.2
Platoon Barracks	(22) 18	1.0
Company Barracks	(70) 60	3.0

(N) = typical number of troops. The actual number assigned may vary.

Ship's Troops are also assigned as the crew for one Weapon or Defense (per Squad). Their Quarters are located near their ship's weapon.

F FUEL STORAGE

Fuel	Power System	Capacity	Comment
Liquid Hydrogen	Power Plant	one ton holds one ton	
Anti-Matter	Anti-Matter Plant	one ton holds 1000 Slugs	
Radioactives	Fission	one ton holds 200 Rods	
Particles	Collector	energy is stored in the Collector Canopy.	

There is no cost associated with Fuel Storage systems.

VEHICLE HULL CONNECTORS

Type	Function	TL	Tons	Configuration	MCr	Comment
Bracket	Exterior Vehicle	7	1	C B P U	1	1 per Vehicle (maximum 10 tons).
Streamlined Bracket	Exterior Vehicle	7	1	S A L	2	1 per Vehicle
Hull Niche	Exterior Vehicle	8	varies	C B P U S A L	1.5	Tons= Half Vehicle.
Hangar	Interior Vehicle	7	varies	C B P U S A L		Tons= Vehicle +10
Cargo Hold	Vehicle Storage	7	varies	C B P U S A L		Tons= Vehicle + 2.
Grapple Pair	Exterior Pod.	9	1	C B P U S A L	1	1 pair per 35 tons
Subhull Grapple	Exterior Subhull	9	1	C B P U S A L	1	Subhull requires 3 pairs per 100 tons
Connector	Permanent	9	0.5	C B P U S A L	1	Replaces Grapple; cannot disconnect.

Grapple Pairs are located one per parent ship and one per carried Pod or Subhull. Brackets are required only on the parent ship.

B SPECIALISTS

- Assign specialty Consoles consistent with the ship mission, including:
 - Political Officer. Broker
 - Cultural Officer. Trader
 - Liaison Specialist. Linguist
 - Contact Specialist. Negotiator
 - Translator. Advocate

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
Short Term (4)	(10)	0	0
Standard (30)	(10)	1	1.0
Long-Term (120)	(10)	2	2.0
Luxury	(10)	1	1.0
Adaptable	(10)	1	1.0

Adaptable required for non-human environments. Luxury required for High Passage staterooms.

FUEL TANKAGE

Evaluate ship fuel requirements and assign appropriate fuel storage.

VEHICLES

Assign vehicles to the ship for local mobility, exploration, and mission support.

Vehicle Storage. 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.

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	MCr
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

Controls 17

Every ship mechanism (and function) has a Control Panel. Each is monitored by a Console under the supervision of a crew member.

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.

A 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.

Assign each Function to a Console

A **function** is an officer-controlled responsibility (astrogation; steward).

Skill	Function
Astrogation	Plots courses.
Pilot	Flight controls.
Security	Internal barriers.
Counselling	Crew mental health.
Freight	Loading/ Unloading.
Steward	Passenger support.

CONSOLES

Each Console controls one or more Control Panels. Each console is identified by single Ehex identifier 0 through Z (if more than 33, assign double digit Ehex Identifiers 00 through ZZ).

Connections. Assign each Control Panel to a Console (write Console ID in the Con Column for each CP).

Multi-Tasking. Any number of Control Panels, Mechanisms or Functions can be assigned to one Console; a Console can Multi-Task by dividing its available C+S.

Console Base TL is the ship TL.

B CONSOLE TONNAGE

Console	Tons	Squares
Cramped	0.5	1
Typical	1	2
Roomy	1.5	3
Spacious	2	4

Console Staffing

Select a Staffing Level.

A Shift (or a watch) is one-third of a day. Except for Dangerous Voyage, weapons and defenses are unstaffed (they are an additional responsibility).

C STAFFING LEVELS

Level	Per Console
Minimal	1 per 3
One Shift	1
Two Shifts	2
Three Shifts	3
Dangerous=	add one Crew per weapon, defense, sensor, vehicle, or small craft console.

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.

SHIP'S COMPUTER

Computers are identified by Model Number (expressed as Cells, or Console Equivalents). Model/0 is little more than a centralized server; a Model/5 is five Console-Equivalents. Bis indicates enhanced capability (adds 1 Cell).

Tons= Model Number.

Cells= Model Number.

Base TL= Model Number + 8

"Bis" adds +1 Cell.

C+S= TL.

MCR= Model * (Model+5).

Install one or more Ship's Computers to support the console network.

D STANDARD SHIP'S COMPUTERS

Model/	Tons	Sq	MCR	TL	Cells
0	0.5	1	0.1	8	0
0 bis	0.5	1	0.5	8	0
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	4
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

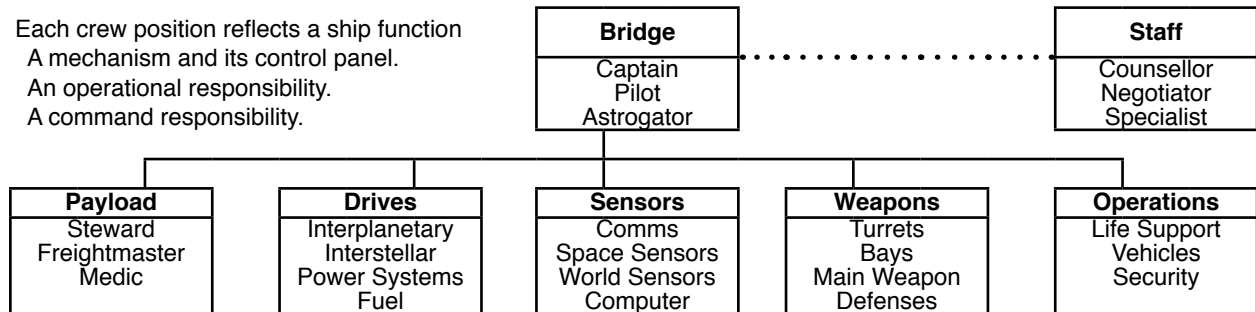
A Ship's Computer may allocate its C+S +K to a number of consoles equal to its Model Number (or Cells).

18 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 movement controls of the ship when in normal space.

The **Astrogator** computes the ship's course, both within a star system and through jump space.

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. Responsibility for the computer and IT is assigned to Sensors.

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 crew positions include **Cook**, **Technician**, or **Clerk**.

A **Vehicle Operator** or **Driver** has responsibility for operation and maintenance of a specific vehicle 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.

Operations also includes various installed facilities: labs, data banks, materials processors

WEAPONS

Weapons covers the combined weapons and defenses of the ship.

A **Gunner** operates a weapons or defense system. In some cases, the position uses a **Sensop**.

DRIVES

Drives is the propulsion and power section of the ship. An **Engineer** or **Drive Tech** is responsible for operation, maintenance, and repair of drives. 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** 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.

Payload is the total discretionary load the ship can carry in addition to operations requirements.

Payload 19

PAYLOAD

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 High and Middle passenger accommodation tonnage.
- C. Allocate fitted payload compartments.
- D. Assign remaining space as cargo hold.

A CALCULATE PAYLOAD TONNAGE

Payload is the available space remaining after all other components have been assigned.

B PASSENGERS

Assign raw tonnage for accommodations for passengers. As required, 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).

C 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.

D GENERAL CARGO PAYLOAD

Assign the remaining space as standard or general cargo hold.

ADDITIONAL DETAIL

The spaces allocated for passenger and cargo can be further defined from the following tables.

ACCOMMODATIONS

Description	Tons	MCr	Comment
Common Area	1	0.0	For movement and recreation.
Standard Stateroom	2	0.1	1 passenger. No fresher.
Standard Suite	4	0.2	2 passengers. No fresher
Luxury Stateroom	6	0.4	1 passenger. Includes fresher.
Single Stateroom	2	0.1	1 passenger. 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 10 passengers.
Shared Fresher	0.5	0.5	shared by 4 passengers
Steerage	0.5	0	2 passengers = Space Bunks
Spacer Niche	1	0	1 crew
Spacer Bunks	0.5	0	2 crew
Spacer Hotbunks	0.5	0	6 crew (2 per shift)
Low Berth	0.5	0.1	
Animal Low Berth	1	0.2	
Emergency Low Berth	1	0.5	contains 10 individuals.
Frozen Watch	2	1.0	contains 10 individuals
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	
Surgery	4	3	
Counsellor	2	0.2	
Lab	4	2	

SPECIALIZED PAYLOAD TONNAGE

Description	Tons	MCr	Comment
Container 1-ton	1	0.1	standard shipping container
Container 3-ton	3	0.3	standard shipping container
Container 5-ton	5	0.5	standard shipping container
Container 10-ton	10	1.0	standard shipping container
Cargo Hold Basic	1	--	no additional cost
Container Handler	1	1	transfers 12 tons per hour
Cargo Hold Bulk Solid	1	--	
Solid Bulk Handler	1	0.1	transfers 20 tons per hour
Cargo Hold Bulk Liquid	1	--	
Liquid Bulk Handler	1	0.1	transfers 40 tons per hour
Cargo Hold Gas Bulk	1	--	
Gas Bulk Handler	1	0.1	transfers 60 tons per hour
Magazine	1	0.5	
Mail Vault	1	1.0	required for express contracts
Air Lock	0.5	0.1	
Cargo Lock	2	0.4	
Vehicle Lock	4	1.0	
Large Cargo Lock	10	2.0	

20 Evaluating The Ship

The final ship design is evaluated for its effects on its crew and passengers.

A CREW AND PASSENGER TONNAGE

The tonnage for Passengers (combined High and Middle) is calculated in 19B1. 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.

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.

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).

CALCULATE DEMAND, COMFORT, AND EASE-OF-USE

The ship designer's decisions influence the opinions of (potential) passengers and the performance and effectiveness of the crew.

A. Calculate tonnage for Crew and Passenger Areas.

1. Passenger Stateroom Tons.

2. Crew Quarters Tons

3. Common Areas for Crew and Passengers.

B. Determine Passenger Demand.

C. Determine Crew Comfort.

D. 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.

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.

The QSP 21

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.

Jump: Maximum jump (or jump variant) capability (in Parsecs).

1 QSP ENTRIES

	Hull	G	J	Config
0		0	0	
1	10	1	1	
2	20	2	2	
3	30	3	3	
4	40	4	4	
5	50	5	5	
6	60	6	6	
7	70	7	7	
8	80	8	8	
9	90	9	9	
A	100		10	Airframe
B	200		20	Braced
C	300		30	Cluster
D	400		40	
E	500		50	
F	600		60	
G	700		70	
H	800		80	
J	900		90	
K	1000	0.1	100	
L	1100	0.2	200	Lifting Body
M	1200	0.3	300	
N	1300	0.4	400	
P	1400	0.5	500	Planetoid
Q	1500	0.6	600	
R	1600	0.7	700	
S	1700	0.8	800	Streamlined
T	1800	0.9	900	
U	1900		1000	Unstream
V	2000		^4	
W	2100		^5	
X	2200	Unknown		
Y	2300			
Z	2400		> ^5	

2 QSP VEHICLE ENTRIES

	Vehicle	Alternate
0		
1		
2	Trailer	
3		
4		
5		
6		
7		
8		
9		
A	ACV	Life Pod
B	Boat. Sub.	Ship's Boat
C	GroundCar	Cutter
D		
E		
F	Winged Flyer	Fighter
G	Grav Carrier	Gig
H		
J		
K		
L		Launch
M	Military Flyer	
N		Pinnacle
P	Pod	
Q		
R	Air/Raft	Rotor Flyer
S		Shuttle
T	ATV-Tracked	Tank. Truck
U		
V		
W	ATV-Wheeled	
X		
Y		
Z		

3 QSP CREW ENTRIES

	Crew Position	Alternate
0		
1		
2		
3		
4		
5		
6		
7		
8		
9		
A	Astrogator	Advocate
B		Broker
C	Counsellor	
D	Drive Tech	Driver
E	Engineer	
F	Freightmaster	
G	Gunner	
H	Political Officer	Cultural Officer
J		Contact Officer
K		Liaison
L		Linguist
M	Medic	
N		Negotiator
P	Pilot	
Q		Xeno Biologist
R	Sensop	
S	Steward	
T	Troop	
U	Specialist	
V	Vehicle Op	Political Officer
W		
X	Exec	
Y	Owner	
Z	Captain	

22 FillForm1

02 Mission	Ship Name		Tons
	Building World- TL	Mission	

Section	Component	Comment	Q	R	E	B	S	Code	CP	Sq	TL	Tons	MCr	KCr
04	A-Configuration		Friction=			Agility=			Max G / Accel		Stability=			
05	B-Tonnage													
06	Hull	D-Structure												
		E-Flotation D E												
		E-Wings / Fins FGWV												
07	E-Fittings J K M Z	J K M Z												
		F-JField Type Strength Safe-D												
08	Armor	Layer0 AV=												
		Layer1 AV=												
		Layer2 AV=												
		Layer3 AV=												
		Layer4 AV=												
		Coatings												
10	Drives	Drive1-Power System Potential= Fuel=												
		Drive2-Maneuver Potential= Fuel=												
		Drive3-Interstellar Potential= Fuel=												
		Drive4- Potential= Fuel=												
11	Fuel	Fuel Fittings												
		Fuel Fittings												
16	Operations	Troops Specialists												
		Life Support Fuel Tankage												
		Vehicles Small Craft												
17	Consoles	Type Staffing												
		Computer Cells												
18	Crew													
19	Payload	General Passengers Specialized												
Totals from FillForm2														
Totals														
20	Evaluations		Demand D=			Comfort C=			Ergonomics E=					

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 and 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..

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 most likely to Hit Location 0). The attack may be aimed at any Hit Location available, including several specifically identified as Center of Image, Hot Spot, Firing Weapon, or Emitting Sensor.

When an attack reaches a Hit Location, the specific Compartment table (with the same Hit Location Number) is consulted with 1D. That element of the Compartment is damaged or destroyed (subject to possible immediate damage control during combat, or repairs after the battle).

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

The ShipSheet Process

Using a complete Ship Design and its FillForm, enter the ship information on 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

For each Hit Location
Allocate elements to each Compartment

Consult the Compartment table and identify the tonnage for each compartment. Insert a name for each compartment. Table. The recommended or default Hit Locations are printed on the Hit Location Table.

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 the two adjacent empty Hit Locations as Wings.

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

Based on FillForm2, enter the Type of Weapon, Defense, or Sensor for each Hardpoint. Sensors with Surface or Antenna mounts can be inserted in blank spaces.

Note that FillForm2 associates specific Hardpoints with specific Hit Locations.

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 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.

Hardpoints. Any weapon, defense, or sensor occupy-

Hit Location Table Entries (Abbreviated)

A Ship Name=											QSP=		0 Dorsal			B	
* Loc	C	0	1	2	3	4	5	6	Compartment	Tons	1 HP Laser (1)		HP Type				
											2 Stateroom (2)						
											3 Stateroom (2)						
	- 1										4 Stateroom (2)		2				
x	0	-	P10							20	5 Fuel (6)		1 Laser				
	+1										6 Fuel (7)		3				

In this example, of a 100-ton Scout TL=10., Location 0 includes a Hardpoint (marked in the leftmost Column *, and in the rightmost Column on the same line. There is no Coating on the ship's Armor (this marked with a dash as empty). Armor Layer-0 is Plate AV=10. For a 100-ton ship, the Compartment Tonnage is 20 tons (and marked in the Tons column). The designer has labelled this Compartment 0-Dorsal and assigned to it: the Laser Turret (1 ton), three staterooms (2 tons each), and two Fuel tanks (6 tons and 7 tons).

ing a Hard Point should be assigned to Entry 1 of the Compartment. If the Mount is larger than the entry tonnage, it is extended to adjacent entries.

Mark locations to indicate potential targetting:

Hot Spot: Any Maneuver Drive and any Power Source.

Center of Ship. Hit Location 0.

Firing Weapon. Any Hardpoint whose weapon has fired in this Combat Round.

Operating Sensor. Any installation containing an active Sensor.

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.

Deployable Mounts

Some items are in Deployable mounts. When deployed, they are separate objects at Location=0 on a separate Hit Location Table.

Several Ship Sheets

Different versions of the Ship Sheet (identified at the bottom of each) are provided for various size hulls.

POD LOCATION AND COMPARTMENT TONNAGE

Hull	Tons	Hit Loc	CT	Entry Tons	Span
A1	10	1	10	2	0
A2	20	1	20	3	0
A3	30	1	30	5	0
A4	40	2	20	3	- 1 0
A5	50	2	25	4	- 1 0
A6	60	2	30	5	- 1 0
A7	70	3	20	3	- 1 +1
A8	80	3	25	4	- 1 +1
A9	90	3	30	5	- 1 +1

Hit Loc= Number of Hit Locations on the Hull.

CT= Compartment Tonnage. The total tons which may be allocated to the Compartment.

Entry. The usual tons assigned to each 1D entry in the Compartment.

Span. The range of available Hit Locations (exceptions apply). Cluster and Braced Cluster may use any Hit Locations -14 to +14. Fins and Wings may be placed outside the range (but adjacent).

HULL LOCATION AND COMPARTMENT TONNAGE

Hull	Tons	Hit Loc	CT	Entry Tons	Span
A	100	5	20	3	- 5 +5
B	200	7	25	4	- 5 +5
C	300	9	30	5	- 5 +5
D	400	11	35	6	- 5 +5
E	500	11	45	7	- 5 +5
F	600	11	55	9	- 5 +5
G	700	11	65	11	- 5 +5
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

- 11	- 10	- 9	- 8	- 7	- 6	- 5
1	1	1	1	1	1	1
2	2	2	2	2	2	2
3	3	3	3	3	3	3
4	4	4	4	4	4	4
5	5	5	5	5	5	5
6	6	6	6	6	6	6

A Ship Name=

QSP=

- 4

- 3

B

* Loc	C	0	1	2	3	4	5	6	Compartment	Tons	HP	Type
										1	1	
										2	2	
										3	3	
										4	4	
										5	5	
										6	6	
												24
												22
										- 2	- 1	20
										1	1	18
										2	2	16
										3	3	14
										4	4	12
										5	5	10
										6	6	8
											0	6
											1	4
											2	2
											3	1
											4	3
											5	5
											6	7
										+ 2	+ 1	9
										1	1	11
										2	2	13
										3	3	15
										4	4	17
										5	5	19
										6	6	21
										+ 4	+ 3	23
										1	1	
										2	2	
										3	3	
										4	4	
										5	5	
										6	6	



+11	+10	+9	+8	+7	+6	+5
1	1	1	1	1	1	1
2	2	2	2	2	2	2
3	3	3	3	3	3	3
4	4	4	4	4	4	4
5	5	5	5	5	5	5
6	6	6	6	6	6	6



Ship Image

A											Ship Name=		QSP=				B	
Loc	C	0	1	2	3	4	5	6	Compartment	Tons	+4	+3	HP	Type				
											1	1						
											2	2						
											3	3						
											4	4						
											5	5						
											6	6	24					
													22					
											+2	+1	20					
											1	1	18					
											2	2	16					
											3	3	14					
											4	4	12					
											5	5	10					
											6	6	8					
												0	6					
												1	4					
												2	2					
												3	1					
												4	3					
												5	5					
												6	7					
											-2	-1	9					
											1	1	11					
											2	2	13					
											3	3	15					
											4	4	17					
											5	5	19					
											6	6	21					
											-4	-3	23					
											1	1						
											2	2						
											3	3						
											4	4						
											5	5						
											6	6						

PODS A1 A2 A3

A		Name=								QSP=	
Loc	C	0	1	2	3	4	5	6	Compartment	Tons	
	-1										
	0										
	+1										



B	
FP	Type
0	
1	
2	1
3	
4	
5	
6	

The Pod has one FP Firm Point which will accept any World Range R= weapon, defense, or sensor.

PODS A4 A5 A6

A		Name=								QSP=	
Loc	C	0	1	2	3	4	5	6	Compartment	Tons	
	-1										
	0										
	+1										



B	
FP	Type
-1	
0	
1	2
2	1
3	
4	
5	
6	

The Pod has two FP Firm Points which will each accept any World Range R= weapon, defense, or sensor.

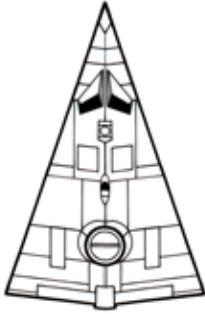
PODS A7 A8 A9

A		Name=								QSP=	
Loc	C	0	1	2	3	4	5	6	Compartment	Tons	
	-1										
	0										
	+1										



B	
FP	Type
+1	
1	
2	
3	
4	
5	0
6	
-1	
1	2
2	1
3	3
4	
5	
6	

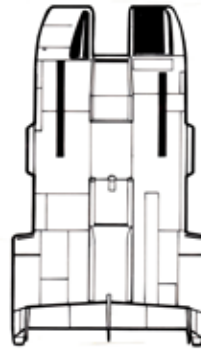
The Pod has three FP Firm Points which will each accept any World Range R= weapon, defense, or sensor.



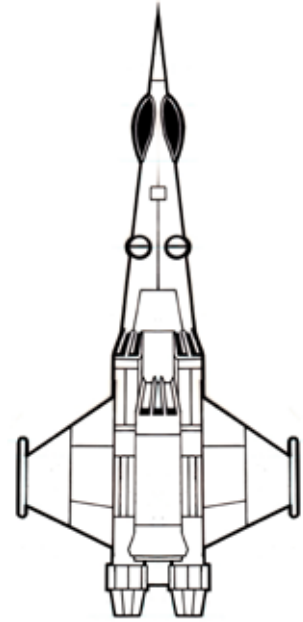
Scout/Courier (S-AL22)



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 refuelling. 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.

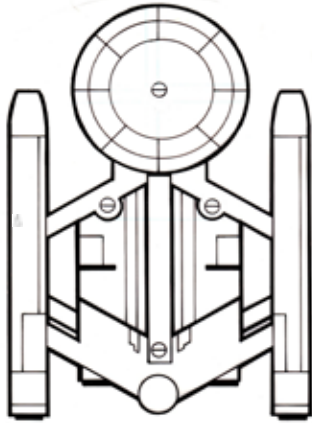
Yacht (Y-EU42)

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.

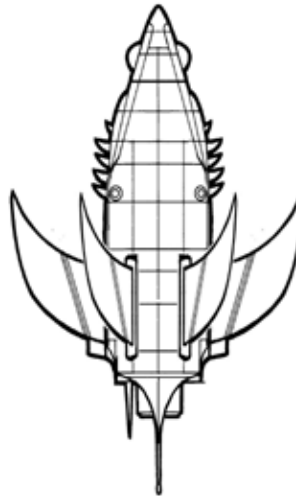
The yacht is built around its luxurious staterooms, including one double stateroom suite for the owner. There is five hardpoints, but no weaponry is installed. There are three



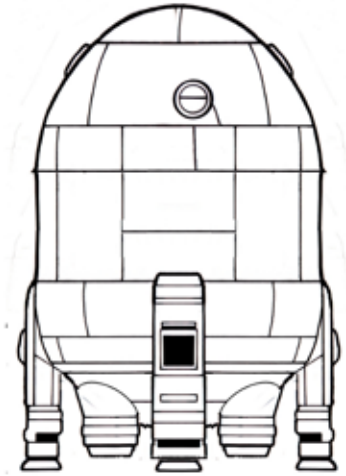
Yacht (Y-EU42)



Frigate (G-FB43)



Corsair (P-GA42)



Cruiser (C-VS23)

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 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 sup-

porting 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 expand 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.

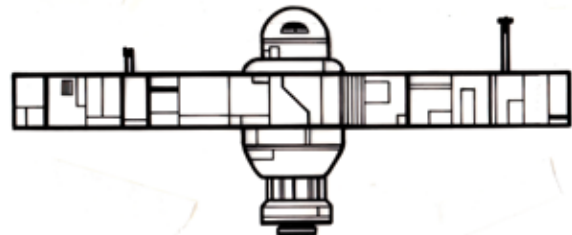
Laboratory Ship (L-DC12)

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)

Fuel Benchmarks

The key consideration for starship operations is fuel.

The benchmark for fuel is the almost universally used fuel for fusion power plants: liquid hydrogen. Its bulk, cost, and availability are well known. Other fuels are identified and priced in relation to liquid hydrogen.

LIQUID HYDROGEN

The standard, easily procured fuel for standard starship (fusion) power plants.

Units. Liquid Hydrogen is accounted for in tons.

Availability. Ships can skim near-pure hydrogen from the atmospheres of gas giants. Various ices (water ice, and others) are a convenient source of hydrogen on comets, ice asteroids, and ice caps of various worlds. Liquid water in oceans, seas, and lakes is also a convenient source. The gathering equipment includes appropriate filters, catalysts, and treatments to make the fuel usable in the power plant.

Hydrogen, in its various forms, is available for little more than the cost of labor and equipment, making it the perfect fuel for ships in remote or unsettled regions; it is also perfect for tight starship budgets.

Costs. On settled worlds and near starports, raw (or unrefined) fuel is available for about Cr100 per ton. The source is usually a nearby lake or sea. Pure (or refined) fuel, properly filtered and certified for power plant use, if available for Cr500 per ton with local personnel doing the fuelling.

Operations

Fusion Power Plants and Jump have specific fuel requirements:

Operations. The Power Plant requires tons of fuel equal to Power Plant Potential times Hull tonnage divided by 100. This fuel supports one month of operations. If the ship is on centralized power this requirement is doubled).

Jump. The Power Plant processes fuel for the Jump Drive. The drive requires tons of fuel equal to Jump Drive Potential times Hull tonnage divided by 10.

For example, the 1000-ton trader **Astarte** with Power Plant-Q has Potential=3. It requires 30 tons of fuel per month to maintain internal operations. Fuel cost at starport retail (Cr500 per ton) is about Cr15,000. The cost can be reduced with gas giant skimming or local self-service refuelling.

The ship has Jump-3; a 3-parsec jump requires 300 tons of fuel (at a retail cost of Cr150,000).

FISSIONABLES

The standard, commonly produced fuel for standard starship fission power plants.

Units. Fissionables are accounted for in rods. One rod is equivalent to 120 tons of liquid hydrogen.

The Rod is a heavy cylinder of radioactives encased in suitable protective metal. It measures about 5 cm in diameter by 1 meter long.

Proper fuel storage will hold 400 rods per ton. Spent rods are jettisoned rather than stored.

Availability. Standard rods are available at A or B starports within the Imperium. In remote areas, rods can be custom manufactured on most Industrial worlds TL-5 and above from supplied radioactive ores.

Radioactive ore is a trade good commonly available on Vacuum worlds and Asteroids.

Cost. Rods have two component costs: the radioactives and the fabrication costs.

Radioactives as trade goods are available for a base price of about Cr4,000 per ton. One ton of ore can be refined to produce fissionables for 1 rod.

Fissionable smelting and fabrication of fuel rods is approximately an order of magnitude greater.

A typical price for a rod is Cr40,000. With materials on hand, they can be manufactured in about a month.

Benchmark Performance. One rod will provide energy for ten years (120 months) before replacement is required.

Operations

A ship using a Fission Power Plant has specific fuel requirements:

Operations. The Fission Power Plant requires Rods equal to Power Plant Potential times Hull tonnage divided by 100. This fuel supports one decade (120 months) of operations.

When a Fission Plant is installed, centralized power is assumed. If the ship is on decentralized power, this requirement is halved.

STARSHIP FUELS

Liquid Hydrogen	Tons	1	Ton per Ton
Fissionables	Rods	200	Rods per Ton
Anti-Matter	Slugs	1000	Slugs per Ton
Collectors	Charge	1	Charge in the Drive

STARSHIP FUEL COSTS

Liquid Hydrogen	Starport Retail=	Cr500 per ton
Fissionables	Fabrication Cost=	Cr40,000 per rod
Anti-Matter	Starport Retail=	Cr6000.
Collectors	Charge produced in operations	

Jump. Fission powerplants are unable to produce energy in sufficient intensity to support Jump.

For example, a 2000-ton cargo carrier **Ishtar** with Fission Plant-V has Potential=2. Its Fission Plant requires 40 rods, which will support the ship for ten years. The rods cost Cr40,000 each, or MCr1.2. Amortized over ten years, each rod costs Cr350 per month, or slightly less than the retail cost of Liquid Hydrogen.

ANTI-MATTER

The standard (but only available at higher technology levels) fuel for starship anti-matter plants.

Units. Anti-Matter is accounted for in slugs. One slug is the equivalent of 12 tons of liquid hydrogen.

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 dedicated fuel consoles: 1,000 slugs per ton. The slugs are consumed in the energy production process.

Availability. Anti-matter slugs are specifically produced for individual ships or anti-matter plants. Starports A and B may have anti-matter slugs suited to specific ship traffic in their region.

Self-Production. Some anti-matter powered ships carry with them the ability to produce additional slugs.

The production equipment consists of a Fusion Power Plant connected to the Anti-Matter Plant. The Fusion Plant consumes liquid hydrogen to produce minute amounts of anti-matter, which is then encapsulated in slugs and stored.

A Fusion Plant, operating in conjunction with an Anti-Matter Plant, can produce one slug per 60 tons of Liquid Hydrogen consumed (or about Cr30,000 each at Starport Retail). In practice, ships generate their own slugs with skimmed or local raw fuel. Slug output is determined by the plant sizes and their potential.

Benchmark Performance. One set of slugs will provide energy for one year (12 months) before replacement is required. Anti-Matter power plants can support Jump with a burst of power output.

Operations

An Anti-Matter Power Plant has specific fuel require-

ments: An Anti-Matter Power 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 10.

For example, a 100-ton scout ship *Aphrodite* fitted with Anti-Matter Plant-C has Potential=6. Its AM Plant requires 6 slugs for a year of operation (an equivalent FusionPower Plant would require 72 tons of Liquid Hydrogen).

The ship also carries a Power Plant-C with Potential=6 to support slug production. It can produce 6 slugs per day (consuming 360 tons of Liquid Hydrogen in the process; it needs an external fuel source).

The ship has Jump Drive-C for Jump-6; a 6-parsec jump requires 60 anti-matter slugs.

COLLECTORS

The Collector power plant accumulates potential energy from exotic particles captured by a canopy. This Charge is released to power a Jump Drive at the instant it is activated.

There is no specific fuel or store of energy present until the drive is triggered.

FUSIONPLUS

FusionPlus modules are small, self-contained cold fusion power sources. Virtually maintenance free, they are sited throughout many ships as independent power sources.

FusionPlus is power by water; its self-sustaining system electrolyzes water to produce hydrogen which is then fused to produce power. The module vents oxygen (to crew spaces) and helium (to external ports).

Modules are inspected and cleaned annually, at which time their small water tank is refilled.

REDUCED OPERATIONS

Power plants can be operated at reduced levels for extended periods and minimal fuel use.

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. Three reduced levels are possible: Quiet, Long-Term, and Hibernation.

FUEL FORMULAE

FUSION

Operations $T = P \times H / 100$
 Jump $T = P \times H / 10$

FISSION

Operations $R = P \times H / 100$
 Jump not supported

ANTI-MATTER

Operations $S = P \times H / 100$
 Jump $S = P \times H / 10$
 Slugs per day $S = P \times H / 100$

T= Tons (Liquid Hydrogen)
 R= Rods (Fission Fuel)

S= Slugs (Anti-Matter)
 H= Hull (tons)

P= Power Plant Potential
 (for Slug production =the lesser of the two Plant potentials).

Quiet. The ship operates at a reduced level sufficient for life support and little else. Only passive sensors may be used. The ship does not maneuver.

Fuel consumption is generally 10% of standard level. Life support is available for ten times the normal period.

Quiet can be elevated to Normal in one combat round.

Long-Term. 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 10 combat rounds.

Fusion Power Plants

A Fusion Power Plant in Quiet Mode consumes fuel at 10% of the normal rate.

A Fusion Power Plant in Long-Term Mode consumes fuel at 1% of the normal rate. It draws from the ship's common fuel tanks and will continue to operate until empty.

If an external fuel source is available, the ship can be directed to shift to Normal Mode and refuel the tanks.

Fission Power Plants

A Fission Power Plant in Quiet Mode consumes fuel at 10% of the normal rate; it continues to function until its rods are exhausted.

A Fission Power Plant in Long-Term Mode consumes fuel at 1% of the normal rate.

If additional rods are available, the ship can be directed to shift to Normal Mode and replace the spent rods.

Anti-Matter Power Plants

An Anti-Matter Power Plant in Quiet Mode consumes slugs at 10% of the normal rate.

An Anti-Matter Plant in Long-Term Mode consumes fuel at 1% of the normal rate. It continues to function until its supply of slugs is exhausted.

Collectors

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.

HIBERNATION

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.

For example, the 600-ton recon frigate *Liberty* operated during the First Frontier War. It has Power Plant-F Potential-4 and Jump Drive-F Potential-4; total fuel tankage is 264 tons.

Operating 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).

On one mission behind enemy lines, it assumed a covert listening position in the outer system. By assuming Quiet Mode, it consumes 2.4 tons per month; it can remain on station up to 110 months or about 9 years.

For example, the class-companion recon frigate *Freedom* is parked (along with several other ships in the class) in long-term storage at the end of the First Frontier War.

Stored in Long-Term Mode, it consumes 0.24 tons per month and can do so for 1,100 months or about 91 years. It (and its companions) are tethered to an ice planetoid. Every 90 years or so, the ship's computer brings the ship to Normal Mode, refills its tanks, and reverts to Long-Term Mode.

COMPUTERS, CONSOLES, AND BRAINS

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.

TECH LEVEL EFFECTS

Fuel requirements are affected by the Tech Level and Tech Level Stage of the power source.

For example, Standard Fusion Power Plant Potential=3 has base TL-10 and fuel efficiency 1.0: it requires the calculated fuel. A naval architect designing at TL-11 may elect Generic Fusion Power Plant Potential=3 because it costs less although it requires 1.1 times the calculated fuel. Or he may elect Improved Fusion Power Plant Potential=3 because (at the same price) it uses only 0.9 times the calculated fuel.

DRIVE TECH LEVEL EFFICIENCY

TL	Stage	TL	Cost	Eff	Fuel
Exp	Experimental	- 3	x10	50%	2.0
Pro	Prototype	- 2	x5	80%	1.2
Ear	Early	- 1	x2	90%	1.1
Std	Standard	0	x1	100%	1.0
Bas	Basic	0	/2	90%	1.1
Alt	Alternate	0	x1	100%	1.0
Imp	Improved	+1	x1	110%	0.9
Gen	Generic	+1	/2	90%	1.1
Mod	Modified	+2	/2	90%	1.1
Adv	Advanced	+3	x1	120%	0.8
Ult	Ultimate	+4	x2	130%	0.7

All TL Stage Effects (Cost, QREBS) apply.

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 star system is collectively called maneuver drives.

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 the 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, Thruster, and Inertialless.

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 from place to place 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.

Range Bands. Actual acceleration, coasting, and deceleration are often abbreviated to a simple description of movement between range bands.

THE GRAVITY-BASED DRIVES

M-DRIVE

Maneuver Drives 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 Drive is a less efficient version of the M-Drive. Usually powered by 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.

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

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.

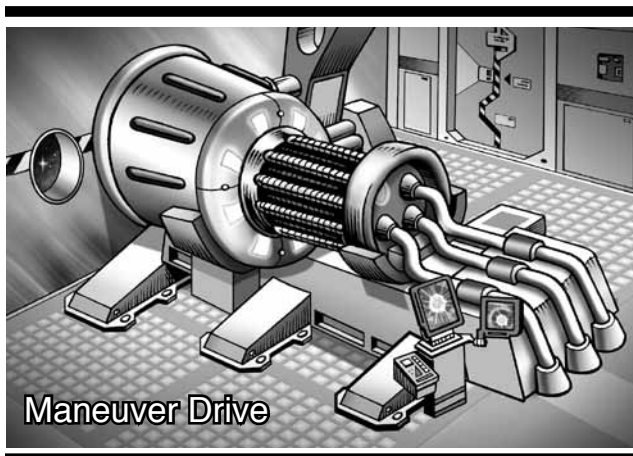
Vector= Length and Direction. A Vector is an arrow drawn on paper to represent the distance and direction a ship moves every turn. In the next turn (if no changes are made) the ship moves the same distance in the same direction. It continues to do the same in very following turn even if it ultimately reaches interstellar space.

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.



Maneuver Drive

Movement Strategies

The various D limits inspire several different 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.

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 or orbit to surface. Orbit is S=3 (an altitude of approximately 500 kilometers).

Drives. The ship may use Maneuver, Gravitic, Lifters, NAFAL, or no Drive (for re-entry). If the Drive cannot produce acceleration equal to local gravity, the ship impacts the surface with Speed= 13.

Fast Boost or Fast Re-Entry

A hull can move from surface to orbit (boost) or orbit to surface (re-entry) relatively quickly.

$$\text{To Orbit in Minutes} = \text{World Size} + \text{Atm}$$

Friction. The ship encounters Friction= 2,000 if Atmosphere 2+, modified by the Hull Configuration Friction Multiplier. Boost imposes half Friction.

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.

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. The ship encounters Friction= 200 if Atmosphere 2+, modified by the Hull Configuration Friction Multiplier. Boost imposes half Friction.

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.

Atmospheric Friction

Hulls moving through Atmosphere experience Friction.

ATMOSPHERIC FRICTION

Operation	Heat Effect	Comment	Drives
Fast Re-Entry	2000	Speed= 16	MG
Slow Re-Entry	200	Speed= 13	MG
Supersonic Flight	64	Speed= 12	MG
Safe Re-Entry	0	Speed= 5	MGZ

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.

Atmospheric Turbulence

Hulls in atmosphere may be subject to Turbulence.

T= S + P + Flux

T= Turbulence. S= Stability. P= Pilot skill.

Roll once per minute for Fast Boost/ Re-Entry

Roll once per hour for Slow or 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 BTSD to one location on the ship.

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. Technically, the limit appears to be:

$$P * 1 / \pi^2 * C$$

P= drive potential. C= light speed. pi= 3.14159...

For Potential=1, the limit= 0.101321.

For Potential=9, the limit = 0.911891.

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.

NAFAL TIME AND SPEED CHART

Accel	Time to		Real Time	Perceived Time	Time Fraction
	Max	Weeks			
0.1	51	1700	1700	1680	0.99
0.2	51	850	850	833	0.98
0.3	51	560	560	539	0.95
0.4	51	425	425	389	0.92
0.5	51	340	340	295	0.87
0.6	51	285	285	226	0.80
0.7	51	240	240	173	0.71
0.8	51	212	212	127	0.60
0.9	51	188	188	82	0.47
Gs	Weeks	Weeks	Weeks	Weeks	

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 N-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 system.

For example, a NAFAL ship with a maximum velocity 0.5c travelling to a system 10 parsecs (10 hexes) distant endures a journey approximately 3400 weeks but the occupants of the ship age only 2950 weeks (= 17.4 years = 0.87 of the actual travel time).

THE IN-SYSTEM TRAVEL TIME CHARTS

The In-System Travel Times charts detail 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.



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.

In the simplest of terms, jump allows ship to travel between star systems quickly.

Jump moves a ship from one star system to another in about a week. Travel from the Start World to a 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: antagonistic to life and even to matter; 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 high-

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. Occlusion occurs if the object is larger than the ship in jump.

Collateral Damage. Damage inflicted on nearby objects by the energy release of jump.

Diameter. Twice the radius of a sphere. For a non spherical object, its greatest dimension. In the case of long, narrow objects (where 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.

Jumpline. A [n imaginary] line connecting the starting point for a jump and the ending point of the same jump.

Jumpspace. 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.

Realspace. The true universe; opposite of jumpspace.

er performance is supported by Leap Space, Bound Space, Vault Space, and beyond.

But, access to these Spaces requires technology 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 rudimentary Leap Drives. It is with good reason that the drives beyond Jump are called the Fantastic Drives.

Jump Is A Paradigm Shift

Jump is a unique: it is not a logical extension of any known technological sequence, and its independent discovery by an intelligent species is considered a mark of great potential.

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 properties of lanthanides.

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 speaking, 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 to jump-2 and 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 par-

secs from home, struggling to overcome scatter (which see) in order to astrogate back to their homesystem.

Strange Effects

Jump Space exhibits two very specific effects: constant time regardless of distance, and courses are 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.

Jumplines. The starting and ending points (in Real Space) are connected by 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 mass of any appreciable size (within Safe Jump Distance of a gravity source larger than the ship).

JUMP FIELDS

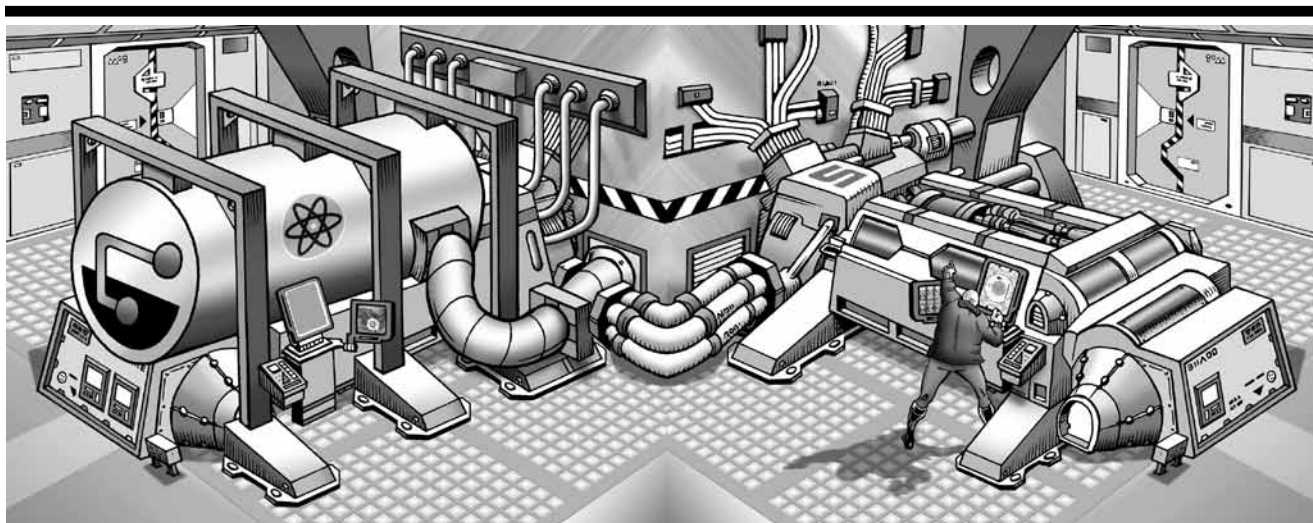
A Jump Drive creates a Jump Field which drags the ship tonnage within it into Jumpspace. The Jump Field can be expressed in three different ways:

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

$$D = (\text{Tons} * 13.5)^{1/3} * 20 \text{ (in meters)}$$



For example, a functioning jump drive in a 100 ton ship creates a jump bubble with a diameter ($=100 \cdot 13.5^{1/3} \cdot 20 = 11.05 \cdot 20 =$) 220 meters.

For example, a functioning jump drive in a 2400 ton ship creates a jump bubble with a diameter ($=2400 \cdot 13.5^{1/3} \cdot 20 = 32.3 \cdot 20 =$) 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 Plates

Hulls may install Jump Plates on the hull surface. These plates radiate the Jump Drive Field in a structure of overlapping globes which enclose the hull.

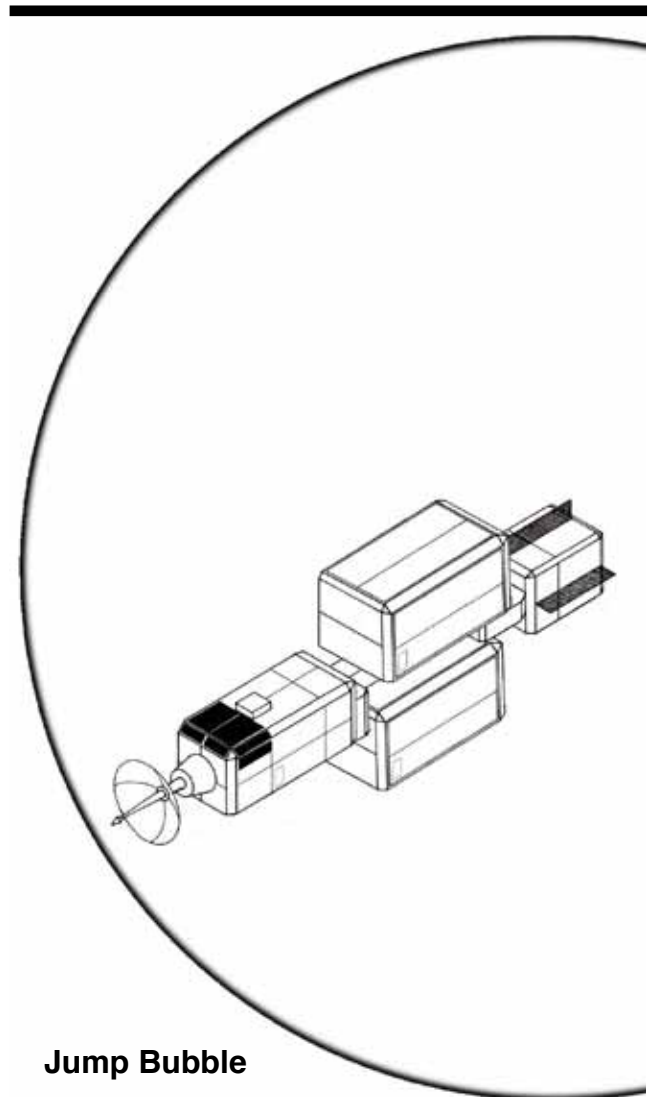
Jump Plates are exterior hull components measuring approximately 1.5 meters square. A hull requires one Jump Plate per 10 tons of Hull.

Cost. The Jump Grid adds MCr0.1 per 100 tons of hull (= KCr1 per ton of hull). A standard Jump Plate cost KCr10.

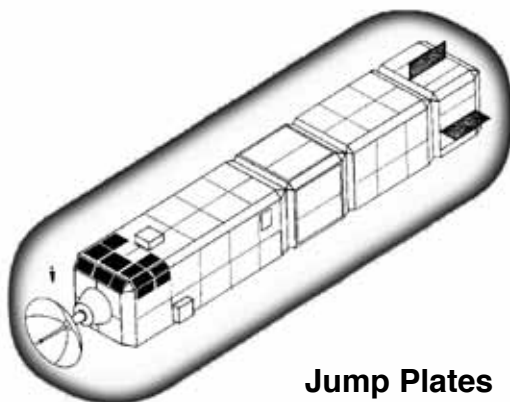
Difficulties. A malfunctioning Jump Plate may prevent the creation of a jump field.

Jump Plates cannot be effectively installed on Cluster and Braced Cluster Hulls.

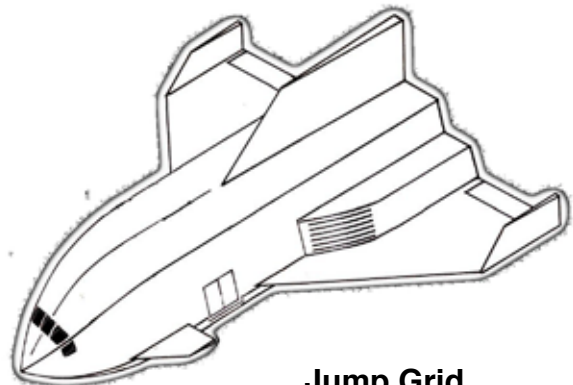
Advantages. Jump Plates are a compromise between



Jump Bubble



Jump Plates



Jump Grid

the Jump Grid cost and the Jump Bubble misjump potential. Jump Plates can be retro-fitted to an existing hull.

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.

MANAGING JUMP DRIVES

Jump Drives are subject to a variety of special details.

Combining Jump Drives

The standard jump drive mechanisms (identified by letters A through Z) are the only practical mechanisms which can be constructed (just as there are limitations on the construction of internal combustion engines; a million-ton diesel engine is impossible). Jump Drives can be ganged and their combined output harnessed using Jump Nexi.

A Jump Nexus (plural = Jump Nexi) connects the output of two or more identical jump drive mechanisms, allowing the joined jump drives to produce jump effects for a larger hull.

A Jump Nexus is no more than an efficient connection. It adds no cost or tonnage.

For example, an N2 or NN jump drive consists of two N jump drives connected by a Jump Nexus. The nexus itself is merely a connection; it adds no tonnage to the combination.

A Jump Nexus can also be used to create other combinations up to nine drives: N3, K4, Z9.

An A9 drive (consisting of nine Jump-A drives and jump nexus) creates an output of 900 EP, is 90 tons, and costs MCr90. A single Jump-Drive-J is more efficient.

Similar nexi (Drive Nexi, Grav Nexi, Maneuver Nexi) connect other drives to create greater output.

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.

Fantastic Drive Governors function similarly. A Hop-3 Drive without a governor can reach up to 30 parsecs (and

always more than 20 parsecs). A Hop-3 drive with a governor can achieve any distance from 10 parsecs to 30 parsecs.

Micro Jumps

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 microjump is impractical: travelling 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 insystem drives.

Micro-hop. The minimum Hop for a Hop Drive is slightly above the next lowest distance possible (= Jump-9).

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 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 include:

Drop Tanks. The ship carries a substantial quantity of fuel (jump fuel) in tanks which can be jettisoned. The result is a ship which need not count 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. The cargo capacity of the ship is modularized; the actual tonnage of the ship for Jump Purposes 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 are more efficient in combat.

THE JUMP PROCESS

- | | | |
|-------------------------------|------------------------|--|
| 1. Preparation For Jump | | |
| Determine Destination System | Captain | |
| Astrogation Task Resolution | Astrogator | Difficulty= Jump Number x Dice |
| Astrogation Task Verification | Astrogator | Difficulty= Jump Number x Dice +1 |
| Move to Jump Point | Pilot | |
| 2. Initiate Jump | | |
| Power Plant Consumes Fuel | Engineer. Power System | |
| Jump Drive Engages | Engineer. Jump. | |
| Jump Entry Flash | | Size= Ship Size+4 |
| Transition To Jump Space | | |
| 3. Period in Jump Space | | = 168 hours +/- Flux x 2 hours |
| Vector Changes | | Not possible with Gravitic based drives. |
| 4. End Jump | | |
| Rumblings | | |
| Jump Exit Flash | | Size= Ship Size+ 4 |
| Transition to Realspace | | |
| Scatter | | |

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 made by the Astrogator. Once he knows which star system, an Astrogator can select a specific destination based on one of several different principles.

Central Star. The planned jumpline extends to the central star in the destination system. The ship will exit jump at a point on the 100D sphere surrounding the star.

Mainworld. The planned jumpline extends to the mainworld of the destination system (actually to a predicted location of the mainworld of the system when the ship arrives). 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 jumpline extends to some other world in the destination system.

A Rangeband from a World. The jumpline extends to a selected point in a rangeband from a world.

An Orbit within the System. The jumpline extends to a specific orbit in the system.

Different destination points have specific utilities. Arrival in an orbit in the Outer System is less likely to be detected, while arrival at the 100D sphere of the Mainworld minimizes travel time to the starport.

Precise astrogation planning depends on available information. Astrogation to a Mainworld or some other World requires precise information (available in most nearby starport data banks), and is not possible for unexplored systems.

Resolving The Astrogation Task

Once the Astrogator knows the destination system and the specific destination within, he can create and resolve the Astrogation Task.

Astrogation calculations are based on Jump Number. The jump number (in parsecs) is the number of dice required for the task (and thus defines its Difficulty).

For example,

To calculate an interstellar jump-1.

Easy (1D) < Int + Astrogator

Uncertain (1D)

To calculate an interstellar jump-2.

Average (2D) < Int + Astrogator

Uncertain (1D)

Math (the Talent) is a Mod on Astrogation tasks.

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.

To manually confirm jump-1 calculations (24 hours).

Average (2D) < Edu + Astrogator

Uncertain (1D).

To manually confirm jump-5 calculations (24 hours).

Hopeless (6D) < Edu + Astrogator

Uncertain (1D).

The Astrogation Confirmation Task is also Uncertain.

For example, Ank Dinsha 888888 Astrogation-3 is plotting out his ship's jump to the next system two parsecs away. Jump-2 makes it an Average 2D task; it has 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.

The Fantastic Drives. When Fantastic Drives (Hop Drive and Skip Drive) the difficulty and the number of dice is based on the distance (for Hop Drive, Distance / 10; for Skip Drive, distance /100). For example, when Astrogating a 30-parsec Hop, the difficulty is Difficult (3D); when Astrogating a 100-parsec Skip, the difficulty is Easy (1D).

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 is the process of 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 space-time" 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 equal to Ship Size plus Mod +4. The ship's gravitational signature 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.

For example, a ship at Range S=12 (= 30 Light-minutes) is detectable to sensors 30 minutes after its initiates Jump.

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 terminate jump early.

If its drives are destroyed, it 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 (or Breakout or Precipitation) is the transition from Jump Space to Real Space. The field which sustains the Jump effect collapses and the ship transitions back into Real Space.

Interference with Exit is virtually impossible. If the Exit Point is within a 100 Diameter sphere, the ship automatically exits at a point where the straight line course intersects that 100D sphere.

Rumblings

Exit from Jump occurs without any specific input or control activity from the ship. Approximately one hour before Exit, the jump drive shows signs of the jump ending (through decreased energy levels, increased vibration levels, and other readings).

Rumblings always 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 equal to Ship Size plus Mod +4 (less intense than an Entry Flash). The ship's gravitational signature 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. The law of the conservation of momentum applies to ships as they enter and exit jump space.

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 the start and the destination (that is, probably relative to the Galactic core).

Scatter

It is possible that the actual Exit Point is not the planned Exit Point. The straight line course for any Jump extends from the Entry Point to a planned Exit Point.

Ships using Jump may be subject to In-System Scatter.

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.

Rangeband 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 the result 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.

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.

Ships using Fantastic Drives may be subject to additional Scatter.

UNPLANNED OUTCOMES

Jump is not a perfect science; jump activity may from time to time produce unplanned outcomes: the Failed Jump and the Misjump.

The Failed Jump

The attempt to jump failed. The ship does not enter jump; it remains in its current location with jump fuel expended.

Jump Drive Failure. The Jump Drive did not process sufficient energy (or did not have sufficient capacity) to initiate

ate Jump. 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).

For example, Jump Drive-B in 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 with more than 400 tons produces Jump Drive Failure.

Interference. If, during the process of 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.

The Misjump

A Jump may begin but produce imperfect results. may but not produce the desired results.

Astrogation Failure. If the Astrogation task fails, time in jump is altered and the jump exit point is changed. Drives are undamaged.

It is not immediately apparent that the Astrogation Failure has occurred. The altered Time In Jump determined but not revealed until Rumbblings are required. Exit point is determined when the ship exits Jump.

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 terrorist's 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 and shuts down six days into the jump. The time roll is 7+Flux= 2 days. The ship emerges into Real Space where 2 days have elapsed, although 6 days have passed onboard ship.

Blocked Jumpline. If the ship's calculated course intersects an uncharted or unsuspected 100D Sphere, the ship exits Jump at the point its course touches the sphere. Time in jump is unchanged; drives do not receive damage.

An Astrogator often plans for his course to intersect a 100D Sphere; it simplifies course planning. But when the

UNPLANNED OUTCOMES

Type	Failed Jump	Failed Jump	Misjump	Misjump	Misjump
Cause	Drive or Power Fails	Interference	Astrogation Fails	Jump Drive Fails	Blocked Jumpline
TIJ=	0 Days	0 Days	7+ Flux Days	7+ Flux Days	Normal
Exit=	No Movement	No Movement	Random	Unchanged	At 100D Limit*
Mishap	in Jump Drive	in Jump Drive	No	In Jump Drive	No

TIJ= Time In Jump. Calculated secretly and revealed only when it occurs. *technically =Safe Jump Distance.

Random Exit is computed using Random Exit Point. It is calculated at the time the ship exits jump.

course encounters an uncharted or unplanned object, the result is a Misjump.

Good astrogators carefully review planets, satellites, asteroids, and comets along the planned course to avoid Unplanned Precipitation.

Nevertheless, most systems have a surrounding Oort Cloud with objects large enough to pose an astrogation hazard. Occasionally, a ship's straight line course intersects the 100 Diameter sphere of an object bigger than the ship, triggering an Misjump.

Two considerations apply: larger ships are less vulnerable to Oort Cloud precipitation because there are fewer larger bodies; and the triggering body is usually a source of water ice or hydrogen suitable for refueling.

Random Exit Point. From the origin of the Jump, determine a random direction on the interstellar hex grid. Determine a distance equal to Dice = Jump Number times 1D. Precipitate the ship from jump at that location.

For example, a ship begins J-1 from Regina and subsequently Misjumps. A random direction from Regina is determined. The ship emerges along that file of hexes in that direction. The distance travelled is Dice = Jump Number x 1D = 1 x 1D = 1 x 3 =) 3 hexes.

For the fantastic drives, the distance to the location is multiplied by the Drive Multiplier.

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, or when the Jump Drive fails during Jump.

A Mishap may also occur 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, consult the Battle Damage charts for the Jump Drive. Determine the Damage Severity and the Diagnosis Severity for each.

DAMAGE SEVERITY	DIAGNOSIS SEVERITY
1D Repair Difficulty	1D Diagnosis Difficulty
1 Easy 1D	1 Easy 1D
2 Average 2D	2 Average 2D
3 Difficult 3D	3 Difficult 3D
4 Formidable 4D	4 Formidable 4D
5 Staggering 5D	5 Staggering 5D
6 Hopeless 6D	6 Hopeless 6D
Impossible 7D	Impossible 7D
Beyond 8 D	Beyond 8 D
Destroyed	Destroyed

Severity = The difficulty of repair of the damage.

Diagnosis = The difficulty of identifying the damage.

Other Objects and Small Craft. Other objects in the jump field consult BTSD.

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 until the severity of damage is less than Easy.

LONG RANGE ASTROGATION

The challenge (and the difficulty) of astrogation increases with distance, and astrogation faces two powerful challenges: occlusion, and scatter.

Blockage

The existence of a gravity source (larger than the ship in jump) on the ship's course (at any point along the course, at the moment jump begins) forces exit from jump at 100 Diameters in front of the object. The effect is similar to the wave function collapse in quantum mechanics.

As the length of the jumpline increases, the potential for occlusion also 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 before; an object may occlude the jumpline but cannot be detected or foreseen.

Calculating The Distance To The First Blockage

Roll 4D-4 and multiply by the Occlusion Multiplier.

The result is the distance to an occlusion along the jumpline. If the result is greater than the length of the jumpline, then there is no occlusion.

For example, the Beowulf begins a one-parsec Jump-1. Jump has an occlusion multiplier = 1. Roll 4D-4 (=4) x 1 = 4. There is no occlusion within the length of the jumpline.

For example, Galactic Explorer begins a 4,000-parsec Leap-4. Leap has an occlusion multiplier = 1,000. Roll 4D-4 (= 3) x 1,000 = 3,000. There is an occlusion of the jumpline at 3,000 parsecs.

For example, 100-ton Scout Murphy begins a 2-parsec Jump-2 from Regina for Wypoc. Jump has an occlusion multiplier = 1. Roll 4D-4 (=0) x 1 = 0. There is an occlusion of the jump line at 0 parsecs: some minor object in the system, or somewhere in the Oort Cloud leaving the system. In this case, the 200-ton Free Trader Beowulf also leaving Regina, happens to be astride the Murphy's course line, about a million kilometers out. The Murphy, when it exits jump, finds itself still in the Regina system and about 4 km (100 times the Beowulf's 40 meter diameter) from the Beowulf.

For example, the !#%& begins a 700-parsec Skip-7 between systems near the edge of the galaxy. Skip has an occlusion multiplier = 100. Roll 4D-4 (=11) x 100 = 1,100 parsecs. There is no blockage along the courseline. The Skip takes about three and a half hours.

JUMP BLOCKAGE

4D-4

times Occlusion Modifier

THE MANY LEVELS OF JUMP TECHNOLOGY

Drive	Multiplier	Performance	Time	Scatter	Destination	Distance	TL
Jump	$\wedge 0$	$1-9 \times 10^0$ parsecs	168 hours	In System $S=12 + \text{Flux}$	Nearby Stars	0	9
Hop	$\wedge 1$	$1-9 \times 10^1$ parsecs	24 hours	In System $S=12 + \text{Flux}$		10	17
Skip	$\wedge 2$	$1-9 \times 10^2$ parsecs	3.5 hours	$\text{Flux} \times 2D$ parsecs		100	20
Leap	$\wedge 3$	$1-9 \times 10^3$ parsecs	30 minutes	$\text{Flux} \times 3D$ parsecs	Transgalactic	1000	22
Bound	$\wedge 4$	$1-9 \times 10^4$ parsecs	4 minutes	$\text{Flux} \times 4D$ parsecs	Pangalactic	10,000	26
Vault	$\wedge 5$	$1-9 \times 10^5$ parsecs	30 seconds	$\text{Flux} \times 5D$ parsecs	Intergalactic Drive	100,000	29
Six Drive	$\wedge 6$	$1-9 \times 10^6$ parsecs	4 seconds	$\text{Flux} \times 6D$ parsecs	Local Group	1,000,000	31
Seven Drive	$\wedge 7$	$1-9 \times 10^7$ parsecs	half-second	$\text{Flux} \times 7D$ parsecs		10 million	32
Eight Drive	$\wedge 8$	$1-9 \times 10^8$ parsecs	milli-second	$\text{Flux} \times 8D$ parsecs		100 million	33
Nine Drive	$\wedge 9$	$1-9 \times 10^9$ parsecs	micro-second	$\text{Flux} \times 9D$ parsecs		1 billion	34

* Higher levels of Skip, and all levels of Leap, Bound, Vault, Seven, Eight, and Nine are above normally encountered TLs.

Scatter

The jumpline for any jump (including the higher level technologies Hop Skip Leap Bound and Vault) extends from the Entry Point to a planned Exit Point.

For Jump technology with distances 1-9, it is possible to astrogate a course in which the jumpline terminates in a star or world. Jumplines which terminate on the 100D sphere of a star or world are not subject to scatter.

Astrogation for jumplines longer than 9 parsecs cannot be specific enough to end in a star or world. They typically terminate instead at the edge of the Inner System $S=12$ or $O=5$. Because the jumpline is plotted based on a visible point originating at least ten years (and potentially 9 billion years or more) in the past, precision accuracy is not possible. The exit point is subject to Scatter.

The magnitude of scatter is related to the length of the jumpline.

In System Scatter. If the jumpline is less than 100 parsecs, scatter is restricted to within the target star system.

In System Scatter = $S=12 + \text{Flux}$

Out System Scatter. If the jumpline is 100 parsecs or greater, then the exit point may be In System Scatter, or it may be to (relatively) nearby systems.

Outsystem Scatter = $\text{Flux} \times \text{Multiplier } D$ parsecs

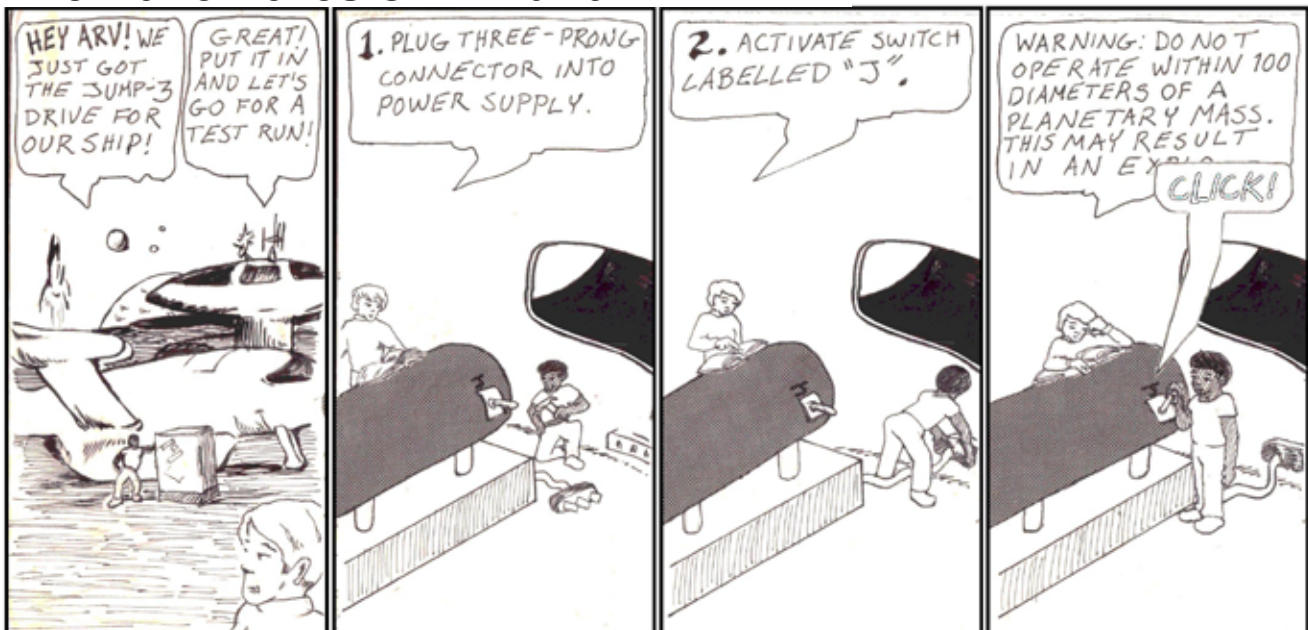
Determine the direction of Scatter randomly.

If Flux = 0, apply In System Scatter

For example, the *!#%&* succeeds in its 700,000-parsec Bound-7 from Andromeda and arrives somewhere near the core of this galaxy. Because the jumpline is greater than 100 parsecs, the ship rolls for Outsystem Scatter = $\text{Flux} \times \text{Occlusion Multiplier } 9D = -3 \times 31 = 93$ parsecs (applied randomly from the intended exit point).

Or, the ship rolls Flux x Occlusion Multiplies $9D = 0 \times 14 = 0$ and arrives in the intended system at $S=12 + \text{Flu} = 12 + 0 = 12$: precisely the planned exit point.

The Adventures of Arv and Ank



How Power Systems Works

Spacecraft require a power source to support the operation of their various drives and internal mechanisms.

Starship jump drives require and consume extreme amounts of energy in a very brief period of time: far more than traditional power sources can supply. The starship power system has one primary function: to meet this demand for energy.

For example, a 1000-ton jump-1 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 is about 3000 tons: far larger than would fit into the ship's hull.

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.

TYPES OF POWER SOURCES

Power Systems are based on a variety of technologies, each with its own advantages and disadvantages.

A **Power Cell** is a rechargeable battery. It receives energy from an outside source and stores it until needed. When exhausted, it can be recharged.

A **Fuel Cell** converts fuel into electric current; it is dependent on a continuing feed of fuel (typically hydrogen and oxygen). A Fuel Cell is more efficient than (for example) an engine-driven electric generator.

An **Ambient Cell** converts light into electricity; it is dependent on a continuing source of relatively strong light.

An engine-driven **Electric Generator** converts motion into electric current. An EG is driven by any local and easily available source of motion: an internal combustion engine, a steam engine, moving water, wind, beasts of burden turning an axle, even people turning cranks.

A **Fission Power Plant** accelerates the decay of heavy metals (uranium, plutonium, thorium) and uses the attendant heat to produce electricity.

A **Fusion Power Plant** joins atomic nuclei in a reaction which has a net output of energy. Early versions are bulky and similar in construction to Fission Power Plants. Higher Tech Level versions are lighter and more efficient.

Fusion Plus is a compact fusion system which converts hydrogen into electricity with minimal waste heat. FusionPlus is unsuitable for large scale power systems.

An **Anti-Matter Power System** brings together matter and anti-matter particles to produce energy.

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.

For Starships

Of the available Power Systems, only four are practical for use on starships: P-Plants, AM Plants, Fission Plants, and Collectors.

The Power System Rule. When installed in a starship,

the Potential for an installed Power System must be at least equal to the greater of the interstellar and interplanetary drives.

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 P-Plant-A drives and nexus) creates an output of 900 EP, is $(9 * 4) = 36$ tons, and costs MCr 36. A single P-P-Plant-J is more efficient.

Combined drives can themselves be combined (and designated by a prefix digit): 4A4 indicates $(4 * 4 =)$ 16 P-Plant Drive-A. The largest drive available under ACS is 9Z9 $(= 9 * 9 =)$ 81 P-Plant-Z.

Similar nexi (Drive Nexi, Grav Nexi, Maneuver Nexi) connect other drives to create greater output.

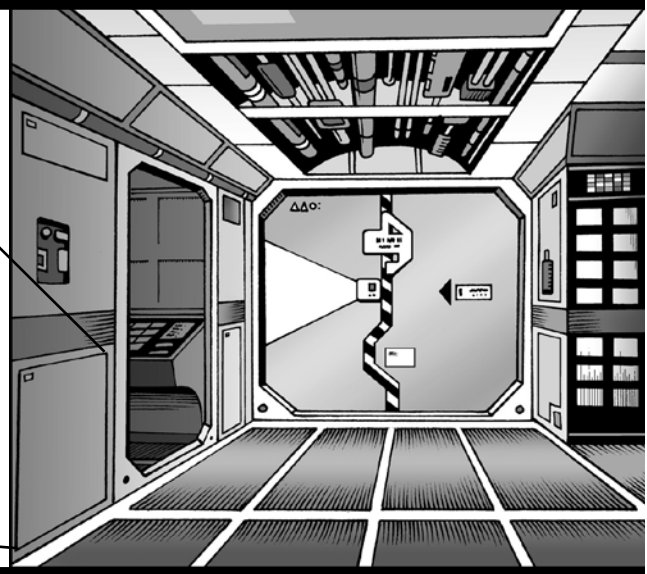
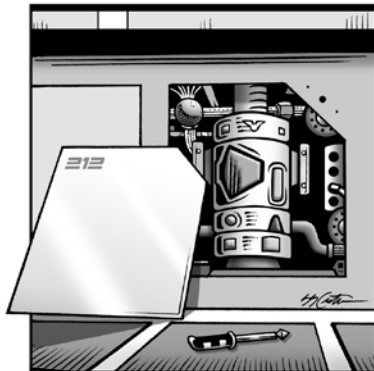
Redundant or Alternative Systems. A ship may be equipped with more than one of any specific type of drive. For example, a ship may be equipped with a Power Plant and an Anti-Matter Plant.

Centralized Or Dispersed

The power system for a ship can be centralized or dispersed.

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).

Dispersed Power



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 without a central power supply.

□ **Power Cells.** Ships may use Power Cells (compact high capacity power storage cells) as the independent power source. Individual components can operate for (1D) days after disconnection from the central power supply.

[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 CH₄, ammonia NH₃, water OH₂, hydrogen sulfide SH₂, 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.

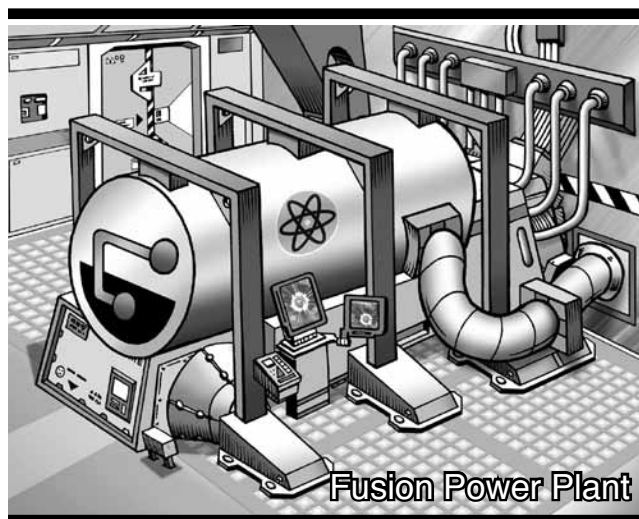
Refined Fuel is available at better quality starports.

Fusion Overclock

Starship Power Plants are “small” fusion 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).

Overclock inefficiencies are reflected in the Drive Efficiency Table.



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 Dive 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 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 can be custom-manufactured using an AM Fuel Processing Unit, or at TL-16+ manufacturing facilities. AM slugs are stored in a 1-ton console near the AM Plant.

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 (relatively) large external surface area to slowly absorb exotic particles; it releases their potential energy in a burst to support the high energy requirements of jump.

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.

Interstellar Drive Support. Power Cells store insufficient energy to support the use of [most] interstellar drives.

FUEL CELLS

The ship has an array of units which convert a source fuel into usable energy.

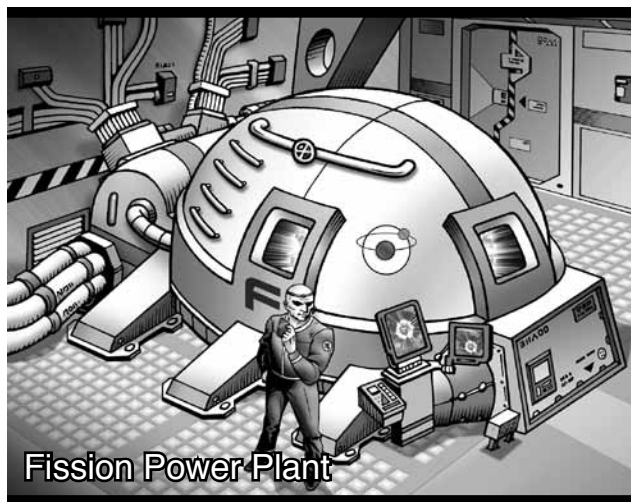
Fuel. Fuel cells consume commonly available fuels to produce electric current. Two specific fuels are required: hydrogen and oxygen.

Hydrogen can be obtained from standard starship fuel, or skimmed from gas giants. Oxygen can 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 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 two 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.



Interstellar Drive Support. Fuel Cells store insufficient energy to support the use of [most] interstellar drives.

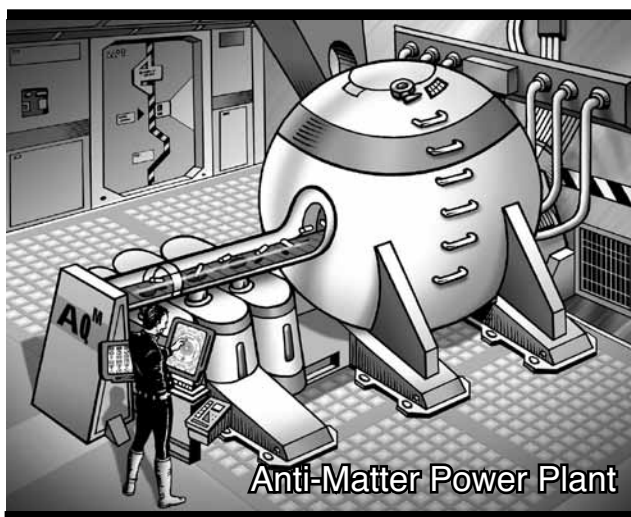
FUSION PLUS UNITS

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.



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 the threats, challenges, and rewards around them.

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 their 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].”

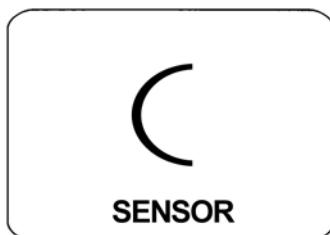
Detection

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.

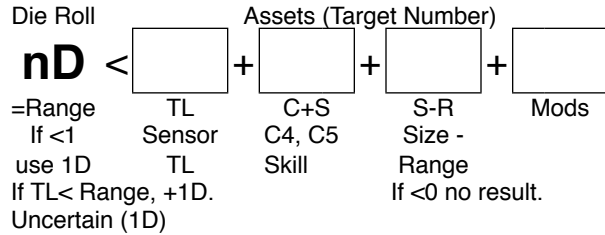
Tracking

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



Difficulty is based on Range to the Target.

Use S= for Space objects and R= for World surface objects as appropriate.

The Sensor Task determines the success of the effort.

Because the possible readings are 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 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. This process allows checking at each available range without revealing to the players which ranges are important.

DESCRIBING SENSORS

Sensors are identified by a LongName which provides enough detail to define its usage. A Sensor LongName includes Stage, Range, Type, and Tech Level.

Stage - Range - Type - Tech Level (C+S)
LongName elements may be omitted if not applicable.

Stage is the sensor's position in the spectrum of sophistication in the developmental life cycle. It is possible for Stage to be blank. For example, Prototype, Basic, Standard, or Advanced.

Range is the sensor's distance factor in acquiring information. Space Sensors use Space Ranges. World Sensors use World Ranges. Range in either case uses a term which translates to a range band.

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.

CREATING SENSORS

The abilities and effectiveness of Sensors is determined primarily by Type and Tech Level.

The Sensors available to a ship are determined by the

Tech Level of the constructing shipyard (although character may upgrade their ship's sensors as better ones become available).

Similarly, the Sensors available to worlds or bases is determined by its governing tech level.

Space Sensors detect a variety of inputs and process them to provide specific details of location, environment, and friends and enemies.

The Sensor Creation Process

Sensors are selected from the Sensor List and then further defined.

For each desired Sensor:

A. Select a **Sensor**. Note its Model Letter and Tech Level. The base tonnage for a Sensor is zero tons. The base cost for World Sensor is MCr0.1. The 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.

Sensor Mounts (with the exception of Surface and Antenna) are installed in Hardpoints.

C. Apply **TL Stage Effects** to the Sensor (as desired, and consistent with the ship TL) to modify cost, performance, and QREBS.

D. If the Sensor has S=, it is possible to apply **Space Range Effects** to increase or decrease Space Range.

E. If the Sensor has R=, it is possible to apply **World Range Effects** to increase or decrease World Range R=.

F. Allocate a **Control Panel** each Sensor.

G. Note the final cost and tonnage.

Surface and Antenna sensor installations do not require hardpoints.

Added 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.

ACTIVE VERSUS PASSIVE

Most sensors are passive. They are receivers of information, but do not emit any information themselves. Passive sensors are difficult to detect.

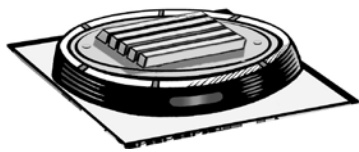
Some sensors are active. They emit some form of information (they send out a radio pulse, or a laser spot in the course of operation). Active sensors give away their location and the fact that they are operating.

A sensor which can be Active or Passive is automatically Passive unless the operator makes the switch to Active (and receives a Mod +3) but also automatically alerts any operating sensors.

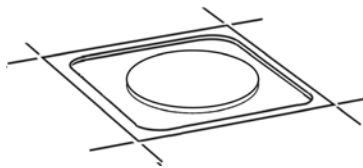
Active Mode can only be used to S=7.

USING THE SENSOR CHARTS

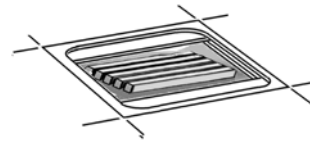
The Sensor Charts show the various sensors and their



Sensors in Hardpoint Mount



Sensor In Surface Mount



Sensor in Antenna Mount

M MASS SENSOR

(Gravitics. Passive). A Mass Sensor detects masses. It is a less sensitive version of the Grav Sensor.

N NEUTRINO DETECTOR

(Gravitics. Passive). 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 behind them.

P PROXIMETER

(Electronics. Passive). A 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.

Q STEALTH MASK

(Polymers. Passive). Stealth Mask is a signal absorber. The device (actually an external hull 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 – Space Range). Stealth Mask is a negative Mod on the attempting **Active** Sensor Task.

R RADAR

(Electronics. Passive/Active). 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.

S SCANNER

(Electronics. Passive/Active). Scanner is an advanced form of Electromagnetic Sensor.

T SCOPE

(Photonics. Passive). Scope is vision screen with distance and enhancement capabilities. It acquires images and magnifies them for interaction, navigation, and analysis.

V VISOR

(Photonics. Passive). Visor is the basic visual sensor. It uses external cameras with telescopic enhancements to produce viewable images.

W COMMPLUS

(Gravitics. Passive/Active). CommPlus is an advanced version of Communicator which uses particles (primarily 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).

Y SOUND SENSOR

(Electronics. Passive). Sound Sensor is an external audio pickup capable of sensing a wide variety of sounds. It operates only in atmosphere (or under water).

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.

EXTENDABLE SENSORS

Sensors may be mounted on Extendable Stalks.

DEPLOYABLE SENSORS

Sensors may be installed in Deployable Hardpoints; they may be moved and operated at a distance from the ship. Deployable Sensors are installed in the Weapons section.

SENSOR CREATION EXAMPLE

For example, several Neutrino Detectors are possible.

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 its associated 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 Fusion+ modules at S=5 = 50,000 km or closer. It has a total Mod +1 to detect.

Assuming the Sensor Operator has C4= 7 and Sensor-3 and Mod + 1 (Experimental = -4; Bay = +5), the Sensor Task calls for him to roll 5D for (6 + 7 + 3 + 1 = 17) or less = about a 50% chance of detecting the target.

AdvDSN DS B1 Neutrino Detector-15

An advanced device with very great detection range, a high tech level, mounted in a Barbettes.

S=12 Deep Space (Space Sensors)

Sensor Cost= MCr1 x1.

Mount Cost= MCr5.0 x5 = MCr25.

Mount Tonnage= 3 x 3 = 9 tons.

The AdvDSN-15 can attempt to detect fusion power plant neutrino emissions at extreme ranges (S=12). It has Mod +4 to detect.

Assuming the Sensor Operator has C4= 7 and Sensor-3 and Mod + 3 (Adv = +3; Barbettes= +1 = +4), 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.

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:

Comms. Communicator (TL8-16) and CommPlus (TL17+).

Detectors. Radar (TL9-11), EMS (TL12-18), and Scanner (TL19+).

Viewers. Scope (TL9-13), Visor (TL14-17), and HoloVisor (TL18+).

Every ship probably has one of these.

Specialized space-range 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=.

STANDARD SENSOR PACKAGES

Package	TL	MCr	Components			Consoles	Tons
Standard-9	9	5.5	Surf LR Comm-9	Surf AR Scope-9	Ant AR Radar-9	3	+2
Standard-10	10	5.5	Imp Surf LR Comm-10	Imp Surf AR Scope-10	Ant LR Radar-10	3	+3
Standard-11	11	4.0	Adv Surf LR Comm-11	Adv Surf AR Scope-11	Imp Ant LR Radar-11	3	+3
Standard-12	12	3.5	Adv Surf LR Comm-11	Adv Surf AR Scope-11	Ant AR Scanner-12	3	+2
Standard-13	13	3.0	Adv Surf LR Comm-11	Adv Surf AR Scope-11	Imp Ant AR Scanner-13	3	+2
Standard-14	14	4.5	Adv Surf LR Comm-11	Surf AR Visor-14	Imp Ant LR Scanner-14	3	+3
Standard-15	15	4.0	Adv Surf LR Comm-11	Imp Surf AR Visor-15	Adv Ant LR Scanner-15	3	+3

Each Sensor requires a 1-ton console on the Bridge (which includes its associated Local Computer) and a Mount placed somewhere on the hull or on a weapons mount.

World Sensors				VI	D	Vd	Or	Fo	G
		R=	0	5	6	7	8	9	10
	TL	Sensor	Contact	1000 m	5 km	50 km	500 km	5,000 km	50,000 km
A	11	Activity Sensor		5 Thoughts	6 Agonies	7 Deaths	8 Many Deaths		
B	9	Deep Radar	Depth R=5 Px Size=2	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	10	Densitometer	Depth R=9 Px Size=6	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	
F	12	Field Sensor			2 Electronics			5 Generators	6 Power Lines
K	9	Analyzer/Sniffer	Operates on Samples						
L	10	Life Detector			5 People	6 Crowds	7 Herds	8 Forest	Vague Readings
M	8	Mass Detector		6 Missile	6 Small Craft	7 ACS Ship	8 BCS Ship	9 Rock	10 Large Rock
P	10	Proximeter		5 Missile	6 Small Craft	7 ACS Ship			
X									
Y	10	SoundSensor		3 Distress	4 Distress!!	5 Gunshots	6 Thunder	7 Explosion	

Space Sensors				Boarding		FR		SR	
		S=		B	1	2	3	4	5
	TL	Sensor	Contact	1000 m	5 km	50 km	500 km	5,000 km	50,000 km
C	8	Communicator							
E	12	EMS							5 Missile
G	13	Grav Sensor							5 Missile
H	18	Holovisor							
J	8	Jammer							
N	10	Neutrino Detector							
Q	12	Stealth Mask							
R	9	Radar						5 Missile	6 Small Craft
S	19	Scanner						3 Book	4 Fusion+
T	9	Scope		3 Book	4 Fusion+	5 Missile	6 Small Craft	7 ACS Ship	8 BCS Ship
U									
V	14	Visor			3 Book	4 Fusion+	5 Missile	6 Small Craft	8 ACS Ship
W	17	CommPlus							
Z									

A SENSORS

Type	TL	Mount	S=	R=	MCr	Use	Trade Skill
A Activity Sensor	11	Surf		7	0.1	Passive	Electronics
B Deep Radar	9	Surf		7	0.1	Active	Electronics
D Densitometer	10	Surf		7	0.1	Passive	Gravitics
F Field Sensor	12	Surf		7	0.1	Passive	Electronics or Magnetics
K Analyzer/ Sniffer	9	Surf		7	0.1	Passive	Electronics, Biologics
L Life Detector	10	Surf		7	0.1	Passive	Magnetics
M Mass Sensor	8	Surf		7	0.1	Passive	Gravitics
P Proximeter	10	Surf		7	0.1	Passive	Electronics
Y Sound Sensor	7	Surf		7	0.1	Passive	Electronics
C Communicator	8	Surf	7		1.0	P / A	Electronics
E EMS	12	Surf	7		1.0	P / A	Electronics
G Grav Sensor	13	Surf	7		1.0	Passive	Gravitics
H Holovisor	18	Surf	7		1.0	Passive	Photonics
J Jammer	8	Surf	7		1.0	Active	Electronics, Magnetics, Gravitics.
N Neutrino Detector	10	Surf	7		1.0	Passive	Gravitics
Q Stealth Mask	12	Surf	7		1.0	Passive	Polymers
R Radar	9	Surf	7		1.0	P / A	Electronics
S Scanner	19	Surf	7		1.0	P / A	Electronics
T Scope	9	Surf	7		1.0	Passive	Photonics
V Visor	14	Surf	7		1.0	Passive	Photonics
W CommPlus	17	Surf	7		1.0	P / A	Gravitics

	AR		LR			DS			
6	7	8	9	10	11	12	=S		
1 ls	2 ls	8 ls	16 ls	3 lm	1 au= 8 lm	30 lm	Sensor	TL	
6	7	8	9	10	11	12	EMS	12	E
Small Craft	ACS Ship	BCS Ship	Local hex	Terrain Hex	Asteroid	World Hex			
7	8	9					Field Sensor	12	xF
Lightning	EMP	EMP+							
6	7	8	9	10	11	12	Grav Sensor	13	G
Small Craft	ACS Ship	BCS Ship	Rock	Large Rock	Asteroid	Moon			
5	6	7	8	9	10	11	Holovisor	18	H
Person	Truck	ACS Ship	BCS Ship	Local Hex	Terrain Hex	Asteroid			
							Jammer	8	J
			6			9	Neutrino Detector	10	N
			Fusion+			Power Plant			
							Stealth Mask	12	Q
7	8	9	10	11			Radar	9	R
ACS Ship	BCS Ship	Rock	Large Roick	Asteroid					
5	6	7	8	9	10	11	Scanner	19	S
Missile	Small Craft	ACS Ship	BCS Ship	Rock	Large Rock	Asteroid			
9	10	11	12				Scope	9	T
Local Hex	Terrain Hex	Asteroid	World Hex						
									U
8	9	10	11	12			Visor	14	V
BCS Ship	Local Hex	Terrain Hex	Asteroid	World Hex					
							CommPlus	17	W
									Z

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 targets. Weapons may use Space Ranges or World Ranges. Range in either case uses a term which translates to a range band.

Mount states the type of weapon mount used with the weapon.

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: it is always the word: 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.

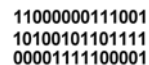
Guidance is the system which controls the missile and directs it to its target. For example, OG is Operator Guided: the Gunner in the Launcher guides the missile to its target. Such a system may include radar guidance, direct joystick control, or some other means.



MISSILE



BEAM



DATA



FIELD

IDENTIFYING SPACE WEAPONS

Stage	Range	Mount	Type	-TL	(C+S)
Adv LR T1 Msl -11 (10)					
Advanced Long Range Single Turret Missile-11 (10)					

IDENTIFYING MISSILES

Stage	Missile	-Size	Type	Guidance
Missile-5X HW				
Missile-5 Explosive Warhead Hard-Wired Guidance				

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 in large part 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 requires a minimum size for its Mount (Minimum Mount as noted in the Space Weapon Types Table).

Mounts may be upgraded. Turrets may be upgraded to larger Turrets or to Barbettes. Bays may be upgraded to Large Bays.

But, Particle Accelerators may be upgraded through all larger Mounts.

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.

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 Turret and Barbette can be made Deployable.

Uses. Deployables have a variety of uses. If a deployed turret is targeted 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

THE SPACE WEAPON TASK

Die Roll	Assets (Target Number)						
nD <	<input type="text"/>	+	<input type="text"/>	+	<input type="text"/>	+	<input type="text"/>
=Range	TL		C+S		S-R		Mods
If <1	Wpn TL		C4, C5		Size -		
use 1D			Skill		Range		
If TL < Range, +1D.							If <0 no result.
Uncertain (1D)							

ship, or within 10 D of a nearby planet S=5 R=10). 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 Mount is armored the same as the 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 and applied as a Mod) is a major element of the Space Weapons Task.

The Type of weapon determines which defenses and armors it can ignore and which it must overcome.

If the 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.

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 is determined by its governing tech level.

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 minimum of 1 ton for Ships and actual tonnage for Small Craft. Costs are not rounded.

For each desired Weapon:

A. Select a Weapon.

B. Select a Mount for the Weapon. 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.

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.

The Weapon Charts. Weapons Attacks-1 and -2 show the ranges at which various weapons operate (including maximum range).

A PARTICLE ACCELERATOR

Particle Accelerators project subatomic particles in 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. PAs in space use Space Ranges S=. They have an effective range limit of about S=7, beyond which the particle beam is too dissipated to do damage.

In Atmosphere. PAs operating in atmosphere (that is, attacking a target which is in atmosphere) use World Ranges R=, and shed 1D of damage for each layer 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 Range Band of atmosphere it penetrates, typically Bands 1 to 7. A PA Barrette would lose effectiveness before the beam hit the target; a Main Mount could potentially hit and damage the target.

B SLUG THROWER

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.

C COMMCASTER

CommCasters are dedicated information and communications links between the ships.

Sensor Data. Two ships, each with CommCasters can share Sensor Data, and each may attack targets sensed by the other.

Virtual Battery Fire. Ships (each equipped with CommCaster) can attack the same target with weapons of the same Type (but not necessarily the same TL or Mount). The hits inflicted by the weapons are summed.

IDENTIFYING SPACE WEAPONS

	R= or S=					
Stage	Range	Mount	Type	-TL	(C+S)	
						Early AR T1 Beam Laser-9 (9)
						Early Attack Range Single Turret Beam Laser-9

D DATACASTER

DataCasters are offensive weapons broadcasting or beamcasting petabytes of information at or against enemy sensors and communicators. DataCasters pursue three strategies: they attempt to spook or overload sensors, they attempt to introduce viruses into onboard systems through flaws in sensor inputs, and they transmit tailored psychological messages and propaganda.

Sensor Overload. Successful DataCaster Attacks on Sensors or Comms inflict Damage on a specific Sensor or Comm.

Virus. Successful DataCaster attacks on non-Sensor, non-Comm locations insert a Virus. A Virus successfully introduced onto a ship disables the Component at the Hit Location.

In each successive Combat Round, the Virus may attack an adjacent Hit Location and succeeds if $1D < \text{Computer} + \text{Virus}$.

For example, a Virus is assigned a value = $1D = 3$. It attacks an adjacent Hit Location Power Plant controlled by $\text{Computer}/2$. It must roll $1D$ for $2+3$ or less = 5. If successful, that location is disabled.

A Virus is isolated if all computer connections are cut between the Virus disabled locations and all other hit locations. The computers can operate independently; but this step prevents use of batteries and commcasters, and restricts the use of weapons to R=7 or less.

Psychological Attacks. Datacaster attacks provide a shifting series of morale attacks, false messages, appeals to a variety of cultural and social fears.

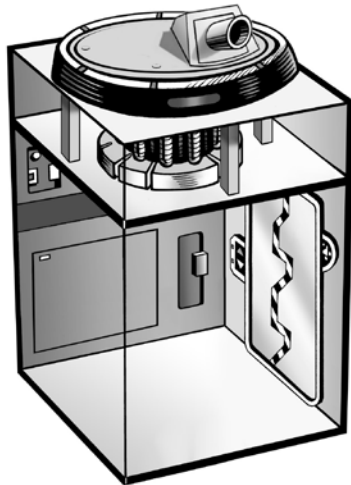
Psychological attacks challenge the Sanity of crew, passengers, staff, and troops. A successful Datacaster attack requires each individual in the affected area to Check San.

E STASIS PROJECTOR

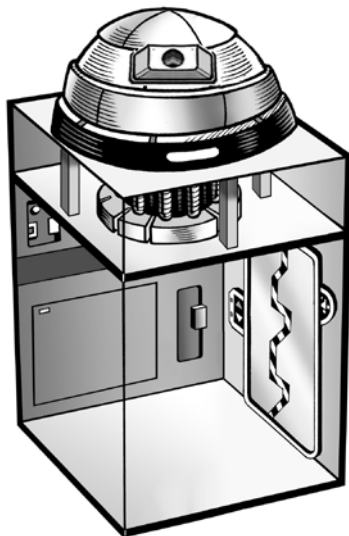
A Stasis Projector imposes a series of Stasis Fields (varying in size from 1 cm to 1.5 m) along a line extending from its projector. The fields tend to form around objects; all molecular activity within the field is suspended; time stands still within an active field. The field remains in effect until 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.



Sandcaster in Single Turret Mount



Plasma Gun in Single Turret Mount



Beam in Single Turret Mount

FUSION GUN

Fusion Guns fire beams of super-heated plasma at their targets and cause damage by their intense heat and kinetic energy. Fusion Guns operate at higher temperatures than Plasma Guns (in which the plasma actually undergoes fusion).

MESON GUN

Meson Guns create Muons and charged Pions and project them in focused beams at near lightspeed toward a target. The speed is calculated to promote particle decay inside the target. The ultimate decay products (electrons and photons) inflict internal damage, having bypassed most defenses.

JUMP INDUCER

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.

A Jump Inducer requires a Jump Drive installed on its ship.

MINING LASER

The 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

Laser weapons fire concentrated beams of energy at their targets and cause damage through intense heat.

The Pulse Laser is a weaponized Mining Laser with im-

proved power and range. It fires in intermittent pulses rather than continuous beams.

BEAM LASER

The Beam Laser is the standard starship Laser weapon. It fires in continuous beams to inflict greater damage.

MISSILE

Missile systems launch Size-5 (roughly person size) Missiles at targets. The Missile itself (independently described) travels to the target and inflicts damage.

KINETIC KILL MISSILE

The KK Missile Launcher is a dedicated Launcher for Size-6 (roughly vehicle size) missiles. The Missile itself (independently described) travels to the target and inflicts damage.

PLASMA GUN

Plasma Guns fire beams of super-heated plasma at their targets and cause damage by their intense heat and kinetic energy (but the temperatures do not reach fusion levels).

ORTILLERY

Ortillery (Orbital Artillery) systems launch a variety of Deadfall Ordnance (unpowered Size 4-5-6 Missiles) from near planet locations for attacks against world surface targets.

RAIL GUN

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 (usu-

Near World Small Weapons			VI	D	Vd	Or	Fo	G
	R=	0	5	6	7	8	9	10
TL	Weapon	Contact	1000 m	5 km	50 km	500 km	5,000 km	50,000 km
B 8	Slug Launcher	[- - - - - AM Mode - - - - -]					Resolved In Next Turn	
D 10	DataCaster	[- - - - - AM Mode - - - - -]						
E 19	Stasis	[- - - - - AM Mode - - - - -]				no	no	no
F 10	Fusion Gun	[- - - - - AM Mode - - - - -]						
H 18	Jump Inducer							
J 8	Mining Laser	[- - - - - AM Mode - - - - -]					no	no
K 9	Pulse Laser	[- - - - - AM Mode - - - - -]						
L 10	Beam Laser	[- - - - - AM Mode - - - - -]						
P 10	Plasma Gun	[- - - - - AM Mode - - - - -]						
Q 12	Ortillery						Resolved In Next Turn	
S 9	SandCaster	[- - - - - AB Mode - - - - -]						
T 14	Jump Damper		Creates 100D Field				no	no
U 15	Tractor/Pressor							
W 16	Disruptor	[- - - - - AM Mode - - - - -]						
X 9	Hybrid K-S-M	[- - - - - AB AM Mode - - - - -]						
Y 9	Hybrid L-S-M	[- - - - - AB AM Mode - - - - -]						

Weapons On this Chart Do Not Reach Beyond R=10

Near World Big Weapons			Boarding	FR			SR	
	S=	B	1	2	3	4	5	
TL	Weapon	Contact	1000 m	5 km	50 km	500 km	5,000 km	50,000 km
A 11	PA (see Note)	no						
C 8	CommCaster	no						
G 13	Meson Gun	no	no	no	no	no	no	no
M 8	Missile	no	no	[- - - - AM Mode - - - -]			Resolved In Next Turn	
N 10	KKM	no	no	no	no		Resolved In Next Turn	
R 12	Rail Gun	no	no	no	no		Resolved In Next Turn	
V 10	Salvo Rack	no	no	[- - - - AM Mode - - - -]			Resolved In Next Turn	

|||||| no ||||||= Attack Not Possible.

Particle Accelerators: Use S= for Space Targets; use R= for targets in Atmosphere.

Ranges for Defenses			VI	D	Vd	Or	Fo	G
	R=	0	5	6	7	8	9	10
TL	Defense	Contact	1000 m	5 km	50 km	500 km	5,000 km	50,000 km
G 11	Meson Screen		Exp Pro	Early	Standard	Improved	Advanced	no
N 12	Nuclear Damper	Exp Pro	Early	Standard	Improved	Advanced	no	no
Q 14	Mag Scrambler	Exp Pro	Ear and Std	Imp Adv		no	no	no
R 19	Proton Screen	Exp Pro	Early	Standard	Imp Adv	no	no	no
T 16	Black Globe	Exp Pro	Imp Adv Ult	no	no	no	no	no
U 20	White Globe	Ear Std		no	no	no	no	no
W 17	Grav Scrambler	Exp and Pro	Ear and Std	Imp and Adv	no	no	no	no

This table shows the size of the protective field created by the defense. The attacking weapon resolves the Absolute Mode Defense Task when it enters the range band at the edge of the protective field.

TL	Defense	Affects
G 11	Meson Screen	G Meson Gun
N 12	Nuclear Damper	N F Nukes F
Q 14	Mag Scrambler	E Stasis Projector. Magnetics. Anti-Matter
R 19	Proton Screen	Anti-Matter
T 16	Black Globe	All
U 20	White Globe	All
W 17	Grav Scrambler	T H Jump Damper, Jump Inducer, J-Drive, M-Drive, G-Drive

	AR		LR			DS		
6	7	8	9	10	11	12	=S	
1 ls	2 ls	8 ls	16 ls	3 lm	1 au= 8 lm	30 lm	Sensor	TL
			no	no	no	no	PA (see Note)	11 A
					no	no	CommCaster	8 C
					RINT	no	Meson Gun	13 G
Launched at start of Battle. Attack occurs in Turn = Space Range.							Missile	8 M
Launched at start of Battle. Attack occurs in Turn = Space Range.							KKM	10 N
Cannot participate in a Battle at this Range.							Rail Gun	12 R
no	no	no	no	no	no	no	Salvo Rack	10 V

Launched at start of Battle. Assumes the combatant has preplanned attacks. Resolved in Turn number equal to S.

RINT. Resolved In Next Turn. |||||| no |||||| = Attack Not Possible.

Particle Accelerators: Use S= for Space Targets; use R= for targets in Atmosphere.

ally planetoid belts or small moons) where they fabricate the bodies of their Missiles on-site (hardly more than slabs or billets of nickel-iron) and add guidance systems.

S SANDCASTER

Sandcasters project clouds of sand (small crystalline particles) which obstruct incoming beam weapons.

Sandcaster is not technically a weapon; it is a defense..

T JUMP DAMPER

A Jump Damper inflates the Diameter effect of a ship; ships within this enlarged field are prevented from initiating jump.

Although the system is mounted in a Barbette, its effect is spherical centered on the ship.

U TRACTOR/PRESSOR

Tractors and Pressors (they are reversed polarity versions of the same thing) 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

A salvo Rack launches groups (salvos) of Size-3 missiles at a target.

W DISRUPTOR

The Disruptor suppresses the charge on the electron. Chemical bonds break; compounds disintegrate. With the electron charge suppressed, atomic nuclei exhibit a positive charge and repel their neighbors, creating 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. Once out of the Disruptor beam's influence, the electrons' negative charge reasserts itself, creating a fine dust.

Disruptors boil off armor in layers.

X HYBRID K-S-M

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 L-S-M

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.

IDENTIFYING MISSILES

Stage	Missile	-Size	Type	Guidance
Missile-5X HW				
Missile-5 Explosive Warhead Hard-Wired Guidance				

A Missile is identified separately from the launching Mount, it takes its TL and Mod from its Launching Mount and its C+S from its Guidance System.

Missiles include: projectiles, bombs, deadfall ordnance.

MISSILE TYPES

Missiles are produced in Types SDXENKYZ.

S Slug. Solid metal projectile.

D Deadfall. Solid projectile crafted to survive passage through atmosphere to target.

X Explosive. High explosive charge. Explodes on impact or when very near the target.

E EMP. ElectroMagnetic Pulse to disable electronics.

N Nuke. A nuclear weapon or device.

K Kinetic. Inflicts damage through high velocity impact.

Y Decoy. Appears as SDXENZ (but not KY).

Z Sensor Package. Single-use sensor package.

SPACE WEAPON TYPES- MISSILE

		Size	Types	Guidance
B	MachineGun	1	S	UG
B	Slug Launcher	2	SX	UG
V	Salvo Rack	3	XE	HW OG
Q	Ortillery	4 5 6	D	UG HW
M	Missile	5	XENYZ	OG HW SA DL
N	KK Missile	6	K	OG HW SA DL
R	Rail Gun	6	X	UG HW

MISSILE SIZES

Missiles are produced in Sizes 1-2-3-4-5-6-7.

MISSILE GUIDANCE

Missiles guidance systems may be:

UG. UnGuided. No guidance system.

HW. Hardwired (=5). Circuits direct missile to target.

OG. Operator Guided (=C+S). Gunner directs missile to the target (must be launched from S=2 or less).

SA. Self-Aware (=C+S). Missile is controlled by an on-board self-aware Brain.

DL. Down Loaded (C+S). Missile is controlled by the downloaded personality of the Gunner.

MISSILE TYPES AND EFFECTS

Effects (in D)

Sz	Missile	Type	S Slug	D Deadfall	X Explosive	E EMP	N Nuke	K Kinetic
1	Missile-1	Bullet	S	Pen= 0				
2	Missile-2	Slug	SX	Pen= 1	Pen= 2			
3	Missile-3	Vsmall Missile	SXE	Pen= 2	Pen= 3	EMP= 3		
4	Missile-4	Small Missile	DXE		Pen= 4	EMP= 4		
5	Missile-5	Missile	DXEN		Pen= 5	EMP= 5	ME	
6	Missile-6	Small Craft	XK		ME			Pen= 6xSp^2
7	Missile-7	Ship	K		ME			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.

Massive Explosion - Missile Warhead

R=	Proximity	Sz-1D Blast	BFE*	Rad	Burn
0	Direct Hit	5	Vaporized= 100D		
1	Hit	6	90 D	20 D	30 D
2	Hit	7	40 D	15 D	20 D
3	Vnear Miss	8	30 D	10 D	10 D
4	Near Miss	9	10 D	5 D	5 D
5	Far Miss	10	5 D	1D	1D
6	Miss	11			

* BFE= Bang, Flash, EMP (EMP only with Nukes).

Massive Explosion Adjustments

Missiles-4-5-6-7 can inflict Massive Explosion.

Missile-5 is the Benchmark for effects.

Missile-4 inflicts one-tenth damage,

Missile-6 inflicts double damage.

Missile-7 inflicts triple damage

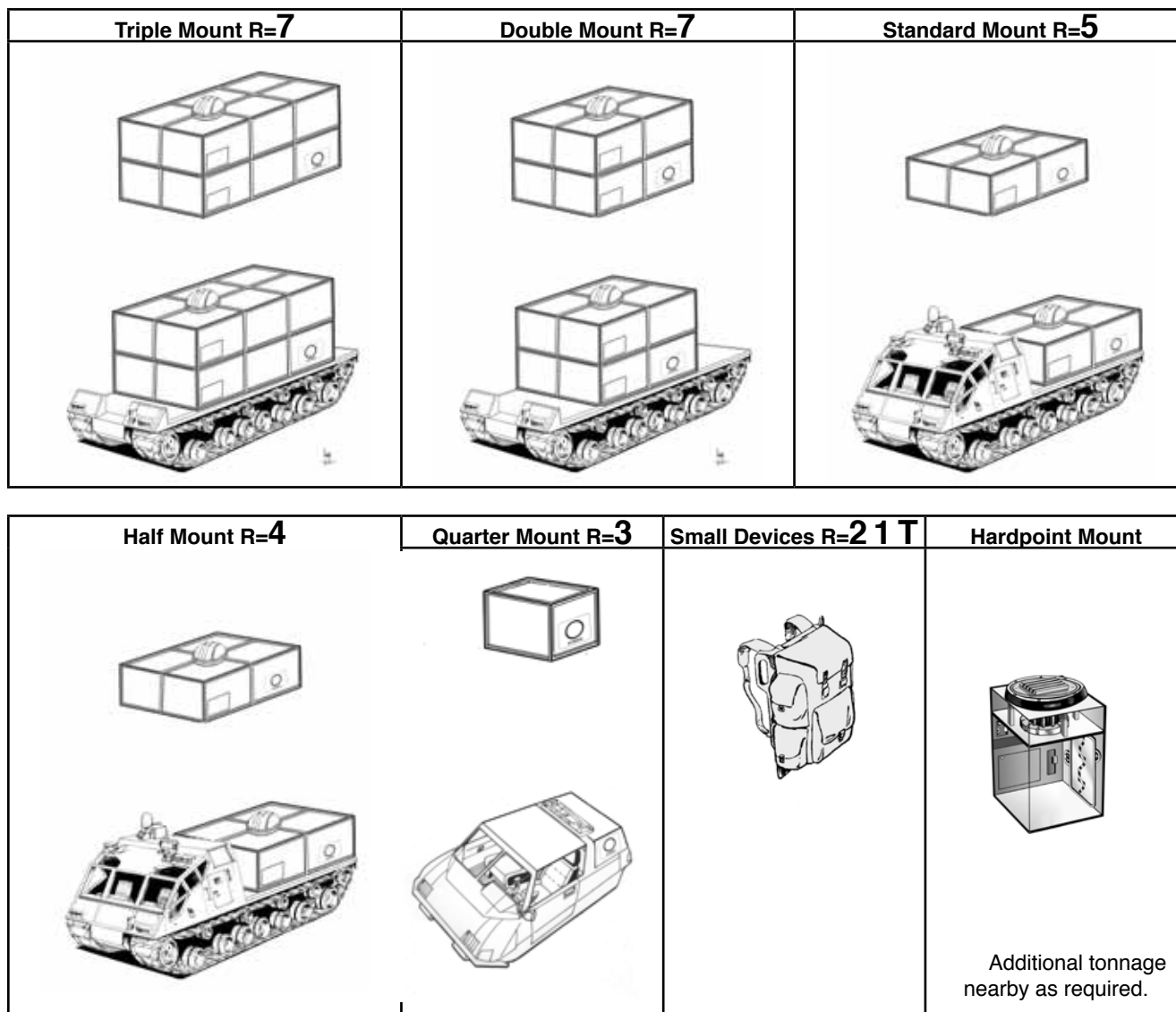
Bang=0 if in space.

Non-Nuke ignore EMP and Rad.

Explosive (not Nuke) inflicts one-tenth damage.

AM Anti-Matter inflicts additional triple damage.

SCREEN GENERATOR MOUNTS



Globe 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.

SCREEN RANGE EFFECTS R=

R=	Range	TL	Cost	Tons	Std Tons	Typical
T	T Talking	+6	x5	/100	0.01	*
1	Vs Vshort 5 meters	+5	x4	/20	0.05	*
2	S Short 50 meters	+2	x2	/10	0.1	*
3	M Medium 150 m	-1	/2	/4	0.3	Quarter-Mount
4	L Long 500 m	-	/2	/2	0.5	Half-Mount
5	VI Vlong 1000 m				1	Standard-Mount
6	D Distant 5 km	+1	x2		2	Double-Mount
7	Vd Vdistant 50 km	+2	x3	x2	3	Triple-Mount

Applies to Turrets and Barbettes. * Used without 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, Tractors and Pressors, and Disintegrators.

The Globe Series projects an impenetrable barrier to matter with an associated absorption of energy. The Globe Series creates the Black Globe (and its variants), Silver Globes, Disruptors, and Stasis Fields.

The Scrambler Series disrupts the expression of fundamental magnetic, gravitic, and electronic forces. The Scrambler Series produces the Mag, Grav, and Electronic Scramblers and their associated counter weapons.

STANDARD MOUNTS

The various force field devices are contained in Mounts: enclosures providing power, basic protection against weather and environment, and access security.

Starship Mounts are standard fittings on ships; they are produced in an array of sizes: Internal, Firmpoint, Turret, Barbette, Small Bay, and Bay.

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.

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.



THE DAMPER SERIES

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, protect against meson guns, produce disintegration effects, and even tractor/pressor effects.

Damper fields alter various particle decay processes. The term damper is a misnomer, as the process in some mechanisms enhances particle decay. There are four basic mechanisms within the Damper Series:

Nuclear Damper suppresses energetic particle interactions, preventing fission, hot fusion, and anti-matter interactions. Its primary purpose is to make the battlefield nuclear free.

Meson Screen suppresses meson decay, preventing the damage produced by meson particle weapons.

Disintegrator suppresses particle attractive bonds, turning matter into a particle dust.

Proton Screen contaminates anti-matter and forces its rapid (near instant) self-destruction.

Tractor/Pressor allows remote manipulation of matter.

NUCLEAR DAMPERS

The Damper Principle creates a volume within which particle decay is suppressed. Nuclear particle decay gov-

IDENTIFYING DAMPERS

Stage	Range	Mount	Type	-TL	(C+S)
Adv LR T1 Msl -11 (10)					
Advanced Long Range Single Turret Missile-11 (10)					

IDENTIFYING SCRAMBLERS

Stage	Missile	-Size	Type	Guidance
Missile-5X HW				
Missile-5 Explosive Warhead Hard-Wired Guidance				

IDENTIFYING GLOBES

Stage	Missile	-Size	Type	Guidance
Missile-5X HW				
Missile-5 Explosive Warhead Hard-Wired Guidance				

erns nuclear fission.

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.

Effect

A nuclear damper prevents or stops a fission reaction. Nuclear warheads cannot detonate. Nuclear reactors cease generating heat, but their considerable latent heat at the moment reactions are stopped continues for some period of time (2D hours).

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) as long as it remains within the ND field.

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.

Variants of the ND field can enhance particle decay, creating runaway fission reactions and increased radioactivity.

Nuclear Dampers affect hot fusion (including most Fusion Power Plants; they do not affect cold fusion, Fusion or Fusion Plus.

Appearance. The surface of a Nuclear Damper field is unremarkable and invisible. The interior of the Nuclear Damper field is unremarkable other than its known effects on particle decay.

Appearance

A single operating Nuclear Damper an invisible spherical field with a standard radius equal to Range R= 5 Vlong (approximately 1000 meters).

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.

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, barbettes, or larger; static locations place the device in a dedicated compartment; mobile installations are fitted into a transportable one-ton cargo container.

Dialable Settings

A nuclear damper suppresses energetic fission, fusion, and anti-matter particle interactions. The operator of a Nuclear Damper can select one of three output levels.

Standard. Energetic interactions are suppressed. Fission, fusion, and anti-matter warheads cannot detonate. Weapons based on fission, fusion, and anti-matter will not operate properly. Fusion gun output does not produce fusion reactions (the weapons are reduced to a poor level of plasma gun performance; hits inflicted are halved).

All. All interactions are suppressed. Fission, fusion, and anti-matter power sources are inoperative. Anti-matter batteries, nuclear batteries, and cold fusion modules are inoperative. Unstable nuclear isotopes do not decay; they are suspended unchanged until the nuclear damper field is removed.

Enhanced. Interactions are accelerated. The Nuclear Damper forces runaway energy production terminating in melt-downs and self-destruction.

Fission and fusion power sources experience melt-downs; fission and fusion explosives experience non-explosive self-destruction.

Anti-matter power sources and anti-matter devices explosively self-destruct.

Use of Enhanced without Directed affects all of the fission, fusion, and anti-matter mechanisms within its field. The Enhanced setting is protected by fail-safe devices (timers, switch protectors, passwords, and warnings).

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.

The standard Nuclear Damper device is Electronic. Variants may be Photonic, Fluidic, or Magnetic.

Baseline Device

The baseline Nuclear Damper is a one-ton TL-12 device with Range R=5. The governing operational Knowledge is Gunner +Screens. The governing maintenance, diagnosis, and repair skill is Electronic.

Option Photonic constructs the device using Photonic principles. The governing maintenance, diagnosis, and repair skill is Photonic.

Option Magnetic constructs the device using Photonic principles. The governing maintenance, diagnosis, and repair skill is Magnetic.

Option Directed. Two separate Nuclear Dampers can interact to 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 (incoming warheads, or opposing ship fission power plants).

Two identical Nuclear Dampers within range of each other can direct their effect to Range +2.

Two ND-12 R=5 with Option Directed and within range of each other can focus their effect on a target at R=7.

Option Kinetic 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.

Coupled with Option Directed, Option Kinetic can add Speed away from the Nuclear Damper creating a Pressor effect, or Speed toward the Nuclear Damper, 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).

Option Suppression enables the device to completely suppress the strong nuclear force (rather than merely lessen it), producing a disintegration effect. Atomic nuclei degrade into their component particles.

The disintegration effect is gradual rather than dramatic: objects within the field receive an accumulating series of hits (equal to device TL) per turn. All objects are affected without regard to intervening armor or other fields (except, the contents of a Nuclear Damper field are unaffected).

A Disintegrator-19 (a Suppression ND-19) inflicts 19 hits each per turn on all objects within the field.

Disintegrators without the Directed option are self-destructive.

Option Proton Conversion enables the device to promote conversions of anti-protons to protons. Within the affected volume, anti-protons spontaneously (the field itself adds the required energy) transmute into protons.

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.

Protections

The presence of an operating Nuclear Damper field counteracts the effects of other Nuclear Dampers. Damper fields do not overlap.

Options

Nuclear Damper options include: Remote, Field Size.

Remote allows computer-, sensor-, or operator-con-

trolled Nuclear Dampers to focus effects on a target beyond the edge of the ND field.

Remote requires two separate Nuclear Damper devices operating within range of each other. Each device operates normally. In addition, ND effects can be focussed on a target at R= Range +1. When used with the Enhanced setting, the effect is to remotely disable a variety of fission, fusion, and anti-matter devices.

Field Size. The size of the Nuclear Damper field may be increased (or decreased) using the Screen Range Effects R= table.

Protections

The presence of an operating Nuclear Damper field counteracts the effects of other Nuclear Dampers. Damper fields do not overlap.

MESON SCREENS

Meson Screens apply a variant of the damper principle which creates a volume within 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.

Appearance

When activated, the Meson Screen Generator creates a volume with a standard radius equal to Range R= Vlong (about 1000 meters).

Aside from the effect on Meson Gun attacks, the internal volume of the Screen is unremarkable. The surface of the volume is normally invisible; when under attack, portions of its surface scintillate as incoming mesons near the volume surface change phase and release energy.

Detection Of Meson Screens. Operating Meson Screens are detectable as a source of static to CommPlus.

Size and Dimensions. The standard Meson Screen device is one-half ton (two 1.5 meter cubes) and designed to be installed in a Mount 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.

Effect

The Meson Screen volume prohibits meson decay within it. Energetic mesons do not release their energy and cannot affect equipment or devices within the volume.

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.

Damage

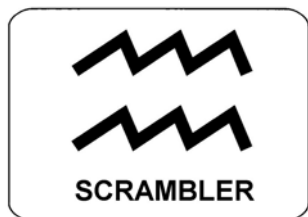
The standard MesonScreen is damaged when an attack penetrates its protective layers and inflicts at least one Hit on the device. The hit process produces damage severity and diagnosis severity.

The standard Meson Screen device is Electronic. Variants may be Photonic, Fluidic, or Magnetic.

Options

The Meson Screen has one option: Field Size.

Size Options. The Size of the Meson Screen Field may be increased (or decreased) using the Screen Range Effects R= table.



THE SCRAMBLER SERIES

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.

MAGNETIC SCRAMBLER

A Magnetic Scrambler disrupts magnetism. Devices which are 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.

Gauss weapons fail.

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 within the Mag Scrambler field.

Magnetic sensors detect wildly fluctuating magnetic values within the volume of the field.

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.

The device is destroyed by 10 starship Hits or 100 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 R=5. 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.

Option Directed allows projection of the Mag Scrambler field to a remote point. The Mag 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 Mag Scrambler R=5, only magnetic fields in Range Band R=5 from the device are affected.

Option Strong greatly increases the power of the Mag Scrambler effect and makes the Scramble effect continue after the device is powered off. Affected devices can be diagnosed and repaired.\

Magnets are demagnetized and electromagnets become unreliable until diagnosed and repaired.

Option Anti suppresses or counteracts the effects of a Mag Scrambler field. Any portion of a Scrambler field volume which is overlapped by an Anti- field is immune to the Scrambler effect.

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.

The device is destroyed by 10 starship Hits or 100 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 R=5. The governing operational Knowledge is Gunner +Screens. The governing maintenance, diagnosis, and repair skill is Gravitic.

Options

Options available for the Grav Scrambler include: Anti-Field. Directed and Strong are not available options.

Option Anti suppresses or counteracts the effects of a Grav Scrambler field. Any portion of a Scrambler field volume which is overlapped by an Anti- field is immune to the Scrambler effect.

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 normally:

simple electric devices (motors, lights, heaters) operate normally.

Appearance and Operation

An Electronic Scrambler creates a spherical field centered on the device. The field has no readily apparent characteristics.

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.

The device is destroyed by 10 starship Hits or 100 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 R=5. 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.

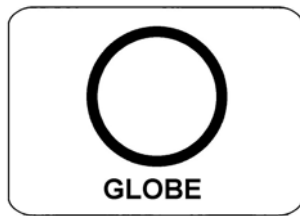
Option Directed allows projection of the Electronic Scrambler field to a remote point. The Electronic Scrambler effect is restricted to the surface of the spherical field. Rather than affecting the entire volume of the field, only the Range Band equal to the radius of the field is scrambled.

For an Electronic Mag Scrambler R=4, only electronic effects in Range Band R=4 from the device are affected.

Option Strong greatly increases the power of the Electronic Scrambler effect and makes the Scramble effect continue after the device is powered off. Affected devices can be diagnosed and repaired.\

Electronic devices are rendered inoperative until diagnosed and repaired.

Option Anti suppresses or counteracts the effects of a Electronic Scrambler field. Any portion of a Scrambler field volume which is overlapped by an Anti- field is immune to the Scrambler effect.



THE GLOBE SERIES

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.

THE 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 $R = V_{Long}$ range (about 1000 meters).

Appearance

When activated, a Black Globe Generator produces a spherical field with a standard radius equal to $R = V_{Long}$ (about 1000 meters).

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.

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 Globes.

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 within a Jump Field is unaffected.

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, Se-

lective, Flicker, Conforming Field, Cancellor, Foam, Remote Projection.

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).

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).

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.

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.

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.

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.

Canceller. A Canceller 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 Canceller 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.

Foam Option. The area affected by the Globe Generator is filled with a foam of minimal size Black Globe bubbles (which immediately absorb energy and collapse). Any matter within the volume is sliced into very small (molecular-level) pieces.

Foam Option Plus remote Projector is a disintegrator.

Foam option alone is a Bomb that disintegrates (cleanly) to about 150 meter radius.

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 noting to absorb it; the energy is distributed as heat across the entire enclosed object.

Polarity Reversal Option. 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 a Stasis Globe) rebounds in a perfect elastic collision.

Stasis. The 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.

Field Size Options. The size of the globe field may be

GLOBE DAMAGE CAPTURE

Heat Sink Thermal Limit			Capacitor Limit
TL	Max Temp	Hits	
7	400	16	
8	500	64	
9	600	144	Based On Jump Drive
10	700	350	=Hull Tons
11	800	400	times
12	900	450	Jump Drive Potential
13	1000	500	
14	2000	1000	
15	3000	1500	
16	4000	2000	
17	5000	2500	
18	6000	3000	
19	7000	3500	
20	8000	4000	
21	9000	4500	

increased (or decreased) using the Screen Range Effects R= table.

For example, a standard Globe has a radius equal to Range R= 5. A smaller Globe can be produced with a radius equal to R= 3 for half the cost and about one-third the tonnage.

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; their energy re-emission significantly enhances their detectability.

ARTIFACT BGS

The Black Globe Generator occurs in two forms: the traditional technologically-developed device, and the artifact.

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.

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 Artifacts. Every Ancient settlement is different technologically: the Droyne developed new technologies to address common problems. One city was constructed entirely of chemically treated and reinforced plant fibers; another laser-cut interlocking stone; yet another a warren of strange V-profile tunnels.

On the other hand, Ancient BG Generators are a common thread that appears in nearly all known Droyne cultures from the Ancient War period. They come in three varieties labeled Alpha, Beta, and Gamma. The Artifact BGGs

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. When connected to a power supply, the Alpha produces a standard Black Globe.

Beta is the next most common (discovered at the rate of about one in 100): two interlocking hollow cubes about Size-4.5 (about one cubic meter; 100 kilograms) composed of laminated carbon embedded with the familiar titanium and tungsten wires and pierced by many overlapping holes. Connected to a Power Supply, the Beta produces a Range R=6 radius Black Globe.

Gamma is the rarest of the artifact BGGs (fewer than one in a thousand devices is the Gamma): a smooth flat Size-3.5 disk massing about 1 kilogram. The Gamma is a solid slab of laminated carbon infiltrated with very small scale networks of wires and circuits. Connected to a Power Supply, the Gamma produces a Range R=4 radius Black Globe.

Reproducible Technology. Incredibly, the A and B 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 = XXXXX.

The Alpha is reproducible at TL-15. The Beta is reproducible at TL-17. The Gamma is reproducible at TL-22. mechanism which prohibits the entry of matter and degrades incoming energy.



Starship Combat

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 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.

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 the enemy to a place of safety.

SCALE

Space Combat is based on variable distance 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.

For example, Space Range Band 2 (S=2) represents a distance of approximately 50 kilometers.

Time Scale

Combat is in Rounds approximately 20 minutes long.

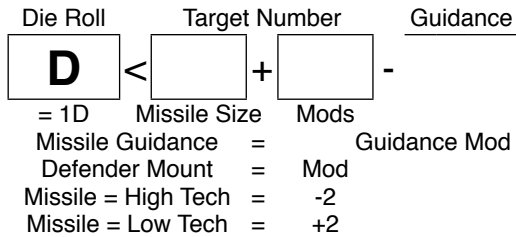
TYPES OF SHIPS

The Traveller Space Combat System resolves conflict between Adventure Class Ships: starships created using the ACS Design System.

Adventure Class Ships 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 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 AM ANTI-MISSILE MODE ACTION



High Tech if Attacker TL+2 over Defender.
 Low Tech if Attacker TL -2 under Defender.

The Search

Ship sensors are constantly searching for worlds, local object, and other ships. The motivation is safety in two distinct meanings of the word:

First, a solid data base of local objects allows astroga-tion choices.

Second, sensors provide information about threats to the ship: be they natural or artificial. Starship combat concerns itself with this second concern.

The Battle

The Space Battle consists of Combat Rounds, divided into five steps, each structured to make the process ma-neagable.

S SENSORS

The first step in the Combat Round is Sensors.

Sensor Operations. Sensors are operated and new con-tacts are noted as they are identified.

Jump. A ship may Jump in the Sensor step, leaving the battle and, for the purposes of the current battle, no longer of interest. Ships arriving in the system by Jump do so in this step.

Boarding. If Boarding is intended by a participant, and circumstances permit, Boarding takes place in this step

M MISSILES

The second step in the Combat Round is Missiles.

Missile Launch. Participants designate targets and launch Missiles. Some missiles may be at close enough range to resolve in this same Combat Round; others may have targets farther away. Note for each missile launch the target and the planned Combat Round of arrival.

Missile attacks from S=6 or greater must be specified before the Battle begins; the Missile attack arrives in Round = Launch Range.

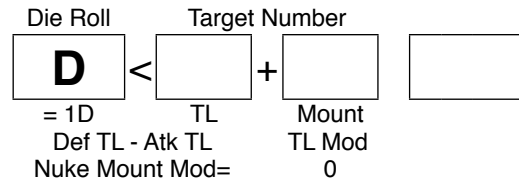
A Missile attack (except KKM) may be launched with an impact delay (specified by the Attacker) of 1 to 6 Rounds.

Missiles can be launched to Lurk in a Range Band, and they attack when a Target moves to S=2 or less.

Those missiles scheduled to arrive to their tragets are resolved, which includes those which were launched this turn and are scheduled to impact immediately.

Anti-Missile Fire. Before a missile can impact a target, each may be subject to anti-missile fire by the target.

THE ANTI-BEAM AND ABSOLUTE MODE ACTIONS



The target may allocate any Anti-Missile capable weap-on to Anti-Missile Fire. The AM Mode Action pits the abili-ties of the Missile minus the Mods of the firing the defense against 1D.

An AM defense may fire against any (and every) incom-ing missile in this Combat Round, but it cannot engage in other combat during the current round.

Those missiles defeated by AM fire are destroyed; they are eliminated from consideration.

Missiles which survive AM fire are resolved for target damage in Step T.

For example, a Missile-4 with Hardwired Guidance (=5) attacks a ship with a single Turret T1 equipped with Beam Laser available for AM Mode defense. Both ships have equal TL. The Target Number is Missile Size= 4 + Defen-der Mount= -3 minus Guidance=5 = 4 - 2 - 5 = -3. The single turret is ineffective; it cannot roll equal or less than -4 on 1D.

A similar attack against a Dual Barbette B2 with Mod +3 produces an AM Target Number = 4 +3 - 5 = 2. The Missile is stopped on a roll of 2 or less.

A ATTACKS

The third step in the Combat Round is Attacks.

All non-missile weapons which are within range may at-tack targets.

Anti-Beam Fire. Before a beam weapon can attack a target, each may be subject to anti-beam fire by the target.

The target may allocate any Anti-Beam capable weapon to Anti-Beam Fire. The AB Mode Action pits the abili-ties of the Missile minus the Mods of the firing the defense against 1D.

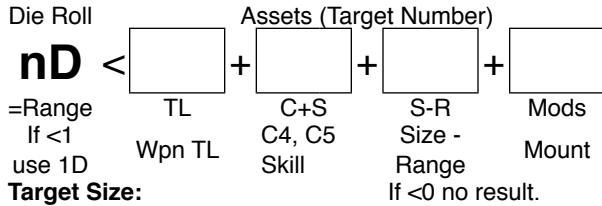
An AB defense may fire against any (and every) incom-ing beam in this Combat Round, but it cannot engage in other combat during the current round.

Absolute Mode Fire. Some defenses are crafted to counter specific weapons (for example, the Meson Screen specifically counters the MesonGun). Before specific weap-on can attack a target, each may be subject to absolute mode fire by the target.

The target may allocate any Absolute Mode defense tp Absolute Mode Fire.

Absolute Mode Against Missiles. Incoming missiles armed with any effect which can be countered by Absolute

THE SPACE WEAPON TASK



1-2-3-4-5 Missile (varies)	6 Small Craft 10-100 tons	7 ACS Ship <2400 tons	8 BCS Ship 2500+ tons
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Mode (for example, nukes or anti-matter) are subject to any available Absolute Mode Defense before inflicting damage.

For example, an attacking single Turret T1 equipped with Beam Laser TL-10 attacks a ship with a triple turret T3 fitted with Sandcasters TL-9. The Target Number is Defense TL-9 minus Attack TL-10 = -1 plus Defense Mount= 0 = -1 + 0 = -1. The AB Mode is ineffective.

A similar Attack against Bay with Mod +5 produces an AB Target Number = -1 + 5 = +4. The attack is stopped on a roll of 4 or less.

For example, a Meson Screen TL-11 in a Bolt-In Mount Mod=0 can fire in Absolute Mode against a Meson Gun installed as a Main Weapon. The Target Number is Defense TL-11 minus Attack TL-13 = -2 plus Defense Mount= 0. The Meson Screen is ineffective because it cannot roll -2 or less.

A similar attack against a Large Bay mounted Meson-Screen Mod=8 produces a Target Number -2+ 6 = 6 and complete defense against the Meson Gun.

All AB Mode and Absolute Mode defenses may defend against all incoming threats. For example, a ship equipped with five Sandcaster defenses can fire all five (five separate defenses) against the incoming beam weapons.

Beams and other weapons which survive defenses conduct their attacks using the Space Weapon Task.

Each Space Weapon attack is based on a Target Number consisting of Attacking Weapon TL plus Operator C+S plus Target Size minus Range plus any applicable Mods.

Target Size is a rough measure in space combat; most ships are Size-7; most small craft are Size-6.

Size Minus Range. S-R uses Space Range S= or World Range S=- depending on the weapon involved.

Mods. The primary Mod used on the Space Weapon-Task is the Mount Mod for the attacking weapon.

Missiles skip the Space Weapon task.

For example, an attacking single Turret T1 equipped with Beam Laser TL-10 attacks. It has already successfully passed AB Mode defenses.

The attacker is a TL-10 ship at Range R=7. The defending ship is Size=7. The gunner is a typical C+S=7 and his gunnery Console is TL-10. The T1 Turret has Mount Mod= -2.

WEAPON MOUNTS

Mount	Type	Tons	Mod	Hits (D)	Skill	M Cr
T1	Single Turret	1	-3	1	Turret	0.2
T2	Dual Turret	1	-2	2	Turret	0.5
T3	Triple Turret	1	-1	3	Turret	1.0
T4	Quad Turret	1	0	4	Turret	1.5
B1	Barbette	3	+1	5	Turret	3.0
B2	Dual Barbette	5	+2	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

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
F FeN	-	-	P	U	-	-	--	20 =20
O Organic	C	B	P	U	S	A	12	6 =TL/2
C Charged	C	B	-	U	S	-	14	28 =TLx2

C ANTI- LAYERS

Type	- - - - - Effect - - - - -		Multiplier=
B Anti-Blast	vs Blast	Bullet Frag	x 10
K Anti-Kinetic	vs Pen		x 10
E Anti-EMP	vs EMP		x 10
R Anti-Rad	vs Rad		x 10
	vs Heat	not Organic, Polymer	x100
	vs Pressure	not Organic	x 10

D COATINGS

Type	- - - - - Effect - - - - -		Multiplier=
S Reflec	vs Burn		x100
T Ablat	vs Heat		x100
U Slick	vs Tractor		x100

The Target Number for the attack is 10 (weapon TL) + 10 (using the Console TL rather than the Gunner's C+S) + 0 (Size-7 minus Range-7) -2 (Mount Mod) = 18. Rolling 18 or less on 7D produces about a 9% chance of a hit.

An exceptional Gunner (C+S= 12) can increase the Target Number from 18 to 20 (about 19%).

Moving inward one Range Band to R=6 increases the Target Number to 19 AND reduces the dice required to 6D (making total probability= about 36%).

Moving outward to R=8 changes S-R to -1 and makes the attack not possible.

When all defenses and attacks have taken place, the

R RANGE CHANGE

The fourth step in the Combat Round is Range Change. Range Band Change. Ships can move between Range Bands and between Range Groups.

Ships in Range Bands B-1-2-3-4-5 can move to an adjacent Range Band in this Step.

Range Group Change. Ships may commit to major Range changes by changing Range Groups.

A ship at SR Short Range S=5 or less can move to AR Attack Range S=6 in 10 - G Combat Rounds. At the end of the period, the Ship may select either S=6 or S=7. Meanwhile, it is at S=5.

A ship at AR Attack Range S=6 or S=7 can move to SR Short Range S=5 in 10 - G Combat Rounds. At the end of the period, the Ship may select S=5. Meanwhile, it is at S=6.

A ship at AR Attack Range S=6 or S=7 can move to LR Long Range S=8 or S=9 in 20 - G Combat Rounds. At the end of the period, the Ship may select either S=8 or S=9. Meanwhile, it is at S=7.

A ship at LR Long Range S=8 or S=9 can move to AR Attack Range S=6 or S=7 in 20 - G Combat Rounds. At the end of the period, the Ship may select either S=6 or S=7. Meanwhile, it is at S=8.

Ramming. After all ships have made any Range Band or Range Group changes, any ship at Range=Boarding can Ram.

Boarding. After all ships have made any Ramming decisions, any ship at Range= Boarding can declare a Boarding Action.

Launch and Dock. Any ships which are docked may Launch. Any ships which are at Range= Boarding can Dock. This sequence prevents a craft from Launching and Docking in the same Combat Round.

T TARGETS

The final step in the Combat Round is Target.

All weapons which have survived anti-weapon fire are resolved for their effects on the target.

Each weapon is considered individually, and resolved in five steps:

1. Attack. Designate a Point of Aim for the attacking weapon. Point of Aim is any Compartment on the ShipSheet identified by a Flux Hit Number and identifiable by the attacking weapon. These include:

Hot Spot: Any Maneuver Drive and any Power Source.

Center of Ship. Hit Location 0.

Firing Weapon. Any Hardpoint whose weapon has fired in this Combat Round.

Operating Sensor. Any installation containing an active Sensor.

Roll Flux and add to the Point of Aim. If the resulting Point Of Aim has no compartment on the ShipSheet, the attack misses. If there is a Compartment present, that Attack is applied to that location's Armor.

2. Hits inflicted by an Attack are determined by the

Weapon Mount (a Single Turret inflicts 1D Hits; a Main-Weapon inflicts 100D Hits). Roll the required dice for the total number of hits.

Hits must Penetrate Armor before they can inflict Damage. Compare the Armor Types and values for the Compartment and destroy (mark off) Armor in layers until Hits are exhausted.

If Hits remain after all armor for the compartment has been destroyed, inflict them on the Compartment.

Compartment Hits. Within the affected Compartment, roll 1D for the specific location. Divide remaining Hits by 2 and consult the Damage Severity Table: the result is the Severity of the Damage. If Severity is greater than 8, the Compartment line is destroyed. Note the remaining unused Hits: apply half to the Lines on each side of the affected Line. If those hits are greater than 8 they are also destroyed. Continued within the Compartment until Hits are exhausted or until available Lines are exhausted.

If Hits inflicted on a Line are less than 9, note the Severity of the Damage.

3. Immediate Action. Damage Control can reduce the damage (other than Destroyed) to a Compartment and a Line within a Compartment.

Select an appropriate skill for a crew member in the Compartment; include any contained Knowledges if available). For example, Mechanical, Gravitics, or Drives. If no specific Character is available, assume a default value of Skill=4.

Check the selected Skill (2D). If successful, Damage Severity is reduced to 1D Easy. and the Line remains operable.

4. Mark Damage to the affected locations.

5. After The Battle. Once the battle ends, determine the Diagnosis Severity of each damaged area.

SPECIAL WEAPONS EFFECTS

There are many exceptions and special situations in Combat. Many are covered in How Weapons Work.

CommCasters and Battery Fire

Weapons of the same type (different other values are allowed) can fire together as a Battery.

One Weapon is the Lead Weapon; if it hits, the other weapons hit. Total Hits is determined by the sum of the Mounts.

Multi-Ship Battery Fire. Several ships in the same Range band can create a Multi-Ship Battery. One ship must have a Comcaster and it has the Lead Weapon. Any other ships in the same Range Band may slave their weapons of the same type to the CommCaster.

Slave Craft. Uncrewed Small Craft can be slaved to a Ship with a CommCaster.

DataCasters

DataCasters inflict special damage:

Overload. A successful attack against Hit Location with Sensor inflicts damage specifically on the Sensor.

Virus Insertion. A successful attack against Hit Location with Comm introduces a virus into the system. The Comm console consults the Damage Severity Table with 1D; apply Immediate Action.

Disruptors

Disruptors boil away armor. Disruptor Hits are applied directly to Armor regardless of type.

COLLISIONS AND RAMMING

Ships may impact each other.

Collisions

Collisions occur in pairs, although multiple collisions are possible.

Accidental collisions may occur when two ships are Boarding Range. Check Pilot for each ship; failure portends a Collision. Both pilots must succeed to avoid a collision.

However, deliberate Docking requires only that the Docking pilot avoid a Collision based on Check Pilot + Dexterity.

A Collision inflicts Damage equal to:

$$D = \text{Tons} * \text{Speed}^2$$

Tons= Volume Tons of the other ship.

Speed= the speed of the other ship.

Roll Flux for the speed of each ship. If the total of the two Fluxes is negative; the Collision is a near miss but there is no impact.

Impact. Roll Flux for the location at which each ship impacts the other. Impose Damage to the Impact Location.

If unused Damage remains, impose it on an adjacent Compartment (not Line).

Ramming is a deliberate Collision. The pilot of the Ramming ship selects the Impact Point of each ship.

e .

For Successful Attacks:

If Hit Location is Defenses and a Defense was used against the attack, that Defense is the Hit Sublocation.

If Hit Location is Hull, Armor is reduced one layer.

If Final Damage is 9 or Greater (Destroyed), attack again with Half Hits at a newly rolled Hit Location.

Black and White Globes

An attack against a Black Globe (it operates in Absolute Mode) which fails imposes no effects. An attack which succeeds inflicts hits against the Black Globe.

The same applies to White Globes. However, successful DataCaster attacks proceed to inflict Virus and Applets.

Comments

A Weapon cannot be built with a Range beyond its Max-

imum on the Weapon Attacks Chart.

If a Jump Inducer destroys a Hit Location (or sublocation) then the adjacent Locations are also destroyed.

A Jump Inducer requires a Jump Drive in the ship.

A Jump Damper requires a Jump Drive in the ship.

A Destroyed Hull (Damage Severity = 9D +) destroys the ship.

Treat each Weapon in the Hybrid T3 as a T1.

A Massive Explosion (in addition to other effects) destroys one layer of Armor.

Beam Weapons shed 1D of Damage for each Range Band in Atmosphere.

Boarding. A craft with people can attempt to Board if at S=B (after Docking, Collision, or Ramming).

THE SPACE COMBAT ROUND

COMBAT OVERVIEW

Combat is resolved in **Rounds**. A Round is one complete set of five SMART phases or steps. This sequence repeats with each new Combat Round.

Space Combat Round = about 20 Minutes

At the end of combat, count the number of Rounds and equate them generally to twenty-minute segments: (a ten Round fight probably took about 200 minutes or a little over three hours). Some Combat Rounds seemed like seconds; some seemed like hours. Some pass uneventfully; 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 (a ten Round fight probably took about ten minutes).

SMART

Situation - Missiles - Attack - Range - Targets

THE FIVE COMBAT ROUND PHASES

1	S	SENSORS	Note current Situation: detect and track targets; not available weapons..	Sensor Operations. New Contacts. Ship May Jump (Depart or Arrive). Boarding Operations.
2	M	MISSILES	Launch Missiles.	New Missiles Launched. Resolve Scheduled Missiles. AM Mode Defenses Fire. Missiles Will Impact Armor in Phase T.
3	A	ATTACK	Fire non-Missile weapons.	Resolve Weapons Attacks. AB Mode Defenses. Absolute Mode Defenses. Attacks Will Impact Armor in Phase T.
4	R	RANGE CHANGE	Ships may change Range.	Ships Move Between Range Groups and Range Bands Ramming. Boarding Craft Contact Hull. Ships, Small Craft, Pods Launch and Dock.
5	T	TARGET EFFECTS	Determine Damage for any successful attacks. .	Determine Aimed and Actual Hit Location. Inflict Damage. Immediate Action Damage Control. Damage Resolution.

AM Mode. Anti-Missile Mode weapons (several types) defending against Missiles.

AB Mode. Anti-Beam Mode weapons (typically Sandcasters) defending against Beams.

Absolute Mode. Specific Defenses defending against very specific attacks (Meson Screen versus Meson Gun).

Which Side Goes First?

SMART governs the actions of each participant in combat. Each of the Phases is simultaneous for all Participants, and is completed by everyone involved before play can proceed to the next Phase. It helps for the Referee (or someone in charge) to call out "End Of <Phase Name> Phase!" when every one is done.

Controlling Who Goes When. Within each Phase, everyone participates (targets, attacks, moves) more-or-less at the same time. Nevertheless, it helps for participants to play in some sequence. Someone must volunteer to go first; if no one volunteers, the Referee says, "Everyone hesitates. Next Phase."

Sensors S

1	S	SENSORS	Note current Situation: detect and track targets; not available weapons..	Sensor Operations. New Contacts. Ship May Jump (Depart or Arrive). Boarding Operations.
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Sensor SOP

Standard Operating Procedure SOP defines how a ship uses its Sensors. Sensors may detect enemy (or potentially enemy) ships. When one is detected, Alert Status changes and the Battle begins.

In practice, Step S repeats until targets are actually sensed.

THE STATUS BOARD

No	Color	Name	Status	Sensors
0	White	Off	Inoperable	Off
1	Grey	Preparing	In 12 Hours	Off
2	Blue	Ready	Operable	Passive
3	Green	Operating	In Flight	Active
4	Orange	Warning	Attack Possible	Passive
5	Yellow	Alert	Attack Probable	Passive
6	Red	Battle	Attack in Progress	Active
7	Maroon	Stalking	Attack Possible	Passive

Mark the specific Sensor values for routine use in the grids below (or copies) for reference.

	SPACE SENSORS								
	Assets			2	5	7	9	12	
	TL	C+S	M	FR	SR	AR	LR	DS	
C Communicator									
E EMS									
G Grav Sensor									
H Holovisor									
J Jammer									
N N-Detector									
Q Stealth Mask									
R Radar									
S Scanner									
T Scope									
U									
V Visor									
W CommPlus									
X									
Z									

THE SENSOR TASK

Die Roll

$$nD < \boxed{} + \boxed{} + \boxed{} + \boxed{}$$

=Range TL C+S S-R Mods
 If <1 Sensor C4, C5 Size -
 use 1D TL Skill Range
 If TL < Range, +1D. If <0 no result.
 Uncertain (1D)

Difficulty is based on Range to the Target. Use S= for Space objects and R= for World surface objects.

USING SENSORS

Alert. When there is something of possible interest, the Referee conveys to the players an Alert:

"Your [sensor] sees something about here [location]."

Detection. The Sensor Task resolves (or doesn't resolve) the Alert. Success provides data about the alert.

Tracking. Once a sensor detects an object, it can track it until some event causes the signal to be lost (moves out of range; hidden by a world; deliberately jams its signal).

Active Sensors Maximum Range = S=7.

The Sensor Task Is Uncertain.

The First Die is Uncertain; the Referee rolls it and keeps that information secret. The Referee then rolls and reveals the second (third, fourth, out to ultimate range) dice.

	WORLD SENSORS								
	Assets			2	5	7	9	12	
	TL	C+S	M	FR	SR	AR	LR	DS	
A Activity Sensor									
B Deep Radar									
C Communicator									
D Densitometer									
F Field Sensor									
K Analyzer									
L Life Detector									
M Mass Sensor									
P Proximeter									
X									
Y Sound Sensor									
Z									

M Missiles

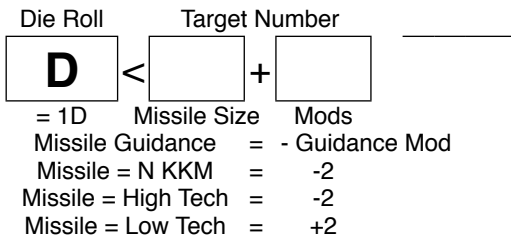
2	M	MISSILES	Launch Missiles.	New Missiles Launched. Resolve Scheduled Missiles. AM Mode Defenses Fire. Missiles Will Impact Armor In Phase T.
---	----------	-----------------	------------------	--

New Missiles Launched. Attacker schedules arrival.
Resolve Scheduled Missiles including newly launched and impacting immediately.

AM Mode Defenses Fire. Any defending weapons capable of AM Mode may fire; if they do, they cannot attack further in the Combat Round. Successful AM Mode fire eliminates the Missile before it can impact.

Unstopped Missiles Impact Armor in Phase T. and inflict Those missiles which successfully pass through AM Mode will impact Armor in Phase T.

THE AM ANTI-MISSILE MODE ACTION



High Tech if Attacker TL+2 over Defender.
Low Tech if Attacker TL -2 under Defender.

AM MODE WEAPONS			
A	Particle Accelerator	L	Pulse Laser
B	Slug Thrower	P	Plasma Gun
F	Fusion Gun	U	Tractor/Pressor
G	Meson Gun	V	Salvo Rack
J	Mining Laser	W	Disruptor
K	Beam Laser	X	AM Missile
M	Missile	Y	Hybrid L-S-M

SPACE WEAPON TYPES- MISSILE

		Size	Types	Guidance
B	MachineGun	1	S	UG
B	Slug Launcher	2	SX	UG
V	Salvo Rack	3	XE	HW OG
Q	Ortillery	4 5 6	D	UG HW
M	Missile	5	XENYZ	OG HW SA DL
N	KK Missile	6	K	OG HW SA DL
R	Rail Gun	6	X	UG HW

MISSILE TYPES

Missiles are produced in types=SDXENKYZ.

S Slug. Solid metal projectile.

D Deadfall. Solid projectile gravity dropped at worlds..

X Explosive. High explosive charge. Explodes on impact or when very near the target.

E EMP. ElectroMagnetic Pulse to disable electronics.

N Nuke. A nuclear weapon or device.

K Kinetic. Inflicts damage through high velocity impact.

Y Decoy. Appears as SDXENZ (but not KY).

Z Sensor Package. Single-use sensor package.

MISSILE GUIDANCE

Missiles guidance systems may be:

UG. UnGuided. No guidance system.

HW. Hardwired (=5). Circuits direct missile to target.

OG. Operator Guided (Mod=C+S). Gunner directs missile to the target (must be launched from S=2 or less).

SA. Self-Aware (Mod=C+S). Missile is controlled by an on-board self-aware Brain.

DL. Down Loaded (Mod=C+S). Missile is controlled by the downloaded personality of the Gunner.

MISSILE FIRE	R=	5	6	7	8	9	10	11	12	13	13	14	16	17		
	TL	S=	B	1	2	3	4	5	6	7	8	9	10	11	12	=S
B	8	Slug Thrower	[- - - AM Mode - - -]				RINT	RINT	RINT	NO	NO	NO	NO	NO	NO	B
M	8	Missile	[- - - AM Mode - - -]				RINT	RINT	RINT	Attack in Turn = Space Range.						M
N	10	KKM	NO	NO	NO	RINT	RINT	RINT	Attack in Turn = Space Range.						N	
R	12	Rail Gun	NO	NO	NO	RINT	RINT	RINT	Attack in Turn = Space Range.						R	
V	10	Salvo Rack	[- - - AM Mode - - -]				RINT	RINT	RINT	Cannot Attack at this Range.						V
Q	12	Ortillery	NO			RINT	RINT	RINT	Attack in Turn = Space Range.						Q	
X	20	AM Missile	[- - - AM Mode - - -]				RINT	RINT	RINT	Attack in Turn = Space Range.						X
Y	9	Hybrid L-S-M	[- - AM AB Mode -]				RINT	RINT	RINT	Attack in Turn = Space Range.						Y

RINT= Resolve In Next Turn.

Attack A

3	A	ATTACK	Fire non-Missile weapons.	Resolve Weapons Attacks. AB Mode Defenses. Absolute Mode Defenses. Attacks Will Impact Armor In Phase T.
---	----------	---------------	---------------------------	--

Available Weapons Fire as targeted by Attacker.

AB Mode Defenses Fire as directed by Attacker (if they have not yet fired); if they do, they cannot attack further in the Combat Round. Successful AB fire stops the attack.

Absolute Mode Defenses Fire. Any defender weapons capable of Absolute Mode may fire (if they have not yet); if they do fire now, they cannot attack further in the Combat Round. Successful Absolute Mode fire stops the attack.

Unstopped Beam Impact Armor in Phase T. and inflict Those attacks which successfully pass through AB and Absolute Mode will impact Armor in Phase T.

THE SPACE WEAPON TASK

Die Roll $nD < \boxed{} + \boxed{} + \boxed{} + \boxed{}$ Assets (Target Number)

=Range TL C+S S-R Mods
If <1 Wpn TL C4, C5 Skill Size - Range
use 1D If <0 no result.

THE ANTI-BEAM MODE ACTION

Die Roll $D < \boxed{} - \boxed{}$ Target Number

= 1D TL Mount

Def TL - Atk TL = TL Mod

ABSOLUTE MODE WPNS				
G	Meson Screen	vs	G	Meson Gun
N	Nuclear Damper	vs		Nukes
Q	Mag Damper	vs	E	Stasis
R	Proton Screen	vs		Anti-Matter
T	Black Globe	vs		All
U	White Globe	vs		All (except D)
W	Grav Scrambler	vs	T U	
AB MODE WEAPONS				
S	Sandcaster	vs	A F J K L P	
Y	Hybrid L-S-M	vs	A F J K L P	

SPACE WEAPONS		5	6	7	8	9	10	11	12	13	13	14	16	17		
	TL	S=	B	1	2	3	4	5	6	7	8	9	10	11	12	=S
A	11	PA (see Note)	attack	attack	attack	attack	attack	attack	attack	attack	attack	NO	NO	NO	NO	A
C	8	CommCaster	attack	attack	attack	attack	attack	attack	attack	attack	attack	attack	attack	NO	NO	C
D	10	DataCaster	[- - - AM Mode - - -]			attack	attack	attack	NO	NO	NO	NO	NO	NO	NO	D
E	19	Stasis	[- - - AM Mode - - -]			attack	attack	attack	NO	NO	NO	NO	NO	NO	NO	E
F	10	Fusion Gun	[- - - AM Mode - - -]			attack	attack	attack	NO	NO	NO	NO	NO	NO	NO	F
G	13	Meson Gun	NO	NO	NO	NO	NO	NO	attack	attack	attack	attack	attack	RINT	NO	G
H	18	Jump Inducer	attack	attack	attack	attack	attack	attack	NO	NO	NO	NO	NO	NO	NO	H
J	8	Mining Laser	[- - - AM Mode - - -]			attack	attack	attack	NO	NO	NO	NO	NO	NO	NO	J
K	9	Pulse Laser	[- - - AM Mode - - -]			attack	attack	attack	NO	NO	NO	NO	NO	NO	NO	K
L	10	Beam Laser	[- - - AM Mode - - -]			attack	attack	attack	NO	NO	NO	NO	NO	NO	NO	L
P	10	Plasma Gun	[- - - AM Mode - - -]			attack	attack	attack	NO	NO	NO	NO	NO	NO	NO	P
S	9	SandCaster	[- - - AB Mode - - -]			attack	attack	attack	NO	NO	NO	NO	NO	NO	NO	S
T	14	Jump Damper	Creates 100 D Field						NO	NO	NO	NO	NO	NO	NO	T
U	15	Tractr/Pressr	attack	attack	attack	attack	attack	attack	NO	NO	NO	NO	NO	NO	NO	U
W	16	Disruptor	[- - - AM Mode - - -]			attack	attack	attack	NO	NO	NO	NO	NO	NO	NO	W
Y	9	Hybrid L-S-M	[- - AM AB Mode -]			attack	attack	attack	NO	NO	NO	NO	NO	NO	NO	Y

R Range Change

4	R	RANGE CHANGE	Ships may change Range.	Ships Move Between Range Groups and Range Bands Ramming. Boarding Craft Contact Hull. Ships, Small Craft, Pods Launch and Dock.
---	----------	---------------------	-------------------------	---

Ships can change Range Bands in the course of combat. Minor changes for advantage take place at the end of the Combat Round. Major changes are more difficult. Ships can change from one Band to an adjacent Range Band during the Movement Phase of a Combat Round, subject to limitations.

Ranges and Bands

Space Ranges are divided into Groups (B FR SR AR LR DS) and into Bands (S= 0 through 13).

Bands B-1-2-3-4-5

A ship may change one Range Band per Combat Round between Space Bands B-1-2-3-4-5.

SR to AR = (10 - G) Rounds

AR to LR = (20 - G) Rounds

LR to DS = (30 - G) Rounds

The ship is in the new Band at the end of the period.

Deep Space

A ship in Deep Space cannot change Range Bands during the course of the battle.

G=

Current Acceleration in G's

Agility =

Power Plant Potential minus Current used Gs, or

Maximum Gs minus Current used Gs.

2 Space Ranges

	S=	Descriptor	Name	R=
	13	Outer System		18
DS	12		Deep Space	17
	11			16
	10	Siege		15
LR	9		Long Range	14
	8			13
AR	7		Attack Range	12
	6	Missile		11
SR	5	Beam	Short Range	10
	4	Far Orbit		9
	3	Orbit		8
FR	2	Fighter	Fighter2	7
	1	Close Fighter	Fighter1	6
B	B	Boarding	Boarding	5

Range is the Range from the Attacker to the Target.

Range may be different for each ship pair.

Movement Sequence

Ships move in a descending sequence based on tonnage (larger ships move before smaller ships).

Ramming. After all Range Changes, a ship or craft at Boarding Range may Ram.

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.

Jump

A ship can escape a battle by Jumping (assuming it has Fuel and is beyond the 100 D Limit) in the Situation Phase..

Target T

5	T	TARGET EFFECTS	Determine Damage for any successful attacks. .	Determine Aimed and Actual Hit Location. Attack Armor and Inflict Damage. Damage Control. Damage Resolution.
---	----------	-----------------------	--	--

HIT AND DAMAGE CHECKLIST

- Attacks.
Point of Aim+ Flux = HL Hit Location.
If Missile Massive Explosion, determine Near Miss?
- Roll 1D Weapon Hits.
Subtract Armor and divide by 2.
Consult Damage Severity Table
Roll 1D for HL Compartment.
- Check Immediate Action.
- Mark Damage Severity to the Compartment:
1D 2D 3D and so on.
If Destroyed, mark Destroyed and roll 1D for all HL Compartments
- After the Battle, determine Diagnosis Severity for each Damaged Component.

MISSILE FIRE						S	D	X	E	N	K
	TL		Size	Type	Guidance	Slug	Deadfall	Explosive	EMP	Nuke	Kinetic
B	8	Slug Thrower	2	SX	UG	=2	-	=2	-	-	-
M	8	Missile	5	DXEN	OG HW SA DL	-	ME	=5	=5	ME	-
N	10	KKM	6	K	OG HW SA DL	-	-	-	-	-	6x Sp^2
R	12	Rail Gun	6	SX	UG HW	=6	-	ME	-	-	-
V	10	Salvo Rack	3	SXE	HW OG	=3	-	=3	=3	-	-
Q	12	Ortillery	4	DXE	UG HW	-	=4	=4	=4	-	-
Q	12	Ortillery	5	DXEN	UG HW	-	=5	=5	=5	ME	-
Q	12	Ortillery	6	DXE	UG HW	-	ME	=6	=6	-	-
X	9	AM Missile	5	X	OG HW SA DL	-	-	ME	-	-	-
Y	9	Hybrid L-S-M	5	DXEN	OG HW SA DL	-	=5	=5	=5	ME	-
						Sz=Pen		Sz= Pen	Sz= EMP		=Pen

Hits inflicted are in D. For example, Pen-1 inflicts 1D Hits . Kinetic Speed= Space Range of Attack

ME= Massive Explosion (see table). Missile-6K is a G-Drive powered Small Craft. Missile-7K is an M-Drive powered Ship.

SPACE WEAPONS			Hits
	TL		
A	11	PA (see Note)	Based on Mount
C	8	CommCaster	
D	10	DataCaster	
E	19	Stasis	
F	10	Fusion Gun	
G	13	Meson Gun	
H	18	Jump Inducer	
J	8	Mining Laser	
K	9	Pulse Laser	
L	10	Beam Laser	
P	10	Plasma Gun	
S	9	SandCaster	
T	14	Jump Damper	
U	15	Tractr/Pressr	
W	16	Disruptor	
Y	9	Hybrid L-S-M	

DAMAGE SEVERITY

H/2 Repair 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

DIAGNOSIS

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

Massive Explosion - Missile Warhead

R= Proximity	Blast	BFE	Rad	Burn
0	Direct Hit	Vaporized=	100D	
1	Hit	90 D	20 D	10 D 30 D
2	Hit	40 D	15 D	10 D 20 D
3	Vnear Miss	30 D	10 D	10 D 10 D
4	Near Miss	10 D	5 D	5 D 5 D
5	Far Miss	5 D	1D	1D 1D
6	Miss			

BFE= Bang, Flash, EMP (EMP only with Nukes). Apply Rad only with Nukes.

R= Size minus 1D

Missile-5 is the Benchmark for effects.

Missile-4 = Damage/10

Missile-6 = Damage x2.

Missile-7 = Damage x3.

Bang=0 if in space.

Non-Nuke ignore EMP and Rad.

AM Anti-Matter inflicts triple damage.

IMMEDIATE ACTION DAMAGE CONTROL

Check 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.

The Galaxy



THE GALAXY

The Galaxy is naturally divided into three distinct regions: the Core, the several Arms, and the Rifts between the Arms.

The Core. The Core of the Galaxy, approximately 3,000 parsecs in radius, holds the majority of the galaxy's mass and stars. The Core has two important characteristics:

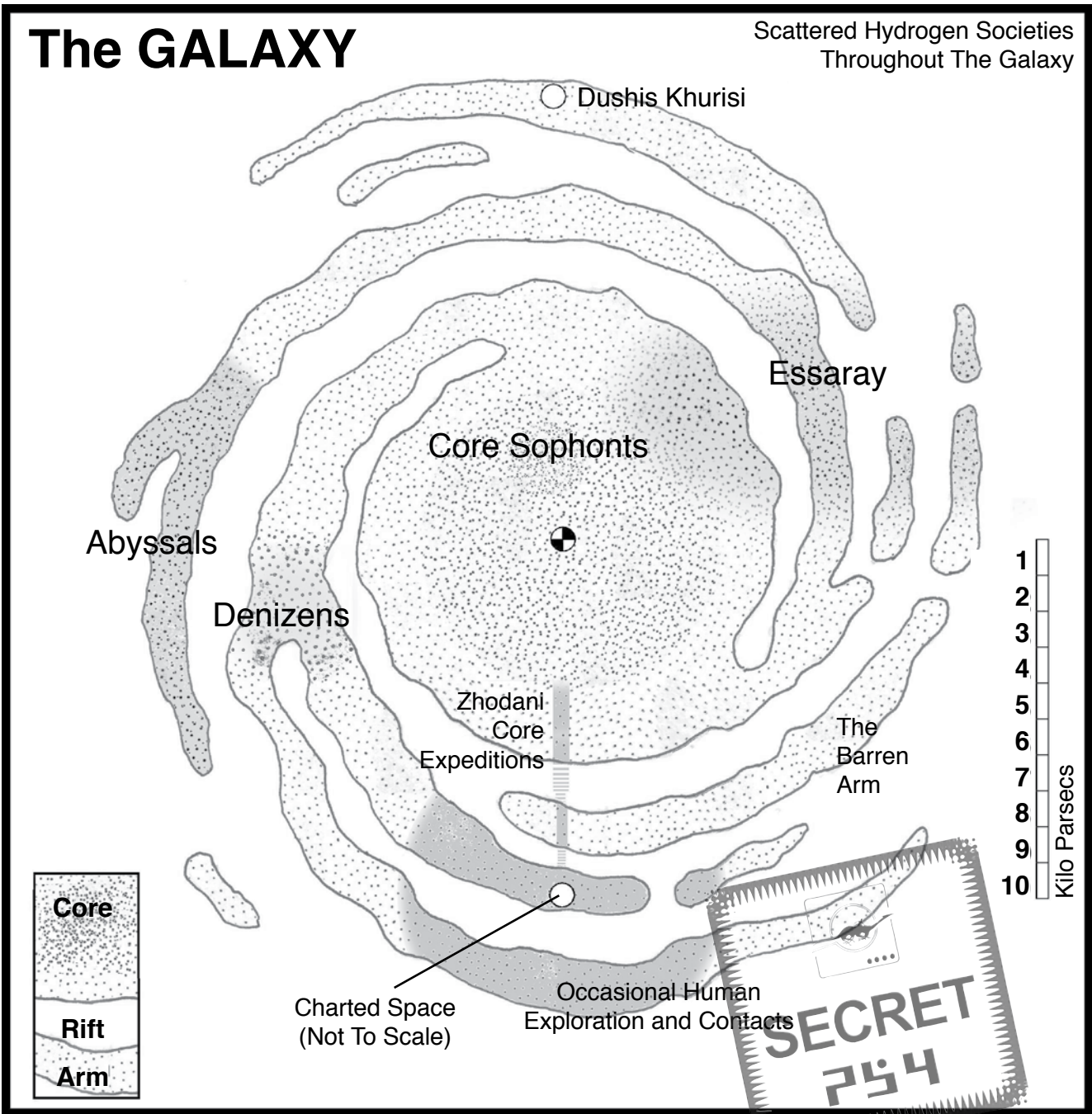
It is dominated by high levels of radiation (high constant levels, and even higher recurring levels). Habitable planets are rare and native life (intelligent or not) are even rarer.

The Core is densely packed with stars, strongly interfering with jump drives. In some parts of the Core, jump is impossible; in other regions, jump is restricted to short distances (often a tenth of a parsec).

The Spiral Arms. Outside of the Core, the Arms are concentrations of stars naturally endowed with planets and naturally hospitable to life.

The Rifts. The Rifts between the Arms have a lower stellar density, and their stars are the dimmer and less useful (typically K and M stars).

Charted Space: Tucked into one spiral arm is a miniscule region known to its inhabitants as **Charted Space**.

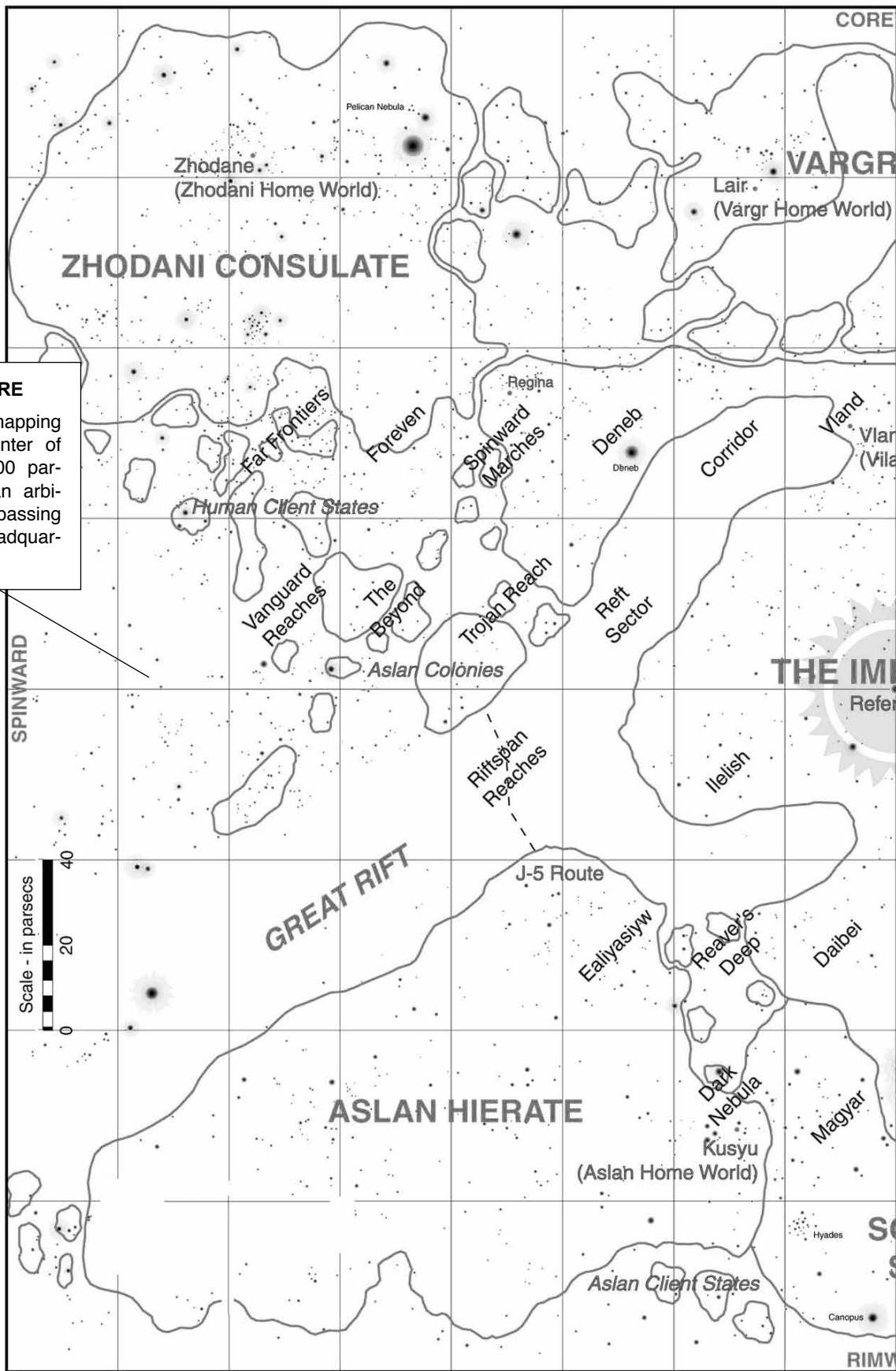


THE GALAXY BEYOND THE IMPERIUM

An exhibit from the secret appendix to the massive Imperial Interstellar Scout Service's Comprehensive Astrographic Survey of the Imperium (popularly known as the **Second Survey**) published in 1065.

While the focus of the Second Survey was a detailed census of the worlds and sophonts of the Third Imperium, the IISS also compiled the information at its disposal to look beyond the imperial borders and analyze both opportunities and threats. The Scout Service hierarchy determined that threats outnumbered opportunities, and the appendix was suppressed.

The meanings of some of the terms on this graphic remain unclear.



THE GALACTIC CORE

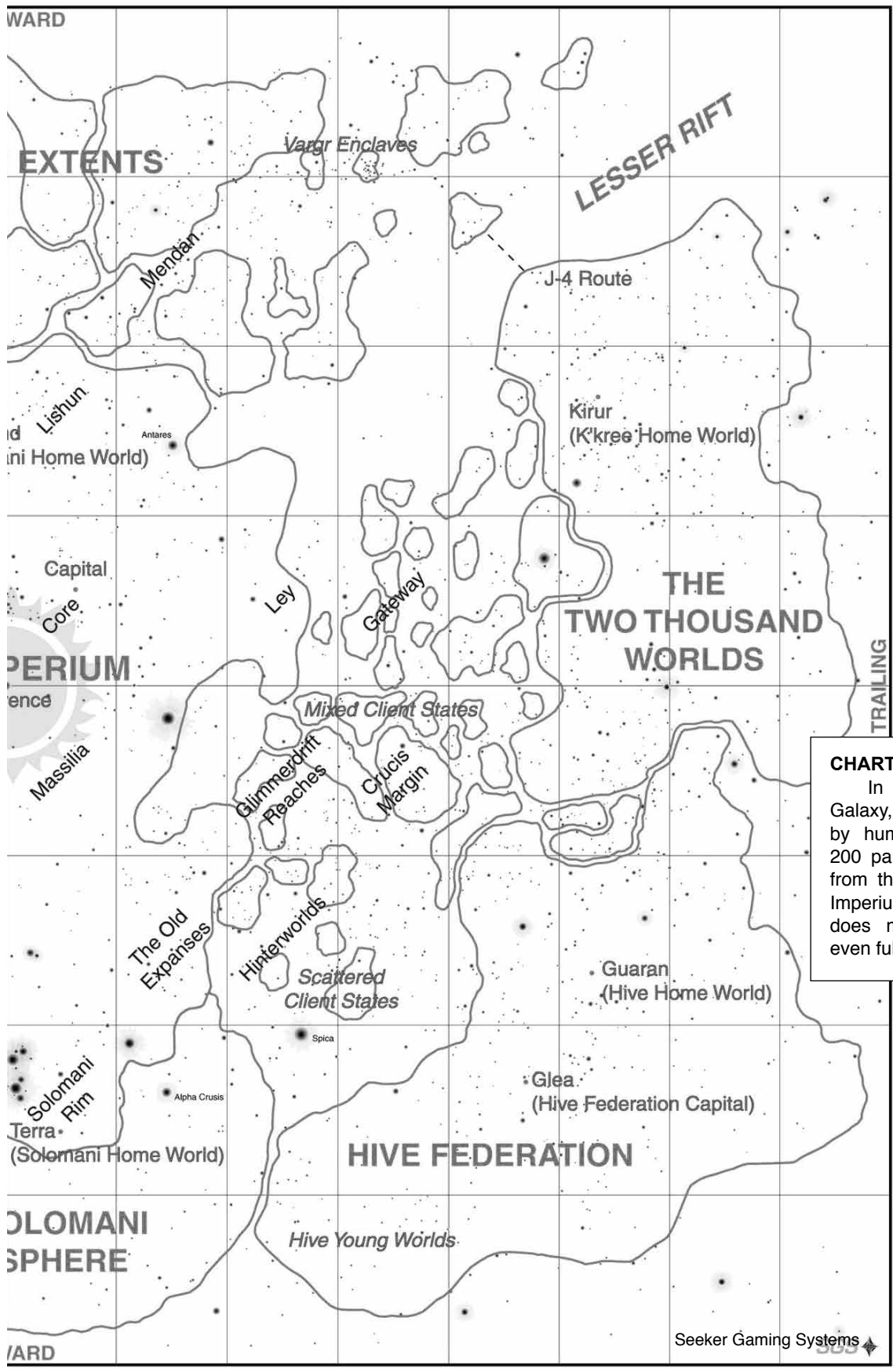
Under Imperial mapping conventions, the center of the Galaxy is 10,000 parsecs coreward of an arbitrary circumference passing through the IISS Headquarters on Reference.

SPINWARD

Scale - in parsecs



RIMW



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 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 36 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 36). 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 the expected facilities available in a system.

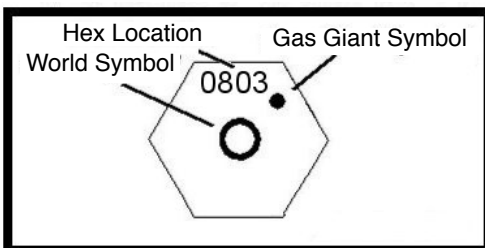
Bases shows the presence of military, naval, or scout bases.

World Name provides the name of the Mainworld.

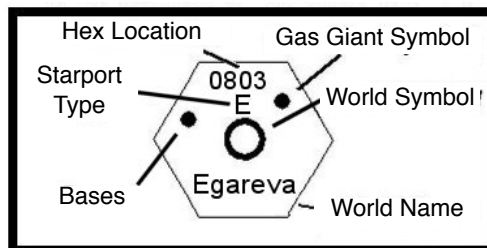
THE CLASSIC SYSTEM CONTENTS TABLE

When creating a subsector or sector map, stellar hexes can be randomly generated. The presence or, and contents

THE STELLAR HEX (Basic Information)



THE STELLAR HEX (Typical Chart Information)



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 most 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 more 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 (1D) to mark a system 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 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.

Conversely, in the Galactic core, count off 35 hexes as populated, and then mark the 36th empty.

CLASSIC SYSTEM CONTENTS TABLE

System Presence=	3 or less	(on 1D)	50%
Gas Giant Presence	9 or less	(on 2D)	83%
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%

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.

Method Three. Roll 2D-2 for each system. A roll of 0- 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 9 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.

Per Sector. The expected number of Stellar Hexes for the Density.

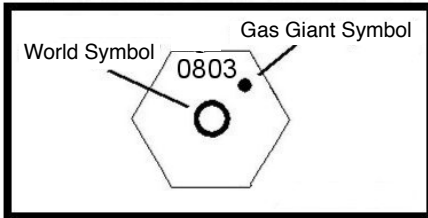
Density. The percentage density of Stellar Hexes.

Countoff. Expected empty hexes between Stellar Hexes; if [brackets], expected Stellar Hexes between empty hexes.

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



A sector map shows the general presence of star systems and main-worlds across a large region of space.

The first step in mapping a large region is to 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).

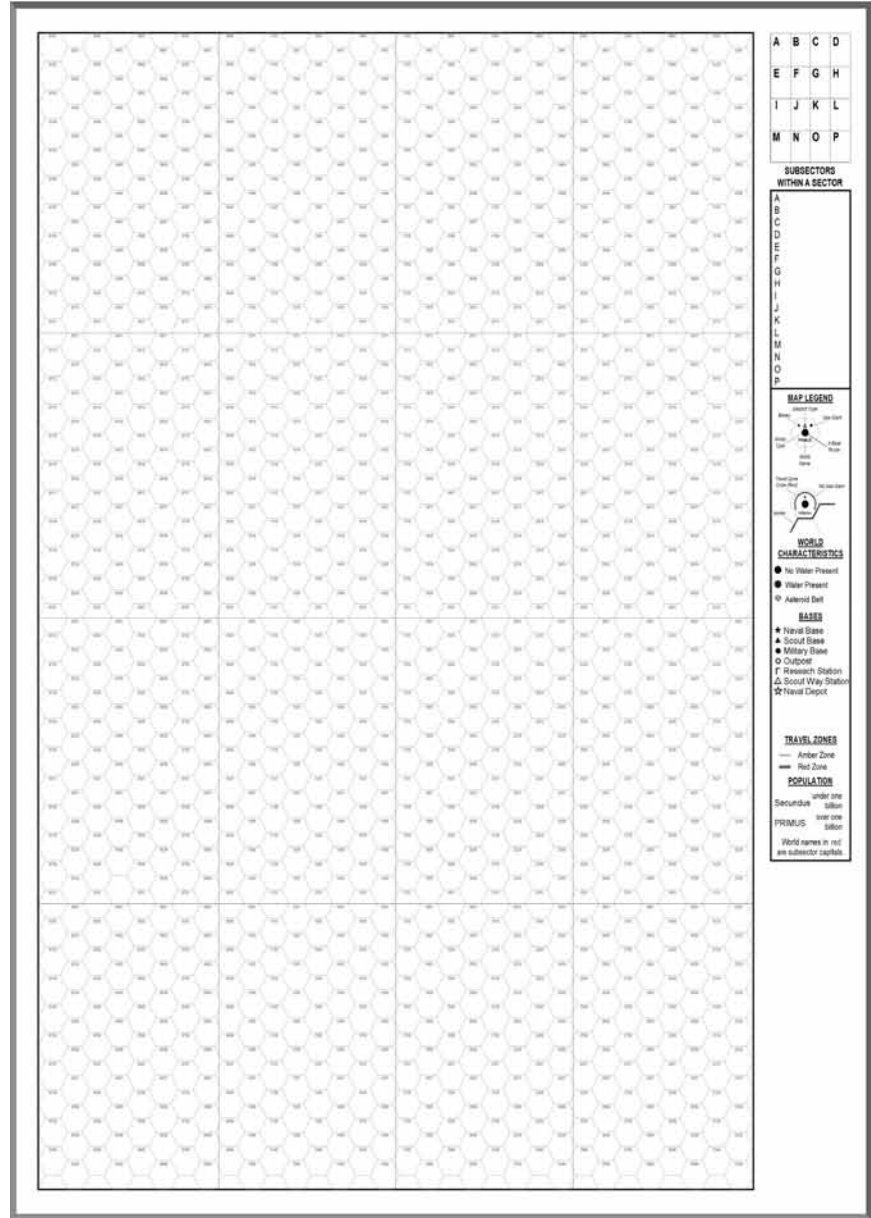
The Sector Map shows as a minimum:

- A. the presence or absence of systems.
- B. the 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.

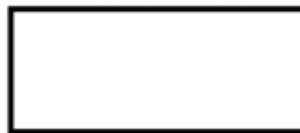
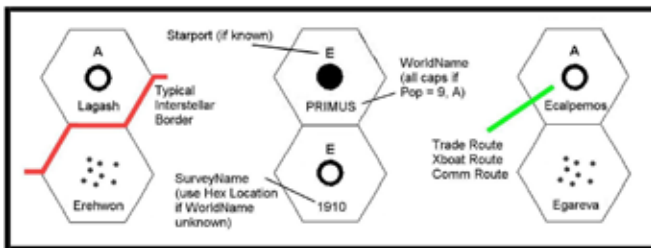
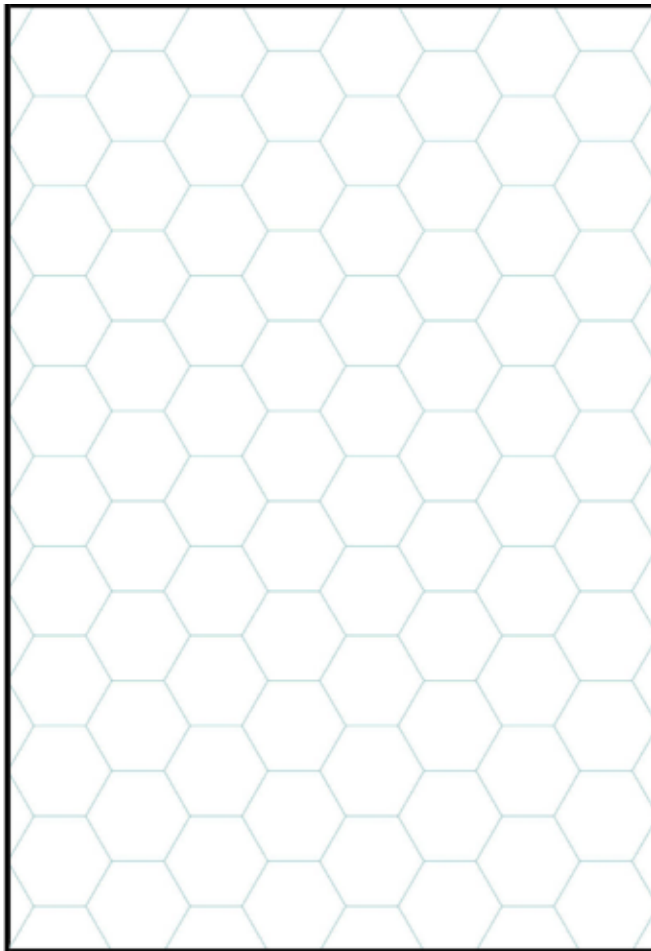
For each hex, roll on the table and mark the symbols.



	Extra Galactic	Rift	Sparse	Scattered	Standard	Dense	Cluster	Core	Asteroids
1D			1 -	2 -	3 -	4 -	5 -		
2D		2 -						11 -	2
3D	3 -								
Per Sector Density	6	38	216	420	640	840	1060	1170	
Count-Off	<1%	3%	17%	33%	50%	66%	83%	91%	
	213	33	6	3	2	[3]	[6]	[36]	36

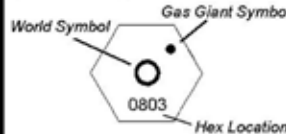
Star Systems are mapped on Subsector grids to provide greater detail on fewer worlds.

THE SUBSECTOR MAP



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

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.

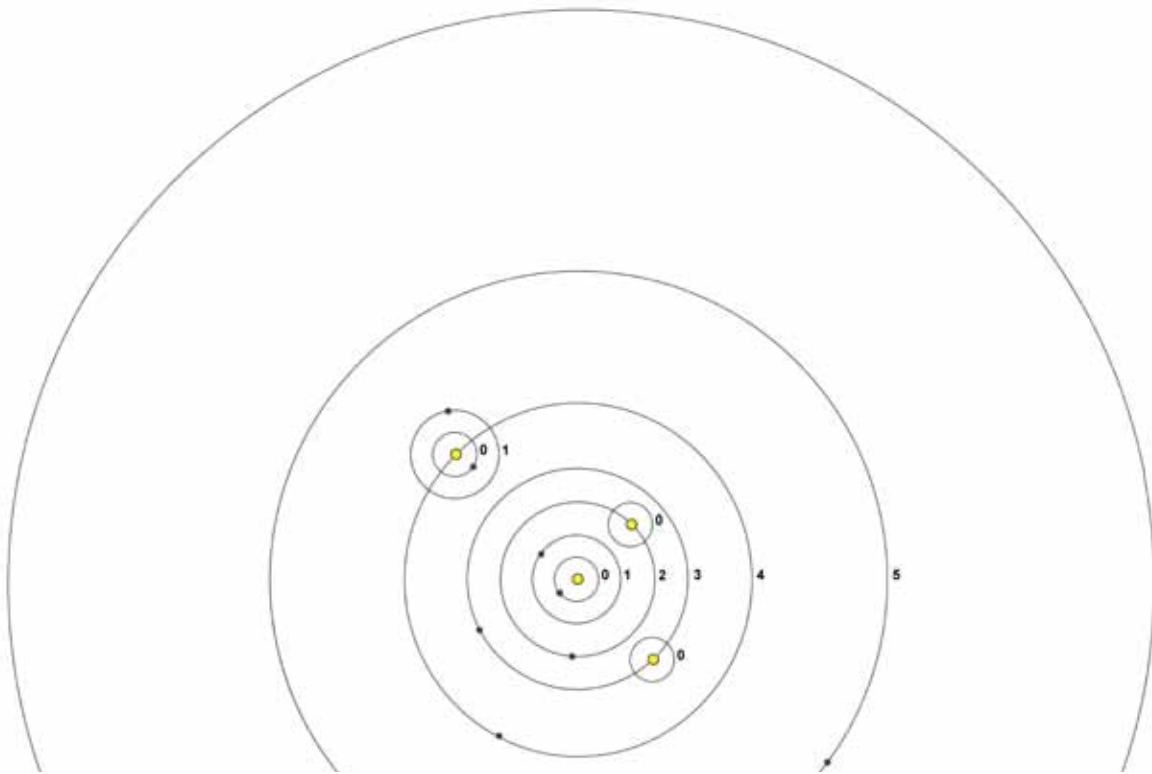
SUBSECTORS WITHIN A SECTOR

A	B	C	D
E	F	G	H
J	K	L	M
N	P	Q	R

Creating a Subsector Map follows the same procedures as creating a Sector Map:

Populate a blank subsector map with system hexes (which contain star systems) and deep space hexes (which are purportedly or generally known to be empty).

	Extra Galactic	Rift	Sparse	Scattered	Standard	Dense	Cluster	Core	Asteroids
1D			1 -	2 -	3 -	4 -	5 -		
2D		2 -						11 -	2
3D	3 -								
Per Sector Density	6	38	216	420	640	840	1060	1170	
Count-Off	<1%	3%	17%	33%	50%	66%	83%	91%	
	213	33	6	3	2	[3]	[6]	[12]	36



THE TYPICAL STAR SYSTEM

The Typical Star System Contains:

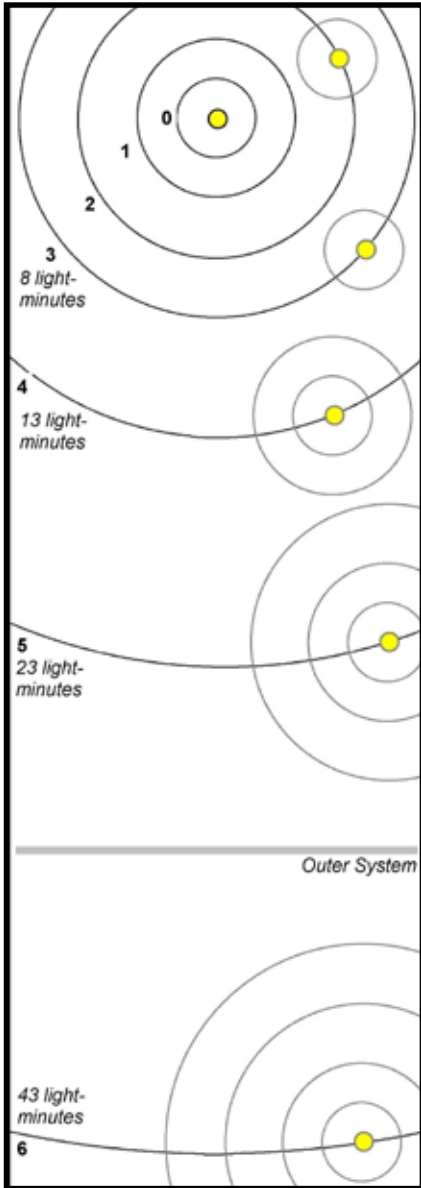
A Central Star

Orbits numbered 0 (zero) and upward

Worlds (including planets, gas giants, and asteroids) occupying some (or all) of these orbits.

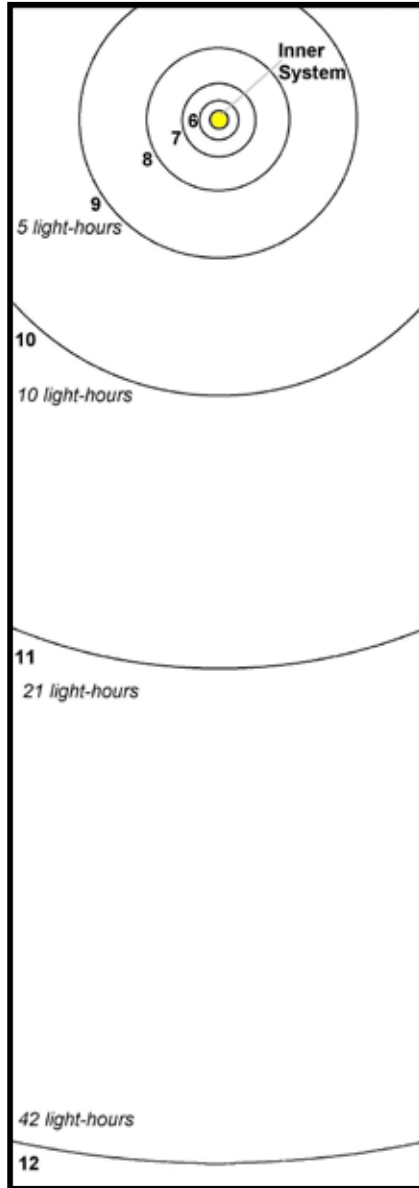
Some systems may have far more, including companion stars in addition to the Primary, an outer system with additional worlds, gas giants, objects, and even companion stars, and a remote system with even more objects.

THE INNER SYSTEM



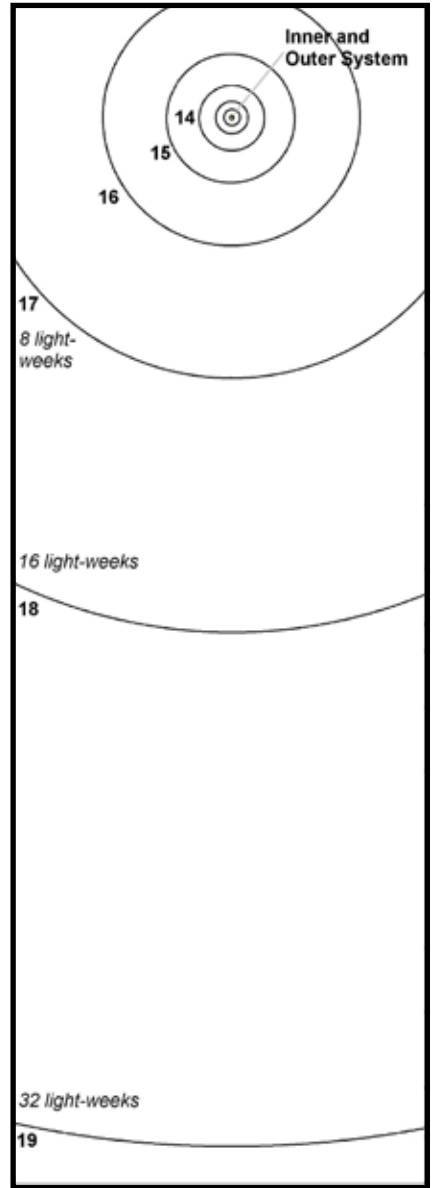
ORBITS 0-6

THE OUTER SYSTEM



ORBITS 7-12

THE REMOTE SYSTEM



ORBITS 13-19

Star Systems And Their Worlds

Star systems contain accumulations of stars, gas giants, and worlds.

Traveller System Generation is a process that 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 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 a family of planets.

Multiple Stars. Some systems have more than one star. The central star is the Primary. There may be other stars which are Close (Orbits 0-1-2-3-4-5), Near (6-7-8-9-10-11), or Far (Orbits 12-13-14-15-16-17). Each of these stars may have a Companion which is extremely close.

Orbits. Each star is encircled by a series of Orbits number 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 star may have a variety of worlds: planets, gas giants, asteroid and planetoid belts, satellites, and 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 astrogation data bases and is generally 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 a series of FillForms. Most systems can be described on the Inner System FillForm which covers the central star and orbits 0 through 6. Where necessary, additional Fillforms can be used for the Outer System and the Remote System.



CREATING STAR SYSTEMS AND THEIR WORLDS

The process of creating star is governed by the System Generation Checklist and Charts A through G.

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.

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.

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 the Mainworld is a Satellite, Flux determines the Orbit name (a letter from Ay to Zee) and if it is 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).

HZ-1 is on orbit closer to the star; the resulting climate is Hot (near the upper limits of human endurance).

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.

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.

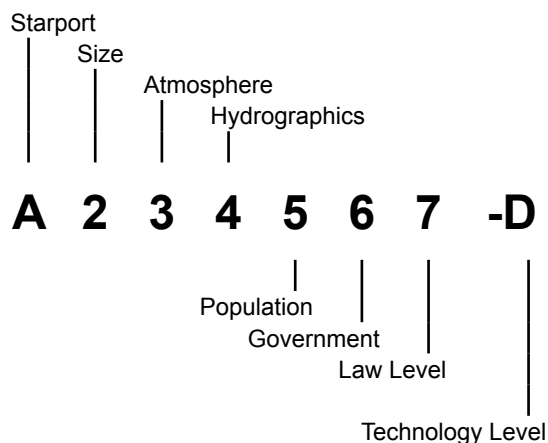
Using Chart B

Chart B provides basic information about the Mainworld. Ships 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.

THE UWP



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 to other 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

The Extensions provide additional information about the Mainworld.

The Importance Extension {Ix}

The Importance Extension {Ix} ranks worlds within a region. It can range from +4 to -2. A world with +4 is Important; a world with 0 or less is Unimportant.

Trade Routes. Trade Routes within a sector connect Important Worlds with 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.

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 can be used to compute the Resource Units of a world (in effect, its world budget).

The Cultural Extension [Cx]

The Cultural Extension [Cx] is a broad insight into the expected social behaviors of the citizens of the world.

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.

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, since 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. The theoretical (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.

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.

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) are labeled Amber if local conditions may prove to be 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.

It is possible for 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

The number of 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, the excess worlds are ignored.

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 and preclude their availability.

The Surface of the Star Column of the Orbital Distance Chart 5a (in the Ranges Chapter) shows precluded orbits.

Worlds other than the Mainworld are subject to restrictions:

Maximum Population for any non-Mainworld is Mainworld Population minus 1.

All worlds other than the Mainworld have Spaceports rather than Starports.

Other Worlds

The creation of additional worlds 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.

Hospitables are potentially habitable or exploitable worlds located in the Habitable Zone.

Planetoids are the worldlets of a Belt. The Population, Government, and Law Level represent the general level throughout the Belt.

Iceworlds are frozen worlds beyond the HZ.

RadWorlds are worlds with extreme levels of radiation. Local values for RadWorlds are provided in Range Table 3b Strangeworlds.

Infernos are worlds with extremely high temperatures. Local values for Infernos 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. Bigworld may also occur throughout a system.

Worldlets are worlds with generally small Size.

Inner Worlds are starward of the Habitable Zone.

Stormworlds are worlds wracked by constant atmospheric turbulence. Local values for Stormworld are provided in Range Table 3b Strangeworlds.

Satellites

When necessary, satellites for worlds and for gas giants can be generated.

Ring. The table may create one or more Rings.

Even More Worlds, Most Uncharted

This system does not create the many small chunks of rock and ice throughout most systems.

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 = +1 + 7 = 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 = $1D + \text{Mods (Starport A = +6)} = 4 + 6 = 10$.
TL-10 = approximately 2100 AD.

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 = (A7B+3)
Resources = $2D + GG + \text{Belts} = 7 + 3 + 0 = 10 = A$.
Labor = Pop -1 = 7.
Infrastructure = $2D + \text{Importance} = 7 + 4 = 11 = B$.
Efficiencies = Flux = +3
Cultural Extension = [6C5C]
Homogeneity = Pop + Flux = 8 -2 = 6.
Acceptance = Pop + Importance = 8 + 4 = 12 = C.
Strangeness = $2D - 2 = 5$.
Symbols = TL + Flux = 10 + 2 = 12 = C.

F

Nobility = cCe = Baronet, a Baron, and a Viscount
Based on Rich, Pre-Ag, Pre-High.
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 = M6 V. Spectral Type = Flux + 1D -1 = 0 + 3 = M. Spectral Decimal = 6. 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 = $1 + 3 + 0 + 2D = 1 + 3 + 0 + 8 = 12$.
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 Habitables Satellite table = $1D = 4 = \text{Hospitable}$.

Use the procedures in this Checklist to create star systems and their component worlds.

The Second Survey Format

Hex	Name	UWP	TC and Rem	{Ix}{Ex}[Cx]	N	B	Z	PBG	W	A	Stellar
0810	Miigamshirshag	E300000-0	As Hi In Va	{-2}{8056}[7685]	B	-	-	624	7	Im	M1 V M6 VII

The Second Survey Format shows tabular information about a star system (and especially its Mainworld) for ready reference in astrogation, 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.

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 + Stars + 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

A	Sector Name and Hex Location. Mainworld Name.
1	Starport. =2D for Starport Type.
1	(optional) Bases.
2	MainWorld Type =Flux (Planet or Satellite).
B	2 If Satellite, =Flux for Satellite Orbit Name.
2	Habitable Zone Variance. =Flux
3	Climate. Note based on HZ.
4	Gas Giants. =2D /2 -2.
4	Planetoid Belts. =1D -3.
	StSAHPGL-T
S	World Size. = 2D-2.
A	Atmosphere: =Flux + Size. If Siz =0, Atm =0.
C	H Hydrographics. =Flux+ Size + Mods. Max=A.
P	Population. =2D-2.
G	Government. =Flux +Pop.
L	Law. =Flux + Gov.
T	Tech Level. =1D + Mods.
D	TC Trade Classifications. Note all required. Defer Secondary, Political, Special TC.
	Extensions.
E	Ix Importance Extension.
Ex	Economic Extension.
Cx	Cultural Extension.
	Additional Data.
N	Nobility. Based on Trade Classifications.
A	Allegiance. Imposed by referee.
B	Bases. Naval. Scout. Depot. Way Station.
F	Z Travel Zones. Imposed by referee.
Nil	Native Intelligent Life and Status.
1	System Stars
2	Star Spectral Types
3	Place Stars In Orbits
G	W Total Worlds In the System.
P	Mainworld Placement.
P	Gas Giant Placement
P	Planetoid Belt Placement
P	Create other Worlds
H1	Actual Habitable Zones for Inner System
J1	Actual Habitable Zones for Outer System
K1	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 astrogration planning.

CHECKLIST

- 1. Starport.** 2D for Starport Type. If desired, add bases.
- 2a. MainWorld Type.** Flux for (Planet, Satellite).
- 2b. Habitable Zone Variance.** Flux for Location in HZ.
- 3. Climate.** Note based on HZ.
- 4. Gas Giants.** Roll 2D /2 -2.
- 5. Planetoid Belts.** Roll 1D -3.

IMPORTANT TERMS

- World.** A planet or satellite.
Planet. A world orbiting a star.
Satellite. A world orbiting a planet.
Mainworld. The most important world in a system.
Belt. An asteroid belt (a mainworld) or a planetoid belt.
Gas Giant. Massive hydrogen-atmosphere planet.

1 STARPORTS ON THE MAINWORLD

2D	Type	Quality	Yards	Repairs	Fuel	Downport	Highport	Bases
2								Naval Base if 2D= 6 or less.
3	A	Excellent	can build Starships	Overhaul	Both	Yes	if Pop =7+	Scout Base if 2D= 4 or less.
4								Possible Depot or Way Station.
5	B	Good	can build Spacecraft	Overhaul	Both	Yes	if Pop =8+	Naval Base if 2D= 5 or less.
6								Scout Base if 2D= 5 or less.
7	C	Routine	No	Major Damage	Unrefined	Yes	if Pop =9+	Scout Base if 2D= 6 or less
8								
9	D	Poor		Minor Damage	Unrefined	Yes		Scout Base if 2D= 7 or less.
10	E	Frontier		No	No	Beacon		No Bases
11								
12	X	None		No	No	No		No Bases

SPACEPORTS ON NON-MAINWORLDS

(Full Base Table at Chart F-B)

Roll	Type	Quality	Yards	Repairs	Fuel	Downport	Highport	Bases
2	F	Good	No	Minor	Unrefined	Yes	No	Fa Farming Possible.
3	G	Poor	No	Superficial	Unrefined	Yes	No	Mi Mining Possible.
4	H	Basic	No	No	No	Beacon	No	Cy Colony Possible.
5								Pe Penal Colony Possible.
6+	Y	None	No	No	No	No	No	Re Reserve Possible.

Non-MW Spaceport.

Roll= Local Pop -1D.

This table is shown for reference.

2 WORLDS AND ORBITS

Main Flux	World	HZ Variance	Satellite Close	Orbit Far
-6	Close Satellite	-2	Ay	En
-5	Far Satellite	-1	Bee	Oh
-4	Far Satellite	-1	Cee	Pee
-3	Close Satellite	-1	Dee	Que
-2	Planet	0	Ee	Arr
-1	Planet	0	Eff	Ess
0	Planet	0	Gee	Tee
+1	Planet	0	Aitch	Yu
+2	Planet	0	Eye	Vee
+3	Planet	+1	Jay	Dub
+4	Planet	+1	Kay	Ex
+5	Planet	+1	Ell	Wye
+6	Planet	+2	Em	Zee

Mainworld. Is it Planet or Satellite?

HZ Variation. From the Habitable Zone.

Satellite Orbit. Note orbit name.

3 CLIMATE

Mark Mainworld with its Climate.

HZ =Temperate
 HZ - 1 =Hot
 HZ +1 =Cold
 HZ = 0 or 1 =Twilight Zone =Tz
 Close Satellite =Locked =Lk

Hot. Limit of human endurance.
Cold. Limit of human endurance.
Twilight Zone. World in Orbit 0 or 1 is tidally locked with a Temperate band at the Twilight Zone, plus a Hot hemisphere facing the Primary and a Cold hemisphere away from the Primary.
Locked. Close Satellite (Ay through Em) is Locked to its planet. Satellites have no Twilight Zones.

4 GAS GIANTS AND BELTS

Determine Gas Giants and Planetoid Belts (Ignore fractions; less than 0 is 0).

Gas Giants = 2D /2 - 2

Planetoid Belts = 1D -3

SAHPGL-T (NEXT PAGES)

(convert negative values to zero).

S. Size. Planetary Size: 2D-2.

A. Atmosphere: Flux + Size.

If Size =0, Atmosphere =0.

H. Hydrographics. Flux+ Size.

Max A. If Size 2, Hyd =0;

If Atm < 2 or A+, Hyd DM - 4.

P. Population. 2D-2.

G. Government. Flux +Pop.

If Pop=0, Gov=0.

L. Law. Flux + Gov. If Pop=0, Law=0.

TL. Tech Level. 1D + Mods.

(convert all less than 0 to 0).

Create and understand the elements of the Universal World Profile using these tables.



**WORLDGEN
STSAHPGL-T**

S SIZE		A ATMOSPHERE		H HYDROGRAPHICS		P POPULATION		
Digit	Diameter	Digit	Description	Effects	Digit	Description	Digit	Description
0	Asteroid Belt	0	Vacuum	S3	0	Desert World.	0	unpopulated
1	1,000 miles	1	Trace	S3	1	10% water.	1	tens
2	2,000 miles	2	VThin, Tainted	P1 S2	2	20% water.	2	hundreds
3	3,000 miles	3	VThin	S2	3	30% water.	3	thousands
4	4,000 miles	4	Thin, Tainted	P1 S1	4	40% water.	4	ten thousands
5	5,000 miles	5	Thin	S1	5	50% water.	5	hundred thousands
6	6,000 miles	6	Standard		6	60% water.	6	millions
7	7,000 miles	7	Standard, Tainted	P1	7	70% water.	7	ten millions
8	8,000 miles	8	Dense		8	80% water.	8	hundred millions
9	9,000 miles	9	Dense, Tainted	P1	9	90% water.	9	billions
A	10,000 miles	A	Exotic	P1	A	Water World.	A	ten billions
B	11,000 miles	B	Corrosive	C1 P1			B	hundred billions
C	12,000 miles	C	Insidious	C2 P1			C	trillions
D	13,000 miles	D	Dense High	varies			D	ten trillions
E	14,000 miles	E	Ellipsoid	varies			E	hundred trillions
F	15,000 miles	F	Thin Low	varies			F	quadrillions

G GOVERNMENT

Gov= Flux + Pop. If Gov >F, Gov= F.

Digit	Description
0	No Government Structure. Family bonds predominate.
1	Company/ Corporation. Rule by a managerial elite.
2	Participating Democracy. Rule by popular vote.
3	Self-Perpetuating Oligarchy. Rule by a restricted minority with little or no input from the masses.
4	Representative Democracy. Government by proxy.
5	Feudal Technocracy. Governmental relationships based on mutually beneficial technical activities.
6	Captive Government / Colony. Rule by a leadership answerable to an outside group.
7	Balkanization. Rival governments continually compete for control of the world.
8	Civil Service Bureaucracy. Rule by agencies employing individuals selected by merit.
9	Impersonal Bureaucracy. Impersonal agencies rule.
A	Charismatic Dictatorship. Government by a single leader enjoying the confidence of the citizens.
B	Non-Charismatic Dictatorship. Government by the successor to a charismatic dictator.
C	Charismatic Oligarchy. Government by a select religious, mystic, or psionic group, organization, or class enjoying the overwhelming confidence of the citizenry.
D	Religious Dictatorship. With little or no regard for the needs of the citizenry.
E	Religious Autocracy. Government by a single religious, mystic, or psionic leader wielding absolute power.
F	Totalitarian Oligarchy. Government by an all-powerful minority which maintains absolute control through widespread coercion and oppression.

L LAW LEVEL

Law= Flux + Gov. If Law > J, Law= J.

Digit	Description
0	No Law. No prohibitions.
1	Low Law. Prohibition of WMD, Psi weapons.
2	Low Law. Prohibition of "Portable" Weapons.
3	Low Law. Prohibition of Acid, Fire, Gas weapons.
4	Moderate Law. Laser, Beam weapons prohibited.
5	Moderate Law. Shock, EMP, Rad, Mag, Grav weapons.
6	Moderate Law. Prohibition of MachineGuns.
7	Moderate Law. Prohibition of Pistols.
8	High Law. Open display of weapons prohibited.
9	High Law. Weapons outside the home prohibited.
A	Extreme Law. Weapon possession prohibited.
B	Extreme Law. Continental passports required.
C	Extreme Law. Unrestricted invasion of privacy.
D	Extreme Law. Paramilitary law enforcement.
E	Extreme Law. Full-fledged police state.
F	Extreme Law. Daily life rigidly controlled.
G	Extreme Law. Disproportionate punishments.
H	Extreme Law. Legalized oppressive practices.
J	Extreme Law. Routinely oppressive and restrictive.

TECH LEVEL= 1D +

Starport A= +6. B= +4. C= +2. X= -4. 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.
 The Technology Chapter defines Tech Levels.

D

WORLDGEN TCS

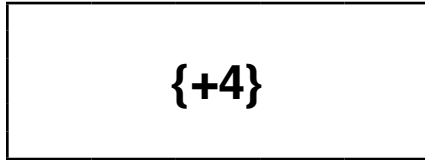
Create the applicable Trade Classifications for the Mainworld and apply Trade Classifications for other worlds in the system. Ba requires Starport E, X. Cp, Cs, Cx require Starport A. Politicals and Specials assigned by Referee (not generated). Lk, Tz, Ho, and Co refer to climate but are not properly TCs.

	Code	S _{iz}	A _{tm}	H _{yd}	P _{op}	G _{ov}	L _{aw}	Definition	Formula
Planetary	As	0	0	0	--	--	--	Asteroid	
	De	--	23456789	0	--	--	--	Desert	
	Fl	--	ABC	123456789A	--	--	--	Fluid	
	Ga	678	568	567	--	--	--	Garden World	
	He	3459ABC	2479ABC	012	--	--	--	Hellworld	
	Ic	--	01	123456789A	--	--	--	Ice-Capped	
	Oc	ABC	--	A	--	--	--	Ocean World	
	Va	--	0	--	--	--	--	Vacuum	
Wa	56789	--	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	--	--	--	9ABC	--	--	High Population		
Economic	Pa	--	456789	45678	48	--	--	Pre-Agricultural	
	Ag	--	456789	45678	567	--	--	Agricultural	
	Na	--	0123	0123	6789ABC	--	--	Non-agricultural	
	Pi	--	012479	--	78	--	--	Pre-Industrial	
	In	--	012479	--	9ABC	--	--	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	Not MW. HZ
	Mi	--	--	--	23456	--	--	Mining	Not MW. MW=In
	Mr	--	--	--	--	--	--	Military Rule (note 2)	
	Px	--	23AB	12345	3456	--	6789	Prison, Exile Camp	
	Pe	--	23AB	12345	3456	6	6789	Penal Colony	
	Re	--	--	--	1234	6	45	Reserve	
Political	Cp	--	--	--	--	--	--	Subsector Capital	Imperial
	Cs	--	--	--	--	--	--	Sector Capital	Imperial
	Cx	--	--	--	--	--	--	Capital	Imperial
	Cy	--	--	--	56789A	6	0123	Colony (note 1)	--
Special	Sa	--	--	--	--	--	--	Satellite	
	Fo	--	--	--	--	--	--	Forbidden	(Red Zone)
	Pz	--	--	--	789ABC	--	--	Puzzle	(Amber Zone)
	Da	--	--	--	0123456	--	--	Dangerous	(Amber Zone)
	Ab	--	--	--	--	--	--	Data Repository	
An	--	--	--	--	--	--	Ancient Site	--	

Note 1. 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. **Note 2.** Military Rule by the regional Allegiance power.

Create the Importance Extension, Economic Extension, and Cultural Extension for the system. **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



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
TL A or more	+1
TL 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.	
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

Importance determines the expected interstellar ship traffic for a starport.

$$S = 10^{Ix} / H$$

S= Total Ships Per Week.

Ix= Importance.

H= Average Cargo Hold Capacity.

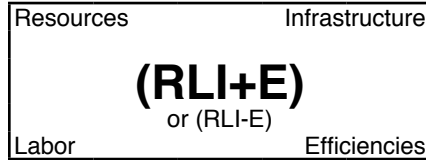
= 100 for most worlds

= 1000 on Trade Routes

For a Busy Empire, use I=I+1

For a Rural Empire, use I= I-1.

EX ECONOMIC EXTENSION



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 + Importance
If Ba, Di, Lo, then = 0. If Ni, then 1D.	
Efficiency=	Flux
The minimum value for Resources, Labor, and Infrastructure is 0. Efficiency may be negative.	

Resources are any materials available for processing and exploitation. They include natural resources, minerals, ores, metals, energy sources, biological assets, and any other materials of limited availability.

Labor is the workforce available for the processing and exploitation of Resources.

Infrastructure is the established technical structures that support exploitation of resources. Infrastructure includes roads, power grids, communications, and factories.

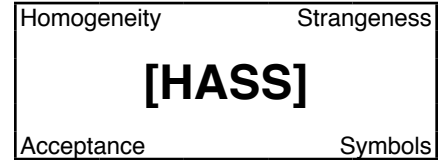
Efficiency reflects the current economic system, and includes sensible legal procedures, appropriate tariffs, customs promoting a balanced work ethic, rewards for merit, and social structures which match ability and job. Negative Efficiency is worse.

RU

$$\text{Resource Units} = R * L * I * E$$

If any value = 0, use 1 instead (to avoid multiplying by zero).

CX CULTURAL EXTENSION



The **Cultural Extension** is contained between [brackets].

The **Cultural Extension (Cx)** is a broad insight into the expected social behaviors of the citizens of the world.

CULTURAL EXTENSION=

Characteristic	Value
Homogeneity	=Pop + Flux
Acceptance	= Pop + Importance
Strangeness	5 + Flux
Symbols	TL + Flux
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 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).

F

WORLDGEN NABZ NIL

NOBILITY

Code	Ranking	Noble	TC
A	Gentleman.	Peer.	
B	Knight	any	
c	Baronet	Pa Pr	
C	Baron	Ag Ri	
D	Marquis	Pi	
e	Viscount	Ph	
E	Count	Hi	
f	Duke	In	
F	Duke	In	
G	Archduke		
H	Emperor		

Noble assignment is based on world TC.

TRAVEL ZONES

Code	Description	TC
G	Green	
A	Amber	Da Pz
R	Red	Fo
Da	Dangerous	Pop=0-6
Pu	Puzzling	Pop=7+
Fo	Forbidden	

WORLDS

Total worlds in the system =
MW + GG + Belts + 2D

if Gov= 1
if Gov= 6

Locals are company employees.
Locals are colonists from a nearby world.

Corporate
Colonists

1 GENERATE SYSTEM STARS

Flux	P	C	N	F	Companion
-5	P	--	--	--	--
-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	la	la	la	II	II	II	II
-5	A	la	la	la	II	II	II	II
-4	A	lb	lb	lb	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

Size IV is not possible for K5-K9 and M0-M9 stars. Size VI is not possible for A0-A9 and F0-F4 stars.

3 PLACE STARS IN ORBITS

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

Spectral Type

Roll Flux for the Primary.
For all others, Primary Flux + (1D-1).
Spectral Decimal. Roll decimal 0 to 9.

Stellar Size

Roll Flux for the Primary; For all others, Primary Flux + (1D+2).
If Size= D, ignore Spectral Decimal.
If Spectral= BD (=Brown Dwarf) ignore remaining rolls.

Habitable Zone HZ orbits by Star are shown on Charts H1 J1 K1.

Note the additional information for the system.

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

Many other allegiance abbreviations are possible.

B BASES

Code	Description
N	Naval Base at starport A or B
D	Naval Depot at starport A about 1 per 1000 worlds
S	Scout Base at starport A B C D
W	Scout Way Station at starport A about 1 per 50 parsecs along major trade routes.

Starport A: Naval Base if 2D= 6 or less.
Scout Base if 2D= 4 or less.

Starport B: Naval Base if 2D= 5 or less.
Scout Base if 2D= 5 or less.

Starport C: Scout Base if 2D= 6 or less.

Starport D: Scout Base if 2D= 7 or less.

NIL NATIVE INTELLIGENT LIFE / NATIVE STATUS

Pop	Atm	TL	Comment	(create sophonts as necessary)
7+	2-9	1+	Intelligent Life evolved on this world.	Natives
7+	A+	1+	Local Intelligent Life incompatible with human environments	Exotics
7+	0-1	1+	Sophonts evolved elsewhere and settled here years ago.	Transplants
0	2+	1+	Intelligent Life evolved on this world, but is now extinct.	Extinct
0	0-1	1+	Evidence of Transplants, but they are no longer present.	Vanished
1-2-3			Non-permanent commercial or scientific activity.	Transients
4-5-6			The initial steps of creating a colony.	Settlers

Create Gas Giants and place them in orbits on the System Fillform.
Fill other orbits with Other Worlds.



**WORLDGEN
OTHER WORLDS**

W WORLDS

Total Worlds In System=

- + Mainworld
- + Gas Giants
- + Belts
- + 2D

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= 2D

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

NUMBER OF SATELLITES

Gas Giants= 1D-1
Inners = 1D-5
Hospitables= 1D-4
Outers= 1D-3
= total number of satellites
for the world.
Zero exactly = Ring and
reroll. Treat less than zero as
none.

P PLACING WORLDS

Place Mainworld

Place Gas Giants
Place Planetoid Belts
Place Other Worlds

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.

Rotate Placement Per Star.

Rotate Placement Per Star.

Rotate Placement Per Star, place worlds using World1 Column.
Last World, place using World2 Column.

GG GAS GIANTS

2D	Size	WSize	Diameter	Type
1	L	20	20,000	
2	M	21	30,000	Neptune
3	N	22	40,000	
4	P	23	50,000	
5	Q	24	60,000	
6	R	25	70,000	Saturn
7	S	26	80,000	
8	T	27	90,000	Jupiter
9	U	28	125,000	2 Mj
10	V	29	180,000	4 Mj
11	W	30	220,000	6 Mj
12	X	31	250,000	8 Mj

Mj= Jupiter Masses. Diameter in Miles.

LGG Large Gas Giant= Size P to X.

SGG Small Gas Giant= Size L to N.

All BD Brown Dwarfs are Siz=Q. Convert
every second SGG Small Gas Giant to IG Ice
Giant (same size).

BASIC PLACEMENT CHART

2D	LGG	SGG	IG	Belt	World1	World2
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 ex-
ceed World Size/4.

The Inner Worlds

= Orbits inside HZ - 1.

- HZ INNERS

1D	Description
1	Worldlet
2	Inferno
3	Inner World
4	BigWorld
5	Stormworld
6	Radworld

INNER SATELLITES

1D	Description
1	Worldlet
2	Worldlet
3	Inferno
4	Inner World
5	Stormworld
6	Radworld
7	Bigworld

DM+1 if satellite of GG. Close Satellites are Locked to the Planet.

If Satellite Size is equal or greater than Planet Size, reduce it to Planet Size -3.

The Hospitables

= Orbits HZ-1, HZ, HZ+1.

=HZ HOSPITABLES

Code	Description
1	Worldlet
2	Inferno
3	Hospitable
4	BigWorld
5	Stormworld
6	Radworld

HOSPITABLE SATELLITES

1D	Description
1	Worldlet
2	Worldlet
3	Inferno
4	Hospitable
5	Stormworld
6	Radworld
7	Bigworld

The Outer Worlds

= Orbits beyond HZ+1.

+HZ OUTERS

Code	Description
1	Worldlet
2	Iceworld
3	Iceworld
4	BigWorld
5	Iceworld
6	Radworld

OUTER SATELLITES

1D	Description
1	Worldlet
2	Worldlet
3	Iceworld
4	Innerworld
5	Stormworld
6	Radworld
7	Bigworld

H1

**WORLDGEN
INNER SYSTEM**

This page is quick reference to the HZ and distances of the Inner System.

100D JUMP DRIVE LIMIT

	la	lb	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		*	*	*

100 D Limit within Orbit shown. Jump Drives cannot operate this limit.

1000D MANEUVER DRIVE LIMIT

	la	lb	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	*

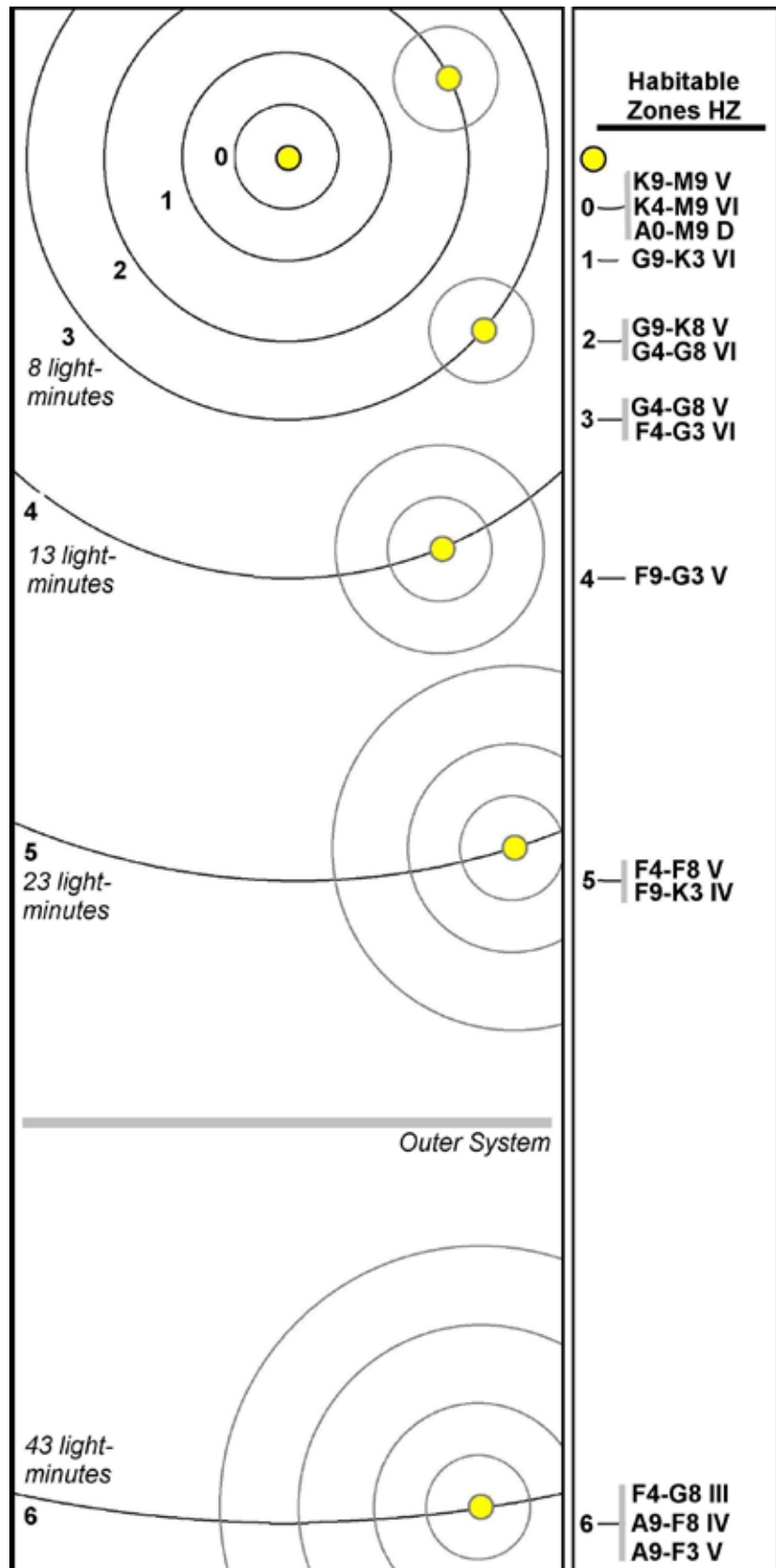
1000 D Limit beyond Orbit shown. Maneuver Drives cannot operate outside the 1000D Limit.

10D GRAVITIC DRIVE LIMIT

	la	lb	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		*	*	*

10 D Limit beyond Orbit shown. Gravitic Drives cannot operate outside the 10D Limit.

* = inside Orbit 0. Blank (K5-M9 IV, A0-F4 VI). Not possible.



J1

WORLDGEN OUTER SYSTEM

This page is quick reference to the HZ and distances of the Inner System.

100D JUMP DRIVE LIMIT

	la	lb	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		*	*	*

100 D Limit within Orbit shown.
Jump Drives cannot operate this limit.

1000D MANEUVER DRIVE LIMIT

	la	lb	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	*

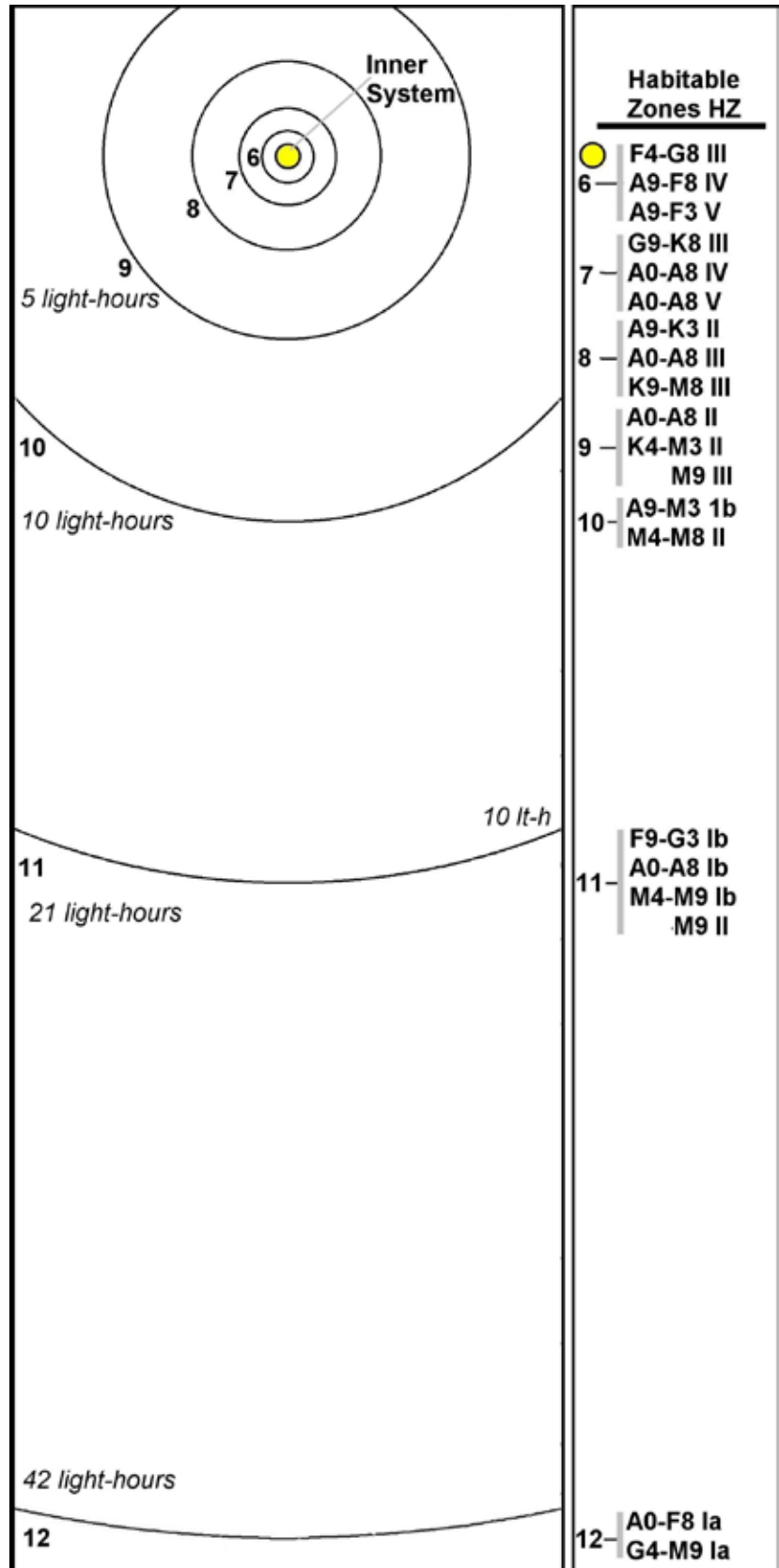
1000 D Limit beyond Orbit shown.
Maneuver Drives cannot operate outside the 1000D Limit.

10D GRAVITIC DRIVE LIMIT

	la	lb	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		*	*	*

10 D Limit beyond Orbit shown.
Gravitic Drives cannot operate outside the 10D Limit.

* = inside Orbit 0. Blank (K5-M9 IV, A0-F4 VI). Not possible.



K1

WORLDGEN REMOTE SYSTEM

This page is quick reference to the HZ and distances of the Inner System.

100D JUMP DRIVE LIMIT

	la	lb	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		*	*	*

100 D Limit within Orbit shown. Jump Drives cannot operate this limit.

1000D MANEUVER DRIVE LIMIT

	la	lb	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	*

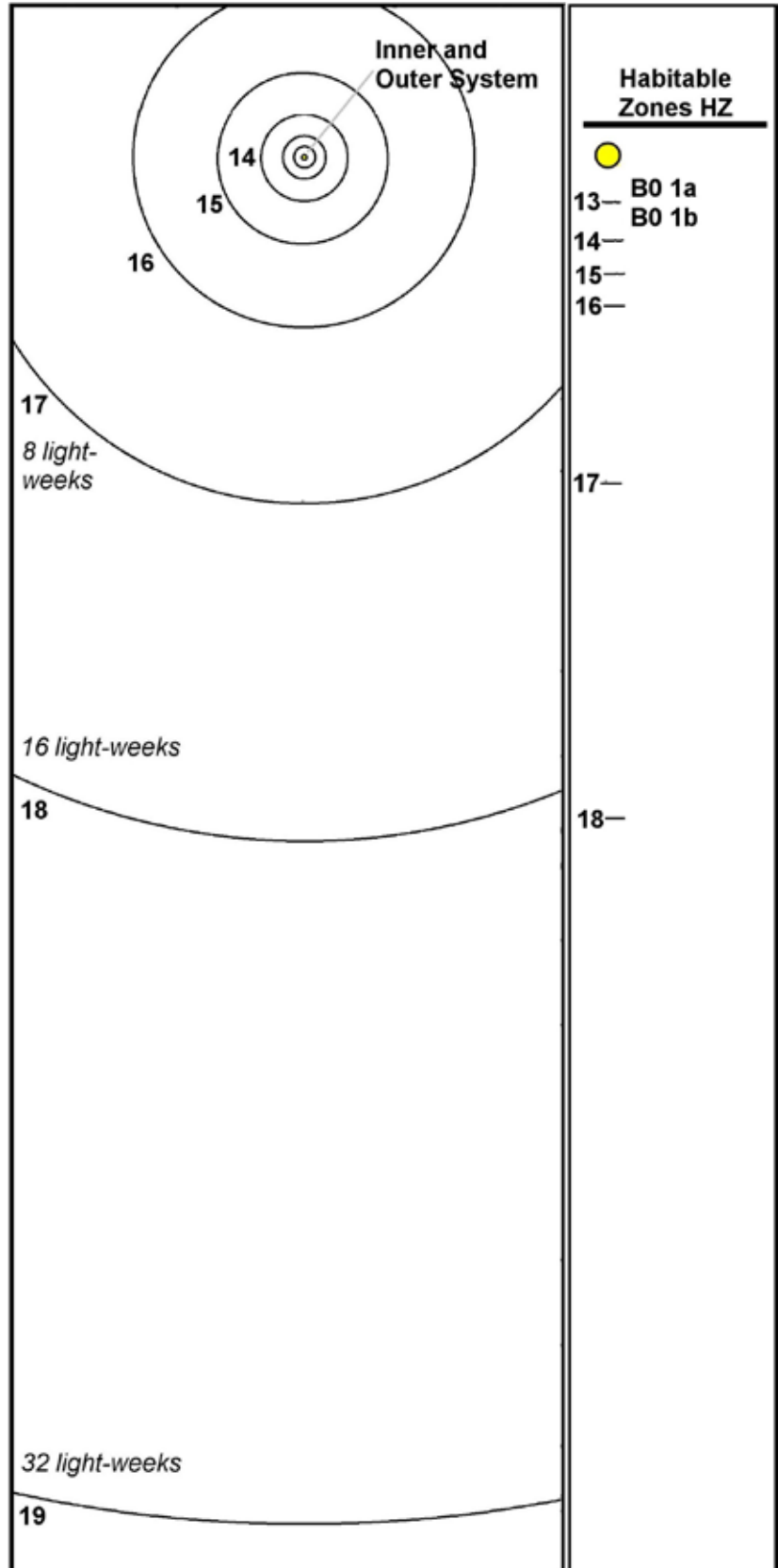
1000 D Limit beyond Orbit shown. Maneuver Drives cannot operate outside the 1000D Limit.

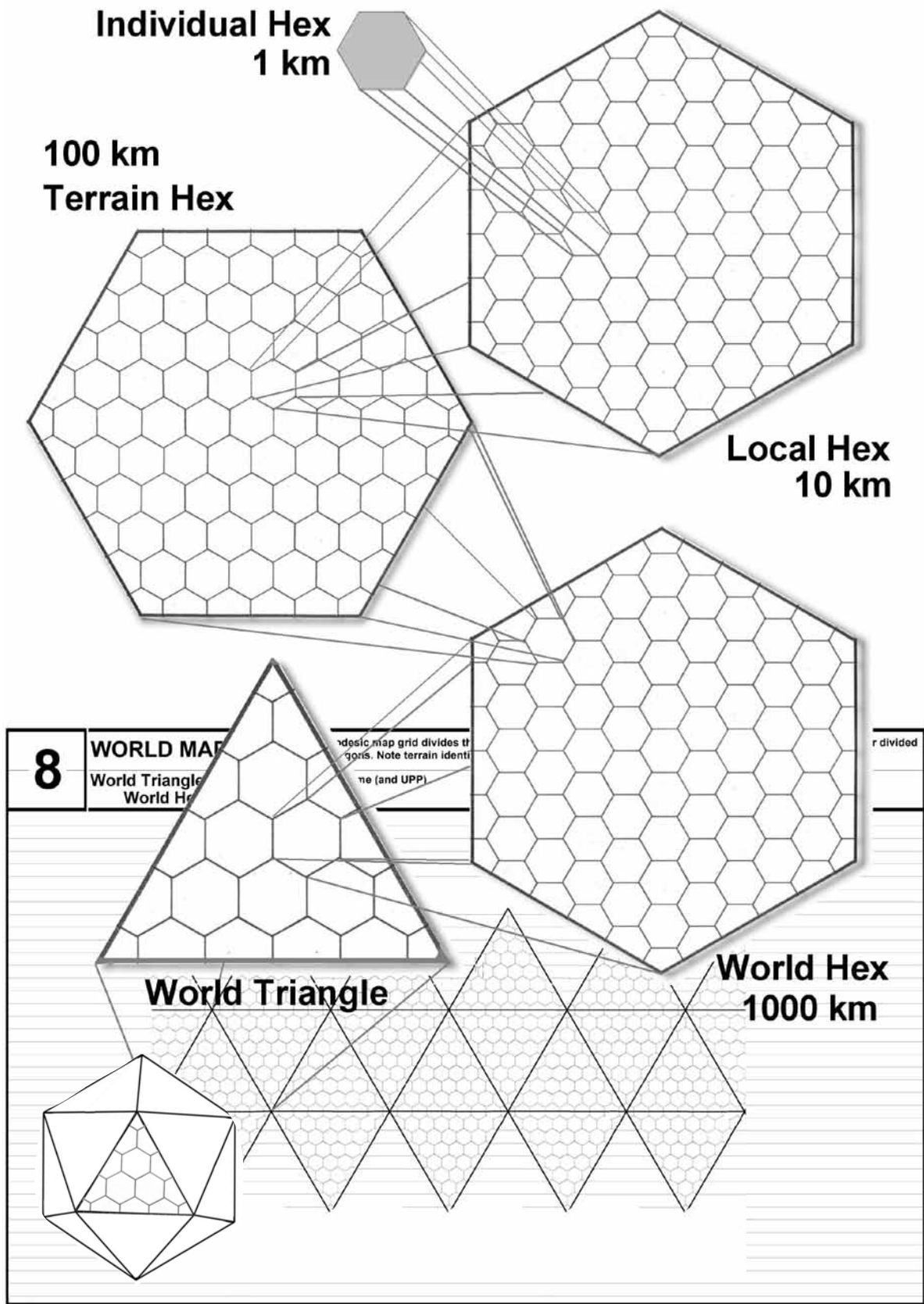
10D GRAVITIC DRIVE LIMIT

	la	lb	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		*	*	*

10 D Limit beyond Orbit shown. Gravitic Drives cannot operate outside the 10D Limit.

* = inside Orbit 0. Blank (K5-M9 IV, A0-F4 VI). Not possible.





World Mapping

The surface features of worlds are the key to exploring and exploiting worlds. Terrain details the character of large and small locations, controls or bars movement by vehicles, and records positions of objects and characters.

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.

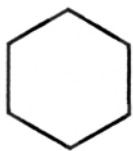
Hex Size. Hex size reflects the distance from the center of a hex to the center of an adjacent similarly sized hex. This value is occasionally called the Diameter of a hex. Hexes are universally even decimal multiples of meters (100 meters, 1,000 meters, 10 kilometers, and such).

The Poles. Worlds are spinning spheres; their poles are 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.

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.



Hexagon Types

For mapping purposes, hexagons (hexes) may be horizontal (the flat edges are on the left and right) or vertical (the flat edges are on the top and bottom).



Each hex is a general geographic (or planetographic) location identified by one of more symbols.

The System 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 (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 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 Traveller Mapping System.

The 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 otherwise 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.

Map Only As Really Necessary.

Map At The Highest Possible Scale.

Involve The Players.

Map Only As Really Necessary. The charts allow random selection of hexes with a few die rolls. There is no need to 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 Scale Possible. Because terrain can be created as needed, reference maps for players can enough to provide them information without 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. Ships 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 Hex (or Terrain Hex, or Local Hex) map and the player, with guidance from the referee, creates and enters t

The Referee's Responsibility

The referee can (and should) determine specific terrain details which are important to an adventure. He can plan and map the strategic base the enemy will defend, or note 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

CREATING WORLD MAPS

The Mapping Charts detail the mapping process.

The Charts include:

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.

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.

The **Traveller Mapping System** uses different size World Maps corresponding to UWP Size. Most MainWorlds 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 Dimensions 01

WORLD MAP DIMENSION DETAILS

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

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	11,058	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		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.

** 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	2.13	2.64	3.22

Comments= 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

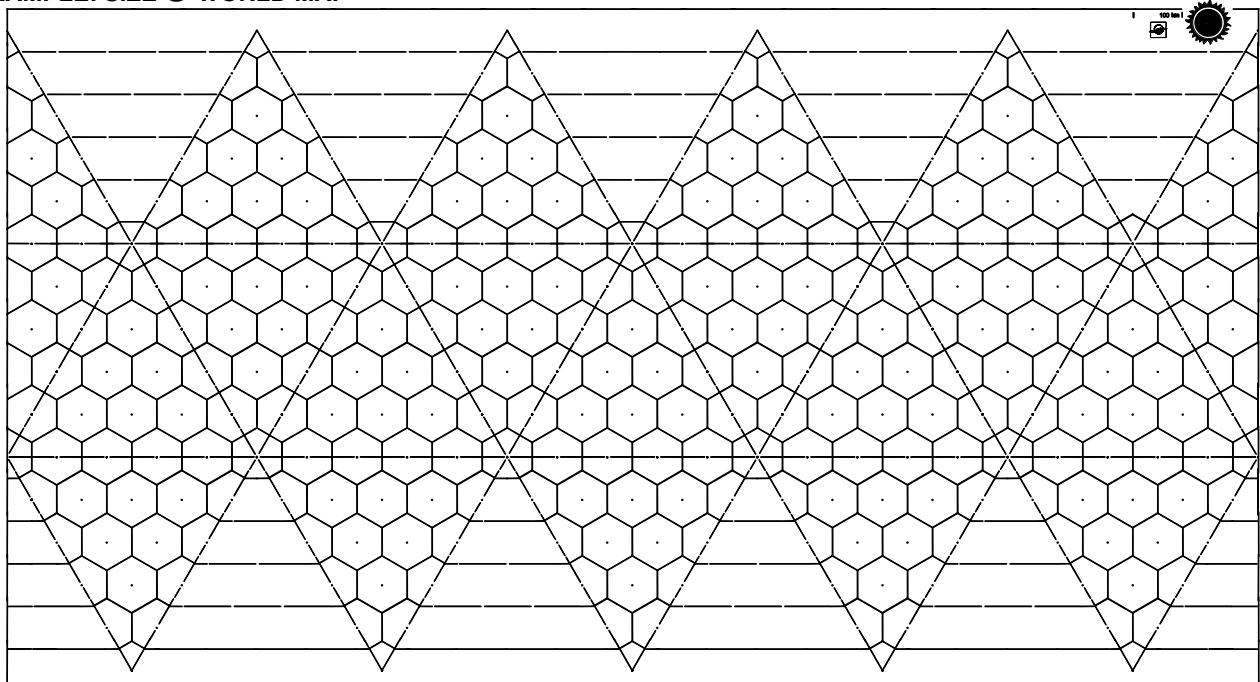
Comments= Size=20 World with 0.4 Density has 1 G surface Gravity and six times the surface hexes of Earth. It is probably low in heavy metals.

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 Triangle is the basic mapping division of a world's surface.

World Triangle 03

THE WORLD TRIANGLE

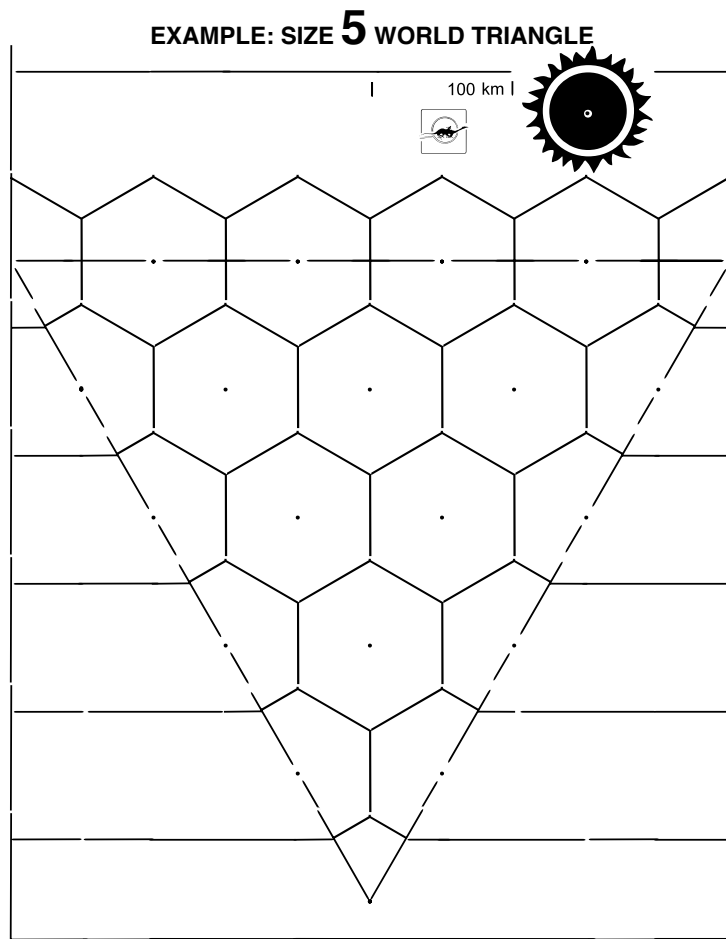
Worlds (planets, satellites) are mapped using a standard geodesic grid composed on constant size World Hexes.

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 in terms of Terrain. The individual World Hexes are the largest unit identified by Terrain.



04 World Hex

The World Hex is 1000 km in diameter (count 10 hexes from any edge to any opposite edge).

THE WORLD HEX

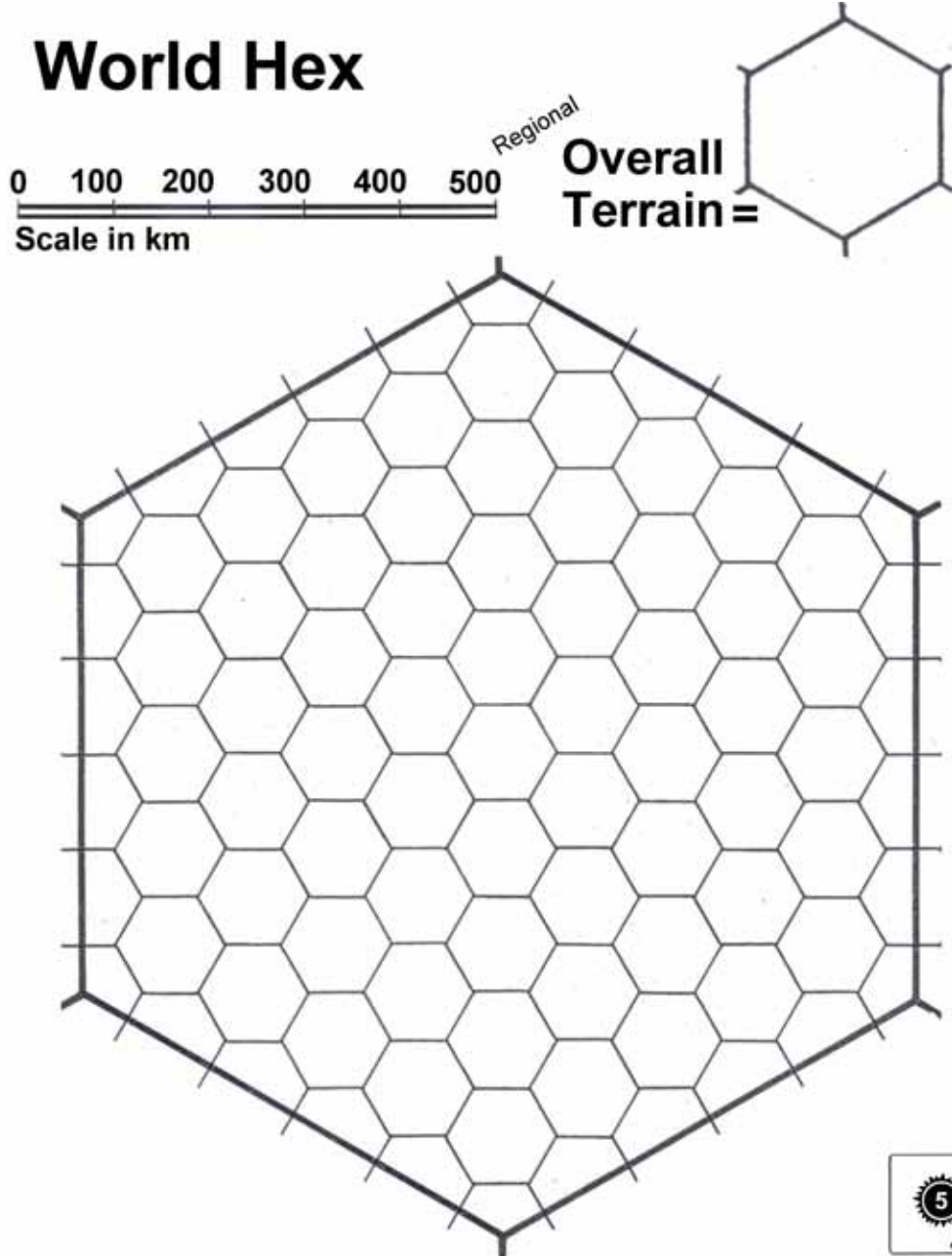
Worlds (planets, satellites) are mapped using a standard geodesic grid composed on constant size World Hexes.

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.

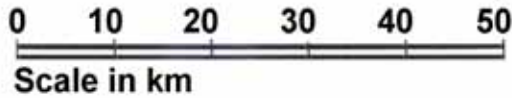
The Terrain within the World Hex is marked as Overall Terrain; terrain within the smaller hexes may vary.



The Terrain Hex is 100 km in diameter (count 10 of 10 km each from any edge to any opposite edge).

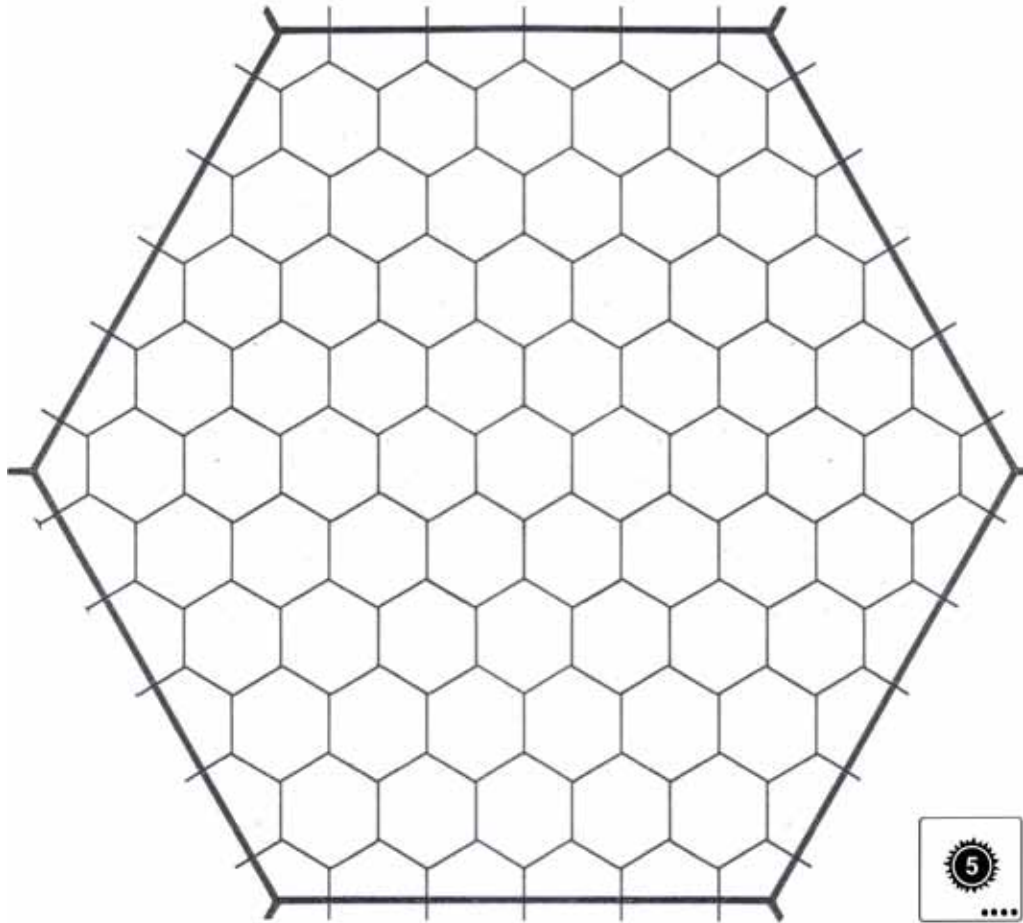
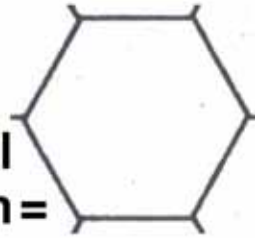
Terrain Hex 05

Terrain Hex



Vdistant

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

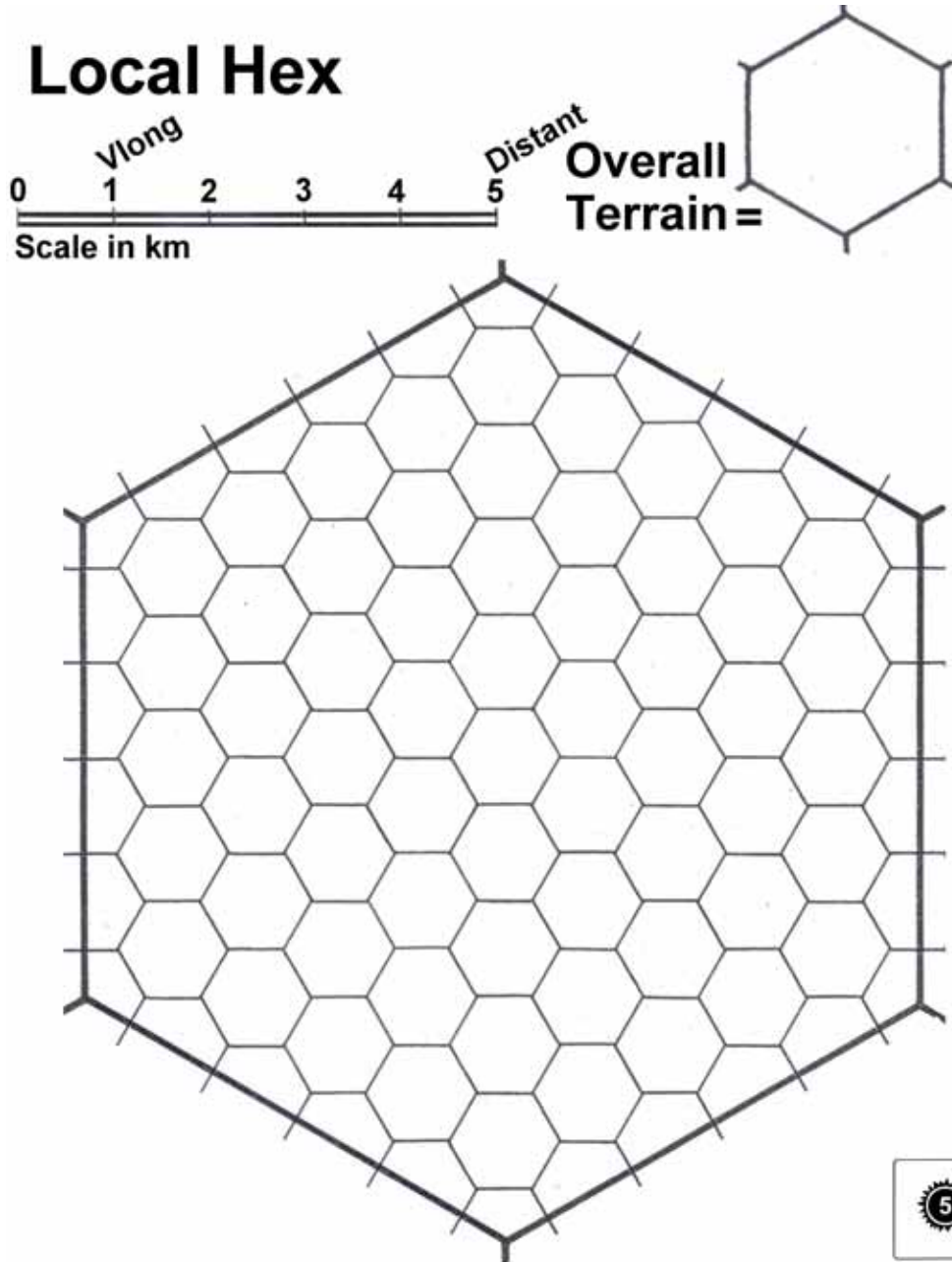
Terrain Hexes are divided into constant size Local Hexes.

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.

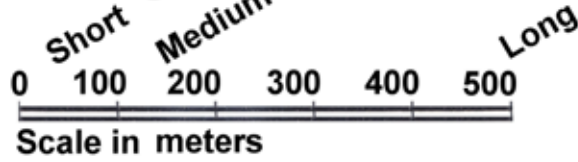
The Terrain within the Local Hex is marked as Overall Terrain; terrain within the smaller hexes may vary.



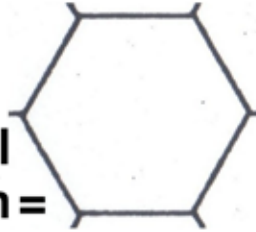
The Single Hex is 1 km in diameter (count 10 hexes of 100 meters from any edge to any opposite edge).

Single Hex 07

Single Hex



Overall Terrain =

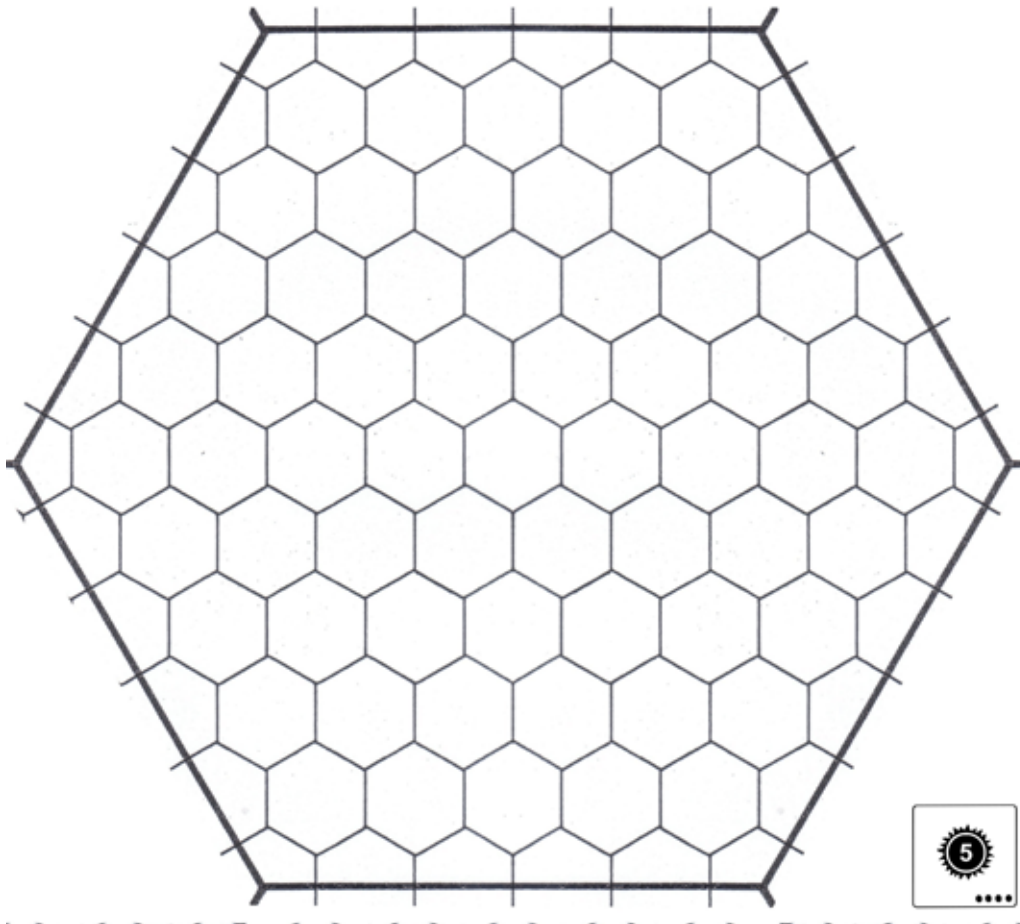


THE SINGLE HEX

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).

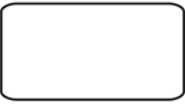







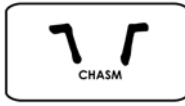
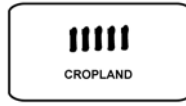


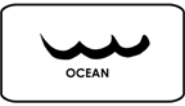

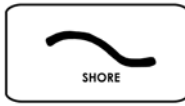

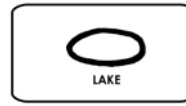
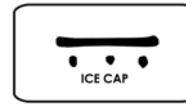

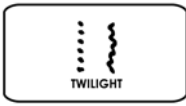



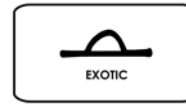








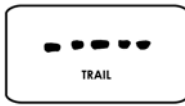

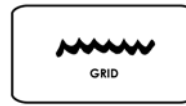



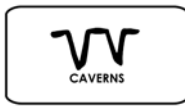
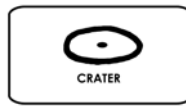

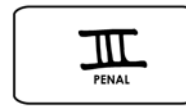



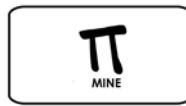

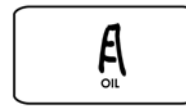






For position reference and for scale, the Single Hex is further divided into 100-meter hexes, which may contain structures or natural features.



08 Terrain Types



Terrain Symbols By Hand 09

	 MARSH	 ROUGH	 WOODLANDS	 SWAMP	 ROUGH WOODS
Clear	Marsh	Rough	Woods	Swamp	Rough Wood
 MOUNTAINS	 DESERT	 CHASM	 CROPLAND	 RURAL	 RUINS
Mountain	Desert	Chasm	Cropland	Rural	Ruins
 OCEAN	 ISLANDS	 SHORE	 RIVER	 LAKE	 ICE CAP
Ocean	Islands	Shore	River	Lake	Icecap
 BAKED LANDS	 TWILIGHT	 FROZEN LANDS	 ICE FIELD	 PRECIPICE	 EXOTIC
Baked Lands	Twilight	Frozen Lands	Ice Field	Precipice	Exotic
 CITY	 DOME	 ARCOLOGY	 SUBURBS	 TOWN	 STARPORT
City	Dome	Arcology	Suburbs	Town	Starport
 HIGHWAY	 ROAD	 TRAIL	 AIR CORRIDOR	 GRID	 HIGH SPEED
Highway	Road	Trail	Air Corridor	Grid	High Speed
 OCEAN DEPTH	 OCEAN ABYSS	 CAVERNS	 CRATER	 WASTELAND	 PENAL
Ocean Depth	Abyss	Caverns	Crater	Wasteland	Penal
 VOLCANO	 ESTATE	 RESERVE	 MINE	 RESOURCES	 OIL
Volcano	Estate	Reserve	Mine	Resource	Oil
 AIRPAD 1	 VLITE AIRSTRIP 2	 LITE AIRSTRIP 3	 AIRPORT MED 4	 AIRPORT HEAVY 5	 AIRPORT VHEAVY 6
Airpad	Vlite Airstrip	Lite Airstrip	Airport	Heavy Airport	Vheavy Airport

10 Random Places

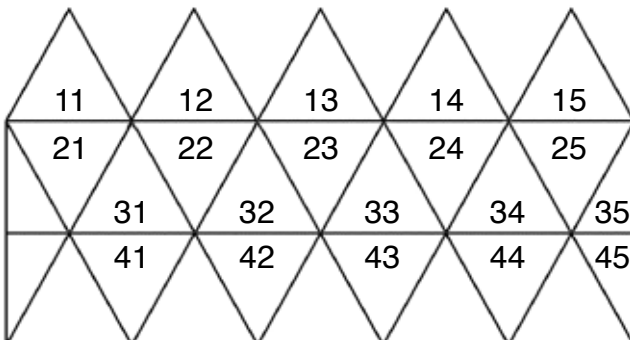
RANDOM PLACES

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).



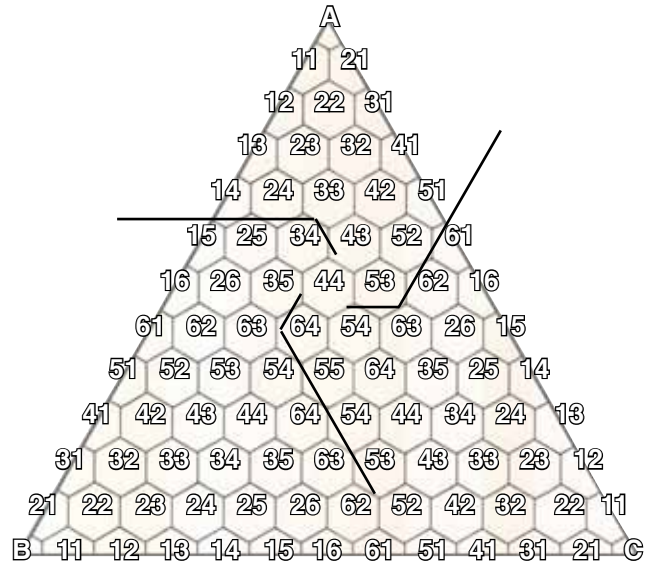
Locations for places (Triangles, World Hexes, Terrain Hexes, Local Hexes) and for the placement of terrain can be randomly selected.

Select A World Hex In A Triangle

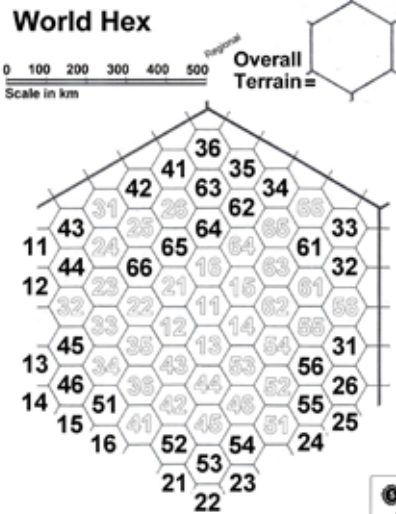
To randomly select a World Hex within a Triangle, roll 1D to select vertex A, B, or C. Then roll 2D for the hex location.

If the Triangle is smaller than the roll, re-roll. If the Triangle is larger break it into smaller Triangles and then randomly select.

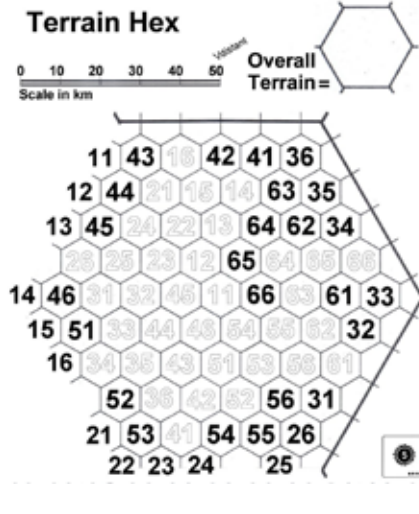
This random selection will not locate a Pent.



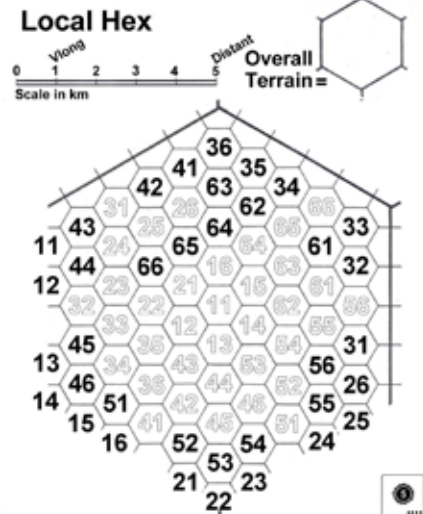
Select A Terrain Hex Within A World Hex



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).

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.

Creating World Maps 11

WORLD DETAILS

St	S	A	H	P	G	L	-	T	TCs	L	R	I	B	HZ

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 20.
19. **Non-Industrial.** Place one Town.
20. **Cities.** Place Cities equal to Pop, one per Continent. If Atm=0-1, A-C, or E+ = Domed.
21. **High Population.** Place total Pop/2 Archologies.
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 TYPE
Resource
Mountains
Chasm
Precipice
Ruins
Crater
Desert
Ocean
Shore
Islands
Ice Caps
Ice Field
Frozen Lands
Cropland
Town
City
Domed
Archology
Rural
Starport
Twilight Zone
Baked Lands
Penal
Wasteland
Exotic
Clear

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.

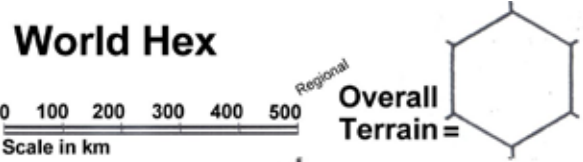
SELECT THE WORLD HEX

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.

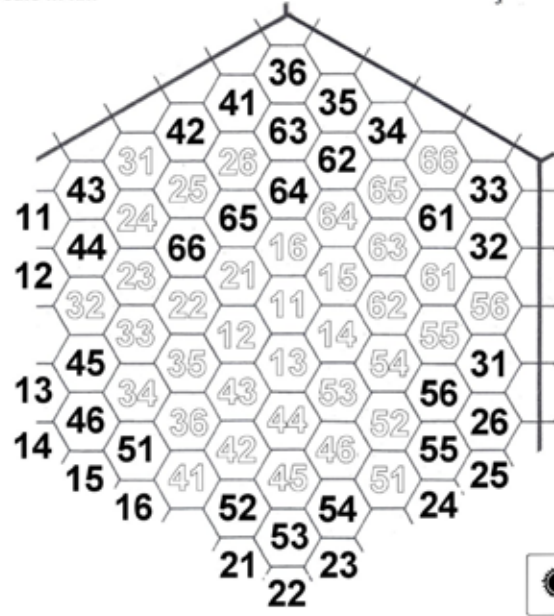


WORLD HEXES

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.



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.

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	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

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	Ocean. Sea.	Oc	Ocean. If surrounding World Hexes are Ocean, mark Ocean Depth.	Ocean.
33	Shore		Ocean if on the Ocean side of Shore; otherwise Land.	Land.
21	Mountains		If Shore, Land is Mountain; Ocean is Islands.).	Other.
23	Chasm		Chasm walls become Precipices.	Other.
45	Precipice		Mark each hex on the previously drawn Precipice Lines Precipice.	Other.
26	Ruins		Place 1D Ruins in BNH.	Other
74	Crater		Place 2D Craters in WNH (represents a Field of Craters).	Other.
22	Desert		Desert. Convert 2D WNH to Clear.	Desert.
32	Islands		Place 1D Islands (Archipelago) in WNH.	Ocean.
36	Ice-Cap		Ice Cap.	Ice Cap.
44	Ice Field		Ice Field.	Ice Field.
43	Frozen Lands		Frozen Lands.	Frozen Lands
24	Cropland		Cropland.	Other
55	Town	Hi	Place one Town in a WNH.	Other.
51	City	Hi	Place one City in a WNH.	Other.
52	Domed	Hi	Place one Domed in a WNH.	Other.
53	Archology		Place one Archology in a WNH.	Other.
25	Rural		Rural.	Other.
56	Starport		Place one Starport in a WNH.	Other.
41	Baked Lands		Baked Lands.	Baked Lands
11	Clear		Place 2D Rough in WNH.	Clear
11	Clear	N1	Place 2D Wood in WNH.	Rough Wood
11	Clear	N2	Place 2D Marsh in WNH.	Clear
11	Clear		Place 1D Lakes in WNH. Join adjacent Lakes.	
13	Rough	N2	Place 2D Swamp in WNH.	
85	Resource		Place 2D Resource in WNH.	Other
75	Wasteland		Wasteland.	Other
46	Exotic		Place 2D Exotic in WNH.	Other
82	Noble Lands		Place one Noble Land	Other
76	Penal		Place 1D Penal Colony.	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.

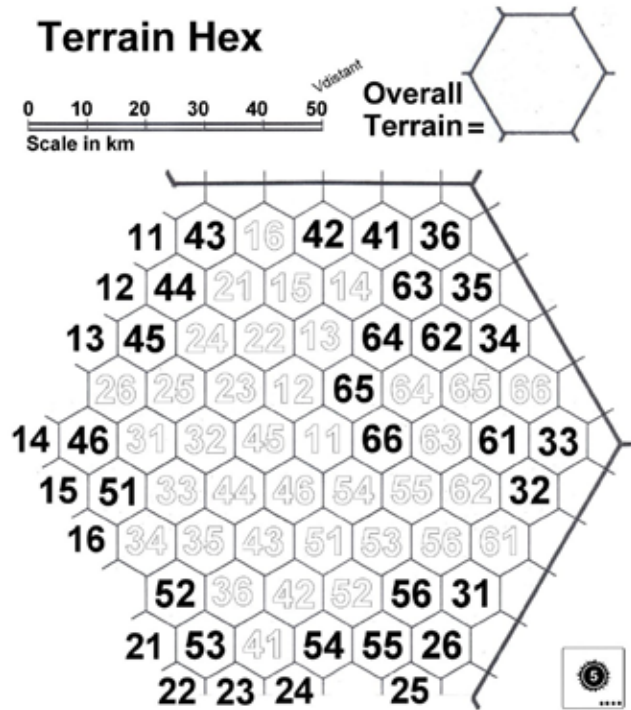
SELECT THE TERRAIN HEX

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.



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.

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 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	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

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	Ocean. Sea.		Ocean.	Ocean.
71	Ocean Depth		Ocean Depth. Place 1D Abyss in WNH.	Ocean
33	Shore		Ocean if on the Ocean side of Shore; otherwise Land.	Land.
21	Mountains		If Shore, Land is Mountain ; Ocean is Islands.	Other.
23	Chasm Line		Chasm walls are Precipices.	Other.
45	Precipice		Mark each hex on the previously drawn Precipice Lines Precipice.	Other.
26	Ruins		Place 1D Ruins in BNH.	Other
74	Crater		Place 2D Craters in WNH.	Other.
22	Desert		Desert. Convert 2D WNH to Clear.	Desert.
32	Islands		Place 1D Islands in WNH. Join adjacent islands.	Ocean.
36	Ice-Cap		Ice Cap.	Ice Cap.
44	Ice Field		Ice Field.	Ice Field.
43	Frozen Lands		Frozen Lands.	Frozen Lands
24	Cropland		Cropland.	Other
55	Town	Hi	Place 1D Towns in a WNH.	Other.
51	City	Hi	Place one City in a WNH. Place Suburbs in adjacent WNH.	Other.
52	Domed	Hi	Place one Domed in a WNH.	Other.
53	Archology		Place one Archology in a WNH.	Other.
25	Rural		Rural.	Other.
56	Starport		Place Starport in WNH. Place 2 City in adjacent WNH.	Other.
41	Baked Lands		Baked Lands.	Baked Lands
11	Clear		Clear	Other
13	Rough		Rough. Place 2D Clear in WNH.	Clear
14	Wood		Wood. Place 2D Clear in WNH.	Clear
12	Marsh		Marsh. Place 2D Clear in WNH.	Clear
15	Swamp		Swamp. Place 2D Clear in WNH.	Woods
35	Lake		Lake. Place 1D Islands in WNH. Join adjacent Islands.	Other
85	Resource		Place 1D each Resource, Mines, Resource Oil in WNH.	Other
75	Wasteland		Wasteland.	Other
46	Exotic		Exotic. Place 1D Volcanic in WNH.	Other.
82	Noble Lands		Noble Lands.	Other.
76	Penal		Penal Colony.	Other.

14a Populating Local Hexes

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.

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 0 km wide.

LOCAL HEXES

Each Single Hex within the Local Hex is about 1 kilometer (= 1000 meters) in diameter.

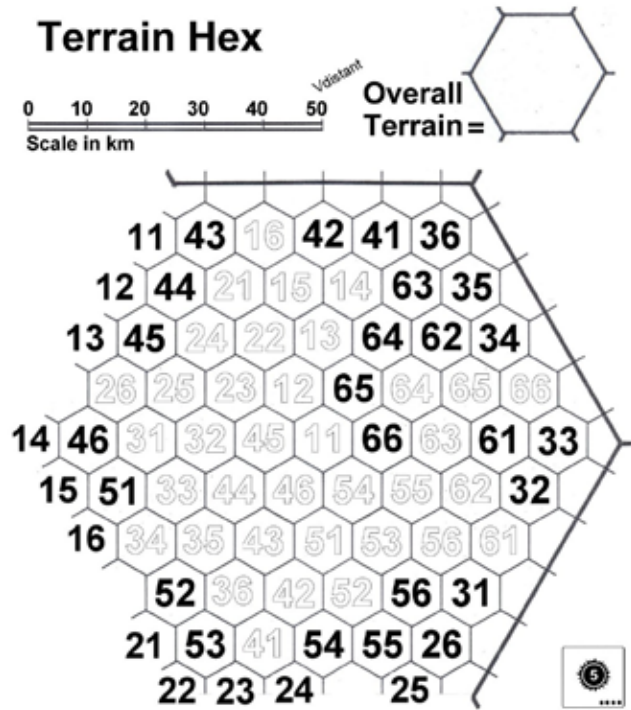
Line of Sight. The Horizon Chart shows the distance to the Horizon from any height.

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 Size= 8 world can see to the horizon which is 8 single hexes distant.

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



HORIZON FROM A SINGLE HEX

R=	R	T	1	2	3	4	5	6	7	8	9
	Short	Human	NearSurf	NOP	Airspace3	Airspace4	Airspace5	Mid	Upper	Orbit	Far Orbit
Size	0.5 m	1.7 m	5 m	50 m	150 m	500 m	1000 m	5 km	50 km	500 km	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

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.	Single Hex=	Note	The White Local Hex Is:	No.	Black Is:
	Ocean. Sea.		Ocean.		Ocean.
	Ocean Depth		Ocean Depth.		Ocean.
	Abyss		Abyss.		Ocean Depth.
	Shore		Ocean if on the Ocean side of Shore; otherwise Land.		Land.
	Mountains		If Shore, Land is Mountain; Ocean is Ocean.).		Other.
	Chasm		Chasm walls are Precipices.		Other.
	Precipice		Mark each hex on the previously drawn Precipice Lines Precipice.		Other.
	Ruins		Place 1D Ruins in WNH.		Other
	Crater		Place 2D Craters in WNH.		Other.
	Desert		Desert.		Desert.
	Islands		Island. Surround with Shore.		Ocean.
	Ice-Cap		Ice Cap.		Ice Cap.
	Ice Field		Ice Field.		Ice Field.
	Frozen Lands		Frozen Lands.		Frozen Lands
	Cropland		Cropland.		Other
	Town		Place Town in one WNH and all adjacent WNH.		Other.
	City		City.		Other.
	Suburb		Suburb.		Other.
	Domed		Place Domed in one WNH and all adjacent WNH..		Other.
	Archology		Place Archology in one WNH and all adjacent WNH.		Other.
	Rural		Rural.		Other.
	Starport		Starport.		City.
	Baked Lands		Baked Lands.		Baked Lands
	Clear		Clear. Place 1D Wood in WNH.		Other.
	Rough		Rough. Place 1D Clear in WNH.		Other.
	Wood		Wood.		Other.
	Marsh		Marsh. Place 1D Clear in WNH.		Other.
	Swamp		Swamp. Place 1D Clear in WNH.		Other.
	Lake		Lake. Surround by Shore.		Other.
	Resource		Resource, Resource Oil, or Mines (as specified).		Other.
	Wasteland		Wasteland		Other.
	Penal.		Penal.		

BLANK WORLD SURFACE MAPS

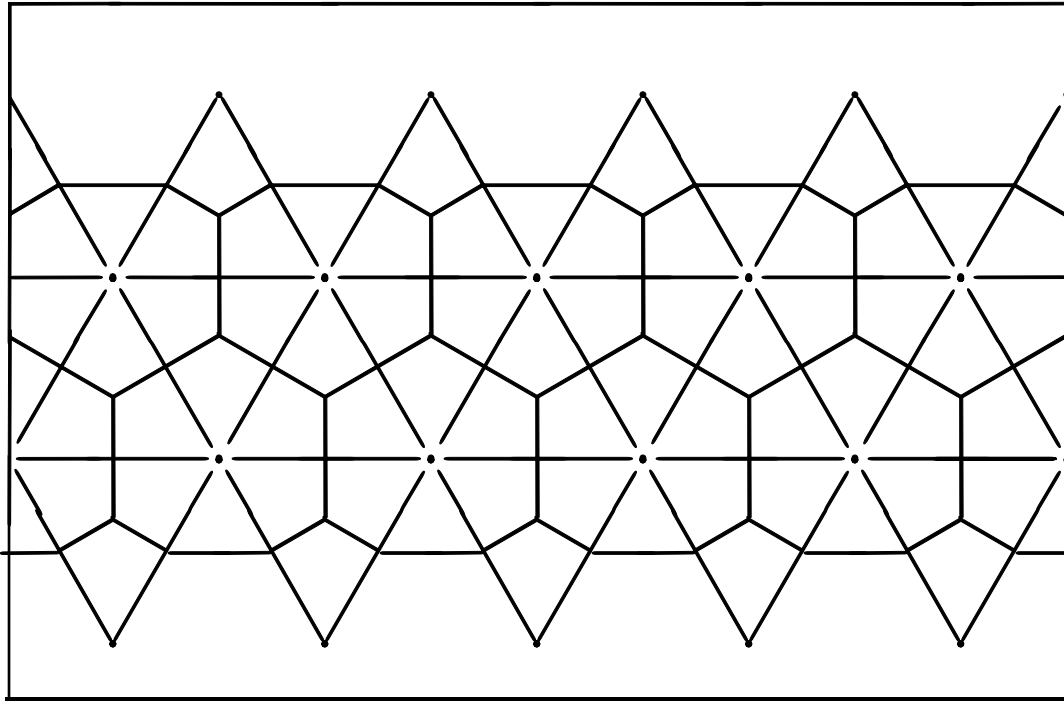
Blank world surface maps are provided for the standard world sizes 1 through 10, plus extraordinary worlds Size= 15 and 20 (Worlds Size=11-14 and are omitted here due to space limitations).

WORLD MAP DIMENSION DETAILS

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 01

SIZE **1** WORLD MAP

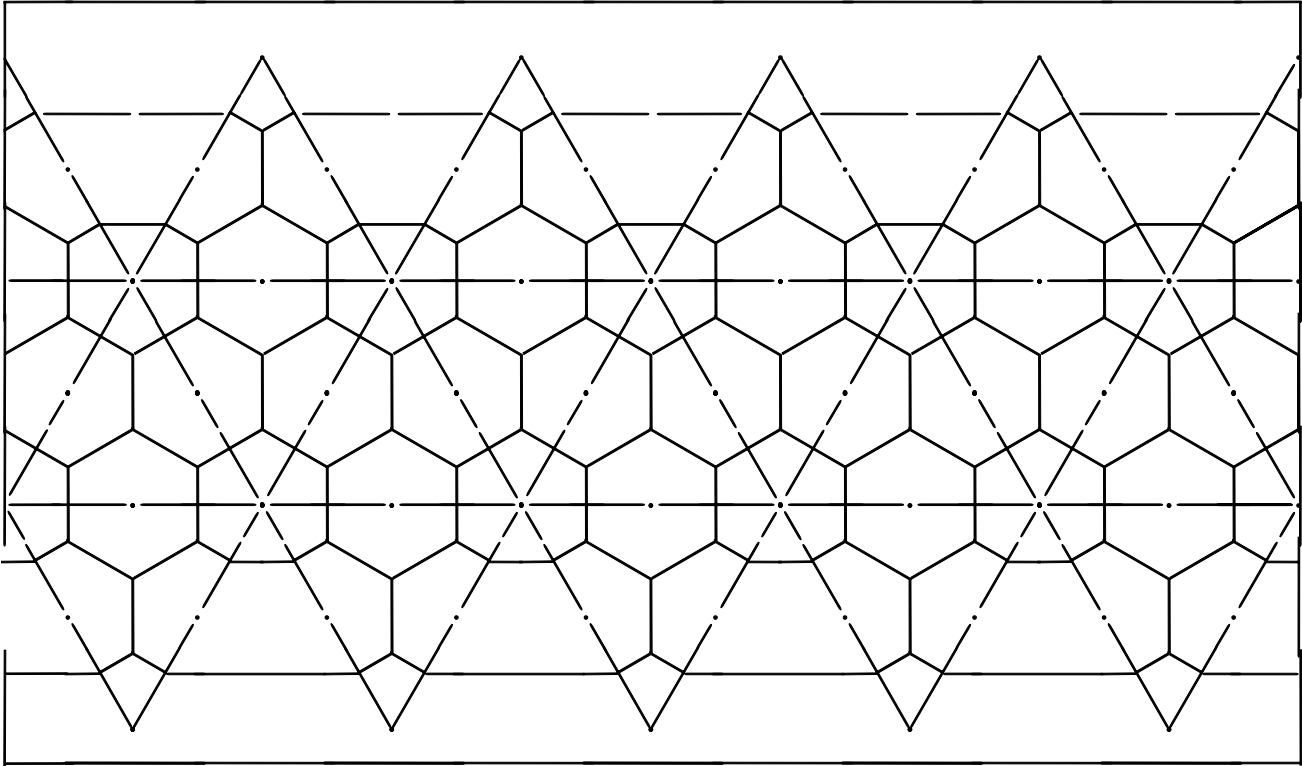


WORLD MAP DIMENSION DETAILS

Size		1
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/Triangle		0.5
World Hexes		12
Volume=	Earths	.002
**G=		.125

02 World Map

SIZE 2 WORLD MAP

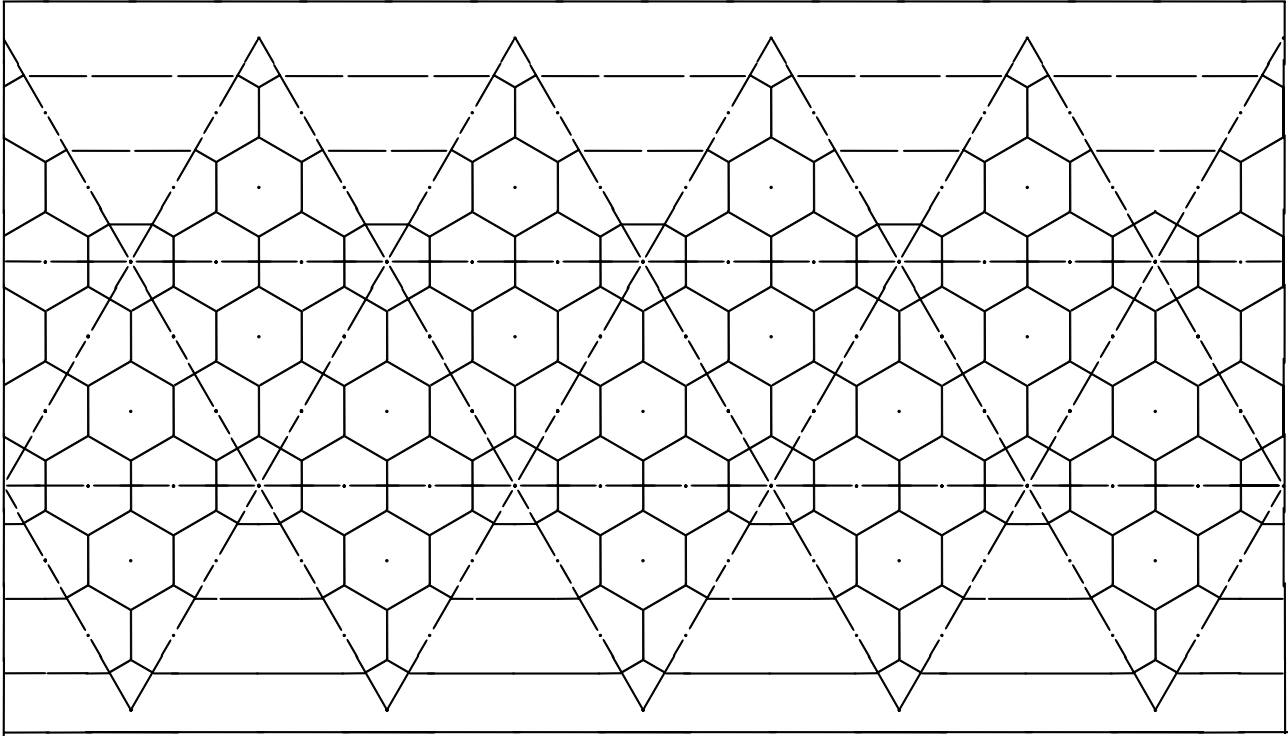


WORLD MAP DIMENSION DETAILS

Size		2
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/Triangle		2
World Hexes		42
Volume=	Earths	.01
**G=		.25

World Map 03

SIZE 3 WORLD MAP

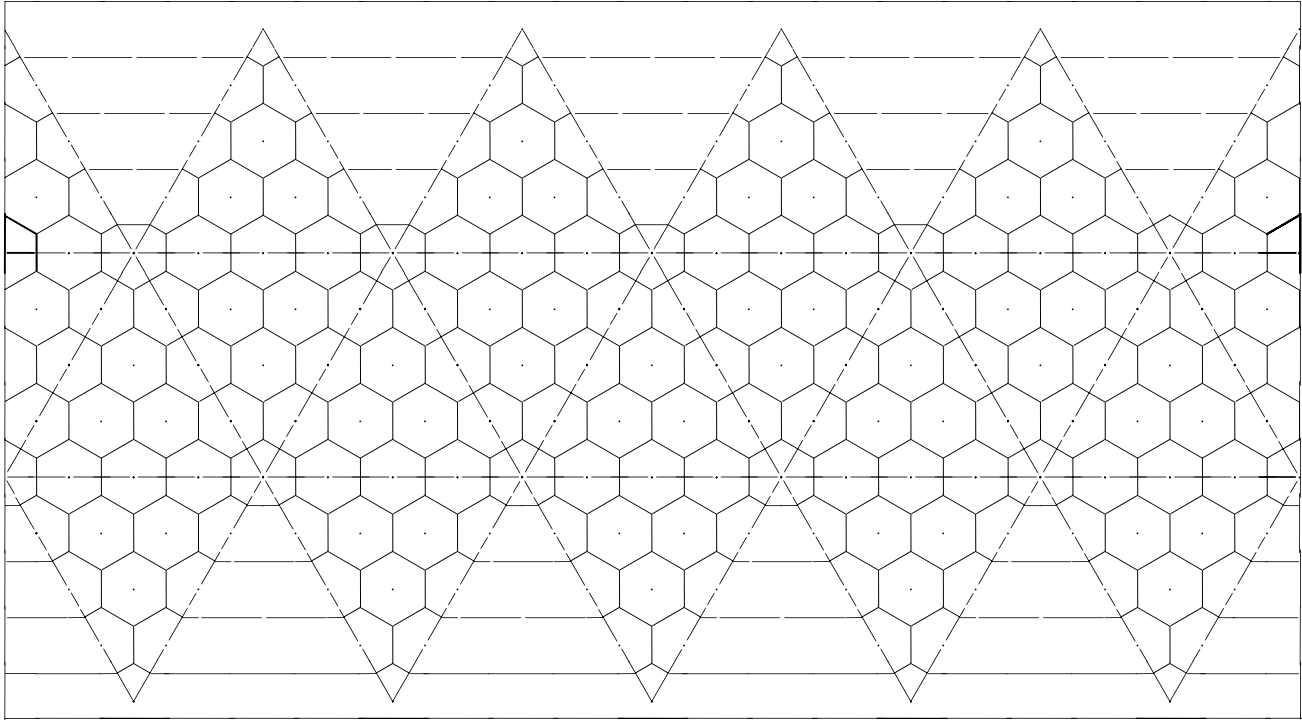


WORLD MAP DIMENSION DETAILS

Size		3
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/Triangle		4.5
World Hexes		92
Volume=	Earths	.05
**G=		.375

04 World Map

SIZE 4 WORLD MAP

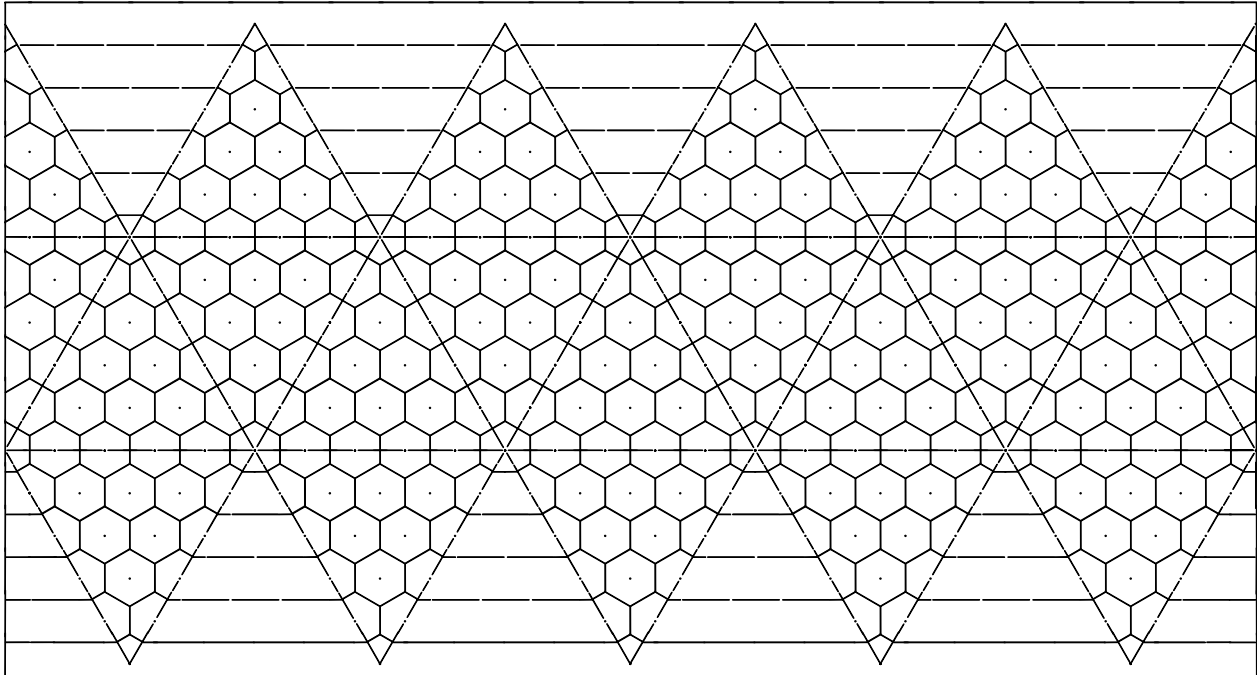


WORLD MAP DIMENSION DETAILS

Size		4
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/Triangle		8
World Hexes		162
Volume=	Earths	.125
**G=		.50

World Map 05

SIZE 5 WORLD MAP

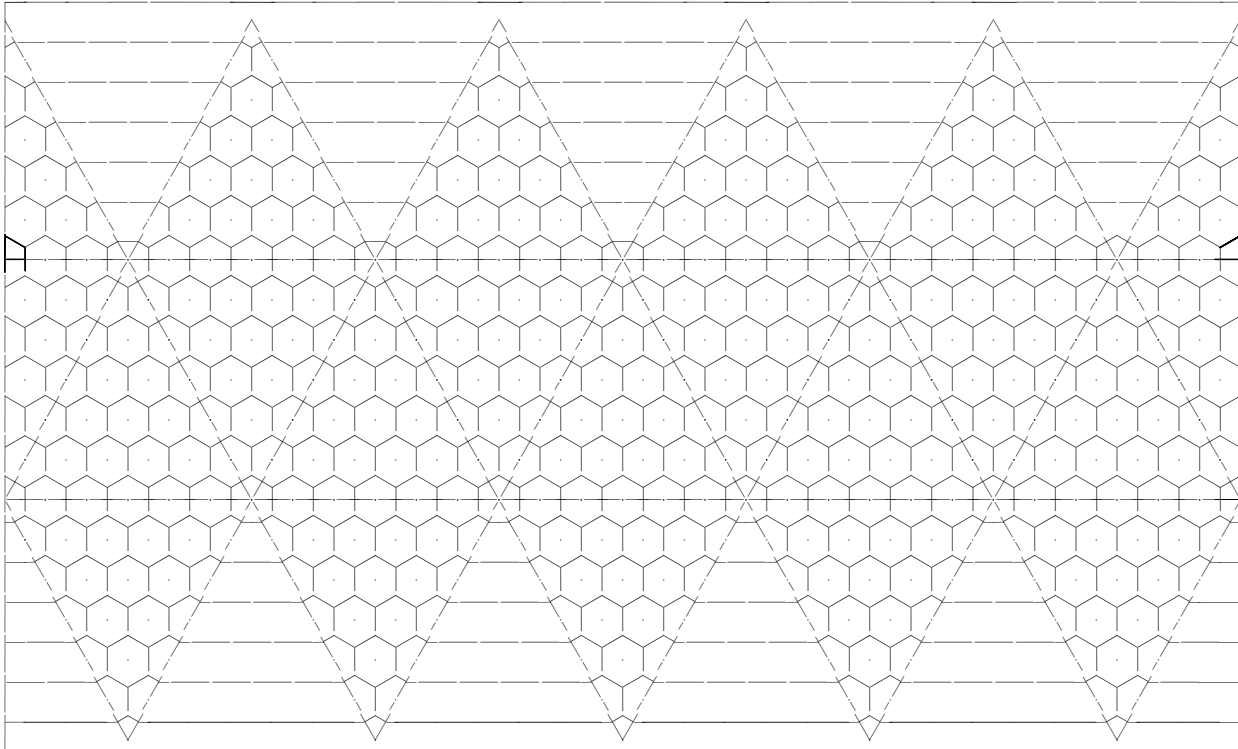


WORLD MAP DIMENSION DETAILS

Size		5
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/Triangle		12.5
World Hexes		252
Volume=	Earths	.25
**G=		.625

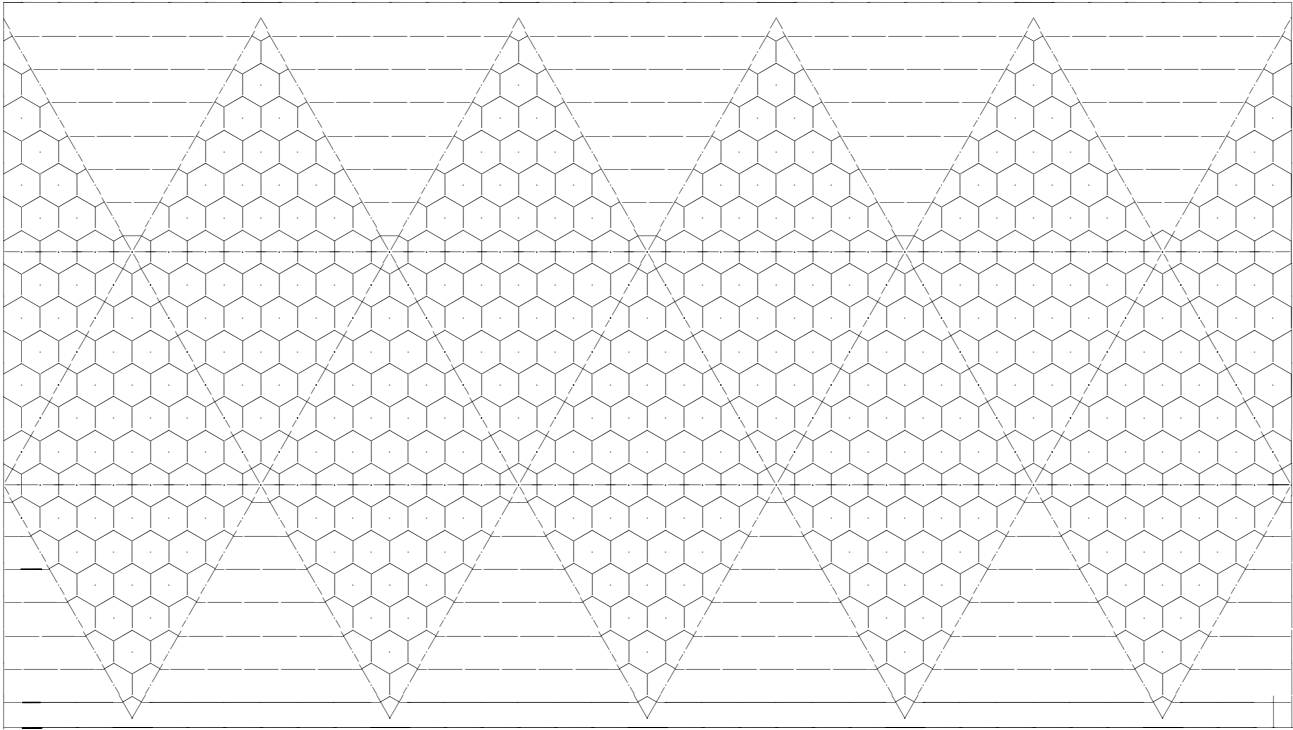
06 World Map

SIZE 6 WORLD MAP



WORLD MAP DIMENSION DETAILS

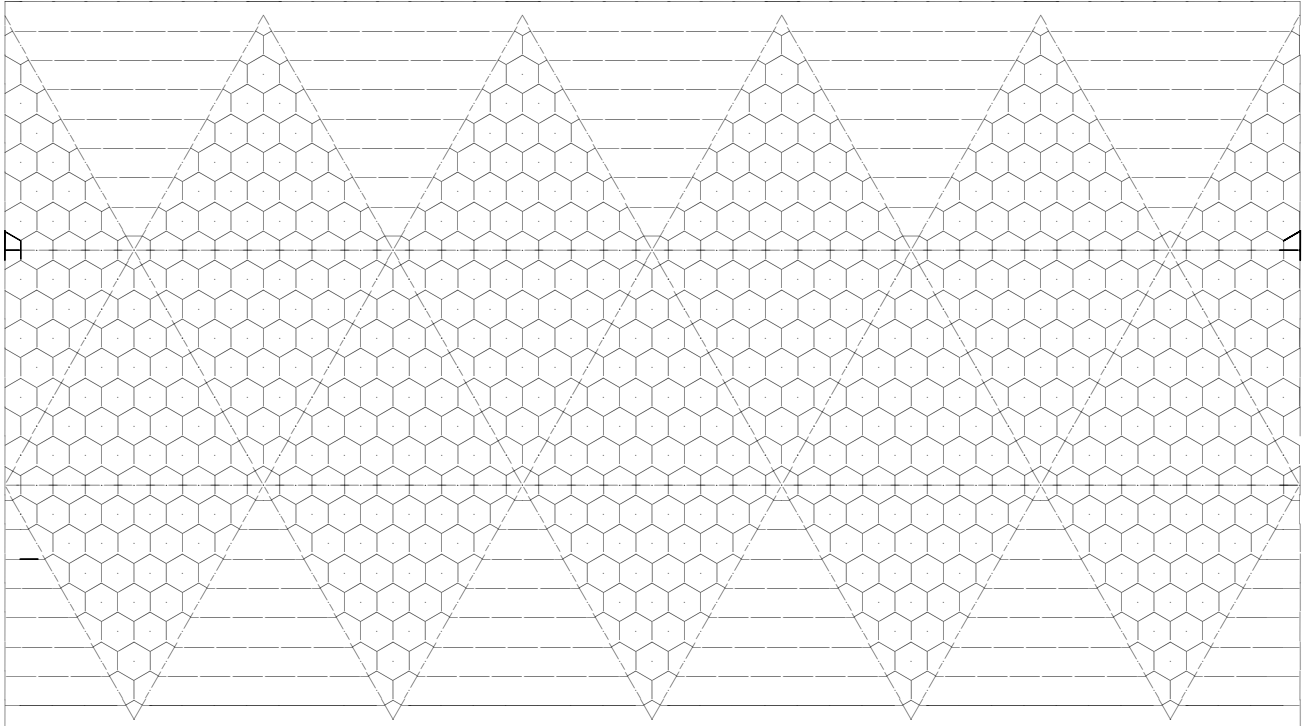
Size		6
Diameter	Miles	6,000
Diameter	Km	9,600
Radius	Km	4,800
Circumference*	Km	30,159
Triangle Edge	Km	6,032
Hex	Km	1,005
Hexes/Triangle		18
World Hexes		362
Volume=	Earths	.42
**G=		.75

World Map **07**SIZE **7** WORLD MAP**WORLD MAP DIMENSION DETAILS**

Size	7	
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/Triangle		24.5
World Hexes		492
Volume=	Earths	.67
**G=		.875

08 World Map

SIZE **08** WORLD MAP

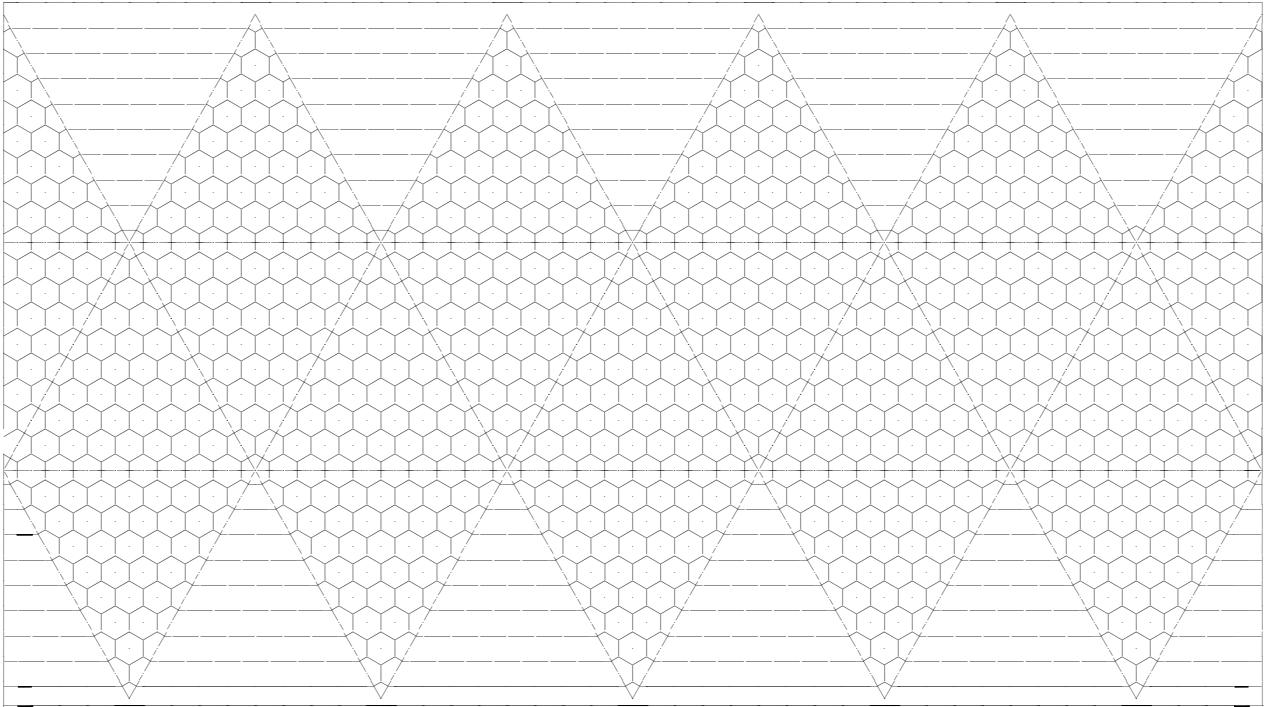


WORLD MAP DIMENSION DETAILS

Size		8
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/Triangle		32
World Hexes		642
Volume=	Earths	1
**G=		1

World Map 09

SIZE **09** WORLD MAP

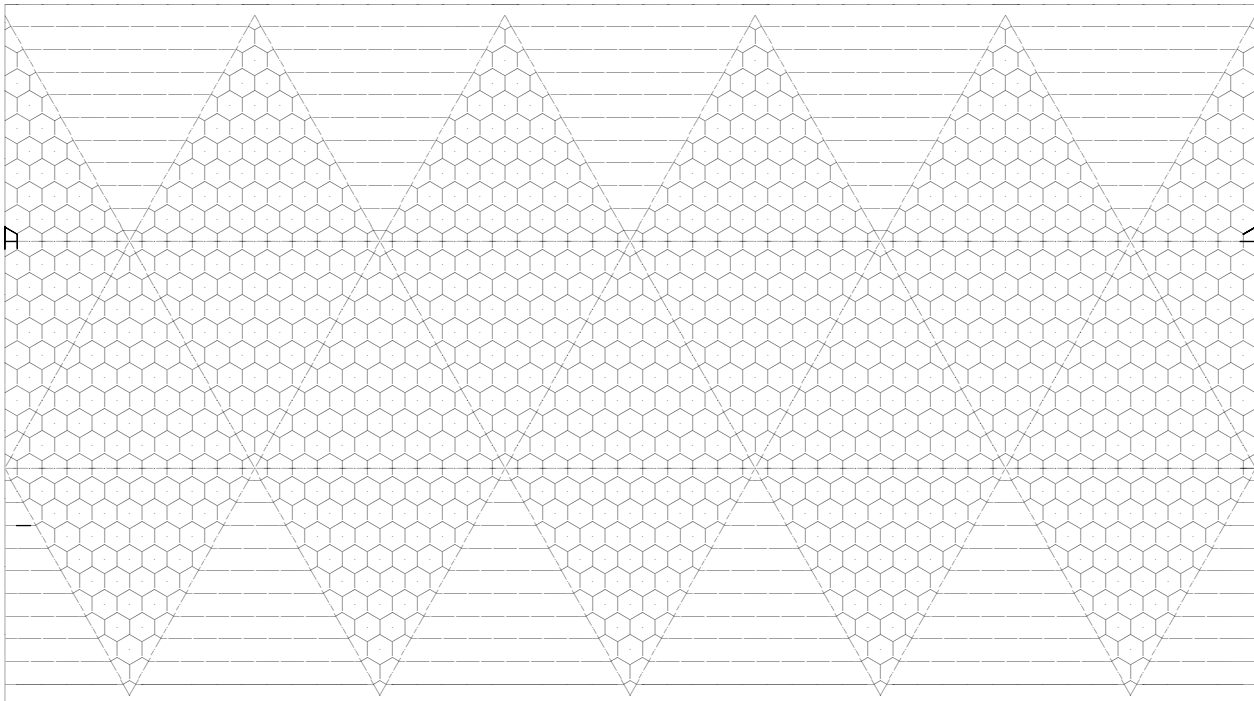


WORLD MAP DIMENSION DETAILS

Size		9
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/Triangle		40.5
World Hexes		812
Volume=	Earths	1.424
**G=		1.125

10 World Map

SIZE **10** WORLD MAP

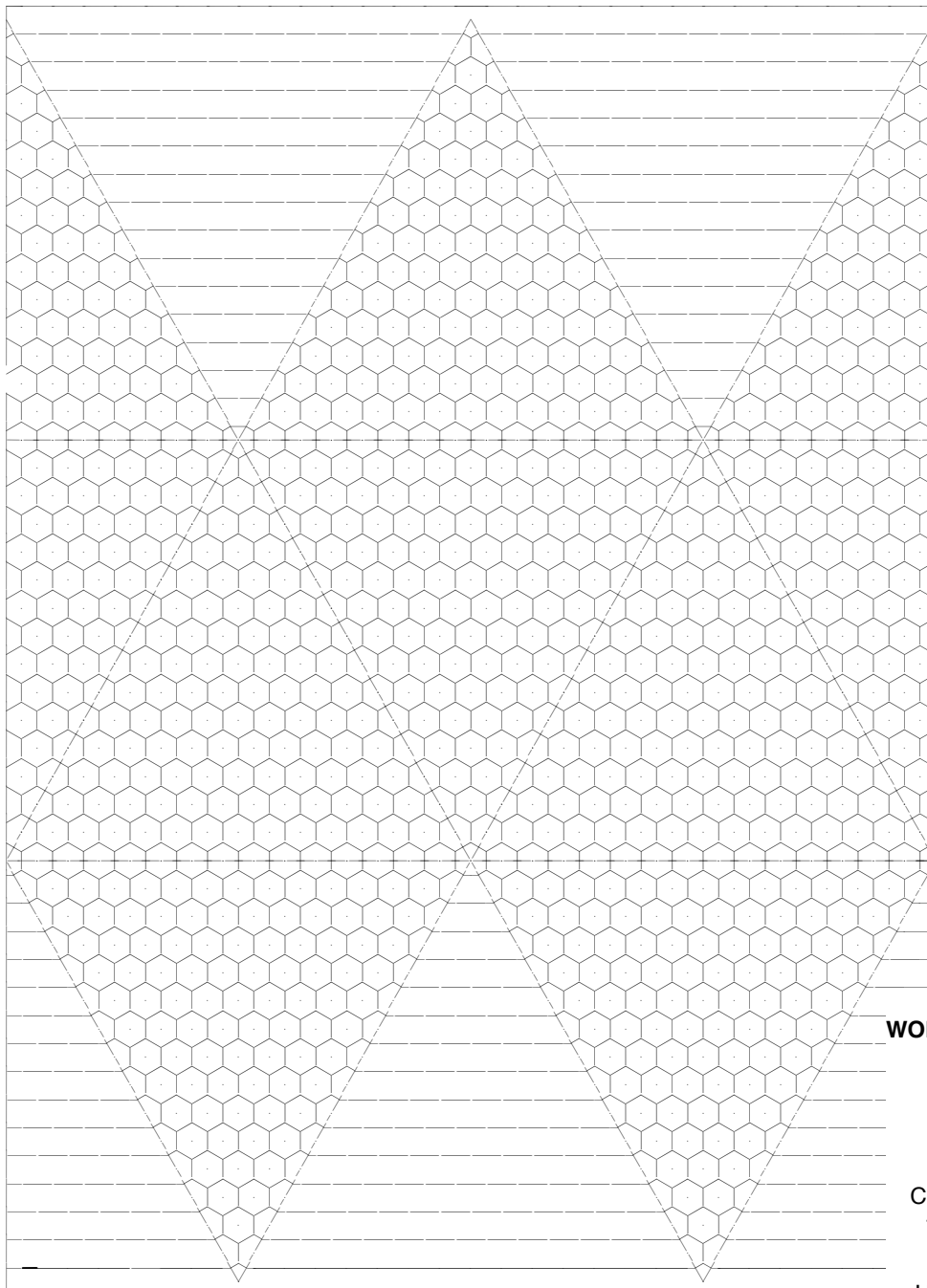


WORLD MAP DIMENSION DETAILS

Size		10
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		50
World Hexes		1002
Volume=	Earths	1.95
**G=		1.25

World Map 15

SIZE **15** WORLD MAP (HALF WORLD)

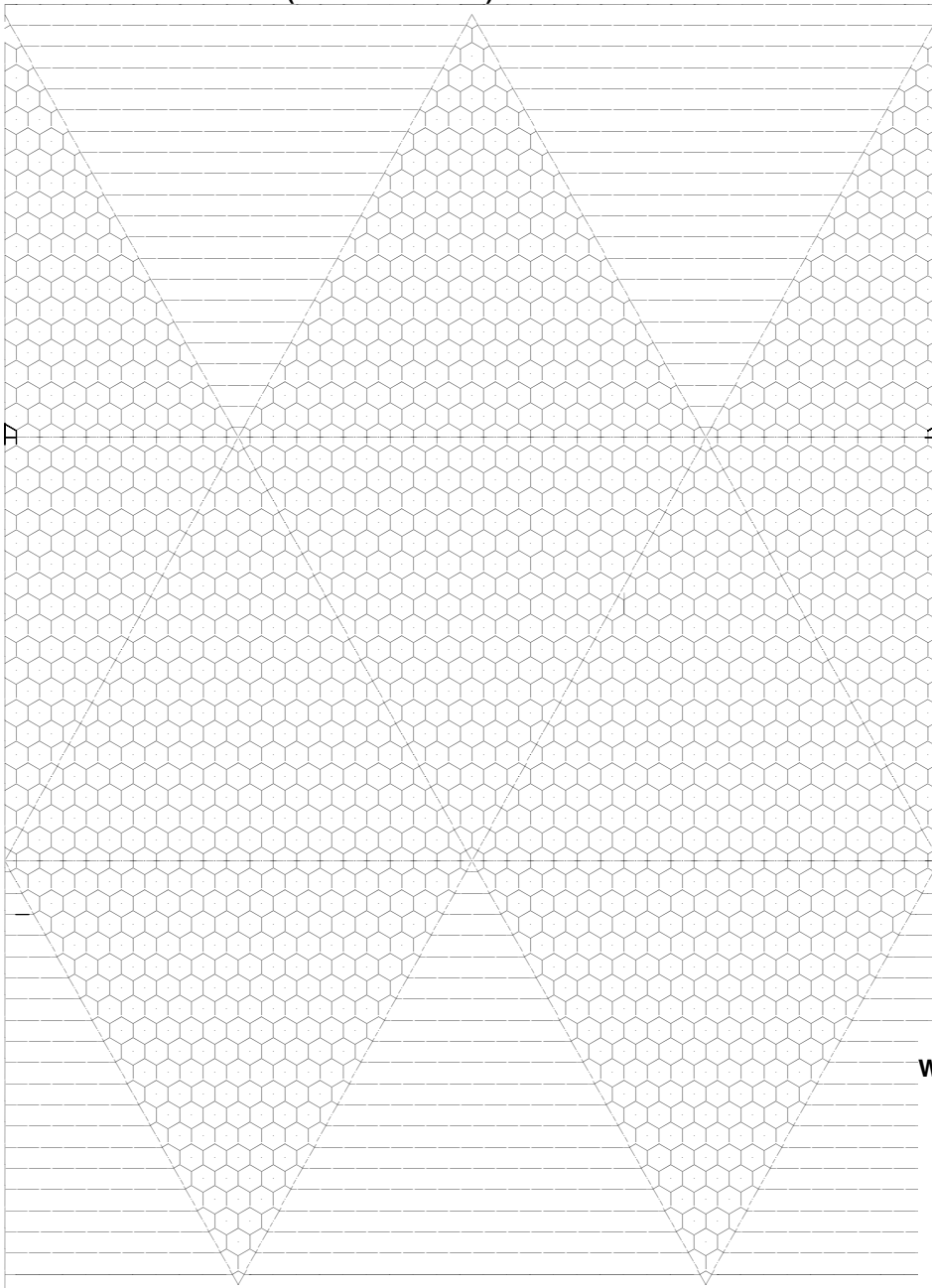


WORLD MAP DIMENSION DETAILS

Size		15
Diameter	Miles	15,000
Diameter	Km	24,000
Radius	Km	12000
Circumference*	Km	75,398
Triangle Edge	Km	5,027
Hex	Km	1,005
Hexes/Triangle		112.5
World Hexes		2252
Volume=	Earths	6.59
**G=		1.875

20 World Map

SIZE **20** WORLD MAP (ONE-THIRD MAP)



WORLD MAP DIMENSION DETAILS

Size		20
Diameter	Miles	20,000
Diameter	Km	32,000
Radius	Km	16,000
Circumference*	Km	100,531
Triangle Edge	Km	10,053
Hex	Km	1,005
Hexes/Triangle		200
World Hexes		4002
Volume=	Earths	15.62
**G=		2.5

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.

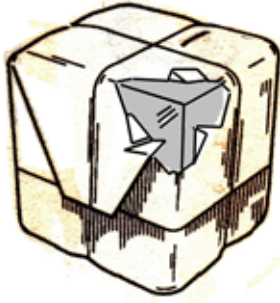
Cost. Cost is the amount paid for a cargo when bought at its Source World.

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.

This custom applies to both cargo and passengers.

Surface delivery for cargo taken on in orbit commands 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.

For example, a cargo from Regina in the Spinward Marches could be identified as: A Ri Cr7000.

A cargo from Zivije in the Spinward Marches is identified as: B Hi Fi Cr8100.

A cargo from Chronor (a Zhodani world in the Spinward Marches) is identified as: C Na Ni Ic Cr8200 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, a goods from Zivije have a Cargo ID = B Hi Fi Cr8100. The only Trade Classification that matches the Random Trade Goods Table is Fi, 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 in-

fluence trade situations.

Steward. Steward is a Mod on the roll for available High Passengers.

Admin: Admin is a Mod on the roll for available Mid Passengers.

Streetwise. Streetwise is a Mod on the roll for available 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.

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 results 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 two dice throw can range from 2 to 12 and 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 (or 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.

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) in the Spinward Marches 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 = Samples, then =5 = Ephemerals). There is a shipment of Samples of Ephemerals 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.

TYPES OF INTERSTELLAR TRADE GOODS

Interstellar trade goods may be of any type, but some are more probable than others. Ordinary materials (such as cast iron ingots) are probably not prime interstellar trade goods.

The 14 Broad Classifications: 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. It includes: Books, tapes, software, creative works, wafers, and scientific data.

Entertainments. Creative works and diversions are always in demand.

Imbalances. When the cost of producing a trade item is very low, then it can be shipped between the stars and sold at a market for less than it costs to produce locally. Worlds with low labor costs often produce goods that can be sold interstellar at a profit.

Manufactureds. Worlds with established factories export their products to worlds which cannot produce them.

Novelties. New products never before seen (or sometimes just never before marketed) are powerful commodities in the marketplace.

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

The 14 Trade Good Types

Consumables.	Novelties.	Samples.
Data.	Pharma.	Scrap/Waste.
Entertainments.	Rares.	Uniques.
Imbalances.	Raws.	Valuta.
Manufactureds.	Red Tape.	

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.

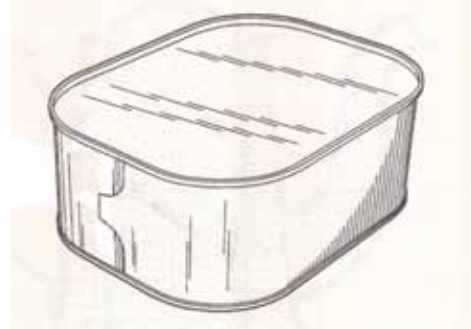
Much of the red tape shipped between worlds is not sold; it is transported as freight to archives or to other offices of the bureaucracy. But some of the information can be purchased and then shipped to other worlds where it can be sold to businesses or organizations which can use it. For example, tax 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 transported to other worlds for analysis or evaluation.

Scrap/Waste. The trash of some worlds can become the valued treasure on 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 is not intended to be comprehensive: interstellar trade necessarily encompasses thousands and 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.

The following are 259 examples of probable trade goods.

Accountings	Bulk Organics	Exotic Fluids	Magnetics	Replicating Clays
Adhesives	Bulk Oxygen	Exotic Sauces	Mandates	Repulsant
Aged Meats	Bulk Particulates	Expert Systems	Masterpieces	Respirators
Allotropes	Bulk Pelts	Famous Wafers	Meat Delicacies	Restoratives
Alloys	Bulk Petros	Fast Drug	Mechanicals	Robots
Anagathics	Bulk Pharma	Fauna	Meson Barriers	Secretions
ANIFX Blocker	Bulk Precipitates	Fermented Fluids	Metals	Seedstock
ANIFX Dyes	Bulk Protein	Filter Mask	Minerals	Self-Defender
ANIFX Emitters	Bulk Spices	Fine Aromatics	Money Cards	Self-Solving Puzzles
Antibiotics	Bulk Synthetics	Fine Art	Monumental Art	ShimmerCloth
Antidotes	Bulk Textiles	Fine Carpets	Motile Plants	Silanes
Antifungals	Bulk Woods	Fine Dusts	Museum Items	Silver
Anti-Matter	Candies	Fine Furs	Music	Skin Tones
Antique Art	Carbons	Fission Suppressant	Musical Instruments	Slow Drug
Antiques	Catalysts	Flavored Air	Navigators	Sludges
Antiseptics	Chelates	Flavored Drinks	Nectars	Software
Antitoxins	Coinage	Flavored Waters	Noisemakers	Soothants
Antivirals	Cold Light Blocks	Flavorings	Non-Fossil Carcasses	Sophont Cuisine
Archeologicals	Cold Sleep Pills	Flill	Nostrums	Sophont Hats
Armor	Cold Welders	Flora	Novel Flavorings	Soundmakers
Aromatics	Collectible Books	Flowers	Nutraceuticals	Sparx
Art	Collectibles	Fluidic Timepieces	Obsoletes	Spices
Artifacts	Combat Drug	Fluidics	Ores	Stimulants
Attractants	Combination	Foodstuffs	Organic Gems	Strange Crystals
Aware Blockers	Contemplatives	Fossils	Organic Polymers	Strange Seeds
Awareness Pinger	Corrosives	Fruit Delicacies	Osmancies	Synchronizations
Backups	Counter-prions	Gallium	Painkillers	Tactiles
Biologics	Crafted Devices	Gemstones	Palliatives	Textiles
Branded Clothes	Cryo Alloys	Germanes	Panacea	Thorium
Branded Devices	Cryogems	Gold	Parts	Tisanes
Branded Drinks	Currency	Gravitics	Pattern Creators	Unusual Dusts
Branded Foods	Databases	Group Symbols	Pelts	Unusual Fluids
Branded Oxygen	Decoctions	Hats	Percept Blockers	Unusual Ices
Branded Tools	Decorations	Health Foods	Pheromones	Unusual Minerals
Branded Vacc Suits	Delicacies	Heat Pumps	Photonics	Unusual Rocks
Bulk Abrasives	Disposables	Holo Sculpture	Pigments	Upgrades
Bulk Carbon	Dominants	Holo-Companions	Platinum	Uranium
Bulk Carbs	Drinkable Lymphs	Humming sand	Plutonium	Used Goods
Bulk Copper	Dupe Masterpieces	Improvements	Polymer Sheets	Vacc Gems
Bulk Dusts	Echostones	Incenses	Polymers	Vacc Suit Patches
Bulk Ephemerals	Educationals	Incomprehensibles	Pseudo Hormones	Vacc Suit Scents
Bulk Fats	Edutainments	Insidiants	Radioactive Ores	Variable Tattoos
Bulk Fibers	Electronics	Insulants	Radioactives	VHDUS Blocker
Bulk Foodstuffs	Emotion Lighting	Iridium Sponge	Radium	VHDUS Dyes
Bulk Gases	Encapulants	Isotopes	Rare Minerals	VHDUS Emitters
Bulk Herbs	Envirosuits	Jewelry	Raw Sensings	Vision Suppressant
Bulk Ices	Ephemerals	Juices	Reactive Plants	Wafers
Bulk Iron	Excretions	Lanthanum	Reactive Woods	Warm Leather
Bulk Metals	Exotic Aromatics	Lek Emitters	Reclamation Suits	Weapons
Bulk Minerals	Exotic Crystals	Livestock	Recordings	Wines
Bulk Nitrates	Exotic Fauna	Luminescents	Regulations	Writings
Bulk Nutrients	Exotic Flora	Mag Emitters	Reparables	

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. Textile dyes with colors in the wavelengths ANIFX.

ANIFX Emitters. Objects which glow (or regularly or intermittently pulse) in the wavelengths ANIFX.

Antibiotics. Pharma capable of targeting and killing microbes.

Antidotes. Pharma which counteract poisons (inorganic poisons) within organisms.

Antifungals. Pharma capable of 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 or 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 which are opaque to Awareness.

Awareness Pinger. Device which emits a recurrent signal which can be sensed by Awareness.

Backups. Computer 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 which serves 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 which serves as a guarantee of quality. Brand names may imply social or group membership perceptions.

Branded Oxygen. Fashionable breathing gases characterized by a brand name which serves 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 characterized by a brand name which serves as a guarantee of quality.

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.

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 are liquids or gases at habitable sophont temperatures, and suitable for industry.

Bulk Iron. Pure or alloyed iron metal suitable for use in industry.

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 minerals 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 conditions.

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.

Eduainmentals. 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, and which form 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.

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 airs mask taints; others are more palatable versions of intrinsic taints.

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.

Filll. Organic gems characterized by beautiful lek and mag emissions. Filll are prized by sophonts with awareness.

Flora. Plant life.

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 flora and fauna

Fruit Delicacies. Edible fruits enhanced with a variety of culinary treatments to create attractive (or unusual) flavors and textures.

Gallium. Elemental gallium in certified purity levels and suitable for use as money.

Gemstones. Attractive examples of precious stones.

Germanes. Germanium based compound useful in industry.

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; naval 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 vacc-suited surface travellers.

Hummingsand. Granular minerals which vibrate (creating sounds) in response to light, heat, or other stimulus.

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 which inhibit thermal equilibrium.

Iridium Sponge. Elemental iridium exposed to vacuum and gases to create an internal sponge texture. Iridium is principal component of positronic brains.

Isotopes. Elements refined to a high level of purity as to isotopic content.

Jewellery. 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.

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.

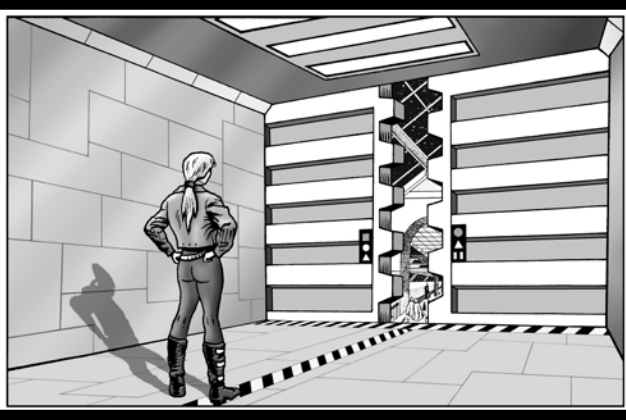
Mag Emitters. Devices which emit (glow, pulse) in the Mag wavelength.

Magnetics. Interesting or useful devices employing the principles of magnetics.

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 characteristics 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.

Parts. Common device component replacement..

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.

Pseudo Hormones. Artificial or synthetic hormones which carry encoded chemical instructions to living cells or organs. Pseudo hormones carry chemical instructions which are not carried by natural hormones.

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 (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.

Repairables. Inoperative devices 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 (usually mineralogical) highly prized for their unusual qualities. Vacc gems are formed through 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, overlay, 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.

Writings. Printed published texts.



Ag As Random Trade Goods

TRADE GOODS DETAIL

As	[]
Ba	Gathered
De	Mineral
Di	Artifact
Fl	Unusual
Ga	Premium
Hi	Processed*
Ic	Cryo
Lo	[]
Ni	Unprocessed
Po	Obscure
Ri	Quality
Va	Exotic **

* Omit for Industrial
 ** Omit for Asteroid

*Imbalance Items

Imbalance Items are in oversupply on the source world; 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 shown and re-roll on the appropriate 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.

Ag-1

1 Raws
1 Bulk Protein
2 Bulk Carbs
3 Bulk Fats
4 Bulk Pharma
5 Livestock
6 Seedstock

2 Consumables
1 Flavored Waters
2 Wines
3 Juices
4 Nectars
5 Decoctions
6 Drinkable Lymphs

3 Pharma
1 Health Foods
2 Nutraceuticals
3 Fast Drug
4 Painkillers
5 Antiseptic
6 Antibiotics

4 Novelties
1 Incenses
2 Iridescent
3 Reflectives
4 Pigments
5 Noisemakers
6 Soundmakers

5 Rares
1 Fine Furs
2 Meat Delicacies
3 Fruit Delicacies
4 Candies
5 Textiles
6 Exotic Sauces

6 Imbalances*
1 He
2 Hi
3 In
4 Na
5 Ri
6 Va

Ag-2

1 Raws
1 Bulk Woods
2 Bulk Pelts
3 Bulk Herbs
4 Bulk Spices
5 Bulk Nitrates
6 Foodstuffs

2 Consumables
1 Flowers
2 Aromatics
3 Pheromones
4 Secretions
5 Adhesives
6 Novel Flavorings

3 Pharma
1 Antifungal
2 Antiviral
3 Panacea
4 Pseudo Hormones
5 Anagathics
6 Slow Drug

4 Novelties
1 Strange Seeds
2 Motile Plants
3 Reactive Plants
4 Reactive Woods
5 IR Emitters
6 Lek Emitters

5 Rares
1 Spices
2 Organic Gems
3 Flavorings
4 Aged Meats
5 Fermented Fluids
6 Fine Aromatics

6 Imbalances*
1 De He Hi
2 Fl Hi
3 Fl Hi In
4 Na Ni
5 De Po
6 Ni Va

As

1 Raws
1 Bulk Nitrates
2 Bulk Carbon
3 Bulk Iron
4 Bulk Copper
5 Radioactive Ores
6 Bulk Ices

2 Samples
1 Ores
2 Ices
3 Carbons
4 Metals
5 Radioactives
6 Silicates

3 Valuta
1 Platinum
2 Gold
3 Gallium
4 Silver
5 Thorium
6 Radium

4 Novelties
1 Unusual Rocks
2 Fused Metals
3 Strange Crystals
4 Fine Dusts
5 Magnetics
6 Light-Sensitives

5 Rares
1 Gemstones
2 Alloys
3 Iridium Sponge
4 Lanthanum
5 Isotopes
6 Anti-Matter

6 Imbalances*
1 Hi In
2 Na Ni
3 He
4 Va
5 Po
6 Ri

Random Trade Goods De FI Ic

TRADE GOODS DETAIL

As	[]
Ba	Gathered
De	Mineral
Di	Artifact
FI	Unusual
Ga	Premium
Hi	Processed*
Ic	Cryo
Lo	[]
Ni	Unprocessed
Po	Obscure
Ri	Quality
Va	Exotic **

* Omit for Industrial

** Omit for Asteroid

*Imbalance Items

Imbalance Items are in oversupply on the source world; 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 shown and re-roll on the appropriate 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.

De

1 Raws

1	Bulk Nitrates
2	Bulk Minerals
3	Bulk Abrasives
4	Bulk Particulates
5	Exotic Fauna
6	Exotic Flora

2 Samples

1	Archeologicals
2	Fauna
3	Flora
4	Minerals
5	Ephemerals
6	Polymers

3 Pharma

1	Stimulants
2	Bulk Herbs
3	Palliatives
4	Pheromones
5	Antibiotics
6	Combat Drug

4 Novelties

1	Envirosuits
2	Reclamation Suits
3	Navigators
4	Dupe Masterpieces
5	Shimmer Cloth
6	ANIFX Blocker

5 Rares

1	Excretions
2	Flavorings
3	Nectars
4	Pelts
5	ANIFX Dyes
6	Seedstocks

6 Uniques

1	Pheromones
2	Artifacts
3	Sparx
4	Repulsant
5	Dominants
6	Fossils

FI

1 Raws

1	Bulk Carbon
2	Bulk Petros
3	Bulk Precipitates
4	Exotic Fluids
5	Organic Polymers
6	Bulk Synthetics

2 Samples

1	Archeologicals
2	Fauna
3	Flora
4	Minerals
5	Ephemerals
6	Polymers

3 Pharma

1	Antifungals
2	Antivirals
3	Palliatives
4	Counter-prions
5	Antibiotics
6	Cold Sleep Pills

4 Novelties

1	Silanes
2	Lek Emitters
3	Aware Blockers
4	Soothants
5	Self-Solving Puzzles
6	Fluidic Timepieces

5 Rares

1	Flavorings
2	Unusual Fluids
3	Encapsulants
4	Insidiants
5	Corrosives
6	Exotic Aromatics

6 Imbalances*

1	In
2	Ri
3	FI
4	Na
5	Hi
6	He

Ic

1 Raws

1	Bulk Ices
2	Bulk Precipitates
3	Bulk Ephemerals
4	Exotic Flora
5	Bulk Gases
6	Bulk Oxygen

2 Samples

1	Archeologicals
2	Fauna
3	Flora
4	Minerals
5	Ephemerals
6	Polymers

3 Pharma

1	Antifungals
2	Antivirals
3	Palliatives
4	Restoratives
5	Antibiotics
6	Antiseptics

4 Novelties

1	Heat Pumps
2	Mag Emitters
3	Percept Blockers
4	Silanes
5	Cold Light Blocks
6	VHDUS Blocker

5 Rares

1	Unusual Ices
2	Cryo Alloys
3	Rare Minerals
4	Unusual Fluids
5	Cryo Gems
6	VHDUS Dyes

6 Uniques

1	Fossils
2	Cryogems
3	Vision Suppressant
4	Fission Suppressant
5	Wafers
6	Cold Sleep Pills

Na In Po Random Trade Goods

TRADE GOODS DETAIL

As	[]
Ba	Gathered
De	Mineral
Di	Artifact
Fl	Unusual
Ga	Premium
Hi	Processed*
Ic	Cryo
Lo	[]
Ni	Unprocessed
Po	Obscure
Ri	Quality
Va	Exotic **

* Omit for Industrial
** Omit for Asteroid

*Imbalance Items

Imbalance Items are in oversupply on the source world; 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 shown and re-roll on the appropriate 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.

Na

1 Raws

1	Bulk Abrasives
2	Bulk Gases
3	Bulk Minerals
4	Bulk Precipitates
5	Exotic Fauna
6	Exotic Flora

2 Samples

1	Archeologicals
2	Fauna
3	Flora
4	Minerals
5	Ephemerals
6	Polymers

3 Novelties

1	Branded Tools
2	Drinkable Lymphs
3	Dupe Masterpieces
4	Pattern Creators
5	Pigments
6	Warm Leather

4 Rares

1	Hummingbird
2	Masterpieces
3	Fine Carpets
4	Isotopes
5	Pelts
6	Seedstocks

5 Uniques

1	Masterpieces
2	Unusual Rocks
3	Artifacts
4	Fine Art
5	Replicating Clays
6	ANIFX Emitter

6 Imbalances*

1	Ag
2	Ri
3	In
4	Ni
5	De
6	Ga

In

1 Manufactureds

1	Electronics
2	Photonics
3	Magnetics
4	Fluidics
5	Polymeric
6	Gravitics

2 Scrap / Waste

1	Obsoletes
2	Used Goods
3	Reparables
4	Radioactives
5	Metals
6	Sludges

3 Manufactureds

1	Biologics
2	Mechanicals
3	Textiles
4	Weapons
5	Armor
6	Robots

4 Pharma

1	Nostrums
2	Restoratives
3	Palliatives
4	Suppressants
5	Antidotes
6	Antitoxins

5 Data

1	Software
2	Databases
3	Expert Systems
4	Upgrades
5	Backups
6	Raw Sensings

6 Consumables

1	Disposables
2	Branded Drinks
3	Branded Foods
4	Branded Clothes
5	Parts
6	Improvements

Po

1 Raws

1	Bulk Nutrients
2	Bulk Fibers
3	Bulk Organics
4	Bulk Minerals
5	Bulk Textiles
6	Exotic Flora

2 Entertainments

1	Art
2	Recordings
3	Writings
4	Tactiles
5	Osmancies
6	Wafers

3 Novelties

1	Strange Crystals
2	Strange Seeds
3	Dupe Masterpieces
4	Emotion Lighting
5	Silanes
6	Flora

4 Rares

1	Gemstones
2	Antiques
3	Collectibles
4	Allotropes
5	Spices
6	Seedstocks

5 Uniques

1	Masterpieces
2	Incomprehensibles
3	Antiques
4	Exotic Flora
5	Fossils
6	VHDUS Emitter

6 Imbalances

1	In
2	Ri
3	Fl
4	Ic
5	Ni
6	He

Random Trade Goods Ri Va Cp

TRADE GOODS DETAIL

As	[]
Ba	Gathered
De	Mineral
Di	Artifact
Fl	Unusual
Ga	Premium
Hi	Processed*
Ic	Cryo
Lo	[]
Ni	Unprocessed
Po	Obscure
Ri	Quality
Va	Exotic **

* Omit for Industrial
** Omit for Asteroid

*Imbalance Items

Imbalance Items are in oversupply on the source world; 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 shown and re-roll on the appropriate 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.

Ri

1 Raws

1	Bulk Foodstuffs
2	Bulk Protein
3	Bulk Carbs
4	Bulk Fats
5	Exotic Flora
6	Exotic Fauna

2 Novelties

1	Echostones
2	Self-Defenders
3	Attractants
4	Sophont Cuisine
5	Sophont Hats
6	Variable Tattoos

3 Consumables

1	Branded Foods
2	Branded Drinks
3	Branded Clothes
4	Flavored Drinks
5	Flowers
6	Music

4 Rares

1	Delicacies
2	Spices
3	Tisanes
4	Nectars
5	Pelts
6	Variable Tattoos

5 Uniques

1	Antique Art
2	Masterpieces
3	Artifacts
4	Incomprehensibles
5	Meson Barriers
6	Famous Wafers

6 Entertainments

1	Art
2	Recordings
3	Writings
4	Tactiles
5	Osmancies
6	Wafers

Va

1 Raws

1	Bulk Dusts
2	Bulk Minerals
3	Bulk Metals
4	Radioactive Ores
5	Bulk Particulates
6	Ephemerals

2 Novelties

1	Branded Vacc Suits
2	Awareness Pinger
3	Strange Seeds
4	Musical Instruments
5	Unusual Minerals
6	Exotic Crystals

3 Consumables

1	Branded Oxygen
2	Vacc Suit Scents
3	Vacc Suit Patches
4	Branded Tools
5	Holo-Companions
6	Flavored Air

4 Rares

1	Vacc Gems
2	Unusual Dusts
3	Insulants
4	Crafted Devices
5	Rare Minerals
6	Catalysts

5 Samples

1	Archeologicals
2	Fauna
3	Flora
4	Minerals
5	Ephemerals
6	Polymers

6 Scrap / Waste

1	Obsoletes
2	Used Goods
3	Reparables
4	Radioactives
5	Metals
6	Sludges

Cp

1 Data

1	Software
2	Expert Systems
3	Databases
4	Upgrades
5	Backups
6	Raw Sensings

2 Novelties

1	Incenses
2	Contemplatives
3	Cold Welders
4	Polymer Sheets
5	Hats
6	Skin Tones

3 Consumables

1	Branded Clothes
2	Branded Devices
3	Flavored Drinks
4	Flavorings
5	Decorations
6	Group Symbols

4 Rares

1	Monumental Art
2	Holo Sculpture
3	Collectible Books
4	Jewelry
5	Museum Items
6	Monumental Art

5 Valuta

1	Coinage
2	Currency
3	Money Cards
4	Gold
5	Silver
6	Platinum

6 Red Tape

1	Regulations
2	Synchronizations
3	Expert Systems
4	Educationals
5	Mandates
6	Accountings

Passengers and Freight

CHECKLIST

1. Find Passengers and Freight.
 - A. Roll for all 3 passenger types.
 - B. Roll for all 3 types of cargoes.
2. Buying Trade Goods.
 - A. Find Sourceworld Trade Data.
 1. Trade Classifications.
 2. Starport Type.
 3. Tech Level.
 - B. Find Cost of Goods.
 1. Trade Price Modifiers
 2. Tech Level Modifiers
 3. Starport Type Modifier.
 4. Accelerated Delivery.
 - C. Purchase Goods.
3. Selling Trade Goods
 - A. Find Market World Trade Data.
 1. Trade Classifications.
 2. Starport Type.
 3. Tech Level.
 - B. Find Price For Goods.
 1. Trade Price Modifiers
 2. Tech Level Modifiers
 3. Starport Type Modifier.
 - C. Sell Goods.

MERCHANT SHIP REVENUES

Item	Income
High Passage	Cr10,000
Middle Passage	8,000
Low Passage	1,000
Freight (per ton)	1,000
Mail (if fitted to carry Mail)	15,000

PREMIUM 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.

PASSENGERS

Roll once for each type on the day the ship leaves port.

High = Flux + Pop at Cr10,000
Mod = + Steward

Mid = Flux + Pop at Cr 8,000
Mod = + Admin

Low = Flux + Pop at Cr 1,000
Mod = + Streetwise

Passage Demand Mod. A ship specific Passage Demand Mod may be applied, if available.

FREIGHT

Roll once for each type each day until the ship has enough freight and cargo.

Daily:

Freight = (Flux + Pop) x (total TCs +1)
Mod = +Liaison

Use total TCs from this list (only):

Ag As Ba De Fl Hi Ic In Lo
Na Ni Po Ri Va Wa

Cargo = up to 100 tons available
(of all types; daily).

Each day, accepted freight is loaded into the hold and payment credited.

The ship leaves when the Captain decides it is ready.

MAIL SHIPMENTS

There are often mail or parcel shipments of mail waiting to be carried to another world. A ship 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.

The Destination World must be at least Importance-2 lower than the current world.

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.

LONG TERM MAIL CONTRACTS

Mail and Private Express contracts can be negotiated on a Long-Term (one year) basis.

Contracts are awarded to the lowest bidder. A ship specifies a route (between two worlds with an **Importance** difference of at least 2) and bids. Roll on the table. If the bid is lower than the Bid from the Table, the ship wins the contract.

2D	10 Round Trips	5 Round Trips
	Lowest Bid	Lowest 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 a Mail Vault.

These tables reflect available levels of goods and passengers appropriate for Player-Characters. They do not reflect overall economic demand.

IDENTIFYING A CARGO

TL Tc1 Tc2 Tc3 Tc4 Tc5 Cost
8 - De Hi In Na Po Cr1,800

Starport. The Starport of the Sourceworld.
TL. The TL of the Sourceworld.

TC1 2 3 4 5. The Trade classifications of the Sourceworld.
Cost. The computed cost of the goods. The cost per ton.

BUYING GOODS

Determine Sourceworld Tech Level
 Base Cost = Cr3,000

SELLING GOODS

Determine Marketworld Tech Level
 Base Price = Cr5,000

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
Wa	Water World	(none)

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
In >	Ag As De Fl	Hi In Ri Va +1,000 per
Lo >		
Na >	As De	Va +1,000 per
Ni >		
Po >	Ag	Hi In Ri -1,000 per
Ri >	Ag De	Hi In Ri +1,000 per
Va >	As In	Va +1,000 per
Wa >		

Tech Level Effect = Plus TL x Cr100 _____

TL Effect = 10% x Source TL minus Market TL _____

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 in Flux (max=+5).	

Total Cost _____

Total Price _____

For example,

Free Trader Beowulf buys a cargo on Efate to sell on Alell. The Cargo ID from Efate is D Hi In Cr 2,300 (=Cr3,000 - 1,000 - 1,000 plus TL Effect = 13 x 100 = 1,300 = Cr2,300).

Beowulf carries it to Alell B46789C-A Ri. It is priced at (Cr5,000 + [In> Ri] = +1,000 = 6,000) plus TL Effect (=13 - 10 = 3 x 10% x 6,000 = +1,800) = Cr7,800. These goods price at Cr7,800.

The trader offers them on the market using the Actual Value Table and rolls 0 = 100%. The goods sell for Cr7,800 producing a profit of Cr5,500 per ton.

Beowulf buys cargo on Alell for sale on Uakye. The Cargo ID from Alell is A Ri Cr5,000 (=Cr3,000 + 1,000 plus TL Effect = 10 x 100 = 1,000 = Cr5,000).

The Free Trader carries it to Uakye B439598-D Ni. It is priced at (Cr5,000) plus TL Effect (=10 - 13 = -3 x 10% x 6,000 = -1,800) = Cr4,200. These goods have a Price of 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 carries the cargo to Efate A646930-D Hi In. They are priced at (Cr5,000 + [Ri>Hi, Ri>In = +2,000 = 7,000) plus TL Effect (=10 - 13 = -3 x 10% x 7,000 = -2,100) = Cr4,900. These goods have a Price of 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. The Selling price is 150% of the Price = Cr7,350 (minus 20% commission = 1,470 =) Cr5,880. He makes a profit of Cr880 per ton.

Quick

TCs

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 Trade Classifications for the world.

WORLD TRADE CLASSIFICATIONS 1

4D	1	2	3	4	5	6
4	De Ba	De He Po	FI Oc Di	Hi Ic In Va	De He Ba	De He Hi In Na Po
5	He Ba	De Hi In	As Va Ba	He Na Po Pi	De Hi Pr	De He Hi In Po
6	He Di	He Po Ba	FI He Ba	De Na Po Pi	Ic Va Di	De He Na Ni Po
7	De Pi	FI Oc Ph	De Po Di	He Na Ni Po	De He Hi	He Hi In Na Po
8	FI Ba	FI Hi Oc	De Ri Ph	De He Po Ba	Na Va Ph Pi	De Hi In Na Po
9	Di	De He Lo	FI Wa Ph	De He Po Di	Hi In Na Va	Hi Ic In Na Va
10	Ag	Oc Ph Pi	FI Hi Wa	Ic Na Ph Pi	FI He Ni	As Hi In Na Va
11	Ri	Wa Ph	Na Pi	He Ni	Hi Po	Ni Oc
12	Hi In	FI Ni	Ni Pa	Hi In	Ic Va	FI Lo
13	Ni	Ga	Va	Po	De Lo	Ri
14	(blank)	(blank)	(blank)	(blank)	(blank)	(blank)
15	Lo	Ph	Wa	Pi	Ic	FI
16	Hi In	Lo Wa	Ni Va	Ag Pi	De Po	Lo Va
17	Po	Hi Pr	Na Ni	Pa Ph	Po Ph	Ri Wa
18	Na	Hi In Oc	Po Ph Pi	Hi Ic In Na	Ag Ni Ri Ga	As Na Va Ph Pi
19	Ba	De Po Ph	Hi In Po	Ri Ga Pa Ph	As Na Ni Va	Ic Na Va Ph Pi
20	Lo Oc	De Ni Ri	De Ni Pr	De Na Ni Po	De Po Ba	De Na Po Ph Pi
21	FI Di	De Hi Po	Oc Ri Ph	Ic Na Va Pi	De He Ph	He Na Po Ph Pi
22	Oc Ba	He Po Di	FI He Di	Ag Ni Ga Pr	Hi Oc Pr	De He Na Po Pi
23	Oc Di	De He Pi	As Va Di	As Na Va Pi	Ic Va Ba	De He Po Ph Pi
24	De Di	De Ph Pi	FI Oc Ba	Ic Na Ni Va	De He Di	De He Na Po Ph Pi

WORLD TRADE CLASSIFICATIONS 2

4D	1	2	3	4	5	6
4	De Ph	Ni Oc Pr	Ri Pa Ph	Oc Pi	FI Oc	De He Ph Pi
5	Oc Ph	Na Po Pi	De Lo Po	As Va	Wa Di	De He Po Pi
6	Ic Ba	Ni Oc Ri	Ni Ri Wa	Hi In Na	Po Pi	Na Po Ph Pi
7	Ic Di	FI Lo Wa	Hi Wa Pr	Na Ni Po	Oc Ri	Hi In Na Po
8	Po Ba	De Po Pi	FI Ni Oc	Ag Ri Ga	Ic Lo Va	De Hi In Po
9	Po Di	He Ph Pi	Ic Na Pi	Ic Na Ni	Ag Ni Pr	De Hi Na Po
10	Ga Ba	He Hi In	FI He Lo	Ri Wa Ph	As Ni Va	Ic Va Ph Pi
11	Ga Di	FI He Ph	Na Ph Pi	FI He Ni	De Ni Po	Ri Ph
12	Na Po	Ic Lo	FI Ph	Ic Pi	FI 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	FI Hi	Wa Pi	De Ni	He Lo	Ni Po
17	Lo Ga	Ag Ni	Ph Pi	Hi Wa	Hi Ga	Ni Pr
18	FI Wa	Hi Ic In	He Lo Po	FI He Hi	Ag Ni Ri	He Hi In Po
19	Va Ba	FI Lo Oc	Ag Ni Ga	Hi Ga Pr	Pa Ph Pi	He Po Ph Pi
20	Va Di	FI Ni Wa	Ni Ga Pa	De Na Po	Ic Ni Va	De Na Po Ph
21	De Hi	Na Po Ph	Ni Wa Pr	De He Ni	As Lo Va	De Po Ph Pi
22	De He	He Po Pi	Na Va Pi	Ga Pa Ph	Na Ni Va	De He Ni Po
23	De Ri	Ic Va Pi	Wa Ph Pi	Ic Ph Pi	He Ni Po	De He Lo Po
24	Hi Oc	Hi Na Po	Hi In Wa	He Po	Wa Ba	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 a Ni Ri Non-Industrial Rich world.

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.

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

Economic trade classifications the UWP elements AHP and generally relate to economic aspects of the world.

Fr Ho Co Lk Tr Tu Tz

Climate trade classifications use the UWP elements SAH and the Habitable Zone of the system.

Fa Mi Mr Px Pe Re

Secondary trade classifications use the UWP elements SAH and the Habitable Zone of the system.

Cp Cs Cx Cy Pe Re

Political trade classifications detail aspects of interstellar government.

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 several 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
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
He	Hellworld
Hi	High Population
Ic	Ice-Capped
In	Industrial
Lo	Low Population
Mi	Mining
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
Pz	Puzzle (Amber Zone)
Re	Reserve
Ri	Rich
Sa	Satellite
Tr	Tropic
Tu	Tundra
Tz	Twilight Zone
Va	Vacuum
Wa	Water World

Ab Ag An As Ba Co Cp Cs Cx Cy Da De Di Fa Fi Fo Fr Ga He Hi Ho Ic In Lk

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.

The TC use refers to AAB, the Imperial designation for data repositories.

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 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 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 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 zero Tech Level.

Co Cold World

The world is at the lower temperature range of human endurance; typically in HZ+1.

Cp Subsector Capital

The world is the political center of a group of tens or dozens of star systems (typically a subsector).

Cs Sector Capital

The world is the political center of a group of hundreds of star systems (typically a sector).

Cx Imperial Capital

The world is the overall political center of an interstellar government controlling thousands of star systems.

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 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 an Amber Zone.

De Desert World

The world has no open or standing water. This lack of water significantly reduces the level of agricultural development.

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 Farming

The world has climate and conditions which promote farming and ranching. In addition, it is in the Habitable Zone and not a Mainworld.

Fi Fluid Oceans

The world's oceans are not composed of water. Non-water oceans may be valuable sources of raw materials for industry.

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 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 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 Hellworld

The world is inhospitable to most sophonts. Its size, atmosphere, and hydrographic make it an extremely unattractive world.

Hi High Population

The world's population is one billion or more (Pop = 9 or A). High population worlds, because of the economy of scale for production, produce quality inexpensive trade goods.

Ho Hot World

The world is at the upper temperature range of human endurance; typically in HZ -1.

Ic Ice-Capped

The world's water is locked in ice-caps.

In Industrial

The world has a strong manufacturing infrastructure and is a producer of many types of goods.

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 Mi Mr Na Ni Oc Pa Pe Ph Pi Po Pr Px Pz Re Ri Tr Tu Tz Va Wa

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 do not / cannot / will not 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 an Amber Zone.

Re Reserve

The world has been set aside by the highest levels of government to preserve indigenous life forms, to delay development of its resources, or to frustrate investigation of some aspect of its 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).

Tw 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.

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 condi-

tions 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. 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. World orbiting a planet.

World. A planet or a satellite.

D

WORLDGEN TCS

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. Politicals and Specials assigned by Referee (not generated). Lk, Tz, Ho, and Co refer to climate but are not properly TCs.

	Code	S _{iz}	A _{tm}	H _{yd}	P _{op}	G _{ov}	L _{aw}	Definition	Formula
Planetary	As	0	0	0	--	--	--	Asteroid	
	De	--	23456789	0	--	--	--	Desert	
	Fl	--	ABC	123456789A	--	--	--	Fluid	
	Ga	678	568	567	--	--	--	Garden World	
	He	3459ABC	2479ABC	012	--	--	--	Hellworld	
	Ic	--	01	123456789A	--	--	--	Ice-Capped	
	Oc	ABC	--	A	--	--	--	Ocean World	
	Va	--	0	--	--	--	--	Vacuum	
	Wa	56789	--	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	--	--	--	9ABC	--	--	High Population	
Economic	Pa	--	456789	45678	48	--	--	Pre-Agricultural	
	Ag	--	456789	45678	567	--	--	Agricultural	
	Na	--	0123	0123	6789ABC	--	--	Non-agricultural	
	Pi	--	012479	--	78	--	--	Pre-Industrial	
	In	--	012479	--	9ABC	--	--	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	Not MW. HZ
	Mi	--	--	--	23456	--	--	Mining	Not MW. MW=In
	Mr	--	--	--	--	--	--	Military Rule (note 2)	
	Px	--	23AB	12345	3456	--	6789	Prison, Exile Camp	
	Pe	--	23AB	12345	3456	6	6789	Penal Colony	
	Re	--	--	--	1234	6	45	Reserve	
Political	Cp	--	--	--	--	--	--	Subsector Capital	Imperial
	Cs	--	--	--	--	--	--	Sector Capital	Imperial
	Cx	--	--	--	--	--	--	Capital	Imperial
	Cy	--	--	--	56789A	6	0123	Colony (note 1)	--
Special	Sa	--	--	--	--	--	--	Satellite	
	Fo	--	--	--	--	--	--	Forbidden	(Red Zone)
	Pz	--	--	--	789ABC	--	--	Puzzle	(Amber Zone)
	Da	--	--	--	0123456	--	--	Dangerous	(Amber Zone)
	Ab	--	--	--	--	--	--	Data Repository	
	An	--	--	--	--	--	--	Ancient Site	--

Note 1. 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. **Note 2.** Military Rule by the regional Allegiance power.

Technology

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 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. A technological society is shaped by its 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 from plastics.

Tools and Tools². Technology is the use of tools to make other tools. The term Tools² refers to tool-making tools.

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 is also used to describe a world, society, or culture. The world Regina is TL-10. The Aslan Colonies which spanned the Great Rift are TL-12.

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 norms of behavior for 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 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) are technological.

USING TECHNOLOGY

Worlds (societies, cultures, civilizations, 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 that 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).

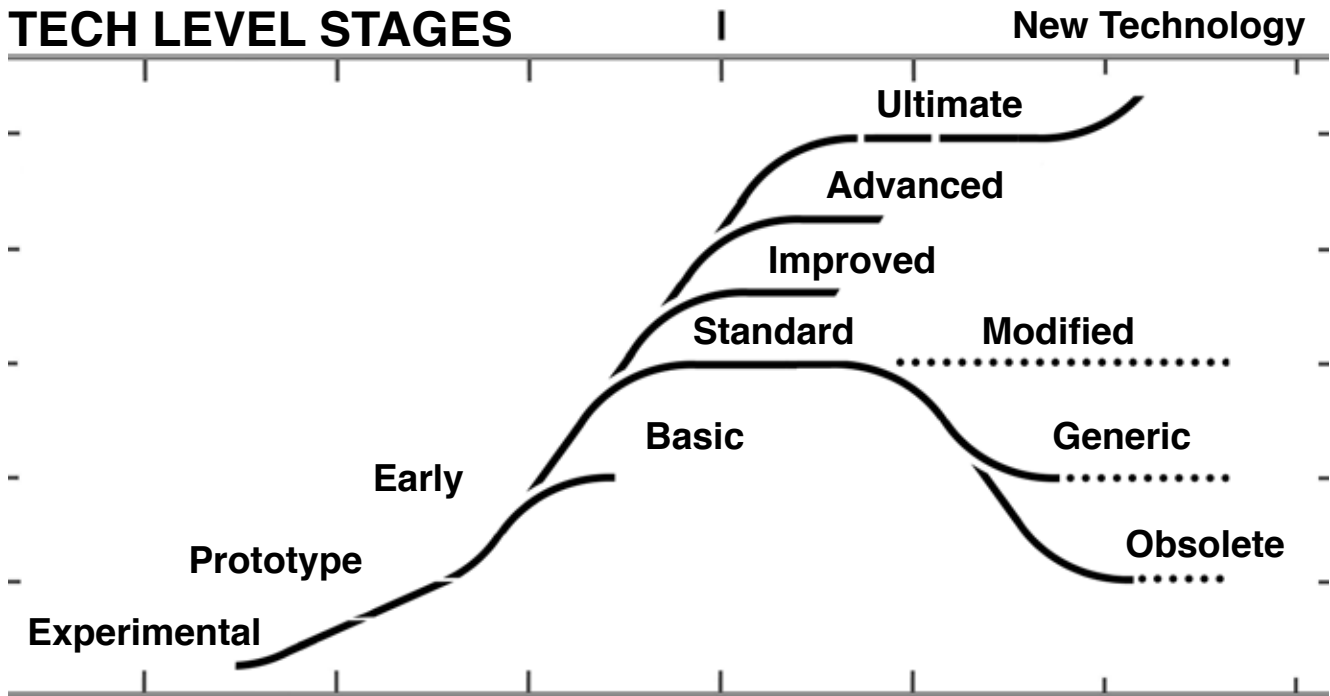
Mods Are Reflected In the Tech Level. A device shows its performance tech level (rather than its base tech level); its

WHAT A FACTORY CAN MANUFACTURE

Stage	TL	Base TL=	For Example:
Exp Experimental	-3	+3	three levels higher than current
Pro Prototype	-2	+2	two levels higher than current
Ear Early	-1	+1	one level higher than current
Std Standard	0	0	current TL
Bas Basic	0	0	current TL
Alt Alternate	0	0	current TL
Imp Improved	+1	- 1	one level lower than current
Gen Generic	+1	- 1	one level lower than current
Mod Modified	+2	- 2	two levels lower than current
Adv Advanced	+3	- 3	three levels lower than current
Ult Ultimate	+4	- 4	four levels lower than current

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 Levels are an inexact approximation: they shade into earlier and later TLs. Such gradations are expressed as Stages. Tech Level Stages describe locations in the long term cycle of technological development. For example,

Experimental is handmade by inventors excited about the potential of a 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.

Basic is a cheaper, bulkier, less-featured version of the standard item.

Standard is the version with the expected features for the technology when it is mature and stable.

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 capabilities added.

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 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.

VARIANT TONNAGES USING TECH LEVEL STAGE EFFECTS

The tonnage (or volume) for an object can vary based on Tech Level Stage Effects. That variation can be expressed in several distinct forms depending on the object. This table shows the different variations used in ShipMaker, GunMaker, and ThingMaker.

TECH LEVEL STAGE EFFECTS

TL	Stage	TL	Cost	Mod	Q	R	E	B	S	ShipMaker	GunMaker	ThingMaker
Exp	Experimental	-3	x10	-3	Q	-2	-3	+3	-3	x 3	x 2	x 3
Pro	Prototype	-2	x5	-2	Q	-2	-2	+2	-2	x 2	x 1.9	x 2
Ear	Early	-1	x2	-1	Q		-1	+1	-1	x 1	x 1.7	x 1.5
Std	Standard	0	x1	0	Q							
Bas	Basic	0	/2	0	Q		-1	+1		x 1	x 1.3	x 1.2
Alt	Alternate	0	x1	0	Q	F	F	F	F	x 1	x 1.1	x 1
Imp	Improved	+1	x1	+1	Q	+1	+1	-1	+1	x 1	x 1	x 1.5
Gen	Generic	+1	/2	0	5	0	0	0	0	x 1	x 1	x 1.5
Mod	Modified	+2	/2	+2	Q	+2	+2	-2	+2	/ 2	x 0.9	x 0.9
Adv	Advanced	+3	x2	+3	Q	+3	+3	-3	+3	/ 3	x 0.8	x 0.8
Ult	Ultimate	+4	x3	+4	Q	+4	+4	-4	+4	/ 4	x 0.7	x 0.5

F= Flux (the value may vary depending on the manufacturer). Q= Quality = 2D-2.

Mod is included in the TL (and not added in again).

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).

Note that 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 willhelp 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.

For example, 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 introduce 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. The development of 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 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 virtually 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 al-

ready 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 system in NAFAL 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: tools² 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 transcends 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.

	Era	Era	Energy	Society	Environ	Comms
	0	Primitive Stone Age	Personal Effort Fire	Tribe. Clan.	Natural. Crude Shelters.	Personal Senses. Messengers.
	1	Bronze Age 3500 BC	Water Power	Ethnic Groups.	Settlement. Villages.	Memorization.
Vlow Tech	1.3	Iron Age 1300 BC			Towns. Roads. Canals.	Writing.
	1.6	Middle Ages 600 AD		Kingdoms.	Cities.	
	2	Age Of Sail 1500 AD	Wind. Sail.	Nations.		Printing.
	3	Industrial Revolution 1700 AD	Coal. Steam.	Democracies.		
	3.3	1800 AD				
	3.6	1850 AD				Code by Wire.
Low Tech	4	Mechanization 1900 AD	Electricity.		Skyscrapers	Sound by Wire. Image Capture.
	5	1930 AD	Oil. Petrochemicals.	Dictators.		Broadcast Sound. Sound Recording.
	6	Nuclear Age 1950 AD	Nuclear Fission.	Superpowers.	Suburbs.	Broadcast Images. Video Recording.
Mid Tech	7	1975 AD	Geothermal. Solar.			
	8	2000 AD	Renewables.			Personal Comms.
	9	2020 AD	Early Fusion.		Arcologies	3D Images/ Video.
High Tech	10	2100 AD	Practical Fusion.	Non-Geographic Communities.		
	11	Imperial Average Circa Year Zero	[FusionPlus].			
	12					
Vhigh Tech	13	Imperial Maximum Circa 550		Robots.		CommPlus.
	14					
	15	Imperial Maximum Circa 1107				
Xhigh Tech	16	Darrian Maximum	Anti-Matter.	Artificial Persons. The Under Society.		
	17					
	18		Exotics. Collectors.			
Uhigh Tech	19	The Far Far Future				
	20					Limited Matter Transport.
	21				Scattered Site Dwellings.	

Transport	Medicine	Science	Computers	Era	Era	
Walking.	Herbal Medicine Mystical Therapy.		Counting.	Primitive Stone Age	0	
Beasts of Burden.	Basic Diagnosis.		Abacus Quipu.	Bronze Age 3500 BC	1	
Wheel.				Iron Age 1300 BC	1.3	
Galleys.				Middle Ages 600 AD	1.6	Vlow Tech
Sailing Ships.	Internal Anatomy.		Algebra.	Age Of Sail 1500 AD	2	
	Crude Surgery.	Mechanics.	Calculus.	Industrialization 1700 AD	3	
Steamships.				1800 AD	3.3	
Railroads.				1850 AD	3.6	
	Antiseptics. Anesthetics.	Medical.	Analog Computers.	Mechanization 1900 AD	4	Low Tech
Groundcars.	Internal Imaging.	Polymers.	Electric Calculators.	1930 AD	5	
		Electronics.	Model /1.	Nuclear Age 1950 AD	6	
Rockets to Orbit.	Organ Transplants. Slow Drug.	Programmer.	Model /2.	1975 AD	7	Mid Tech
		Photonics.		2000 AD	8	
NAFAL.	Cryogenics. Fast Drug.	Gravitics.	Model /3.	2020 AD	9	
Gravity Manip. Lifters to Orbit.	Anti-Virals.	Fluidics.	Model /4.	2100 AD	10	High Tech
		Magnetics.	Semi-Organic Brain. Model /5.	Imperial Average Circa Year Zero	11	
	Anti-geriatrics.		Positronic Brain. Model /6.		12	
	Effective Cloning. Forced Growth.	Biologics.	Wafer Technology. Model /7.	Imperial Maximum Circa 550	13	Vhigh Tech
	Geneering.		Self Aware Model /8.		14	
	Anagathics.		Model /9.	Imperial Maximum Circa 1107	15	
			True Artificial Intelligence.	Darrian Maximum	16	Xhigh Tech
					17	
					18	
Elemental Matter Transport.				The Far Far Future	19	Unhigh Tech
Global Matter Transport.					20	
System Matter Transport.					21	

	Era	Era	Speed1	Speed2	Weapons	Hvy Wpn
	0	Primitive Stone Age	Walking	1 5 kph	Clubs. Rocks	
	1	Bronze Age 3500 BC	Beasts of Burden	2 10 kph	Blades. Spears.	
Vlow Tech	1.3	Iron Age 1300 BC	Wheel			Massive Armies
	1.6	Middle Ages 600 AD	Galleys	3 20 kph		Siege Weapons
	2	Age Of Sail 1500 AD	Sailing Ships	4 30 kph		
	3	Industrial Revolution 1700 AD			Musket	Cannon
	3.3	1800 AD	Steamships	5 50 kph		
	3.6	1850 AD	Railroads	6 100 kph	Revolver	Artillery
Low Tech	4	Mechanization 1900 AD			Cartridges	Mortars
	5	1930 AD	GroundCars	7 300 kph	Rifle. Machinegun.	
	6	Nuclear Age 1950 AD		8 500 kph		
Mid Tech	7	1975 AD	Rockets To Orbit	9 700 kph		
	8	2000 AD		10 1000 kph		
	9	2020 AD	Civil SST	11 2000 kph		
High Tech	10	2100 AD	Civil Space Transport	12 3000 kph		
	11	Imperial Average Circa Year Zero				
	12					
Vhigh Tech	13	Imperial Maximum Circa 550				
	14				Psi-Shields	
	15	Imperial Maximum Circa 1107				
Xhigh Tech	16	Darrian Maximum				Black Globe
	17				Fusion Rifles	
	18				Personal Damper	
Uhigh Tech	19	The Far Far Future	Elemental Matter Transport		Disintegrator Pistol	
	20		Global Matter Transport		Disintegrator Wand	White Globe
	21		System-Wide Matter Transport		Relativity Rifle	

Space Travel									Tech	Era	Era	
Stargazing									Primitive Stone Age	0	Vlow Tech	
									Bronze Age 3500 BC	1		
									Iron Age 1300 BC	1.3		
									Middle Ages 600 AD	1.6		
Sea Navigation									Age Of Sail 1500 AD	2		
									Industrial Revolution 1700 AD	3		
									Mechanical 1800 AD	3.3		
									1850 AD	3.6		
									Mechanization 1900 AD	4		
Gravitic Maeuver NAFAL Jump Hop Skip P-Plant Anti-Matter Collector G M N J H S P A C 1 4 1 1 1 7 3 9 5 2 7 3 9 4 5 7 1 6 8 2 7 9 3 8 1 4 9 2 5 3 1 6 4 1 2 7 5 2 3 8										Electronics 1930 AD		5
										Nuclear Age 1950 AD	6	
										Programmer 1975 AD	7	Mid-Tech
										Photonics 2000 AD	8	
										Fluidics 2030 AD	9	High Tech
										Gravitics 2100 AD	10	
										Imperial Average Circa Year Zero	11	Vhigh Tech
										Magnetics	12	
										Biologics	13	Xhigh Tech
										Imperial Maximum Circa 550	14	
									Imperial Maximum Circa 1107	15	Uhigh Tech	
									Darrian Maximum	16		
										17	The Far Far Future	
										18		
										19	Uhigh Tech	
										20		
										21		

	Era	Era	Weapons	Defenses	Sensors1	Sensors2
	0	Primitive Stone Age				
	1	Bronze Age 3500 BC				
Vlow Tech	1.3	Iron Age 1300 BC				
	1.6	Middle Ages 600 AD				
	2	Age Of Sail 1500 AD				
	3	Industrial Revolution 1700 AD				
	3.3	1800 AD				
	3.6	1850 AD				
Low Tech	4	Mechanization 1900 AD				
	5	1930 AD				
	6	Nuclear Age 1950 AD				
Mid Tech	7	1975 AD	Missile			Sound Sensor Densitometer
	8	2000 AD	Mining Laser CommCaster		Jammer Communicator	Mass Sensor
	9	2020 AD	Slug Thrower	SandCaster	Scope Radar	Analyzer/ Sniffer Deep Radar
High Tech	10	2100 AD	KK Missile DataCaster		Neutrino Detector	Proximeter Life Detector
	11	Imperial Average Circa Year Zero	Particle Accelerator			Activity Sensor
	12		Fusion Gun	Nuclear Damper	Stealth Mask EMS	Field Sensor
Vhigh Tech	13	Imperial Maximum Circa 550	Meson Gun		Grav Sensor	
	14		Jump Damper	Mag Damper	Visor	
	15	Imperial Maximum Circa 1107				
Xhigh Tech	16	Darrian Maximum	Tractor/Pressor	Black Globe		
	17			Grav Scrambler	CommPlus	
	18		Disruptor		Holovisor	
Uhigh Tech	19	The Far Far Future		Proton Screen	Scanner	
	20		AM Missiles	White Globe		
	21		Stasis			

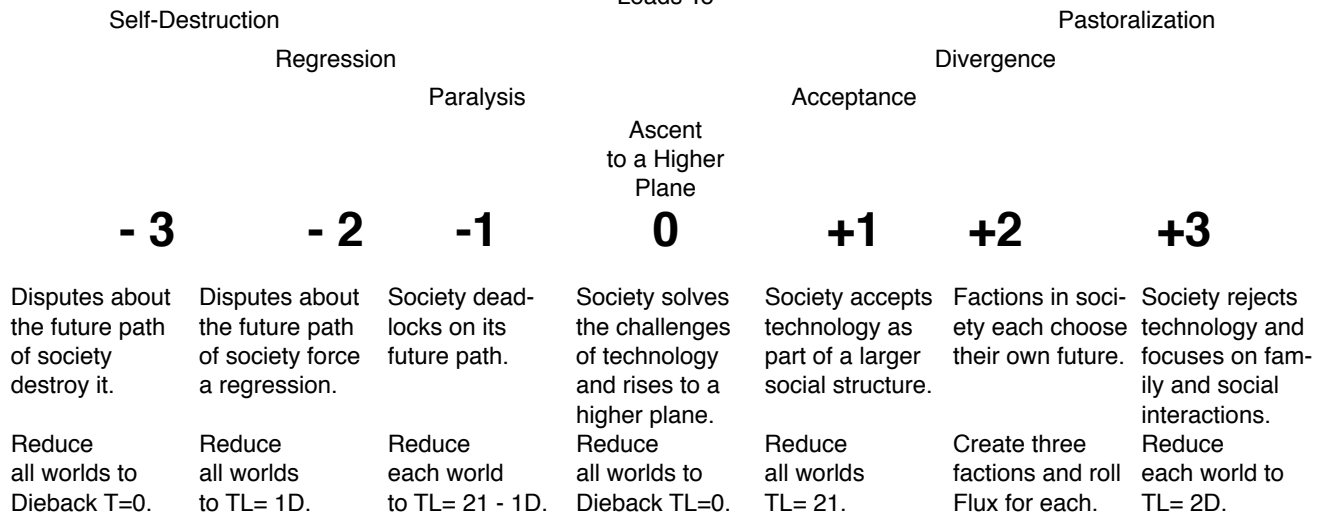
Flux=	- 5	- 4	- 3	- 2	- 1	0	+1	+2	+3	+4	+5	
Points=	- 2		- 1		0			+1		+2		
22	Individual Transformations.					PlanetBreaker Bombs						
23	Grey Goo.	Rosettes.						Leap Drive	Practical PsychoHistory.			
24	Planetbuster Bombs.					Many Capsule Dyson Sphere.		Portals.				
25	Various Goos	Inertialless Drive.		Reality Manipulation.			Psionic Engineering.		Rapid Terraforming.			
26	World Scale Constructs.			Socioneering.			Bound Drive.		Implantable Ethics.			
27	Most Goos	Group Personalities.		Ring Worlds.								
28							Simultaneous Lives.		Pocket Universes.			
29	Happiness			Rigid Dyson Spheres.			Vault Drive.					
30	Stellar Scale Constructs.											
31								Six Drive.				
32								Seven 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 misuse or 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 TECHNOLOGY

Technology beyond TL-21 borders on the fantastic. It is not routinely available, and every encounter with it is a challenge.

Individual Transformations. The ability to change physical capabilities of individual sophonts, including enhanced characteristics, alternate bodies, and the ability to change between those alternatives.

Grey Goo. Self-replicating nano capable of reducing objects (people, cities, living matter, worlds) to a disorganized froth.

The Other Goos. Harnessing the concepts of Grey Goo produces a spectrum of nano with tailored purposes: mining, construction, recycling, and others.

Rosettes. A gravitational 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.

Practical PsychoHistory. The ability to make exact predictions of the social behavior of large groups of sophonts, and based on those predictions to shape the course of future history.

Planetbreaker Bombs. The ability to create devices which will split worlds: massive world-scale destruction which reaches the core.

Planetbuster Bombs. The ability to create devices which will destroy worlds. The term Planetbuster assumes actual destruction of worlds; alternative technologies include Nova Bombs capable of exploding stars, "scrubbing" world surfaces with kinetic impacts or nuclear fire, and anti-atmosphere weapons which merely destroy the life-sustaining aspects of the world.

Many Capsule Dyson Sphere. A system of multiple worldlets (capsules) dedicated to capturing the energy of a central star in support of the power needs of the local population.

Portals. The ability to create portals: instantaneous connections between distant locations.

Inertialess Maneuver. 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.

Psionic Engineering. The ability to manipulate matter (at all scales from the sub-atomic to the macro) without physical interaction: the psionic engineer "encourages" matter to move and interact to accomplish the desired results. Psionic engineering is a prerequisite to many large scale physical constructs.

World Scale Physical Constructs. 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).

Rapid Terraforming. 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).

Group Personalities. The ability to blend distinct personalities into one master personality (temporarily or permanently). Group personalities exhibit a variety of experiences and abilities for greater efficiency, creativity, and responsibility. Members of the group share in the insights and abilities of the overall personality.

Ring Worlds. The ability to create a solid habitable ring around a central star.

Engineered Societies. The ability to create a social and cultural structure based on created specifications. Just as Geneering manipulates genetic structure, Socieneering manipulates social and cultural structure to improve efficiencies, reflect desired values, and propagate them throughout society.

Reality Manipulation. The ability to edit reality, primarily through redos: limited retrospective changes to past events to alter their effects on the present. This technology is a paradigm shift.

Reality Drive. The ultimate in interstellar transportation: drives capable of reaching almost any destination with a minimum of cost and time.

Rigid Dyson Spheres. The ability to create a solid shell surrounding a central star. The shell provides vast land surface area and efficiently captures the total energy output of the star.

Implantable Ethics. The ability to define right conduct and to implant its constraints on individuals. The concept may include internal or external monitoring and imposed consequences.

Stellar Scale Physical Constructs. 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).

Pocket Universes. The ability to create very small parallel universes (small in a relative sense) containing isolated star systems and accessible from the true universe through a variety of portals.

Post-Jump Drives. 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 Drives. The ability to negate inertia and accelerate instantaneously to speeds restricted only to the friction of the interstellar (or intergalactic) media.

Happiness. 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 of recipients from individuals to whole worlds.

Species Life Span

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

A Generation equals the sum of a sophont's Life Stages 0+1+2+3 (in years).

A sophont species is initially identified as Lethargic (1D=1,2), Average (1D=3,4), or Fast (1D=5,6).

The table column entry shows Base Generations. The species spends Generations= Base Generations times 1D at each Tech Level. After that time passes, the species advances to the next Tech Level.

If the 1D= 6, also consult the TL Progression Events Table.

PROGRESSION EVENTS TABLE

1D	Event	
1	Pause	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.

An Event occurs if the Period Roll=6. The species spends 1D generations at the current TL and then rolls 1D for the Event.

TL CAP

Upon reaching a Tech Level Cap (if called for), a species begins a Long Plateau without significant advancement.

PROGRESSION EVENTS TABLE

1D	Long Plateau Event	
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.

Long Plateau Events occur after a species has begun the Long Plateau. After 1D * 100 * TL Generations, roll 1D on this table for an Event. If that TL Cap is not removed, continue this cycle.

Lethargic	Average	Fast	Era	Era	
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	
1,000	100	10	Industrialization 1700 AD	3	Low Tech
100	10	1	Mechanization 1900 AD	4	
100	10	1	1930 AD	5	
100	10	1	Nuclear Age 1950 AD	6	Mid Tech
100	10	1	1975 AD	7	
100	10	1	2000 AD	8	
100	10	1	2020 AD	9	High Tech
100	10	1	2100 AD	10	
100	10	1	Imperial Circa Year 0	11	
100	10	1		12	Vhigh Tech
100	10	1	Imperial Circa 550	13	
100	10	1		14	
100	10	1	Imperial Circa 1107	15	Xhigh Tech
100	10	1	Darrian Maximum	16	
100	10	1		17	
100	10	1		18	Uhigh Tech
100	10	1	The Far Far Future	19	
100	10	1		20	
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	32-32-33		

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. Some species are subject to a TL Cap. Others reach some point less than maximum ordinary and 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 on the order of 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 fast; its lifespan is 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. 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.

If the 1D roll for Period is 6, impose a period of 6 times the indicated generations and then consult the TL Progression Events table.

TL PROGRESSION EVENTS

1D	Event	
1	Pause	1D Additional Generations at TL.
2	Regression	Reduce TL 1D and continue.
3	Shift to Lethargic	Future changes are Lethargic.
4	Shift to Average	Future changes are Average.
5	Shift to Fast	Future changes are Fast.
6	Decline	Future changes are TL reductions.

An Event occurs if the Period Roll=6. The species spends 1D generations at the current TL and then rolls 1D for 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. 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: a variety of social 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 is nothing to shake its firm conviction that no higher technological levels exist or are possible.

PLATEAU EVENTS TABLE

1D	Long Plateau Event	
1	New Awakening*	Long Plateau ends.
2	Regression	TL reduced 1D.
3	Regression	TL reduced 1D
4	Decline*	Future changes are TL reductions.
5	Decline*	Future changes are TL reductions.
6	Crisis	Singularity.

* TL Cap removed. Long Plateau ends.

A Long Plateau Event occurs after a species has begun the Long Plateau. After 1D * 100 * TL Generations, roll 1D on this table for an Event. If the 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.

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.

Regression. The species is reduced 1D Tech Levels. The species then progresses normally (still subject to its TL Cap).

Decline. The 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 table indicates the TL Cap is removed, then the Long Plateau ends.

THE TINROA

The Tinroa (one generation= 20 years) 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).

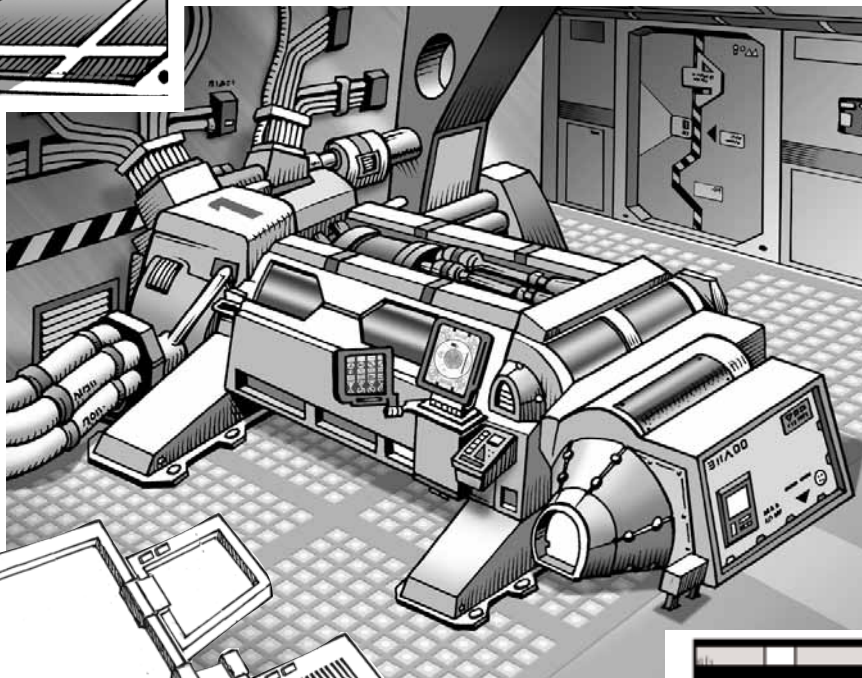
After a little more than 8 million years (and only a tiny fraction at high TLs), the Tinroa reached the Technological Singularity and disappeared as a sophont species. Archeological evidence of their civilization is found on a few worlds just beyond the Imperial border in Foreven sector.



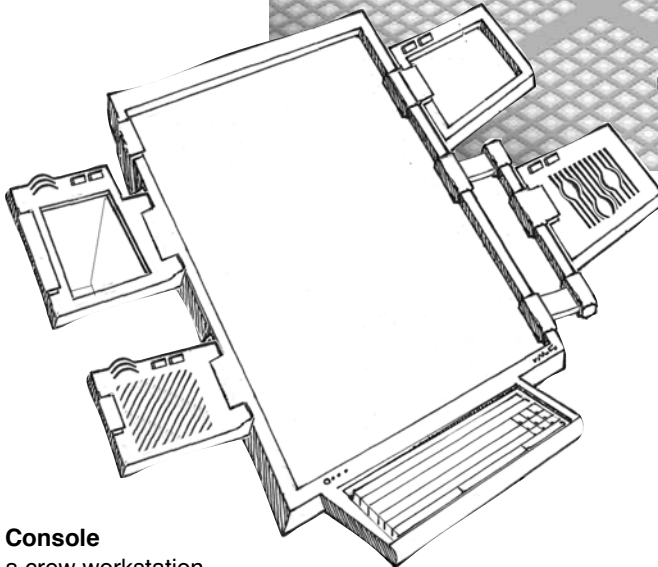
Mainframe
the primary Computer
on the ship.



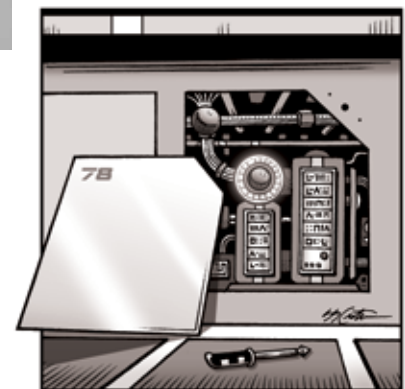
Controller
a portable,
less-powerful, console.



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

Mainframes are **Large** Computers 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 Mainframe: the central automated information and data processor for a starship.

Consoles

Consoles are **Medium** Computers, 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

Controllers are portable **Small** Computers; 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 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, un-repairable, 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 re-

quirements 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.

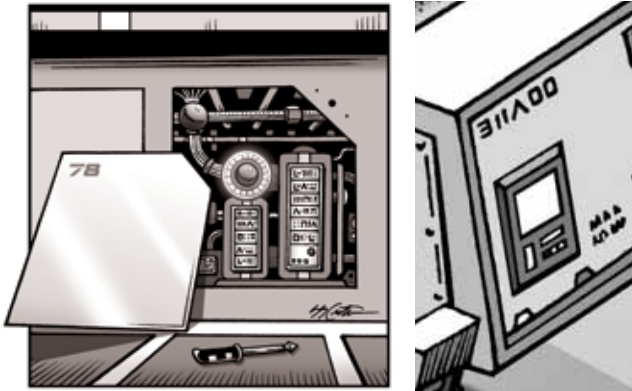
AN OVERVIEW

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 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.



HOW CONTROL PANELS FUNCTION

In terms of User interaction, Control Panels and Data Ports have very little function.

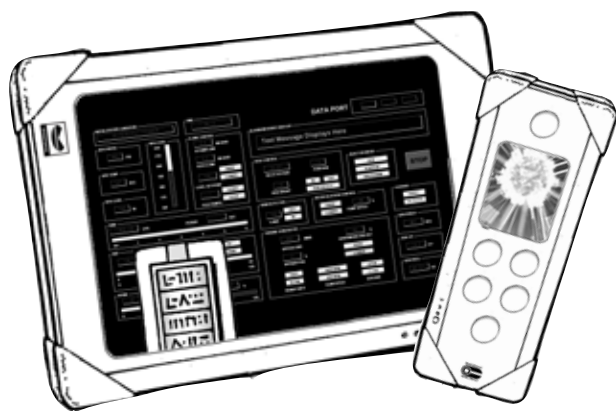
A Data Port is little more than a connection: User interaction is limited to connecting a cable or wireless repeater to associate it with a controller or console.

A Control Panel is primarily a diagnostic interface. The User connects it to a console which then allows some degree of control.

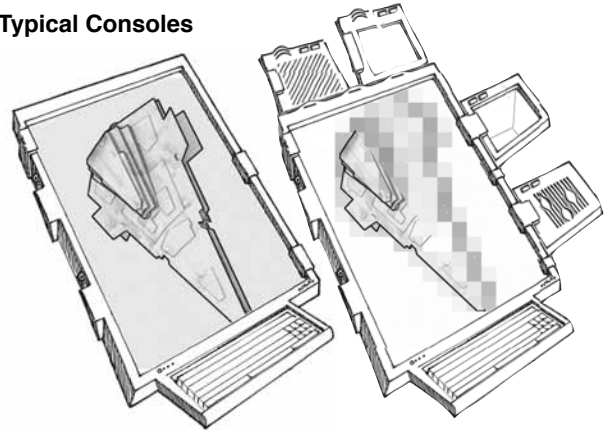
HOW CONTROLLERS FUNCTION

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.



Typical 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: exceptional circumstances 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 777777 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.

The task resolution function is consulted in response to exceptions: to unusual or unexpected situations which may 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, potentially independent processors. They contain central data banks and a store of reference materials. They monitor the activities of the various consoles and their mechanisms.

A Computer operates (subject to high level direction) without requiring an intervening User.

The Power To Resolve Tasks

A mainframe is a Task Resolver. It can, if instructed, resolve 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 simultaneously resolve the same task through several consoles and select the best outcome.

The Power To Supplement Consoles

The 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.

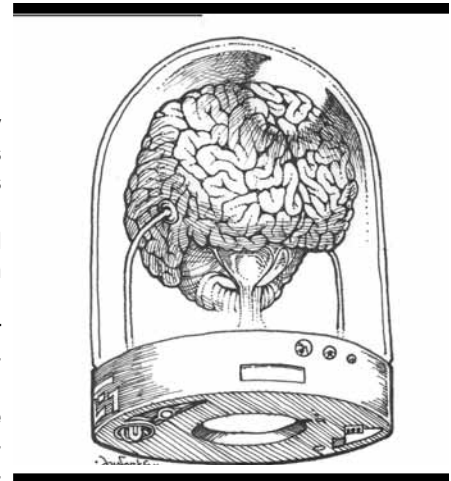
Any Skill, Characteristic, or Knowledge may be a Program. Computers associated with a specific mechanism are equipped with the specific Programs they need to properly enable or resolve tasks.

For example, a crew member attempting an Astrogation task 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.

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.



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	M Cr	Tonnage	Computer Notes	
0	Model/0	8	0.1	Console	Model. Computer Model name.	
1	Model/1	9	1.5	1	(bis = second or enhanced).	
1b	Model/1 bis	9	3.0	1	TL. Tech level of the computer.	
2	Model/2	10	5.0	2	KCr. Computer cost.	
2b	Model/2 bis	10	7.5	2	Tonnage. Ship tons required for the computer.	
3	Model/3	11	10.5	3	Console= 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		
6	Model/6	14	39	6		
7	Model/7	15	52	7		
8	Model/8	16	68	8		
9	Model/9	17	85	9		
fib	Fiber Optic	fib	+1	x 1.5	x 2	
phot	Photonic	phot	+3	/ 2		
flu	Fluidic	flu	+4	x 2	x 2	
mech	Mechanical	mech				
pos	Positronic	pos				
C	Control Console		9	0.2	Console	Computers are identified by Model Number (expressed as Cells, or Console Equivalents). Model/0 is little more than a centralized server; a Model/5 is five Console-Equivalents. Bis indicates enhanced capability (adds 1 Cell).
O	Operating Console		8	0.1	Console	Tons= Model Number. Cells= Model Number. Base TL= Model Number + 8
W	Workstation		7	0.05	Console	"Bis" adds +1 Cell. C+S= TL.
H	Controller		8	0.05		M Cr= Model * (Model+.5).
P	Control Panel		5			Install one or more Ship's Computers to support the console network.
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 Level
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	F	-2	-3	+3	-3	One of a kind. Lesser capabilities. Much heavier. Very costly.
Pro	Prototype	-2	x5	-2	F	-2	-2	+2	-2	Very rare. Lesser capabilities. Heavier and more costly.
Ear	Early	-1	x2	-1	F		-1	+1	-1	Primitive. Heavy. Costly.
Std	Standard	0	x1	0	F					Typical of available models.
Bas	Basic	0	/2	0	F		-1	+1		Heavier and cheaper than Standard.
Alt	Alternate	0	x1	0	F	F	F	F	F	Different capabilities.
Imp	Improved	+1	x1	+1	F	+1	+2	-1	+1	Some improved capabilities. Greater Ease of Use.
Gen	Generic	+1	/2	0	0	0	0	0	0	Cheaper than Standard (otherwise near identical to Std).
Mod	Modified	+2	/2	+2	F	+2	+2	-2	+2	Changed to positively affect performance.
Adv	Advanced	+3	x1	+3	F	+3	+3	-3	+3	Lighter, added capabilities.
Ult	Ultimate	+4	x2	+4	F	+4	+4	-4	+4	Lighter, most effective. Costlier.

F= Flux (the value may vary depending on the manufacturer).

B= Bulk (in Deck Squares). Minimum Deck Squares = 1.

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=5 and S=4.

Early Control Console-9 still computes its C=5 and S=4 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=5 S=1 versus C=4 S=0.

Advanced Control Console-9 still computes its C=5 S=4 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			
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 aboard his customized yacht, enjoys doing the Jump calculations himself.

To calculate an interstellar jump-4.

Formidable (4D) < Int + Astrogator
Uncertain (1D)

To manually confirm jump-4 calculations (24 hours).

Staggering (5D) < Edu + Astrogator
Uncertain (1D).

The TL-15 yacht has a Standard Console-15 dedicated to Astrogation, and a Model/7 Computer.

Lord Rolling's C+S=9+4= 13. 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 first Die is Uncertain and rolled secretly.

Assume the Uncertain Die is a 6; the worst possible. If the other 3 dice = 9 or less, then the calculations are successful. Otherwise, he must confirm the calculations (again with an Uncertain die). Assume the Uncertain=6; he must roll 9 or less on 5D to confirm.

Without confirmation, the calculations must be redone.

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 personality changes from moment to moment, and as recordings age, they become increasingly different from the current personality and from later recordings.

A Personality Can Be Recorded

[Personality] Scanners can 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 written to a Wafer.

THE ELEMENTS OF THE PERSONALITY

C4= Intelligence,
C5= Education or Training or Instinct,
C6= Social Standing or Charisma (either may be zero)
CS= Sanity,
a set of Skills and Knowledges and Talents,
a set of unique memories,
a sense of self (of one's identity).

A RP 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; personality 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

RECORDING THE ISOLATED PERSONALITY

	C4	C5	C6		
X	X	X	5	6	0
Not Applicable					

selected elements removed (Memories, Skills, even Identity) before it is Re-Implanted. Selective Mindwipe can be used to 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 Species, But It Degrades

A Recorded Personality can be temporarily overlaid on any individual of the same species.

An Overlay is temporary (as opposed to an Implant, which is permanent): the overlaid personality replaces any competing elements while allowing non-competing elements to co-exist. For example, if the Overlaid Personality has been edited to contain only Astrogation-9, then all other elements of the individual remain, but he now has Astrogation-9. If he originally has Astrogation-12, then that ability is lost.

Personality Degradation. The overlaid personality elements are dominant; the original personality 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 about one level per day. The reduction occurs during sleep. Upon awakening from a sleep period, each quantified skill and characteristic is reduced by -1. For example, if the overlaid personality includes Electronics-4, Mechanics-3, and Gravitics-2, then upon awakening from the first sleep period, it has Electronics-3, Mechanics-2, and Gravitics-1. When all overlaid skills have reduced to 0, the overlaid personality dissipates 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, the character Checks San. If this roll fails, San is reduced -1.

A Recorded Personality Can Be Run On A Computer, But It Degrades.

A Recorded Personality file which includes the Identity element can be run on a computer: the result is a functioning copy of the 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 it may interact with users.

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 is run on a Computer and monitor its activities. The resulting effect is that the person feels like he is in the computer.

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 Species, But It Degrades.

A Recorded Personality Can Be Implanted Only on the Original or on A Clone Of The Original.

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).

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 (very rarely, perhaps once in 40,000 times), an Overlaid Personality (whether 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.

For example, 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.

OVERLAID PERSONALITIES DEGRADE

Normally, a Personality which is Run on a Computer or Overlaid on a Person Degrades.

Perhaps one time in 40,000 (10- on 8D), this Degradation fails. When the person awakens expecting the final dissipation to be complete, the overlaid personality emerges dominant. When a personality in a Computer reaches 24 hours and is expected to dissipate, the overlaid personality emerges dominant.

The Referee's Call. The possibility of non-degradation of a Personality is extremely low. The Referee may impose non-degradation.

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.

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 attempt 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 be able to take up residence in a new system.

Important Thoughts

1. An organic personality that knows Psionics and is in an organic brain retains its Psionic abilities.

2. Positronic Brains are holographic: their personalities cannot be recorded or transferred.

Wafer Technology

Wafer Technology records personalities and edits them to retain only specific essential skills and knowledges. These recordings are transferred to Wafers: thin chips which can temporarily implant specific elements of a personality.

Costs. Skills and knowledges on wafers are priced based on skill levels: a base cost of KCr20 plus KCr 10 per level.

Use. Wafer transfers of skills and knowledges function in the same way as personalities: the skill level is highest for the first personal day; the skill then reduces one level per day until it dissipates.

Associated with the use of wafers is the daily Sanity Check as the skill dissipates.

Emergency Sets. Many ships carry a reserve kit of Skill Wafers for emergency use.

Entertainment Chips provide less intense personality transfers for entertainment purposes: the entire personality dissipates after the next sleep period; Easy Check Sanity only once.

Many entertainment chips are multi-user: several users network into the same story and group of personalities) for a common experience.

Entertainment chips are priced about Cr100.

Emergency Personalities. Major organizations maintain Emergency Personality Wafers specifically created to

address extreme or unusual situations. The Wafer is loaded with a specific (and perhaps edited) personality skilled and suited for specific situations.

For example, after a disastrous experience with the virulent and semi-intelligent Slime epidemic on Daddadh C5339AE-9, imperial authorities identified local functionary Bruce of the Clan Laing as the person most knowledgeable. His recorded personality is carried on an Emergency Wafer on board Dreadnaughts of the Imperial Fleet. In a similar emergency, a suitable officer is identified, implanted with the personality of Bruce, and given control of the situation (with an implicit time limit of setting solutions in place before the personality degrades).

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.

MISSILE BRAINS

Missiles can be equipped with a variety of guidance and control systems.

Hardwired (C+S)= 5

The Missile is hardwired with a rudimentary decision-making systems. It operates independently once launched.

Minimum Missile Size = 3.

Operator Guided (C+S)= Operator

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.

Minimum Missile Size = 4.

Self-Aware (C+S)= varies

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, 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 even to 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.

Minimum Missile Size = 5.

DownLoad

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).

Minimum Missile Size = 5.

For example, Senior Missile Gunner Antaine O'Flannagain 998987 Gunner-6 Turrets-2 on board the Imperial Cruiser *Bellerophon* is about to begin battle against a squadron of Zhodani Light Cruisers. He downloads his own personality into a salvo of ten missiles and launches them before the battle begins.

As the missiles streak toward their targets; they communicate with each other, warning themselves of defenses along the way and even about target vulnerabilities. Gunner Antaine's personality is resistant to enemy Datacaster propaganda, and his C+S = 9+6+2 is significantly better than

the self-aware missiles he has in stock.

Missile after missile attacks a target, and as the early one are picked off by defenses, the later ones become more motivated to make their way through.

Six of the ten missiles are picked off by defenses, but the other four manage each to cripple their targets.

BRAINS IN ACTION

For example, the crew of the Wilderness Traveller is stuck on Fornice A554A87-C in the Spinward Marches as their ship awaits a crucial replacement part. Money is tight while they wait, and they are working for an express package service planetside. The pay is only average, but the promise of bonuses enticed them to take the jobs.

Merchant Spacer JW Cantrill 888888 Driver-2 Wheeled-2 is driving a Large Truck. He is operating a Large Truck TL-10 equipped with Console-10.

On his first job, the console is a task enabler, allowing Cantrill to operate it easily. Any Driver tasks that arise can be resolved with the Console's TL-10, or Cantrill can override it with his C+S+K= 12.

On the second job, the company installs a Positronic Brain C4=1. It adds the ability for the Console to operate independently. Cantrill turns operations over to "Dan" and settles in to sleep. After several hours, "Dan" awakens Cantrill and says "I'm lost." The truck is at the barricade at the end of a dead end alley. Cantrill uses his skills to back out of the alley and get them on their way.

On the third job, the company upgrades to a Positronic Brain C4= 8 Edu=8; it has Driver-4 Wheeled-2 Tracked-2. The trip is uneventful and the Truck basically runs itself. When the delivery is complete and they return to the terminal, Cantrill is told that the company thanks him for his service, pays him a small (less than expected) bonus, and tells him he no longer has a job.

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 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 Charisma	= R default	no cost
C6 Charisma	= 1D	Cha * KCr10
C6 Charisma	= 2D	Cha * KCr20
C6 Social Standing		not normally possible
C6 Caste	= 0	if Pattern has Caste

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.

E SKILLS

A brain can acquire skills equal to C4 + C5.

Select one Primary Skill equal to one-half Intelligence.

Select two different Secondary Skills (or Knowledges) each equal to one-quarter Intelligence.

Select a Hobby equal to one quarter Intelligence.

If the Brain has Instinct, allocate any number of skills equal to Ins.

A Brain can increase skills though C5=Edu or Tra.

Hidden behind the known mental characteristics C4 and C5 are the incredible and often untapped powers 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**. Unless the distinction is important, the term Object includes Subject and Operator.

The capability of an Operator to use Psionics is a Psionic Ability or simply **Ability**.

Psionics Is Obscure

Most people doubt the existence of Psionics, dismiss it as quack science, and generally look down on those who do believe in it.

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).

Forbidden Knowledge. 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 capable of practicing Psionics are a minority, often a very small minority. Because of the potential advantages that Psionics can provide, and be-

cause 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.

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.

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.

Small ads (popups, printed pages, spam) promote various "Sciences of the Mind" and potential for "self-development."

Supposedly, every major population center has a (secret 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 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 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

THE TRUE INSTITUTES

A True Psionics Institute provides psionics testing, training, and even mentoring.

CP= Psi

Every character 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. 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. The value should be stated in Ehex.

Psionics Is Genetic. Record the first Die of Psi as the genetic D.

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 indigent candidates, the cost is 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

THE THREE BRANCHES OF PSIONICS

ESP	Extra Sensory Perception	The ability to acquire sensory data directly to the mind.
ECM	Extra Corporeal Manipulation	The ability to manipulate without the use of the body.
Intuitions	Insight, Curiosity, and Luck	The ability to access useful information before it is readily available.

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. Once that session is complete, the character must (in his travels) find another Psionics Institute for his next Training Session.

The 5 Stages Of Psionics

Adherents of Psionics progress in their understandings of the science through five distinct **stages**, each with its own meaning and importance.

Meeting Other 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.

What Stage Are You? Second. And you?

The conversation has begun; each has tentatively revealed an interest in, and an understanding of, Psionics.

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 determines explores his psionic strength and determines if it is balanced, or if it is 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. The decision will last a lifetime.

Basic Ability Allocation. The character has **three times** Psi in points available to allocate to Direct, Self, and Remote, but no Basic may be allocated less than Half CP in points. It is possible to allocate zero points to an Ability.

Direct requires physical contact between the operator and the subject. Psionic tasks assume Direct. Direct is limited to R= 0 Contact.

Remote operates at a distance from the operator and without physical contact. Remote Psionic tasks add a Remote component (and cost). Remote is limited to R= CP.

Self reflects the power of Psionics onto the individual himself. Self Psionic tasks are distinct from Remote or Direct.

At the end of the First Training session, the character also learns a fundamental psionic arcane ability (some call it a trick):

To cloud other minds
Check Psi (2D)

Success forces others to completely ignore the character (and those around him as part of his group). The effect does not affect security sensors, imagers, or technological devices. Most new Psionics try out their new ability as soon as possible.

Finally, the character is formally declared a **First Stage Psion.**

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 allocates CP and Abilities into 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 **three times** Psi in points available to allocate to the six Psionic Senses, but no Psionic Sense may be allocated less than Half CP in points. It is possible to allocate zero points to an Ability.

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 Mods equal to the difference in Size.

At the end of the Second Training session, the character has learned the basics of ESP. He is also instructed in the dangers of fatigue when using ESP: after every Psi-Sense action, there is a chance of overwhelming fatigue: Check Endurance; failure advances Attention Level (see The Personal Day) one lower.

At the end of the session, the character is declared a **Second Stage Psion**.

For example, Human Citizen Uvasti Seng 666B99 Psi-5 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 an access 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 turns and scans the darkness across the tarmac. He cannot See anything. He turns his attention to his Psi- Vision. There is a Size-5 Attack Beasts almost at the horizon Range= 6.

To **Spot** an Object Psi-Vision

Range < Psi-Vision + Benchmark + Remote + Mod

5D < 30 - 1

He must roll 29 or less on 5D (which is almost automatic). He is amazed at how clearly he can see in the dark. Then (Check End [not C5]) he is overcome by a feeling of fatigue; he closes the cargo hatch and retires for the night.

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.

Manipulation 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 **three times** Psi in points available to allocate to the six Psionic ECM Abilities, but no Ability may be allocated less than Half CP in points. 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.

At the end of the training session, the character is formally declared a **Third Stage Psion**.

Move

Move is the Ability to change an object's location:

To Move an Object

Range (nD) < Constant + Remote – Size

Range (nD) < Constant + Direct - Size

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 Move an object which standing or riding it.

Move can impart a Speed to an object. Minimal speed and location change is easy and automatic. The maximum speed that can be imparted is Move Constant divided by 10 (retain fractions).

Gravity is not involved in the Move process.

Teleport

Teleport is the Ability to move objects (including the Op-

erator himself) instantaneously to a distant point.

Teleport is instantaneous.

Teleport Distance. Teleport requires that the operator visualize (or sense) the destination. A Psion can Teleport to a location he can see (or use another of his senses to sense), excluding As a practical matter, possible Teleport distance is the limit of ordinary vision ($R=8 = 500 \text{ km}$).

Teleport ignores all intervening obstacles: it passes through walls, matter, energy differences, all barriers.

Temperature Change. An object or a person who changes altitude is subject to a temperature change effect: Altitude Change $R = \text{Range}$. If the subject increases altitude, the subject sustains Cold- R . If the subject decreases altitude, the subject sustains Heat- R .

To Teleport

Range (nD) < Constant + Remote - Size

Range (nD) < Constant + Direct - Size

Teleport using Direct requires the operator physically touch the object being teleported.

Explorer Bin Lagash (CP=9, Teleport-8, Size=5) is surveying a world far beyond the Imperial frontier. Surprised by a snowcat (Size=3, Range=1), he reacts instinctively as it leaps and tries to teleport the snowcat one kilometer straight up (=Range 5). He needs to roll $17 - 1 - (3 + 1) - 5 = 7$. He rolls 6 and succeeds. The Snowcat inexplicably finds itself 1000 meters up, immediately suffers Cold-5, and is falling.

Bin likes the dramatic; a better-trained user would simply teleport the Snowcat 50 meters away Range=2, leaving the animal unharmed. He would need to roll $17 - 1 - (3 + 1) - 2 = 10$, giving a substantially better chance of success.

Stutterport. It is possible for an operator to continuously teleport an object over a series of very small distances.

To Stutterport

Range (nD) < Constant + Direct - Size

Each action takes 1/C3 seconds (Endurance-7 allows seven actions per second).

Rogue Ank Lagash 777B77 (CP=9, Direct-9, Teleport-9) climbs aboard a slab of rock (Size=6) and concentrates. He needs to roll $(9 + 9 - 6) = 12$ on 2D which is automatic. The slab moves about 50 meters instantaneously; he keeps concentrating, and the slab moves another 50 meters in the same direction. Ank could keep this up all day long (he thinks), but after perhaps 21 of this short teleports (Check End each time), he feels a wave of fatigue and grounds the slab. He has moved about (21 teleports of 50 meters each) = 1,050 meters; each teleport controlling thought took about a seventh of a second: the slab had an effective speed of (21 teleports / 7) = 3 seconds; (1,050 meters / 3 seconds) = 350 meters per second.

Eshift or Energy Shift

Energy Shift is the Ability to channel energy from the environment into or out of object: Energy Transfer is the equivalent of a heat pump.

To Shift Energy In

To Shift Energy Out

Range (nD) < Constant + Remote - Size

In Contact (2D) < Constant + Direct - Size

Self (2D) < Constant + Self - Size

Success in Eshift allows the operator to impose Hot-N, Cold-N, or Elec-N where N is the Eshift Constant (N = actual points transferred, not Dice).

Energy Shift can be used in both positive and negative ways. It can inflict damage on objects, or it can counteract or cancel damage inflicted on objects.

Characteristic Shift. Eshift can also transfer or enhance Characteristics.

To Transfer a Characteristic

Range (nD) < Constant + Remote - Value

Contact (2D) < Constant + Direct - Value

Transfer may be out (from the operator to the subject) or in (from the subject to the operator). The transferred value remains with the recipient for about an hour and then wears off one point per minute. The donor's characteristic is similarly reduced.

The Touch

The Touch is the Ability to influence biological processes. It may be a positive or a negative activity. The Touch is Direct or Self.

The Healing Touch

The Hurting Touch

Direct (2D) < Constant + Direct - Size - Hits

Self (2D) < Constant + Self - Size - Hits

The operator lays his hands (manipulators) on the subject and removes (or inflicts) hits (damage). Hits are expressed in points (not Dice). If the action is Self, the operator is healing his own wounds.

OOB

Out Of The Body is the Ability to project one's consciousness to a location apart from the body and without regard to barriers. The individual is equipped with his own senses and his psionic senses in the remote location.

To Travel OOB

Range (nD) < Constant + Self

The consciousness (indeed, the personality) of the operator leaves the body to travel to the remote location; the body remains unconscious 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 operator becomes Tired, the consciousness is drawn back to the body.

An operator in OOB can observe with the physical sens-

es as well as the Psionic Senses. He cannot interact with physical objects except through Psionic abilities.

MENTATION

Mentation is the Ability to read, influence, and control minds. The process is one of domination: those with greater Psi are able to influence those with lesser (or with no) Psi.

To win a Psionic brawl.

Difficult (3D) < Psi + Remote - PsiShield

Opposed (up to 4). Resolves the brawl in one task. All losers receive 2D hits. The winner is unscathed.

To Control A Mind

Difficult (3D) < Psi + Remote - PsiShield

Difficult (3D) < Psi + Direct

Opposed (2). Resolves in one task.

The Loser obeys the winner for 1D Rounds.

To Read A Mind

Difficult (3D) < Psi + Remote - PsiShield

Difficult (3D) < Psi + Direct +Mod

Opposed (2). Resolves in one task.

The winner obtains the information from the mind of the loser.

Armor. PsiShield is a defense against the Remote psionic efforts; it does not restrict defenses.

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 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 Good and - 5 Evil.

Roll Flux for a value between +5 Order and - 5 Chaotic.

In each case, 0= Neutral.

The committee (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 discouraged.

At the end of the session, the character is formally declared a **Fourth Stage Psion**.

FINDING A FIFTH STAGE INSTITUTE

A Fourth Stage Psion or higher must find an institute which is in tune with his personality. When the character finds and approaches an Institute, roll Flux twice to produce values for Good/Evil and Order/Chaos. An institute which does not coincide with the character's general values will be (sadly) turned away.

The Types Of Institutes

Order / Good	Neutral / Good	Chaotic/ Good
Order/ Neutral	Neutral / Neutral	Chaotic/ Neutral
Order/ Evil	Neutral/ Evil	Chaotic/ Evil

For example, Fourth Stage Psion Ank Lagash Tested = -3 Chaotic +2 Good and after some negotiation with the Committee, he accepted a rating of -3 Chaotic +3 Good. While visiting a world, he locates a Psionic Institute (which the Referee determines is Order Good (the specific values don't matter).

They turn him away as unsuited for their disciplines.

THE FIFTH TRAINING SESSION

The character explores his abilities in the Intuitions.

A character attending his fifth training session discovers the details of the Intuitions and his abilities with them.

The Intuitions

There are three Intuitions: Insight, Luck, and Curiosity.

Curiosity relates to the serendipitous acquisition of information.

Insight relates to the processing of information.

Luck relates to forcing favorable outcomes.

Basic Intuition Allocation

The character has **two times** Psi in points available to allocate to the three Intuitions, but no Intuition may be allocated less than Half CP in points. It is possible to allocate zero points to an Intuition.

At the end of the training session, the character is formally declared a **Fifth Stage Psion**.

Using The Intuitions

The Intuitions are values to be Checked.

Only One At A Time. In each gaming session, randomly select one of the three Intuitions (even if the character has that Intuition at zero-value). The Intuitions are available one-at-a-time. Once one has expressed itself, it becomes dormant until both of the others have expressed themselves as well.

Check Insight. The character can see (or puzzle out) correct action, which usually expresses itself as a question: "Why don't we try (blank)?"

Roll 2D. If the result is equal or less than **Insight**, the proper course of action reveals itself to the character.

Check Curiosity. The character wonders about the nature of objects or the environment, which usually expresses itself as a question: “Why is that (blank)?”

Roll 2D. If the result is equal or less than **Curiosity**, the nature of the object becomes apparent.

Check Luck. The character is naturally lucky. When a negative event occurs, he has a chance that it will miss him. “Just lucky I guess.” Luck applies to its holder: it cannot be shared or transferred to others.

Roll 2D. If the result is equal or less than **Luck**, the negative event does not happen.

PSIONICS IS AN ORGANIC ABILITY

Non-organic (electronic, fluidic, 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 become usable again.

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 often react with alarm or distaste when they encounter unfamiliar behavior.

TRADITIONAL PSIONIC ACTIVITY EQUIVALENCES

Traditional	Psionic
Astral Projection	OOB
Clairience	Psi-Smell
Clairaudience	Psi-Hearing
Clairgustance	Psi-Smell (the Taste aspects)
Clairsentience	Psi-Touch
Clairvoyance	Psi-Vision
Cryokinesis	Eshift
Electrokinesis	Eshift
Healing	The Touch
Levitation	Move
Mind-Reading	Mentation
Out of the Body	OOB
Psychokinesis	Move
Pyrokinesis	Eshift
Remote	Viewing Psi-Vision
Telekinesis	Move
Telepathy	Mentation
Teleportation	Teleport

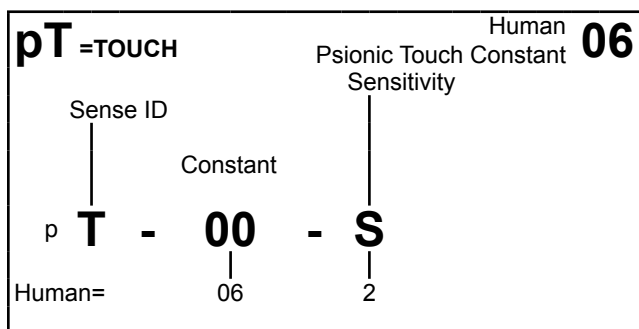
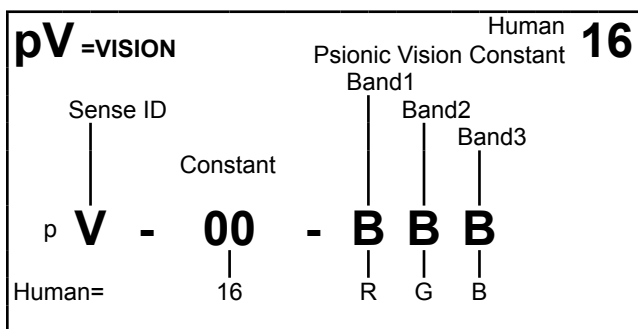
The traditional names for paranormal activity have their equivalents in Psionics, as shown in this table.

THE SIXTH STAGE

The Sixth 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.

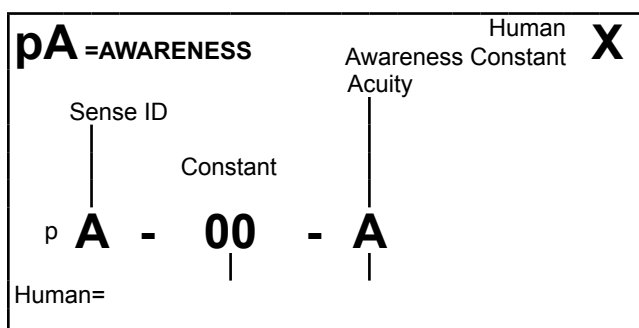
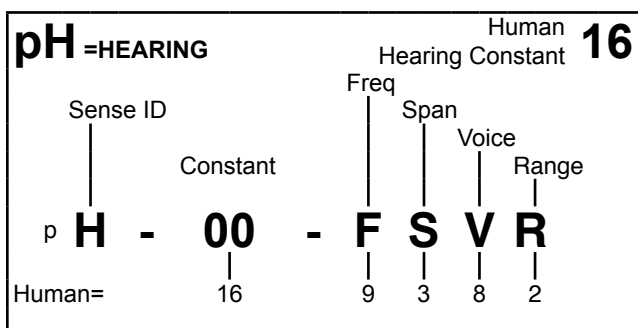
Some Sixth Stage Psionics make their abilities the focus of their lives; others pursue other activities and use Psionics as a supplement. Yet others organize their own Psionic Institutes.

THE PSIONIC SENSE ACTIONS



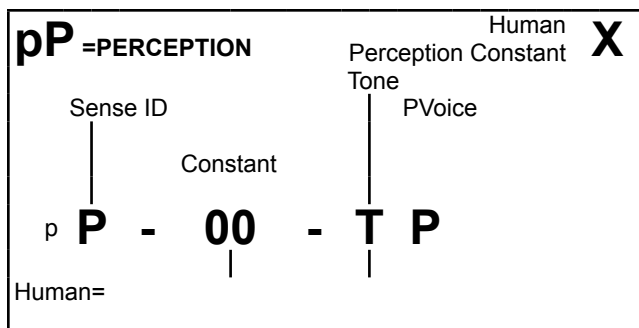
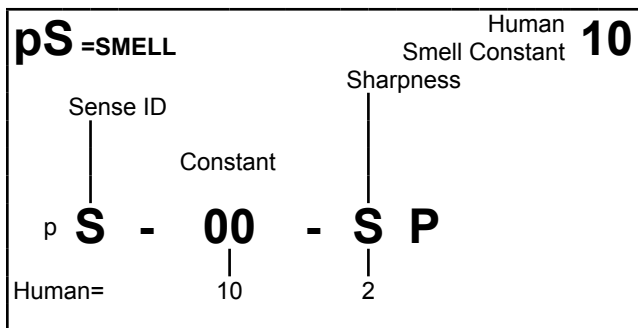
nD To Notice an Object
< Constant + Benchmark + Mod + Mod

nD To Notice an Texture
< Constant + Benchmark + Mod + Mod



nD To Notice an Sound
< Constant + Benchmark + Mod + Mod

nD To Notice an Field
< Constant + Benchmark + Mod + Mod



nD To Notice an Scent
< Constant + Benchmark + Mod + Mod

nD To Notice an Aura
< Constant + Benchmark + Mod + Mod

RANGES

Range=	0	1	2	3	4	5	6	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

VISION BENCHMARKS

	Contact	Reading	Talking	Vshort	Short	Medium	Long	Vlong	Distant	Vdistant
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 BENCHMARKS

	Contact	Reading	Talking	Vshort	Short	Medium	Long	Vlong	Distant	Vdistant
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

AWARENESS BENCHMARKS

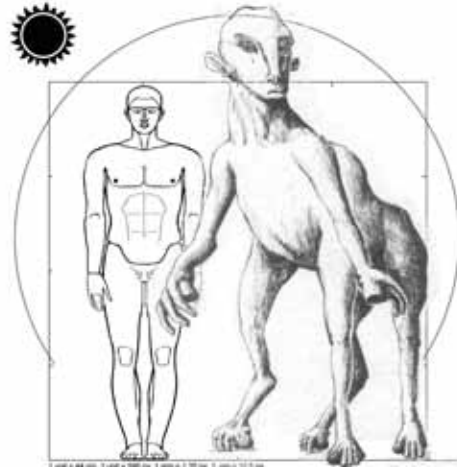
Mass										
Electric										
Magnetic										
	Contact	Reading	Talking	Vshort	Short	Medium	Long	Vlong	Distant	Vdistant
Range	0	R	T	1	2	3	4	5	6	7
Distance				5 m	50 m	150 m	500 m	1000 m	5 km	50 km

PERCEPTION BENCHMARKS

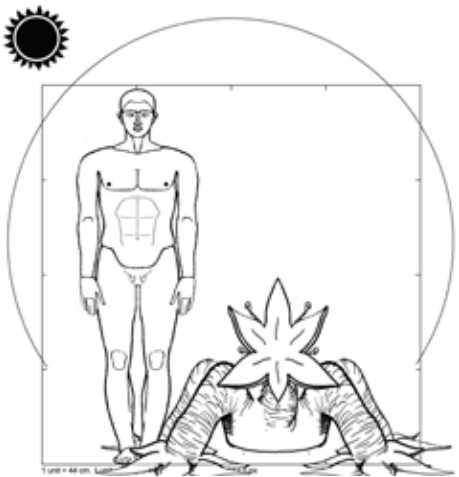
Thought										
Life										
	Contact	Reading	Talking	Vshort	Short	Medium	Long	Vlong	Distant	Vdistant
Range	0	R	T	1	2	3	4	5	6	7
Distance				5 m	50 m	150 m	500 m	1000 m	5 km	50 km



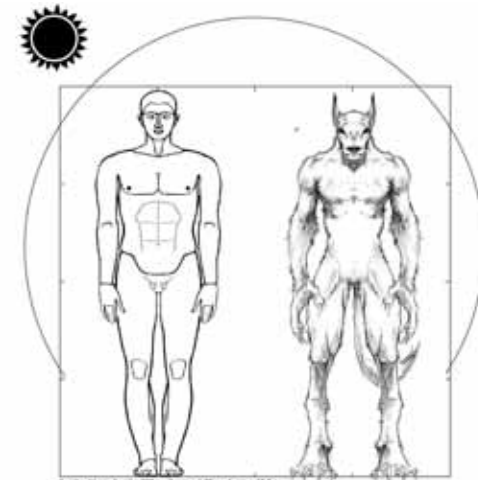
The Zhodani of Zhdant (Plieb-2 [K0 V] A6549C8-F)



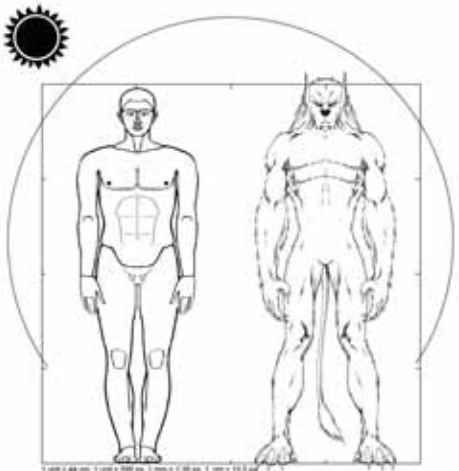
The K'kree of Kirur (Gzang-5 [F1 V] B863A03-F)



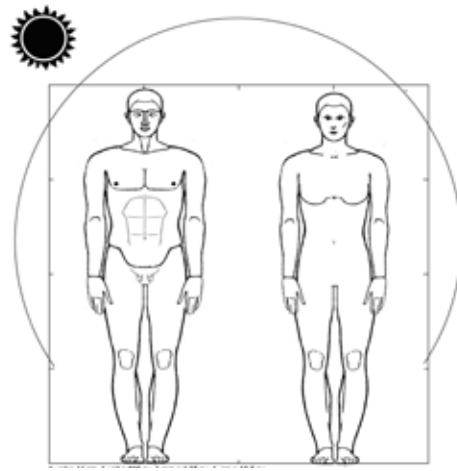
The Hivers of Guaran (Primary- 2 [K1 V] A667800-F)



The Vargr of Lair (Kneng-3 [G5 V] A8859B9-F)



The Aslan of Kusyu (Tyeyo-3 [G4 V] A876986-E)



The Humans of Terra (Sol-3 [G2 V] A877B99-D)

The **Traveller** universe is filled with non-human sophonts. Many can be created using the **Traveller Sophont Creation System**. The result is a completed **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 SCS 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).

SCS is expressed as 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 Process** 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 SCS DOES NOT DO

The **Traveller Sophont Creations System SCS** 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.

SCS does not create non-physical bodies, fantasy creatures, or beings well outside the environment tolerable to humans, and many other unusual circumstances are beyond the scope of this work



WISEMAN'S GUIDE TO SOPHONTS IISS, 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. Sapient 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.

TERMINOLOGY

The following terms are commonly accepted.

Species is a biological classification of beings which share the same genetic and 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, 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 Sapient 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

		Atm=															
		Vacuum	Trace	Vthin Tainted	Vthin	Thin Tainted	Thin	Standard	Standard Tainted	Dense	Dense Tainted	Dense High	Ellipsoid	Thin Low	Exotic	Corrosive	Insidious
		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	Transplants											Natives		Exotic Natives		
	8																
	9																
	A																
	B																
	C																
	D																
E																	
F																	

* TL=0. ** TL=1+.

VT= Vanished Transplants. EXN= Exotic Extinct Natives.

CEXN= Catastrophic Extinct Exotic Natives.

Gov=1 Corporate.

Gov=6 Colonists.

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.

Colonists (World Government = 6 [regardless of Population]). The world is a colony; its inhabitants are called colonists. The sophonts of this world evolved on some other world; depending on the age of the colony, some locals may have been born elsewhere; many probably have been born on this world.

Transients (World Population = 1-2-3). The 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). The 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 who are not Settlers, Transients, Colonists, or Transplants are Natives. They evolved on this specific world.

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.

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 catastrophe which forced their extinction may or may not be known.

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.

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.

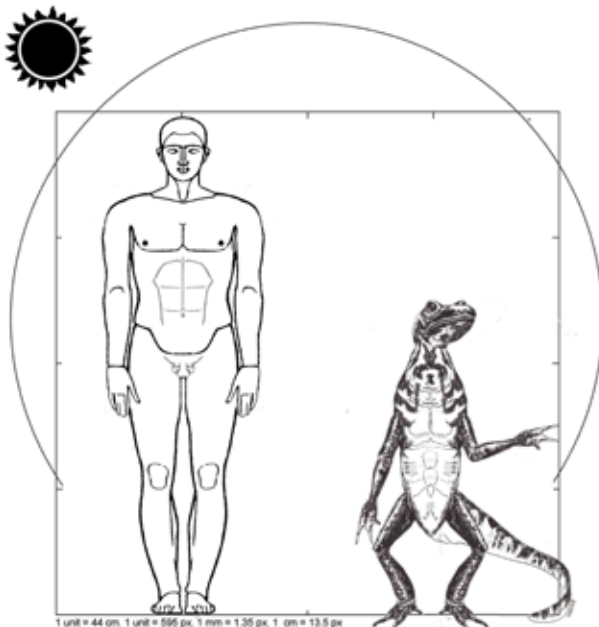
For example,

The Solomani of Terra (Sol 3 [G2 V])
 The Aslan of Kusyu (Tyeyo-3 [G4 V])
 The Urdushkha of Irdi (Irluush 5 [F4 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])



The Bwaps of Maharaban (Glowl-2 [G4 V]) A4698AB-B

AN OVERVIEW OF SOPHONT CREATION

The SCS process proceeds through several pages of numbered charts:

Introduction. This text introduction is an overview of the **Traveller** Sophont Creation Process.

01. The Sophont Creation Checklist recapitulates the steps necessary to create a Sophont species, including references to the numbered charts.

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.

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.

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.

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. Uniques suggests structures for those rare sophonts who have unique or non-standard abilities.

15. 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.

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. 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 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-Ell-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 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 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 closer than HZ= -1 is too hot for routine occupation. Such worlds however in Orbit 0 or 1 have a habitable Twilight Zone.

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 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

The Characteristics page details the assignment of the physical, mental, and social characteristics for the Sophont. Separately, the number of dice rolled for each Characteristic is determined.

Humans. Humans have characteristics Strength, Dexterity, Endurance, Intelligence, Education, and Social Standing. 2D is rolled for each characteristic.

Big Sophonts

The extreme upper reaches of the Characteristic Values Table produces Characteristics with values 4D 5D or 6D. Because the lower range of these rolls produces abnormally low values, the first two dice of each roll are automatically 6 each.

For example, for a sophont rolling C1 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 page is skipped.

The Central Concept. The Caste Creation process creates a Caste Generation Table with entries 02 through 12; when the SCC is used to create individual characters, this table is used when determining individual Caste for a character. For example, in the process of creating four different Sophonts (call them the Ay, Bee, Cee, and Dee), each with Body Caste Structure. For each, 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 this 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.

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 (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.

What Does Caste Mean?

The presence of Caste in a sophont species defines a variety of roles which casted individuals play with the greater

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.

society of the species. Castes are expressed as metaphors which define specific roles and provide guidance to referees and players).

For example, within the Body Caste, each caste roles replicate 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. 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,

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

Specimen Gender for the Ay, Bee, Cee, and Dee

F	Entry	Ay	Bee	Cee	Dee
1	K02	Female*	Female*	Female*	Female*
2	K03	Male*	Male*	Male*	Male*
3	K04	Female	Female	Male	Female
4	K05	Female	Female	Female	Male
5	K06	Female	Female	Male	Male
6	K07	Female	Female	Male	Male
5	K08	Female	Male	Male	Female
4	K09	Female	Female	Female	Male
3	K10	Female	Male	Male	Female
2	K11	Female	Male	Female	Female
1	K12	Female	Male	Female	Female

F= Frequency: the number of times this entry is expected to occur out of 36 rolls. * Automatic Entry.

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).

09. LIFE STAGES

The Life Stages page recounts the various developmental periods in the life of a Sophont. Life Stages are reckoned in Terms.

Humans. Humans begin life with a two year infancy (a half Term) followed by nine Life Stages of two Terms each (=74 years).

Non-Humans. Different sophonts can 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, the 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 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.

12. SPECIAL ABILITIES

The Special abilities page determines special abilities available to the race as a whole, or to members of genders or castes.

13. MANIPULATORS

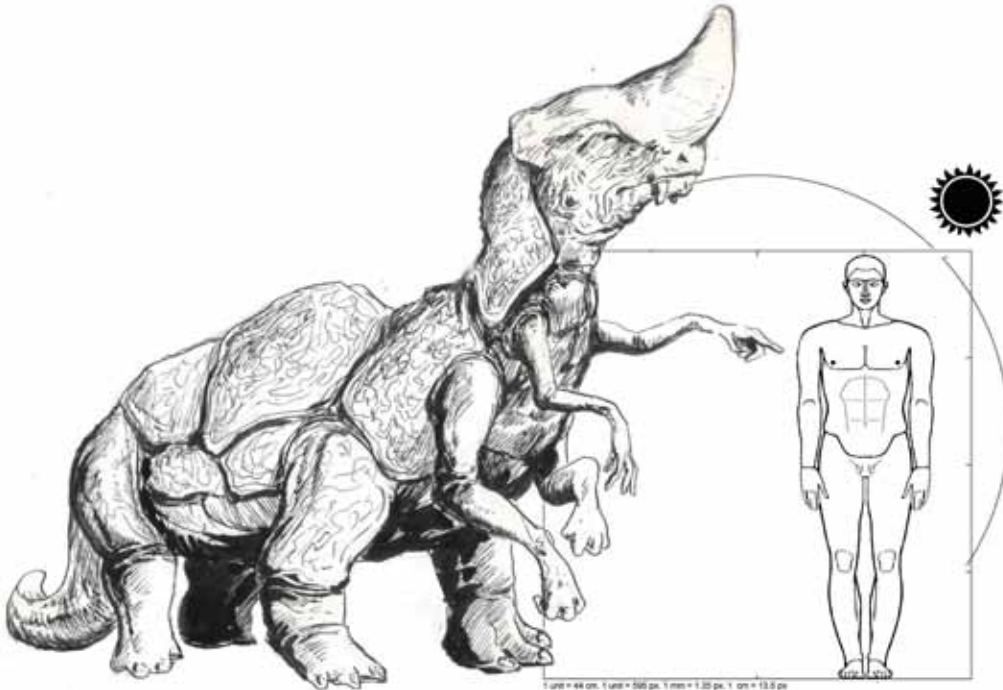
The manipulators assigned under Body Structure are illustrated.

14. 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-



The Virushi of Virshash (Thintle-6 [F9 V] DA86954-6

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.

15. 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 charac-

teristics C1 C2 C3 (count Agi Gra Vig as half; count Sta as double). 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 120.

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= 5D Dex= 3D End= 2D for a total of 10D. Because Str is 4D or greater, multiply by 120 = 1200 liters = 1200 kilograms (=a little more than a ton).

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. 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.

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 great 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.

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The Sol system contains 4 worlds (plus minor planets and satellites), four gas giants, and one planetoid belt.

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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 Group (technically 1234) gender structure. The reported gender census (IISS Survey Report: 420-892R) is One: 46%, Two: 44%, Three: 5%, Four: 5%.

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).

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 are reports that individuals are capable of Psionics at low levels (approximately 10% of the population).

There are 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 an 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 Sophont Creation.

A. Prepare a blank Fillform.

04. Basics selects or 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. Determine Homeworld variance within HZ (and Climate).

D. Is Mainworld a Satellite?

1. Satellite Close of 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 on columns C1-C2-C3-C4-C5-C6 for characteristic names.

B. Characteristic Values. Flux on columns C1-C2-C3-C4-C5-C6 for Dice for each Characteristic.

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 Entry 2 on the FillForm, 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 its duration (in 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. Flux plus Roll Special Ability

B. Voices.

1. Flux Voice if Hearing

2. Flux Poice if Perception.

13. Manipulators. Note details of the minipulator use.

14. Uniques. As desired, implement unique details.

15. Sophont Size. Calculate sophont size.

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		3 CharGen Start	
C1 Str	Energy	Vision String	LimbGroup2		4	
C2 Dex Agi Gra	Vibration	Hearing String	LimbGroup3		5 Physical Aging	
C3 End Vig Sta	Volatiles	Smell String	LimbGroup4		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	2	K02	C1	C2	C3	C4	C5
G2- 2MA						2MA	3	K03					
G3- 3NB						3NB	4	K04					
G4-							5	K05					
G5-							6	K06					
G6-							7	K07 Common					
Caste Assignment							8	K08					
Caste Shift							9	K09					
Gender Assignment							10	K10					
Gender Shift							11	K11					
Caste-Gender Relation							12	K12 Unique					

SCS Sophont Creation Card

T5-004

03

SOPHONT
FILLFORM

Sophont
Homeworld

Homeworld

04	A	HomeStar	
	B	Habitable Zone Orbit	
	C	Mainworld Orbit	
	D	Satellite Orbit	
	E	Homeworld SAHPG	
	F	Climate	
	G	Native Status	

Environment

05	A	Native Terrain	
	B	Locomotion	
	C	Niche/ Subniche	
	C	Breathes	
		Species Spectra	

Characteristics

		GP=		
06	A	C1		D=
	A	C2		D=
	A	C3		D=
	A	C4		D=
	A	C5		D=
	A	C6		D=

Gender and Caste

	Gender	2D	Caste
07		2	
		3	
08		4	
		5	
		6	
		7	
		8	
		9	
		10	
		11	
		12	

Caste Differences

		C1	C2	C3	C4	C5	C6
07	K02						
	K03						
	K04						
	K05						
	K06						
	K07	0	0	0	0	0	0
	K08						
	K09						
	K10						
	K11						
	K12						

Gender Differences

		C1	C2	C3	C4	C5	C6
08	G01						
	G02						
	G03						
	G04						
	G05						
	G06						

Details

15	Size	
10	Scent	
12	Special	
07	Castes	
07	Caste Census	
08	Genders	
08	Gender Census	

Life Stages

		Terms	Years
09	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

10	AB	Vision
	AB	Hearing
	AB	Smell
	AB	Touch
	AB	Aware
	AB	Percept
	C	Language Medium
12		Voice
		Poice

Body Structure

11					
	A	A-	B-	C D	E F -G
	A	Symmetry			
	A	Tail			
	B	Skeleton			
	B	Fluids			
	B	Skin			
	B	Weapons			
	B	Manipulators			

Comments:

04

SOPHONT HOMEWORLD

Each sophont species originally evolved on a homeworld with specific details of environment.

04 Homeworld generates this information as part of the species background.

If pre-existing information is available, use it rather than this table.

SOPHONT HOMEWORLD

STAR SYSTEM INFORMATION

The star system and homeworld data necessary for a sophont include:

- A. Star Spectral, Decimal, Size.
- B. Habitable Zone for System.
- C. Mainworld Orbit, HZ Variation.
- D. Is The Mainworld A Satellite?
- E. Homeworld SAHPG (from UWP).
- F. Climate.
- G. Native Status.
- H. Homeworld and Species Name (may be deferred).

B HABITABLE ZONE ORBIT

Spectral	A0-	A4-	A9-	F2-	F7-	G2-	G9-	K4-	K9-	M4-	
Size	A3	A8	F1	F6	G1	G8	K3	K8	M3	M8	M9
la	12	12	12	12	11	12	12	12	12	12	12
lb	11	11	10	10	10	10	10	10	10	11	11
II	9	9	8	8	8	8	8	9	9	10	11
III	8	8	7	6	6	6	7	7	8	8	9
IV	7	7	6	6	5	5	5	-	-	-	-
V	7	7	6	5	4	3	2	2	0	0	0
VI	-	-	-	3	3	2	1	0	0	0	0
D	0	0	0	0	0	0	0	0	0	0	0

Habitable Zone (HZ) orbit number indicates a world surface environment hospitable to humans and similar sophonts.

Orbit 0 or 1 indicates 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 the Mainworld in the Orbit Number from Table B, plus or minus the variation from this table.

D SATELLITE?

Flux	Satellite	Close*	Far
-6	Satellite	Ay	En
-5	Satellite	Bee	Oh
-4	Satellite	Cee	Pee
-3	Satellite	Dee	Que
-2	World	Ee	Arr
-1	World	Eff	Ess
0	World	Gee	Tee
+1	World	Aitch	Yu
+2	World	Eye	Vee
+3	World	Jay	Dub
+4	World	Kay	Ex
+5	World	Ell	Wye
+6	World	Em	Zee

Is Mainworld a Satellite?

If Yes, determine Close or Far.

Note Satellite Orbit Letter.

*Close Satellite is Lk Locked.

E HOMEWORLD

Create the SAHPG (Size, Atmosphere, Hydrographics, Population, Government) components of the Universal World Profile.

S. Size. Planetary Size: 2D-2.

A. Atmosphere. Flux + Size.

If Size =0, Atmosphere =0.

H. Hydrographics. Flux+ Size. Maximum A.

If Size =0-1, Hyd =0;

If Atm =0-1 or A+, Hyd DM - 4.

P. Population. 2D-2.

G. Government. Flux +Pop.

Convert negative values to 0.

F CLIMATE

Temperate. Normal Human temperature range.

Tr Tropic. Hot. The upper limits of human temperature endurance.

Tu Tundra. Cold. The lower limits of human temperature endurance.

Fr Frozen. Unsurvivable with technological assistance.

Tz Twilight Zone. Tidally locked with a Temperate Twilight Zone, plus a Hot hemisphere and a Cold hemisphere.

Lk Locked. Close satellite (Ay through Em) Locked to the planet.

There is no Twilight Zone; day length equals satellite orbit time.

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

- 5	Baked Lands Hot region.
0	Twilight Zone Temperate region
+1	Frozen Lands Cold region

Substitute these native terrain names if the Home-world is Twilight Zone or Locked.

NATIVE ENVIRONMENT

The details of a sophont's evolutionary environment shape its physiology and physical structure, locomotion, and ecological niche.

NATIVE EVOLUTIONARY ORIGINS

A native sophont 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 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		
+1	Forest	Walker	Walker	Walker	Walker	Walker	Walker		
+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		

SOPHONT MOVEMENT

Type	Walks	Dives	Swims	Flies	Other	Breathes
Walker	Walks	-	-	-	-	<Atm>
Amphibian	Walks	-	Swims	-	-	<Atm> + Water
Triphibian	Walks	-	Swims	Flies	-	<Atm>
Aquatic	-	Dives	Swims	-	-	<Atm>
Diver	-	Dives	-	-	-	Water
Flyer	Walks	-	-	Flies	-	<Atm>
Flyphib	-	-	Swims	Flies	-	<Atm> + Water
Swimmer	-	-	Swims	-	-	<Atm>
Static*-	-	-	-	Immobile	-	<Atm>
Drifter*	-	-	-	-	Drifts	Water

* Producer only.

Walks= Moves

(walks, jumps, crawls) on land.

Dives= Moves in water depths.

Swims= Moves in water, near surface.

Flies= Moves in atmosphere.

Breathes= <Atm>= Home-world Atmosphere.

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
- 3	Herbivore	Intermittent	Hunter	Pouncer	Hijacker	Collector
- 2	Omnivore	Intermittent	Hunter	Pouncer	Hijacker	Collector
- 1	Omnivore	Intermittent	Gatherer	Pouncer	Hijacker	Collector
0	Omnivore	Intermittent	H / G	Chaser	Intimidator	Basker
+1	Omnivore	Grazer	Gatherer	Chaser	Intimidator	Basker
+2	Omnivore	Grazer	Gatherer	Chaser	Intimidator	Basker
+3	Carnivore	Grazer	Gatherer	Chaser	Intimidator	Basker
+4	Carnivore	Grazer	Gatherer	Trapper	Intimidator	Basker
+5	Scavenger	Grazer	Gatherer	Siren	Reducer	Basker
+6	Scavenger	Filter	Eater	Killer	Reducer	Basker

Roll Flux for Niche; then Flux in the appropriate column.

Apply Environment Roll as a Mod to appropriate columns (but not Basic Class).

06

SOPHONT CHARACTERISTICS

THE CHARACTERISTICS

The sophont species has six characteristics, some of which may differ from the standard Human characteristics.

- Determine the specific six Characteristics.
- Determine the dice rolls for each of the Characteristics.

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

Possible personal characteristics include:

Char	Characteristic	H*	Description	GP Letter
C1	Str	Strength	H physical power and ability.	S
C2	Dex	Dexterity	H body and eye-hand coordination.	D
C2	Agi	Agility	A overall body coordination.	A
C2	Gra	Grace	A overall body-limb coordination.	G
C3	End	Endurance	H physical resistance to fatigue.	E
C3	Sta	Stamina	A long-term ability to pursue a task.	S
C3	Vig	Vigor	A short-term ability to resist fatigue.	V
C4	Int	Intelligence	H natural ability to think and reason.	I
C5	Edu	Education	H achievement level of schooling	E
C5	Tra	Training	A based on cultural heritage	T
C5	Ins	Instinct	A based on genetic heritage.	I
C6	Soc	Social Standing	H position in large group hierarchy.	S
C6	Cha	Charisma	A position in small group hierarchy.	C
C6	Cas	Caste	A position in genetic group hierarchy.	K

H= Human characteristic (may be present in non-humans). If all characteristics are H, the species may be (but not necessarily is) Human.

A= Analog (non-human) characteristic.

- All sophonts have Strength.
- A sophont may have Dexterity or analog: Grace or Agility.
- A sophont may have Endurance or analog: Stamina or Vigor.
- All sophonts have Intelligence.
- A sophont may have Education or analog: Training or Instinct.
- A sophont may have Social Standing or 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

For characteristics C1 through C6, roll Flux to determine each specific characteristic.

If Flyer, DM -2. Flyers are more likely to have Agi, Sta, and Ins.

If Swimmer or Diver, DM +2. Swimmers and Divers are more likely to have Gra, Vig, and Tra.

B CHARACTERISTIC VALUES

	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	2D	2D
+5	7D	3D	3D	3D	2D	2D
+6	8D	3D	3D	3D	2D	2D

Roll separately on the proper column for each characteristic. Rolls above the entries on the table use the highest entry. Rolls below the entries on the table use the lowest entry.

Physical: Roll Flux, DM+ Environ Flux.

C3: If Chaser, DM +2. If Pouncer, DM -2.

C5 (Edu/Tra): Always 2D for sophonts.

C6 (Cas): See the Caste tables.

* IF the value is 4D 5D 6D 7D 8D, use a base value= 12 for the first 2D (that is, 6D = 12+4D).

The Unstated Characteristics

Sanity. The sophont species has Sanity.

Psi. The sophont species has Psi.

CASTE

For those species with Caste, it rigidly assigns social and economic roles within the community unit. The specific differentiation of caste roles between species varies widely.

THE CASTE GENERATION TABLE

If the Sophont has Caste, create a Caste Generation Table on the SCS; if C6 is not Caste, skip this process.

- A. Determine the Caste Structure.
- B. Create a Caste Table on the FillForm.
- C. Determine Caste Based Differences.
- D. Determine Caste Shift (if any)
- E. Determine Caste Assignment process.

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, Pilot, or Gunner.

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 skill 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	Special
- 5	Healer	Innovator	Healer	Medic	Artist	DeMinimus
=Gender - 4	=Gender	=Gender	=Gender	=Gender	=Gender	Useless
- 3	Antibody	Guard	Defender	Aide	Enforcer	Advisor -
- 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+
=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 specific Caste Characteristic digit for the UPP is the highest die roll on the Caste Table which creates this Caste.

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 any 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 special rules.

08

SOPHONT GENDER

GENDER

Gender indicates the evolutionarily established reproductive roles within a species. Gender may include physical differentiation between the members of the genders and other distinctive differences

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. Specific structures include a few, some, or all of the available genders.

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

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.

If FMN or EAB, enter Gender 3 (Neuter, Bearer) on entry line 4.

For each remaining line, roll Flux on the specific column.

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
+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

Initial Gender Assignment is based on 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.

THE GENDER GENERATION TABLE

The Gender Generation Table on the Being Creation Card is unique to the race being described; it determines genders of the race, and in what proportion they occur.

A. Gender Structure and Table.

Structure column determines the specific 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 the sophont has Caste, note the Caste-Gender Relation.

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	+1D	+3	+3	+3	+3
+4	+2D	+4	+4	+4	+4
+5	+3D	+5	+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

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.

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	Flux
-5	1/2	1	0	0	0	1	0	0	0	1	-5
-4	1/2	1	1	1	1	1	1	1	1	1	-4
-3	1/2	1	1	1	1	1	1	1	1	1	-3
-2	1/2	1	1	1	1	1	1	1	1	1	-2
-1	1/2	2	2	2	2	2	2	2	2	2	-1
0	1/2	2	2	2	2	2	2	2	2	2	0
+1	1/2	2	2	2	2	2	2	2	2	2	+1
+2	1/2	3	3	3	3	3	3	3	3	3	+2
+3	1/2	3	3	3	3	3	3	3	3	3	+3
+4	1/2	4	4	4	4	4	4	4	4	4	+4
+5	1/2	6	6	6	6	6	6	6	6	6	+5

Duration is shown in 4-year Terms (1 = one term of four years).

Life Stages for a sophont species may vary in length. This chart indicates the number of (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 are generated and start play at the beginning of year 3 of Teen. (=12 for Humans).

AGING

Aging affects the Physical and Mental characteristics (but not Edu or Tra). ultimately reducing them to zero and inflicting death.

Characters are immune to Aging for roughly the first half of their lives. Once Aging begins, it occurs every Term on the character's birthday.

Physical Aging

Physical Aging affects Physical Characteristics C1, C2, and C3. Physical Aging Checks begin at Life Stage 5.

Mental Aging

Mental Aging affects Intelligence and Instinct (if present). Mental Aging Checks begin at Life Stage 9

THE AGING CHECK

Resolve the Aging Check every four years on the character's birthday. For each affected Characteristic, roll the Age Crisis.

To Feel Age Effects (The Aging Check)

2D < Life Stage

Success inflicts -1 on the characteristic.

(A character wants to FAIL this action).

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.

10

SOPHONT SENSES

THE SENSES

There are six possible senses: Vision, Hearing, Smell, Touch, Awareness, and Perception, of which all Sophonts have Touch. They may have one or more of the others. Senses are defined and described using the human senses as the baseline. Other senses are possible, but they are either minor in scope, or too exotic for this system to handle.

CREATING THE SENSES

- Determine Available Senses.
- Determine Sense Strings for each of the Senses. For each Sense:
 - Roll the Constant.
 - Roll the Elements.
- Preferred Language.
- Racial Scent.

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

A THE SENSES

SOME SENSES ABSENT

- Blind**= No Vision.
- Deaf**= No Hearing.
- Anosmic**= No Smell.
- Unaware**= No Awareness.
- Oblivious** = No Perception.

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

B

VISION

HEARING

SMELL

TOUCH

AWARE

PERCEPT

Flux	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.

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

THE RACIAL SCENT

Generate Racial Scent with 1D and 1D for each of the six digits, in format ABC-DEF. Human= HUM-

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= triplets; Radial = 1D limbs per group. Asymmetrical= 1D limbs per group (roll for each limb group).

DM -2 if Grace. +2 if Agility. +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.

STRUCTURE OVERVIEW

The Body Structure Overview shows the details of head, torso, limbs, and tail of the sophont 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

A- B- CD- EF- G

A BODY STRUCTURE

Flux	Symmetry	Head and Torso		Flyer		Walker		Aquatic Amphibian		Diver Swimmer		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.

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 Flyer. 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)

Weapon. Natural weapon.

Manipulators. Front Limbs terminate in Manipulators (Rear Limbs do not). Manipulators on Legs are dual use (thus doubling as Feet or Peds).

If otherwise no Manipulators, assume Mouth is Manipulator.

Stance. A sophont 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).

12

SOPHONT SPECIAL ABILITIES

SPECIAL ABILITIES

A sophont (every member, or specific members based on gender or caste) may have special abilities.

CASTE SKILLS LIST EXPANDED

A	B	1	2	3	4	5	6
1	1	Recon	Aeronautics	Admin	Advocate	SoundMimic	ACV
1	2	Spines	Aquanautics	Artillery	Artist	Biologics	Author
1	3	Sensors	Automotive	Astrogator	Beams	Computer	Broker
1	4	Actor	Bureaucracy	Craftsman	Computer	Driver	Mole
1	5	Flyer	BattleDress	Dancer	Diplomat	Explosives	Medic
1	6	Empath	Engineer	Designer	Exotics	G-Drive	Grav
2	1	Flapper	Fluidics	Electronics	Forensics	J-Drive	Math
2	2	Leader	Heavy Wpns	Engineer	Legged	Liaison	JOT
2	3	Tracked	Launcher	Gravitics	Mechanic	Athlete	Trader
2	4	Pilot	Magnetics	Hostile Env	Ordnance	Blades	LTA
2	5	Animals	Life Support	Language	P-Plant	Counsellor	Sail
2	6	Tactics	Photonics	Musician	Sapper	Ortillery	Ship
3	1	Turrets	Programmer	Strategy	Small Craft	Fighting	Rotor
3	2	Seafarer	Slug Thrower	M-Drive	Stealth	Osmancer	Rider
3	3	Survey	Naval Arch	Navigation	Survival	Wheeled	Sprays
3	4	Comms	Streetwise	Polymers	Trainer	Screens	Sub
3	5	Teacher	Teamster	Spacecraft	Animals	Steward	Wing
3	6	Unarmed	Vacc Suit	Starships	No Skill	Zero-G	WMD

Roll three dice to determine a specific skill..

SPECIAL ABILITIES

Flux	1 The Arts	2 Talents	3 Talents	4 Senses	5 Disability	6 Trades
-5	Actor	Insight	Math	Touch	-	Biologics
-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	Electronic

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.

Sophont Based Special Abilities. Consult this table once for the Race.

Gender Based Special Abilities. Consult this table once for each Gender..

Caste-Based Special Abilities Consult this table once for each Caste

Adjustments to Special Abilities.

Music: If Deaf and Oblivious, reroll.

Smell: If Anosmic, reroll.

Mem < - >. Roll for the Sense associated. 1= Vision. 2= Audio. 3= Scent. 4= reroll. 5= Aware. 6= Percep. If the sense is absent, 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= Fluid Filled Sac, if 1D= 5 or 6, Sophont has Morph.

CASTE SKILLS LIST SHORT

1D	1D	Skill List 1	Skill List 2
1	1	Actor	Heavy Wpns
1	2	Admin	Hi-G
1	3	Animals	Hostile Env
1	4	Art	Insight
1	5	Astrogator	JOT
1	6	Athlete	Language
2	1	Author	Lawyer
2	2	BattleDress	Leader
2	3	Biologics	Liaison
2	4	Broker	Mechanic
2	5	Bureaucracy	Medic
2	6	Carouse	Music
3	1	Command	Naval Arch
3	2	Comms	Photonics
3	3	Computer	Pilot
3	4	Counsellor	Polymers
3	5	Craftsman	Programmer
3	6	Dancer	Recon
4	1	Designer	Sapper
4	2	Diplomat	Seafarer
4	3	Driver	Sensors
4	4	Electronics	Stealth
4	5	Engineer	Steward
4	6	Explosives	Strategy
5	1	Fighting	Streetwise
5	2	Fluidics	Survey
5	3	Flyer	Survival
5	4	Forensics	Tactics
5	5	Forward Ob	Teacher
5	6	Gambler	Trader
6	1	Gravitics	Vacc Suit
6	2	Gunner	Zero-G
6	3	Biologics	Mechanic
6	4	Electronics	Photonics
6	5	Fluidics	Polymers
6	6	Gravitics	Programmer





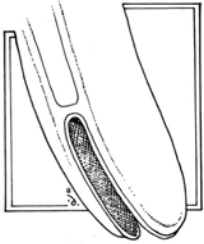
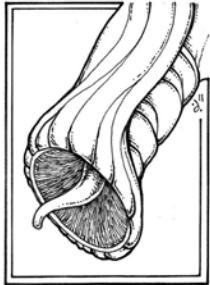
Select Skill List 1 or Skill List 2.

TYPES OF VOICES

Flux	Code	Voice	Poice
-5	1	Whistles	Faint
-4	2	Whistle	Vague
-3	3	Vowels	Common
-2	4	Musical	Firm
-1	5	Standard	Strong
0	6	Standard	Powerful
+1	7	Standard	
+2	8	Guttural	
+3	9	Consonantal	
+4	A	Clicks Pops	
+5	B	Mimic	

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.

 <p style="text-align: center;">Hand</p>	 <p style="text-align: center;">Paw</p>	 <p style="text-align: center;">Tentacle</p>
<p>Two opposed groups of one or more moderately flexible digits, capable of holding an object.</p>	<p>Several unopposed moderately flexible digits which can grasp and hold an object.</p>	<p>One or more flexible digits capable of entwining or coiling together or in opposition.</p>
 <p style="text-align: center;">Grasper</p>	 <p style="text-align: center;">Gripper</p>	 <p style="text-align: center;">Socket</p>
<p>Three or more mutually opposed flaps or digits capable of clamping an object between them.</p>	<p>Two opposed groups of relatively inflexible flaps or digits capable of clamping an object between them.</p>	<p>A hollow rimmed with muscle capable of holding an object within it, with or without an internal digit.</p>

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.

14

SOPHONT UNIQUES

UNIQUES

Some sophonts have unusual or unique physical or life cycle structures. These uniques may be implemented for specific sophonts are desired or appropriate.

This list is not exhaustive.

SYMBIONTS

The sophont lives in a paired relationship with another organism (which may or may not be a sophont).

Carrier. A being (sophont or not) which provides the physical body for an attached or interior sophont.

Dominated Carrier. A non-sophont Carrier is paired with a symbiont (the Dominant) acting as the brain for the two beings. The Carrier is typically deficient in Mental Characteristics; the Dominant is typically diminutive but highly intelligent.

A Dominant can be transferred from Carrier to Carrier.

Assisted Carrier. A sophont Carrier is paired with a sophont symbiont (the Assistant). Both Carrier and Assistant are intelligent and interact to process information.

An Assistant can be transferred from Carrier to Carrier.

WORLD CONDITIONS

The conditions of the homeworld have an effect of the abilities of the sophont. Sophonts from worlds with extremes of Hot, Cold, Light, and Radiation have a natural threshold immunity or protection against such damage.

Hot Worlds. The sophont may ignore Hot-2 or less.

Cold Worlds. The sophont may ignore Cold-2 or less.

HIBERNATION

The sophont passes some period of time in a state of total suspended animation. The sophont culture makes provision for care for, and protection of, the individual during the hibernation period..

METAMORPHOSIS

Metamorphosis is an abrupt and dramatic change in the sophont's physical structure. Sophont 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 Second Form.

Complex Metamorphosis. The sophont metamorphoses several times: randomly select a series of Life Stages at which the sophont changes Form. Number the successive forms First, Second, Third, (and beyond).

The Changes. When a sophont metamorphoses, it takes on a totally new physical structure: create a NEW sophont to be the next stage: the new form may exhibit any number of changes.

Life Stages. Each change takes place at the beginning of a Life Stage.

AVAILABLE METAMORPHIC FORMS

- First.
- Second.
- Third.
- Fourth.
- Fifth.
- Sixth.
- Seventh.
- Eighth.
- Ninth.

UNIQUES

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. Such 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.

TECH LEVEL CAP

A sophont is restricted to the maximum TL shown here.

SOPHONT TL CAP

		Ins	Cha
D1	D2	Cas	Soc
1	1	1	1
1	2	1	2
1	3	2	3
1	4	2	4
1	5	3	5
1	6	3	6
2	1	4	7
2	2	4	8
2	3	5	9
2	4	5	10
2	5	6	11
2	6	6	12
3	1	7	13
3	2	7	14
3	3	8	15
3	4	8	16
3	5	9	17
3	6	9	18
4	1	10	33
4	2	10	33
4	3	11	33
4	4	11	33
4	5	12	33
4	6	12	33
5	1	13	33
5	2	13	33
5	3	14	33
5	4	14	33
5	5	15	33
5	6	15	33
6	1	33	33
6	2	33	33
6	3	33	33
6	4	33	33
6	5	33	33
6	6	33	33

If TL Cap= 33, there is no effective limit to Sophont TL advancement.

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 $3.4 \times 3.5 = 12$).

The result is typical size for the sophont.

Calculating Size

Characteristic	Dice	Comment
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 / 2	makes it lighter or smaller

Dice= Characteristic Dice (if Str = 2D, Dice = 2).

$$\begin{aligned} \text{Total} &= \text{C1} + \text{C2} + \text{C3} \\ \text{Typical Size} &= 12 * \text{Total} \end{aligned}$$

For example, a Human SDEIES rolls 6D (2D + 2D + 2D) for C1 C2 C3 physical characteristics. Size = $6 * 12 = 72$. A Human is size 72 (=approximately 72 liters in volume and 72 kilograms in weight).

BULK

Some sophonts have a Size out of proportion to their Strength. For any sophont with Str 4D or greater (including any Sophont Gender or Sophont Caste member created with a total of 4D or greater), roll Bulk and multiply by raw Size.

Bulk= 1D. If =6, add +1D;
if that = 6, add +1D;
if that = 6, add+1D;
...

For example, a Hexaphant SDSIES rolls 12D (5D + 2D + 5D) for C1 C2 C3. Size = $12 * 12 = 144$. Because Str is 4D, roll for Bulk (1D= 5) and multiply by Size (= $5 * 144 =$) 720. A Hexaphant is size 720 (=720 kilograms).

SMALL, STANDARD, OVERSIZE, AND TITAN

Sophonts (as well as robots and armored suits) fall into four broad Size classes:

Small. About 1 meter tall and 36 kg. C1+C2+C3 = 3D.
Standard. 1.5 to 2 meters tall. 72 kg. C1+C2+C3 = 6D.
Oversize. 2 to 3 meters tall. 144 kg. C1+C2+C3 = 12D.
Titan. More than 3 meters tall. C1+C2+C3 = 14D+.

SIZE

Physical height and weight of a character can be determined from the physical characteristics C1 C2 C3.

BODY FORM PROFILE

BFP	W=D=L	Descriptor
1	W=D=L /1]	Cubic. Max volume.
1.4	W=D=L / 1.4	Globular. Ball. Orb.
2	W=D=L / 2	
3	W=D=L / 3	Tortoise
4	W=D=L / 4	
5	W=D=L / 5	Hippo, Bison
6	W=D=L / 6	Primate
7	W=D=L / 7	Vthick. Obese Human
8	W=D=L / 8	Thick. Heavy Human
9	W=D=L / 9	Typical Human
10	W=D=L /10	Thin Human
11	W=D=L /11	Vthin. Ostrich
12	W=D=L /12	
13	W=D=L /13	
14	W=D=L /14	Crocodile.
15	W=D=L /15	
16	W=D=L /16	T Rex
20	W=D=L /20	Shark
25	W=D=L /24	Anaconda
75	W=D=L /75	Snake. Pterosaur.
100	W=L. D=L /100	Sheet. Leaf. Film.

BFP= Body Form Profile Divisor
L= Length. W= Width. D= Depth.

Body Form Profile equates known animal bodies with a BFP allowing calculation of volume, mass, and hit points (and UPP characteristic points) based on Length.

Using The 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 (6 feet) 1.8 meter 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.

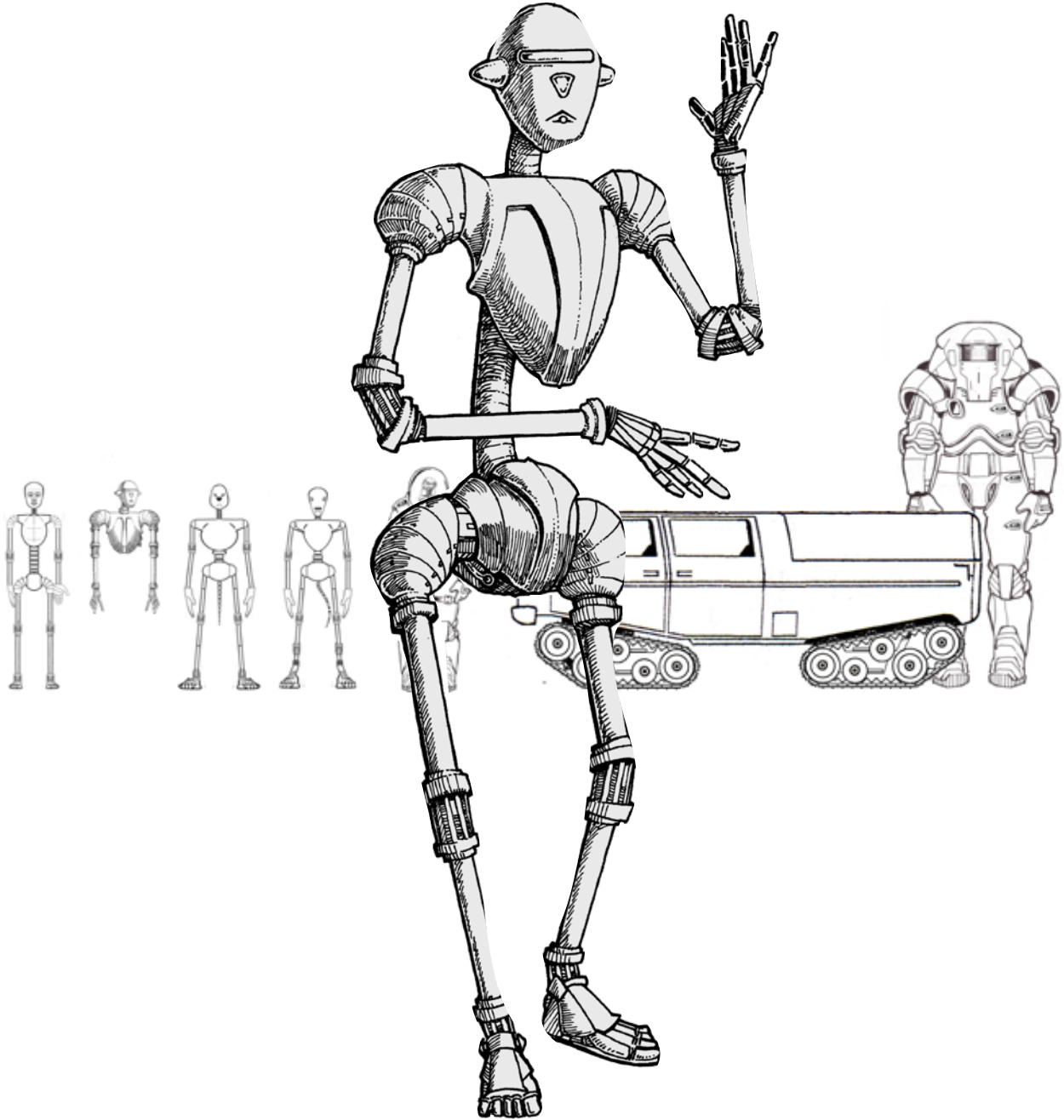
Using The Table for Length. Using Sophont Size and BFP (and Bulk if not=1), find L Length in meters. Convert Size (/1000) to Volume in m3. Multiply Volume by BFP squared and find the cube root.

For example, 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=100 BFP=1 sophont is about a half-meter tall.

A Size=72 BFP=7 sophont is about 1.5 meters tall.

A Size=1000 BFP=14 sophont is almost 6 meters tall (or long), or roughly 5.8 meters long, 0.4 meters wide, and 0.4 meters deep.



A robot is a truly non-biological (typically mechanical) sophont. Robots are distinguishable from **clones** (which are duplicates created from existing genetic templates), **chimeras** (the result of genetic engineering), and **synthetics** (a blend of biological and non-biological processes).

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. There are two broad categories of robots:

Sophontiform. An entirely mechanical being constructed as an imitation of a sophont. Those constructed as imitations of humans are more specifically called **humaniform**.

Strangeform. Some robot designers have cast off the constraints of imitation and constructed robots whose form is 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

Since a strangeform robot emphasizes function over form, it is essentially a vehicle or (mobile) device with a brain. To create one, select a vehicle and in it install a brain.

The potential is near infinite: robot taxis, robot buses, 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 driven vehicles and robot vehicles.

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

An appropriate brain is selected for the robot.

A variety of brain types are available for robots:

Organic Brain. A living brain is harvested from a sophont and installed in the robot. The circumstances of origin

for such brains range from the merciful (ensuring the survival of an individual whose body is destroyed) to the nefarious (involuntary conversion as a consequence of, or because of, criminal activity or even indebtedness).

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.

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.

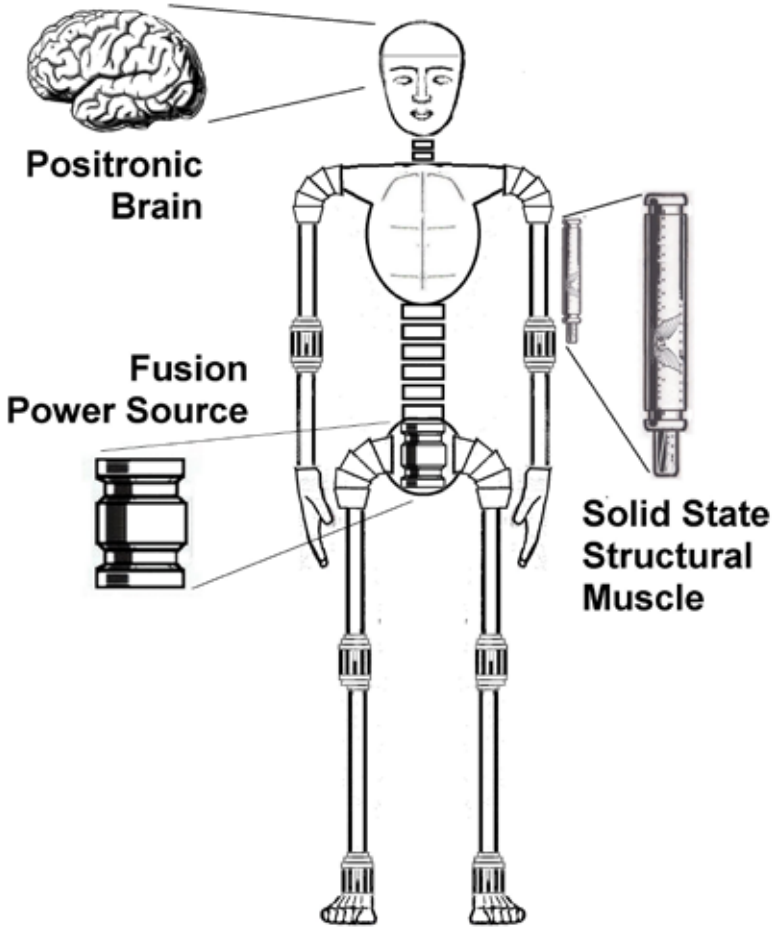
Enhancements. The body of a robot may be improved with a variety of options.

Control Codes. Safety controls protect sophonts from most possible harm by robots. Control codes may be passive or active. **Passive Codes** are powerful ingrained responses which occur automatically and 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>The Elements of the Practical Robot Autonomous / Self-Directing Mobile (self-transporting) Corporeal (has a physical body)</p>		<p>The Most Important Element: Capable of acting LIKE a sophont (like = 10% to 90% similarity)</p>
<p>Course Syllabus:</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>Positronic Brain Includes capabilities for Creative thought, free will, And the ability to learn.</p>	<p>Fusion Power Source Efficient power source With low maintenance factor and Uses commonly available fuel.</p>	<p>Solid State Structural Muscle Structural components Provide powerful motion With low power drain, and low fatigue factor.</p>
<p>Other Features Self-repairing (through parts replacement). Viable in all environments (0 through C) with appropriate options.</p>		

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

Use this checklist to design and construct robots.

For Sophontiforms:

1. Select Sophont Pattern.
 - A. 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. Manufacturer / Model.
11. Control Codes.

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.

02

ROBOTS
FILLFORM

Robot Model
10-Manufacturer

Sophont Pattern= **A** **B** **CD** **EF** **G**

Head Torso Front Rear Tail
 Limbs Limbs Limbs Limbs Probisc

								Units	Cr
03	A	Brain	C4=						
		Wafer Jack							
		Emotional							
04		C							
		V Vision	V						
		H Hearing	H						
		S Smell	S						
		T Touch	T						
		A Aware	A						
05		P Percept	P						
		A Skeleton							
		B Muscles							
		C Limbs							
06		D Manipulators							
		A Enhancement							
		B Connectors							
		C Skin							
7	D	Additions							
		C1=	D=	x4	Mods=				
		C2=	D=	x4	Mods=				
	B	C3=	D=	x4	Mods=				
		C4=							
C	C5=								
S	C6=								
8	A	Sanity							
		Primary							
		Secondary1							
		Secondary2							
9	A	Skill Limit							
		Power Source							
11	A	Control Code							
		Control Code							

Total=

SELECT A ROBOTIC BRAIN

- The robot requires a brain.
 A. Select Brain Type.
 B. Note Specific Details

BRAINS FOR ROBOTS

- Robot Brains may be
 Organic (from a sophont),
 Organic Clone (cloned from a sophont)
 Semi-Organic (cloned from an animal)
 Electronic, Fluidic, or Photonic

Location

A Brain may be located in the Head or in the Torso.
 A Robot with Body Structure HBS usually has a head with a Brain; otherwise the Brain is in the Torso.
Exceptions. The robotic brain may be placed in the torso even if the robot has a head.

Brain Contents

A Brain contains a personality consisting of
 C4 Intelligence (determined by the Brain type),
 C5 Education Training or Instinct (from genetics of an organic brain, or assigned to a non-organic brain),
 a variety of Skills and Knowledges (selected by the Factory; total levels limited by C4+C5), and
 a variety of Memories.

Brain Enhancements

A brain can be enhanced:
Emotional Supplement. Reservoirs supply the Brain with emotional or mood hormones. Organic Brains use actual hormones; Electronic or Positronic Brains use electronic simulation.
Wafer Jack. An Organic or Semi-Organic Brain can be fitted with a Wafer Jack which allows temporary or permanent skill downloads.

A BRAINS

Basic Type	C4=Intelligence	KCr	Units
Organic Brain.	From original.	30	3
Organic Clone Brain.	G	C4 * 10	1
Organic Clone Brain.	G+D	C4 * 10	2
Organic Clone Brain.	G+DD	C4 * 10	3
Organic Clone Brain.	G+DDD	C4 * 10	4
Semi-Organic Clone Brain	1	C4 * 10	1
Semi-Organic Clone Brain	0+D	C4 * 10	2
Semi-Organic Clone Brain	0+DD	C4 * 20	3
Electronic Brain.	D	C4 * 10	1
Electronic Brain.	DD	C4 * 20	2
Positronic Brain	1	5	1
Positronic Brain.	D	C4 * 5	2
Positronic Brain.	DD	C4 * 20	2
+ 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.
 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.

B BRAIN PARAMETERS

Type	Ages	Sleeps	Power	Wafers	Air	Temperature Range	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.	Natural

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 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.

04

ROBOTS SENSES

CREATING SENSES FOR ROBOTS

For each desired sense, create a sense string and determine its costs.

Add any desired or appropriate additional components, and determine their costs.

A SENSORY COSTS

The costs for senses are based on the specific sense constant and the various inputs they can sense.

Vision		Hearing	
Constant	* KCr10	Constant	* KCr10
Per Band	* KCr10	Per Hearing Freq	* KCr 1
Telescopic	KCr40	Per Voice Freq	* KCr 1
Microscopic	KCr40	Amplified Voice	KCr 1
Replay Module	KCr20	Replay Module	KCr20
Vision Replay Screen	KCr10	Touch	
Awareness		Constant	* KCr10
Constant	* KCr10	Per Manipulator	automatic
Smell		Body Overall	Units * KCr 1
Constant	* KCr10	Perception	
Scent Emitter -1	KCr10	Constant	* KCr10
Scent-Emitter-2	KCr100	PVoice Band	KCr10
Scent-Emitter-3	KCr200		

B THE SENSE STRINGS

Sensory Strings are created for sophonts using 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 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. A Robot may omit senses from the pattern (for example, Smell).

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.

D	VISION			HEARING			SMELL			TOUCH		AWARE		PERCEPT				
	Flux	C	Band	Star	C	Freq	Span	Voice	C	R=	Sharp	C	Sensi	C	Acuity	C	Tone	Poice
-6	04	DHV	B0-B3	04	1	0	1	04	0	0	04	0	04	0	04	0	0	0
-5	06	UDH	B5-B8	06	1	0	1	06	0	1	06	1	06	1	06	1	1	1
-4	08	SUD	B9-A1	08	2	1	2	08	0	1	08	1	08	1	08	1	1	1
-3	10	PSU	A2-A8	10	3	1	3	10	0	1	10	2	10	2	10	2	2	2
-2	12	BPS	A9-F6	12	4	2	4	12	0	1	12	2	12	2	12	2	2	2
-1	14	GBP	F7-G1	14	5	2	5	14	1	2	14	3	14	3	14	3	3	3
0	16	RGB	G2-K0	16	6	3	6	16	2	3	16	3	16	3	16	3	3	3
+1	18	CRG	K1-K3	18	7	4	7	18	3	4	18	3	18	3	18	3	3	3
+2	20	ACR	K4-K6	20	8	4	8	20	3	5	20	4	20	4	20	4	4	4
+3	22	NAC	K7-K9	22	9	5	9	22	3	5	22	4	22	4	22	4	4	4
+4	24	INA	M0-M1	24	A	5	A	24	4	6	24	5	24	5	24	5	5	5
+5	26	FIN	M2-M4	26	B	6	B	26	4	6	26	5	26	5	26	5	5	5
+6	28	XFI	M5-L8	28	C	6	C	28	4	6	28	6	28	6	28	6	6	6
+7	30	ZXF	L9+	30	D	7	D	30	4	6	30	6	30	6	30	6	6	6

C= Constant. V= Voice. R= Range.

ROBOT BODY DETAILS

Select details for the robot body.

- A Skeleton
- B Muscles
- C Limb Sizes
- D Manipulators

A SKELETONS

Variant	Basic Type	KCr	Units
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.

REQUIREMENTS TO SUPPORT CHARACTERISTICS

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 its Size, for example 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.

D MANIPULATORS

Manipulator	KCr	Units
Hand	10	1
Paw	10	1
Dexterous Paw	20	1
Tentacle	20	1
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

Dexterous is required if C2= Dex.

Ped Option is required for each Leg in LG 1 or LG 2.

06

ROBOTS BASICS

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 electric shock against an assailant or threat.

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 and protecting components from weather and environ.

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 Freq it detects; Voice must include this Freq.

Sonic Emitter. Provides sound source for Echolocator.

Photonic Emitter (Floodlight). Provides standard lighting in the 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 characteristics.

- A. Physical.
- B. Mental.
- C. Social.

A PHYSICAL CHARACTERISTICS

A Robot has **three** physical characteristics selected during the design process.

The character values are calculated:

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).

The Physical Characteristics are associated with the Torso and Limbs. When (if) the Head is detached, the Head alone cannot use C1 C2 C3.

B MENTAL CHARACTERISTICS

A Robot has **two** mental characteristics based on its Brain and its selected C5 characteristic.

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	default
C5 Instinct	= 6 * D	based on Pattern

Robot 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 Int.

Robot Education. Education cannot exceed C4 Int.

Robot Instinct. If the Robot pattern has Instinct, then the Robot 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

Every Robot Brain has Sanity. The manufacturing process creates Sanity in the Brain; testing then 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

C SOCIAL CHARACTERISTIC

A Robot has **one** social characteristic.

C6 Charisma	= R	default
C6 Charisma	= 1D	Cha * KCr10
C6 Charisma	= 2D	Cha * KCr20
C6 Social Standing		not normally possible
C6 Caste	= 0	if Pattern has Caste

Robot Charisma

Robots are conditioned (during the production or manufacturing process) to obey specific societal rules. One such set of rules is deference to and obedience of superiors.

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.

Charisma C6 = R. The standard conditioning establishes C6 Charisma = R (for Robot). The R value is equivalent to zero; the Robot defers to or obeys any organic sophont.

Standard conditioning has no additional cost, and is automatic unless specifically NOT selected.

Charisma C6 = 1D or 2D. Selected Robots are conditioned with C6 Charisma (1D = 1-6). Robots with Charisma assume supervisory roles over Robots with lower Charisma.

Robot Social Standing

Most Robots of current manufacture do not participate in the C6 Social Standing hierarchy. They can acquire and use C6 = Social Standing only under limited circumstances.

Prosthetic Bodies. An Original Organic Sophont Brain (which retains its original memories) in a Robot body which is more-or-less faithful to the pattern is a prosthetic. It retains the C6 Social Standing (/ Charisma / Caste) of the original.

Passing. A Robot sufficiently imitative of the actual appearance and abilities of the pattern sophont can pass as a sophont. The Robot picks a value for Social Standing (which may not be greater than C4 Int).

Mistake. A bureaucrat may mistakenly recognize (in some legal proceeding) a robot as a sophont (thus granting it Social Standing as long as the mistake is not corrected).

Robot Sanity

A Sanity of 5 or 6 is reasonable for a Robot rarely facing challenges or unusual circumstances.

08

ROBOTS SKILLS

SELECT ROBOTIC SKILLS

Determine the robot's primary and secondary skills.

A SKILLS FOR ROBOTS

A robotic brain receives

One Primary Skill (most related to the robot's intended function) equal to one-half Intelligence.

Two different Secondary Skills (reasonably related to the robot's intended function) equal to one-quarter Intelligence.

The Initial Limits On Skills.

Total initial skills (and talents and knowledges) and levels for a Robot = C4 plus C5.

Instinct. If C5 = Instinct, the initial limit is C4, but it also receives three Instinctual skills each equal to C5.

Increasing Skills

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.

Roll die A (if greater than 3, reroll) and die B for row; roll die C for column.

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

ROBOT SKILLS

A	B	1	2	3	4	5	6
1	1	Recon	Aeronautics	Admin	Advocate	SoundMimic	ACV
1	2	Spines	Aquanautics	Artillery	Artist	Biologics	Author
1	3	Sensors	Automotive	Astrogator	Beams	Computer	Broker
1	4	Actor	Bureaucracy	Craftsman	Computer	Driver	Mole
1	5	Flyer	BattleDress	Dancer	Diplomat	Explosives	Medic
1	6	Empath	Engineer	Designer	Exotics	G-Drive	Grav
2	1	Flapper	Fluidics	Electronics	Forensics	J-Drive	Math
2	2	Leader	Heavy Wpns	Engineer	Legged	Liaison	JOT
2	3	Tracked	Launcher	Gravitics	Mechanic	Athlete	Trader
2	4	Pilot	Magnetics	Hostile Env	Ordnance	Blades	LTA
2	5	Animals	Life Support	Language	P-Plant	Counsellor	Sail
2	6	Tactics	Photonics	Musician	Sapper	Ortillery	Ship
3	1	Turrets	Programmer	Strategy	Small Craft	Fighting	Rotor
3	2	Seafarer	Slug Thrower	M-Drive	Stealth	Osmancer	Rider
3	3	Survey	Naval Arch	Navigation	Survival	Wheeled	Sprays
3	4	Comms	Streetwise	Polymers	Trainer	Screens	Sub
3	5	Teacher	Teamster	Spacecraft	Animals	Steward	Wing
3	6	Unarmed	Vacc Suit	Starships	No Skill	Zero-G	WMD

Roll three dice for a specific skill: Roll A (reroll if >3), then roll B, and top row C.

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 other 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

Animal Handler	Historian
Animal Trainer	Janitor
Bodyguard	Laborer
Cashier	Librarian
Cleaner- Exterior	Maid
Cleaner- Interior	Messenger
Clerk	Miner
Companion	Museum Curator
Constructor	Nanny
Cook	Nurse
Courier	Prospector
Dishwasher	Repairbot
Doorman	Rescue Worker
Driver-Cargo	Researcher
Driver-Passenger	Servant
EMT	Shepherd
Enforcer	Soldier
Explosives Disposal	Stoop Labor
Farmer	Store Clerk
Garbage Collector	Teacher
Gardener	Tester
Gatherer	Traffic Director
Groundskeeper	Tutor
Guard	Usher
Handybot	Valet
Handyman	Waiter
Harvester	Warbot

SELECT ROBOTIC POWER SOURCE

Determine the robot's power source.

09

ROBOTS
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.

10

ROBOTS MANUFACTURERS

MANUFACTURERS

Robots are manufactured by a variety of businesses or companies on a variety of worlds.

Local Sophontiform Robot Manufacturers

Flux	Designation
-5	<Industrial World> Robotics
-4	<Homeworld> Artificial
-3	Global Robotics and Artificial <Sophont>s
-2	<Homeworld> Robotics and Artificial <Sophont>s
-1	<Star> Robotics and Artificial <Sophont>s
0	<Surname> Patent Robotics Industries
+1	<Star> Artificial and Robotics Industries
+2	<Letters> Robotics and Artificial <Sophont>s
+3	<Satellite> Robotic Labor Industries
+4	<Star> Artificial Labor Industries
+5	<Industrial World> Industries

Well-Established Sophontiform Robot Manufacturers

Flux	Designation
-5	<Star> Robotics, A <MegaCorporation> Company
-4	<Sophont> Robotics, A <MegaCorporation> Company
-3	<Satellite> Robots, A <MegaCorporation> Company
-2	<Letters> Robotics, A <MegaCorporation> Company
-1	<Industrial World> Sophontiforms
0	<Industrial World> Robotics
+1	<Industrial World> Artificial
+2	Robots <MegaCorporation>
+3	RUR, A Division of <MegaCorporation>
+4	Artificial and Robots Division, <MegaCorporation>
+5	<Star> Artificial, A <MegaCorporation> Company

Other Sophontiform Robot Manufacturers

Flux	Designation
-5	Tlehtaowa. Official Robotics to the 29 Clans Aslan
-4	Star Patterns Trading Hivers
-3	Six Eyes Nest Hivers
-2	Shinku University Research Directorate Imperial
-1	Chiadle Warbots Zhodani
0	Tliazhashal Defense Industries Zhodani
+1	Ungzoenogzkha [rebranded contraband] Vargr
+2	Eksaekfoer [often counterfeit] Vargr
+3	Panstellar Expert Construction Labor Solomani
+4	Klikooog's' Cleaning Robots K'kree
+5	Spinward Specialties Couriers Imperial

MODEL NAMES AND NUMBERS

Robots are given model names and numbers based on a variety of naming strategies.

Robot Model Number

Flux	Designation
-5	<Company Initial><Short Sophont>Number 4-digit>
-4	<Sophont><Production Day><Production Year>
-3	<Company><Short Sophont>Number 4-digit>
-2	<Company><Short Sophont>Number 3-digit>
-1	<Company><Sophont><Genetic> -<Number 2-digit>
0	<Company> Artificial <Sophont> <Production Year>
1	Model <Number 3-digit>
2	Model <Number 3-digit> (Obsolete)
3	Model <Number 4-digit> (Discontinued)
4	<Company> Model <Sophont><<Number 3-digit>
5	<Function> Model -<Number 4-digit>

Military Robot Models

Flux	Designation
-5	Fighting Robot, <Function>, Model <3-digit>
-4	Robot, <Function>, Model <3-digit>
-3	Robot, <Function>, Model <4-digit>
-2	Robot, <Function>, Model <1-digit>A1
-1	Robot, <Function>, Model <2-digit>A1
0	Fighting Robot, <Function>, Model <4-digit>
+1	Robot, <Function>, Advanced Model <1-digit>
+2	Robot, <Function>, R<3-digit> Mod 1
+4	Robot, <Function>, Model <3-digit>A2
+3	Robot, <Function>, Model <4-digit>A3
+5	Fighting Robot, <Function>, Model <2-digit>A2

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) 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 preprogrammed 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 1. The Asimovian Three Laws of Robotics are restated to protect the robot's pattern sophonts.

The Universal Three Laws. 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+).

ROBOT DISEASE AND ILLNESS

There are three major types of deterioration of Robots.

Rust

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 (or Deconditioning) frees the robot from its natural constraints: the robot goes slowly insane, culminating in a burst of berserker violence.

The robot's sanity begins a reduction at the rate of -1 per month. When it reaches zero, it suffers a total sanity breakdown, attacking in a rage everyone within range.

Onwee

Individual robots, as thinking intelligent beings, by 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 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.



BeastMaker

Life abounds in the universe, and travelers encounter native life forms as they move from world to world.

Animals 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.

An Animal Encounter Table for Every Terrain Hex. Each terrain hex which can support animal life has an associated Animal Encounter Table. Adventurers consult the table when hunting, sightseeing, researching, and sometimes when directed to by events or chance. The 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; consequently, it is not necessary to build extensive Animal 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 Animal Encounter Tables are pre-generated, special details need not be determined until needed.



1D	Quantity	Size	Speed	Strength	Movement	Type	A_	F_	Comments
4	C	Single	Small	Fast	Strong	Amphib	Pouncer	A_	F

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 animals: sometimes merely seeing them in the distance; other times confronting them close up.

Animal Encounter Tables

Beast encounters are governed by a series of Animal Encounter Tables-- one for each terrain type on a world. As players move through terrain hex, an encounter may occur. When it does, the Animal Encounter Table indicates what specific animal 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 Animal 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.

The 1D Table resolves animal type with 1D. This simple table is adapted to most circumstances. The animals that appear may be a nuisance, or may delay a journey, or may simply show the types of animals which inhabit this world.

When an encounter occurs, roll 1D on the table to determine the specific animal.

The 2D Table resolves animal type with 2D. The table provides more variety and more potentially interesting encounters. When characters are closely interacting with a terrain hex (they are marooned, or hunting, or surveying), the 2D table is more appropriate.

When an encounter occurs, roll 2D on the table to determine the specific animal.

The Table Description of the Beast

The Animal Encounter Table provides basic descriptions of several animals. Obvious parts of the specific animal 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 provides an approximation of the number of animals present.

Size indicates a general notion of the size of the animals.

Animal 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.

Thus, normal human vision cannot see a Size=3 animal beyond R=3 (about 150 meters).

Speed is the expected speed the animal is capable of achieving. Speed uses the same scale as vehicle speed.

Strength indicates the relative strength of the animal.

The description of Strength is relative: a large weak animal (Str= 5 x 1D) is probably stronger than a tiny strong animal (Str= 1 x 4D).

Movement shows the type of movement to be expected. The animal may be a flyer or a swimmer, and these facts will usually be evident from observation.

Type is the ecological subniche (or position in the food chain) that the animal occupies.

The **Animal Encounter Table** also shows the expected reactions for the animal and any comments. These items are usually not revealed. The Animal Encounter Table is best used within a 100km Terrain Hex.

The Range Of The Encounter

The distance at which an animal encounter occurs is based on the size of the animal (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 NICHE

Animals are identified (and classified) in terms of the ecological niches they occupy. Each animal occupies a specific position in the hierarchical food chain.

An animal 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 animal moves is fundamental to an understanding of its activities and behavior.

Types of Locomotion

There are several basic types of locomotion.

Walks. The animal moves (walks, jumps, crawls) on land. Walking also includes unusual methods of land movement including rolls, flows, hops, climbs, and slithers.

Swims. The animal moves in water at or near the surface. Swimmers may breathe air or water (or both). The animal 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 animal moves in water, primarily in the depths. Diving animals live entirely within a water environment.

Flies. The animal moves in the atmosphere. Flying may include gliding, lighter-than-atmosphere buoyancy, kiting, and other flight mechanisms.

Drifts. The animal 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 animal does not normally move.

Multiple Locomotion Types

An animal may have multiple types of locomotion.

Amphibian. The animal is capable of moving on land and in water. It can walk and swim. For example, a frog or a crocodile.

Aquatic. The animal operates in a water environment. It can swim and dive. For example, a whale.

Flyer. Theoretically, flyer would apply to an animal 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 animal can move on land, in water, and can fly. For example, a duck.

Flyphib. The animal moves in both water and atmosphere. It can swim and fly: a flying fish.

Breathing

An animal may have multiple breathing abilities.

Air- <Atm>. Insert the UWP Atm value for the world (for example, Air-8, or Air-A). The animal 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 animal breathes water (or Fluid).

Air-<Atm> and Water. The animal breathes either air or water.

ANIMAL TYPES

Animals can be described by their ecological niche.

Herbivores

Animals which eat unresisting food. While this is usually means plant-eaters, the definition here includes the eating of unresisting animals as well. Herbivores are of three types:

Grazers: Animals 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 animal. 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 animals) at close range into a digestive sac. A filter can absorb an animal 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 animals. They inflict automatic wounds of 1D per each 150 kilograms of animal mass (wound alteration is ignored). They attack through reflex.

Omnivores

Animals which eat food without regard to its resistance. The bear, which eats fruits and berries as readily as hunts for animals, is an omnivore. Omnivores have three types.

Gatherers: Animals 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: Animals 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. Animals 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

Animals which prey on other animals by attacking and killing them in the face of resistance are carnivores. Carnivores are of five types.

Pouncers: Animals 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 animals. 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: Animals which kill their prey by attacking after a chase are termed chasers. They tend to be pack animals. Typical Terran chasers are wolves.

Trappers: Animals which passively allow their prey to enter a created trap wherein they are killed and eaten. Trappers tend to be solitary and slow but will attack any animal which enters their trap. Usually, a trap will not wound or damage the trapped individual, but will tend to hold the one trapped in order for the trapper to attack. A typical Terran trapper is the spider.

Sirens: Distinct from the trapper, which creates a trap for its prey, a siren also creates a lure to draw prey to the

trap. The trap is treated in much the same manner as that of the trapper, but the lure entails additional consideration.

In most cases, the lure will be specific to some animal 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. Very rarely, the lure will be psionic in nature. 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, apparently for the act itself, in a kind of blood lust. Killers' reason (such as territorial defense) is replaced by a raw killing instinct. Attacks by killers are fierce and violent. Killers generally disregard the defender's size as a factor. A typical Terran killer is the shark.

Scavengers

Animals 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 animals. Their standard procedure is to approach a kill and force other animals 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 animals 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 animals 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.

ANIMAL TRAINING

Some wild animals may be susceptible to training. Each animal has a training potential based on three foundational tasks: Defer, Obey, and Learn Simple Task.

Defer. The animal accepts the trainer as a superior companion. It will not attack unless provoked. Defer is the first step in training an animal: breaking a horse, capturing an elephant, or establishing authority with a dog.

Obey. 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 until obey becomes automatic for the animal.

Learn Simple Task. The animal learns a basic or simple task (sit, lie down, stay). Complex tasks and sophisticated responses are built on a series of simple tasks.

Training Animals

Many animals 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 animal, determine the species response: from the Animal Training Difficulty Table, roll three times on this table to determine the training difficulty for the species. A trainable animal must have acceptable difficulty levels for all three tasks (at a mini-

ANIMAL 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 selects 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

mum not NO in all three tasks).

The Best Animal 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 animal from a group and evaluates it. Assume the candidate is the best animal in the herd, and that evaluating a group (perhaps a hundred animals) takes a day.

REACTIONS

Animals react to encounters with adventurers in three basic ways: they may attack, they may flee, or they may do nothing. Animal encounter entries provide codes which govern such reactions.

Reaction Rolls are individualized for each animal 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 animals will attack **If Possible:** they attack if their weapon is in range of an individual.

Some animals will attack **If [they have] Surprise:** they attack if an individual is within R=1.

Some animals will flee **If [they are] Surprised:** they flee if an individual is within R=1.

Attack and Flee Sequence. Most animals 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 animal may Attack. The number is the 2D roll (or less for the animal to attack).

For example, A7 indicates that the animal, upon sensing the presence of danger (including the approach of characters), will attack on a roll of 7 or less.

F Flee

The animal may Flee. The number is the 2D roll (or less for the animal to flee).

For example, F7 indicates that the animal, upon sensing the presence of danger (including the approach of characters), will flee on a roll of 7 or less.

S Speed

The animal has a speed at which it moves (whether attacking or fleeing). The number is the change in range it can perform in a turn.

For example, S1 indicates the animal can move one range band in a turn. S0 indicates the animal cannot change range bands in a turn.

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.

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 animal, 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 animal, 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 IISS insignia (and selecting appropriately from the Animal 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 animal, 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 animal, 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 animal), divide Size by Divisor to determine average Width and average Depth. Multiply the three 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 typical 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.

00 Describing Beasts

A Beast can be described by creating the entries for this text section by gathering information from the referenced charts.

<p>The <Beast Name> is inhabiting on <terrain> on <world name>. It is a</p>	<p><BEAST NAME> <general description> <terrain> <world name>. <size> <speed> <strength> <subniche>.</p>	<p>Descriptive text. Terrain Type. World Name.</p>
<p>The <Beast Name> is a (classified and consisting of its weapons include The body is characterized by covered by Interior body fluids are</p>	<p><symmetry> <number of feet> <body structure>), <structure>. <weapon> <skeleton> <skin> <fluids>.</p>	<p>Chart 01-3. Chart 01-6. Chart 01-5. Chart 01-1. Chart 02-A-Body Structure-Symmetry. Chart 02-A-Body Structure- Note. Chart 02-Body Structure Overview. Chart 02-Expanded from Overview. Chart 02-B-Body Features-Weapons. Chart 02-B-Body Features-Skeleton. Chart 02-B-Body Features-Skin. Chart 02-B-Body Features-Fluids.</p>
<p>The <Beast Name> is a <Terrain> Based on its Profile: : and the <Beast Name> is about long, cubic meters/liters, and Tons/kilograms/grams.</p>	<p><Locomotion>. <profile>, <density> <size>, <length> <volume> <mass></p>	<p>Chart 01-4. Chart 03-B-Body Profile. Chart 03-C-Density. Chart 01-3. Chart 03-A-Animal Sizes (modified by Flux). Chart 03-D-Calculate Volume. Chart 03-D-Calculate Volume</p>
<p>The <Beast Name> is maximum speed = The <Beast Name> has Endurance: Pack animal: the can be loaded with</p>	<p><speed>: <kph>. <Endurance> <Beast Name> (<body weight> / 3 =) <load></p>	<p>Chart 01-6-Speed-2 Chart 01-6-kph. Chart 03-Animal Endurance.</p>
<p>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=</p>	<p><Endurance> hours. <Beast Name> <body weight> kg <endurance> hours.</p>	<p>Chart 03-Calculation Paragraph. Chart 03-Work Animals. Chart 03-Animal Endurance.</p>
<p>Two <Beast Name> hitched together can pull a wagon loaded with A wagon-hitched is capable of a burst of Speed= for about</p>	<p><body weight x 2> kg. <Beast Name> <maximum speed/2> <endurance> minutes</p>	<p>Chart 03-Calculation Paragraph. Chart 03- Animal Endurance. Chart 03-Calculation Paragraph. Chart 03- Work Animals. Chart 03- Animal Endurance.</p>
<p>Riding Animal: the <Beast Name>can carry a rider at Speed= 1 for End= It can do a burst of Speed= for about</p>	<p><endurance> hours. <maximum speed> <endurance> minutes. <edibility> edible;</p>	<p>Chart 03- Animal Endurance. Chart 03-Work Animals. Chart 03- Animal Endurance. Chart 04-Edibility</p>
<p>The Beast is Its taste is Its most edible parts are The Beast's ability to Defer is The Beast's ability to Obey is The Beast's ability to learn Simple Tasks is</p>	<p><taste>. <alternative>. <defer>. <obey>. <learn-simple-tasks>.</p>	<p>Chart 04-Taste Chart 04-Potential Alternatives Chart-04-Animal Training Defer Chart-04-Animal Training Obey Chart-04-Animal Training LST</p>

Create each individual beast for the Animal Encounter Table using tables 0 through 8.

Basic Beast Information 01

0 NICHES

Code	Niche
P	Producer
H	Herbivore
O	Omnivore
C	Carnivore
S	Scavenger
E	Event

1 TYPE

1D	Subniche
1	Collectors
2	Collectors
3	Collectors
4	Baskers
5	Baskers
6	Baskers

Herbivore

1	Filters
2	Grazers
3	Grazers
4	Grazers
5	Intermittents
6	Intermittents

Omnivore

1	Hunter
2	Hunter
3	HG Hybrid
4	Gatherer
5	Gatherer
6	Eater

Carnivore

1	Trapper
2	Siren
3	Chaser
4	Pouncer
5	Pouncer
6	Killer

Scavenger

1	Intimidator
2	Intimidator
3	Hijacker
4	Carrion-Eater
5	Carrion-Eater
6	Reducer

2 QUANTITY

1D	Quantity	
0	Single	=1
1	Lone	=1
2	Pair	=2
3	Triplet	=3
4	Some	= 2D
5	Several	= 1D+2
6	Many	= D*D
7	Many	= D*D

If Quantity = 2 or 3, increase encounter range one band.
If Quantity > 3, increase encounter range two bands.

4 LOCOMOTION

Flux	Land	Water
-5	Amphibian	Diver
-4	Amphibian	Diver
-3	Walker	Diver
-2	Walker	Aquatic
-1	Walker	Swimmer
0	Walker	Swimmer
+1	Walker	Swimmer
+2	Walker	Swimmer
+3	Flyer	Amphibian
+4	Flyer	Flyphibian
+5	Flyphibian	Triphibian

Select Land or Water based on the general character of the terrain.
Plus Atmos DM.

6 SPEED

1D	Speed1	Speed2	kph
1	Static	Immobile	0
2	Creep	Slow	5
3	Crawl	Run	10
4	Xslow	Typical	20
	Vslow	Quick	30
5	Slow	Vquick	50
6	Standard	Fast	100
7	Cruise	Vfast	300
8	Cruise	Vfast	300

DM+2 for Flyers.

3 SIZE

Flux	Size	
-6	R	Microscopic 1 mm
-5	R	Microscopic 1 mm
-4	T	Miniscale 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	8	Vcolossal 7500 m

Size= Greatest dimension.
Plus Grav DM.

5 STRENGTH

1D	Strength	Str=
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

Plus Grav DM.

7 WEAPON

Flux	Others	Carni
-6	Peds	Claws
-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		
6	Intermittents	11	11
1	Hunter		
2	Hunter	14	10
3	HG Hybrid	12	11
4	Gatherer		
5	Gatherer	11	12
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	12	12
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 Grace. +2 if Agility. +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.

STRUCTURE OVERVIEW

The Body Structure Overview shows the details of head, torso, limbs, and tail of the sophont 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
A-	B-	CD-	EF-	G

A BODY STRUCTURE

Flux	Symmetry	Head and Torso		Flyer		Walker		Aquatic Amphibian		Diver Swimmer		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.

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 Flyer. 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)

Weapon. Natural weapon.

Manipulators. Front Limbs terminate in Manipulators (Rear Limbs do not). Manipulators on Legs are dual use (thus doubling as Feet or Peds).

If otherwise no Manipulators, assume Mouth is Manipulator.

Stance. A sophont 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).

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	R=	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 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.

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

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.

BEASTPOWER

Beastpower is a standardized evaluation of the power animals and vehicles.

ONE BEASTPOWER=
BP = Tons x (Speed ^3)

Steady BP. For long term work, assume Speed=1 (thus BP= mass tons).

Peak BP. Maximum (very short term) BP for an animal uses the formula.

WHEN ANIMALS ATTACK

Speed	Speed1	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.

WORK ANIMALS

Work Type	Load***	Flyer Speed = Max-1	FlyerSpeed= Max
		Speed=1	Speed= Max
Pack Animal.	= Body Wt/3	End hours	no
Wagons.	= Body Wt*	End hours	End minutes**
Riders.	= Body Wt/3	End hours	3x End minutes**

* Ignore weight of wagon. 2x, 3x, 4x, and 6x beasts hitched together are possible.

** bursts allowed per hour. Values may be used to produce average daily speeds.

*** Flyers carry half load; travel at Max minus 1.

ANIMAL ENDURANCE

Animal Endurance is the time (in hours) it 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=1 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.

04 Beast Details

ANIMAL 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 selects 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

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).

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.

EDIBILITY

Flux	Edible?	Taste	Potential Alternatives
- 5	No	Disgusting	Sensory Organs
- 4	No	Disgusting	Brain
- 3	No	Offensive	Skeleton
- 2	No	Bad	Digestive Organs
- 1	No	Slightly Off	Circulatory Organs
0	No.	Ordinary	Eggs and Reproductive
+1	Marginal.	Unusual	Secretions
+2	Marginal.	Good	Interior Fluids
+3	Yes.	Tasty	Respiratory Organs
+4	Yes.	Delicious	Outer Coverings
+5	Yes.	Exquisite	Waste Process Organs

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.

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 result, consult Edible? And Taste.

Non-Human Table Use. Non-human compatible digestive systems roll independently on the table.

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.

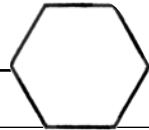
Mark Terrain Hex Symbol.

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

BLANK ANIMAL ENCOUNTER TABLE

Terrain Hex=

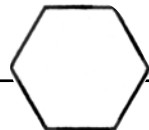


		Terrain Type				Worldname and UWP				
1D		Quantity	Size	Speed	Strength	Locomotion	Type	A_	F_	Comments
1	P							A_	F_	
2	H							F_	A_	
3	O							A_	F_	
4	C							A_	F_	
5	S							A_	F_	
6	E									

P= Producer. H= Herbivore. O= Omnivore. C= Carnivore. S= Scavenger. E= Event.

BLANK ANIMAL ENCOUNTER TABLE

Terrain Hex=



		Terrain Type				Worldname and UWP				
1D		Quantity	Size	Speed	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.

BeastMaker Events

The unusual is always a challenge to travelers. 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 medium range, 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 inflict 3D damage to the StrIDexIEnd of each member in the group

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.

Beastiary

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.

Name	Niche	Quantity	Size	Speed	Strength	Moves	Type	Mass(kg)	A/F
Anola	O	Several	Typical	Xslow	Std(3)	Walk	Gatherer	2.9	
Beaked Monkey	H	Triplet	Typical	Crawl	Std(2)	Walk	Intermittent	2.6	
Bush Runner	O	Some	Large	Xslow	Std(3)	Walk	Hunter	58	
Cave Trapper	C	Lone	Large	Crawl	Std(3)	Walk	Trapper	98	
Chamax Hunter	O	Many	Large	Xslow	Weak	Walk	Hunter	47	
Crested Trapper	C	Lone	Large	Creep	Std(4)	Walk	Trapper	222	
Daghadasi	H	Many	Colossal	Xslow	Strong	Swim	Filter	3.0E+11	
Elyosa	H	Pair	Large	Xslow	Strong	Walk	Grazer	400	
Focaline Tree Rat	O	Triple	Typical	Crawl	Std(3)	Walk	Hunter	3.1	
Groat	H	Many	Large	Xslow	Std(3)	Walk	Grazer	27	
Kian	H	Many	Vlarge	Vslow	Strong	Walk	Grazer	790	
Kudebeck's Gazelle	H	Several	Large	Slow	Std(3)	Walk	Grazer	72	
Snowcat	C	Lone	Large	Xslow	Std(3)	Walk	Pouncer	98	
Tree Kraken	C	Lone	Typical	Xslow	Std(2)	Walk	Pouncer	11	



Anola

Length: 0.75m. Volume: 2.9L. Burden: 1 kg. End: 6.

An arboreal omnivore native to Pysadi (Spinward Marches 3008), 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 sys-

tem 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 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.

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 omni-



vores (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 O₂/CO₂ 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 can usually be found on the edges of forested regions, 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 6 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 length of the local year, bush runners will have from 1 to 3 litters per mating season.

Bush runners do not breed well in captivity, so most specimens occur in the wild. 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 of both sexes 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 of the Spinward Main. It is a warm-blooded vertebrate analogue of a spider, complete with eight legs and a segmented body, but otherwise very similar to most mammals of similar size and weight. It will attack when its nest is threatened, especially if young are present. The trapper will fight fiercely until killed; if rendered unconscious, it will regain consciousness within five minutes and then continue to fight until killed.

Source: Twilight's Peak.



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 (Spinward Marches). 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: 2500m. Volume: 3.1E+11 L. Burden: 1.0E+11 kg. Endurance: 8.

A colossal leviathan inhabiting the seas of Bellerophon (Esperance/Solomani Rim 1519). 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** inhabits Sea Surface terrain on Bellerophon (Nouve 0-Ess [M1 V]).

It is a Vcolossal, Vfast, Vstrong, 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 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.

The **Daghadasi** is a Sea Surface Swimmer.

Based on its Profile-13, Near Standard Density, and Vcolossal Size, the **Daghadasi** is about 7500 m long, 2.4 billion cubic meters, and about 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 Heline/Alakh (Dark Nebula 1005) 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 repellent qualities (2 square meters typical yield per animal at Cr500 per square meter = Cr1,000).

Sources: Knightfall (adapted).

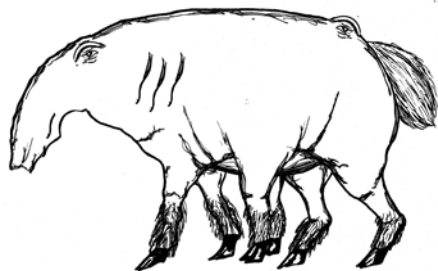
Focaline Tree Rat (Abdor var.)

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 (Aramis subsector). 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 be-



cause 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 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 (Rhylanor / Spinward Marches 2613) 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).

Finally, they have a secret weapon; a small gland, concealed under the tail, can expel a noxious fluid to a distance of nearly 3m. Somewhat like tear gas, it makes an enemy concentrate on getting away rather than attacking. Strangely, this fluid is ineffective against their most common predator: the leaping snowcats of Fulacin.

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 returns home.

Cloth made from the hair of groats is called groatle. At first, the shaggy goat hair seems ordinary, but if cleaned 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 (Trin's Veil / Spinward Marches 3035). 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 combat 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 the planet Victoria, 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 made of a white ivory which (in both sexes) protrudes from the skin of the skull to form paired horns. There are three pairs of legs, attached to a dorsally located spinal column. Respiratory and circulatory systems follow Terran norms.

Adult kudies weigh 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 mate for a season or more, and raise from 1-3 young per year. The young are born early in the year, are 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 are usually found in the upland valleys of Victoria, where there is sufficient vegetation to support them, and rough ground to provide 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.

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 carried polar bears.

Averaging 100 kilograms each, snowcats congregate in prides or packs of three (rarely more) and hunt together for their food. They are typical pouncers in that they lie in ambush and attack with a burst of speed; striking from concealment, and waiting until at close or medium range, the strongest of the group pounces first, with each of the remaining two snowcats in the pride striking 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, where they make their lairs and hunt the shaggy groats 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.

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 the planet Forboldn (Regina/Spinward Marches 1808), 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 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.

Worlds with known tree kraken populations include Forboldn, Menorb (Spinward Marches 1803), Kinorb (2202), Jesedipere (3001), Aramanx (3005), Extolay (1711), and Dinomn (1912). 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 homeworld 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 can be rendered ineffective.

Tluugiirs can be trained with patience and (in the case of those with intact stingers) caution. They have been 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 and associated systems. The body proper, containing the animal's vital organs, is suspended below the gas bag, where the eight tentacles come together.

Tluugiir are bisexual (MF) and oviparous. The mating flight of a pair of Tluugiirs is a spectacle of rare grace and beauty. The animals usually form one lasting pair-bond, and hatch two young Tluugiirs each year.

Tluugiirs are approximately as intelligent as a housecat, but exhibit the loyalty of a dog (a "sort of aerial airedale"). 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.



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.

Functions

■ Enhancers	Base Tech Level
■ Protectors	Size
■ Enablers	Profile
■ Resolvers	Density
■ Entanglers	Construction
■ Cultural Items	Dimensions
■ Value Items	Volume
■ Analogs	Mass (& Weight) Protection

Basic Form

Added Detail

Cost
Controls
Range Effects
TL Stage Effects.
QREBS
Power Supply
Signature

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 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.

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.

DESCRIBING A DEVICE

Function=	User Defined
Base Tech Level=	User Defined (subject to TL Table)
Size=	User Defined (subject to Size Table)
Profile=	User Defined
Density=	User Defined
Construction=	User Defined
Dimensions=	L= Size. W, H defined by Profile.
Volume=	L * W * H
Mass=	V * Density * Construction
Protection=	Density. Additional User Defined
Cost=	Base Value Table Value Enhancements
Controls	User Defined (per recommendations)
Range Effects=	As desired for variants
TL Stage Effects=	As desired for variants
QREBS=	As desired for variants
Power Supplies=	User Defined (per recommendations)
Signature=	User Defined (per recommendations).

BASED ON FORM AND FUNCTION

Equipment is described by its function and its form.

Function describes what the item does in both general and 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; binoculars increases visible range for the Visible Sense action; cold weather clothing protects against Cold; a specialized computer resolves vehicle driving tasks.

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 snoopersound 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 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.

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= 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, Volume can be determined in cubic meters m3. Divide 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:

$$L= 7.5 \text{ cm. } W= 1.5 \text{ cm. } H= 1.5 \text{ cm. } D= 19.0. C= 1.0.$$

$$0.075 * 0.015 * 0.015 = 0.00001687 \text{ m}^3 = 0.017 \text{ liters.}$$

$$0.017 * 19.0 * 1.0 = 0.32 \text{ kg} = 320 \text{ grams.}$$

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. 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

V Distant 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.

Q R E B S

Any object can be modified by QREBS.

Power Supplies

If an object requires power, it can be supported by Power Cells, Ambient Cells, 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 Cell** 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.

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= 000000).

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 inside = $84 - 72 = 12$ 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= (Density * 3 + Coating + Coating) = 15.

NAMING EQUIPMENT

Equipment should have a simple name and a 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) identification systems list the simple name followed by a variety of attributes, and finally by a model number.

Camera, 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-Naasirkaa-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 user to use both eye 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 ThingMaker Process

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.

TABLET COMPUTER (EXAMPLE)

Function=	Task Enabler	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.
Base Tech Level=	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.
Size=	3	A tablet computer is approximately Size=3 (20 cm; 8 inches). Size=4 (75 cm; 3 feet) is far too large; Size=2 (75 mm; 3 inches) is far too small. Size=3 is about the dimensions of a book.
Profile=	Thick Sheet	The tablet computer approximates a thin book and is approximately square. The referee selects Profile= Thick Sheet.
Density=	Standard 1.0	The referee considers the final object and concludes that, while light in weight, it probably would not float. He selects Density= Standard.
Construction=	Internal Mechanism 0.8	The tablet computer is an electronic device. Construction= 0.8 Internal Mechanism.
Dimensions L W H=	0.2 * 0.2 * 0.13	A Thick Sheet object with L= 20 cm is 20 cm wide and about 1.3 cm thick.
Volume V=	0.52 liters	Dimensions produce a volume of 0.00052 cubic meters * 1000 = 0.53 liters.
Mass=	0.42 kg	Volume 0.52 liters * Standard Density 1.0 * Construction 0.8 = 0.42 kg.
Protection=	Ar= 1 Ca= 1	Density 1.0 produces base Protection 1.0 in all eight Protections.
	Fl= 1 Ra=11	There are no additional protections.
	So= 1 Ps= 1	
	In= 1 Se= 1	
Cost=	Cr1,000	A reasonable Benchmark Value = 3 = Cr1,000. There are no Value Enhancements.
Controls	Complex Digital Controls.	This is a Portable object with complex digital controls.
Range Effects=	None.	There are no Range Effects.
TL Stage Effects=	None.	There are no Stage Effects.
QREBS=	None.	There are no QREBS Effects.
Power Supplies=	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). Strength = Power Supply Size + Flux = 4.
	Strength= 4	Sensors view the device as Size=4.

The Types Of Equipment

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

0	
1	
2	
3	
4	
5	
6	
7	
8	
9	
A	Protections, Safety (Armor, Clothing, Insulation, etc), Augments
B	Breathing Gases. Specialized Mixtures.
C	Cables and Surface Gear
D	Detectors (Sensors, Sensory aids, Signal amplifiers, etc)
E	Emitters (of signals capable of being sensed).
F	Food. Nutrients.
G	Non-Breathing gases.
H	
I	(not used)
J	
K	Containers, Carriers, Cases, Backpacks, Holsters. K1 Controllers, Computers, Consoles
L	Liquids. Liquid Manipulating Equipment. Pumps.
M	Construction Materials, Structural Items
N	Information, Software, Data, Apps, Programming. Computers.
O	(not used)
P	Power. Power Supplies. Power Cells. Energy Sources.
Q	Small Craft.
R	Drugs (Rx) and Medical.
S	Structures, Shelters,
T	Tools. Toolkits. Basic Machines.
U	Uniques
V	Vehicles.
W	Weapons.
X	Explosives. Exothermic Chemicals.
Y	Robots, Automatons, Strangeforms.
Z	

Making Things-1

CHECKLIST

Identify the object to be created in terms of its usefulness. Use the following Checklist to describe and define its details.

0 THINGMAKER CHECKLIST

1	Function=
2	Base Tech Level=
3	Size=
4	Profile=
5	Density=
6	Construction=
7	Dimensions L W H=
8	Volume V=
9	Mass=
10	Protection=
12	Cost=
13	Controls
14	Range Effects=
15	TL Stage Effects=
16	QREBS=
17	Power Supplies=
18	Signature=

1 FUNCTIONS

Things have functions in relation to the activities of characters and the use of 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

TL	eHex	Comment
0	0	Primitive
1	1	Bronze Age
2	2	Age of Sail
3	3	Industrialization
4	4	Mechanization
5	5	
6	6	Nuclear Age
7	7	1975
8	8	2000
9	9	2020
10	A	2100
11	B	Imperial Year 0
12	C	
13	D	Imperial Max 550
14	E	
15	F	Imperial 1107
16	G	
17	H	
	I	= omitted
18	J	
19	K	Far Far Future
20	L	
21	M	
22 -33		Fantastic Tech

3 SIZES

Flux	R=	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. Profile determines its other dimensions: width and depth, and allows the computation of other information (such as weight / mass).

Determine Size of the object based on its presumed portability and usefulness.

Decimal Sizes. For greater accuracy in calculations, Size may be expressed as a decimal to reflect the object's major dimension. Greater detail is possible with extrapolation. 85 cm corresponds to Size= 4.15.

Making Things-2

4 PROFILE

Profile	L=	W=	H=Mod
Light Fabric	Size L	L/1000	
Fabric	Size L	L/ 300	
Heavy Fabric	Size L	L/ 100	
Sheet	Size L	L/ 50	
Thick Sheet	Size L	L/ 20	
Rod	Size H	L/ 14	
Cylinder	Size H	L/ 2	
Disk	Size H	L/ 10	
Vflat	Size H	L/ 20	
Flat	Size H	L/ 12	
Vthin	Size H	L/ 11	
Thin	Size H	L/ 10	
Typical	Size H	L/ 9	
Thick	Size H	L/ 8	
Vthick	Size H	L/ 7	
Pyramid	Size H	L/ 6	
Slab	Size H	L/ 5	
Sphere	Size H	L/ 1.4	
Cube	Size H	L 1	

L= Length (= Size). W= Width.
H= Height (or Depth or Thickness)

5 DENSITY

Density	Descriptor
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	Dirt. Earth.
2.5	Brick. Concrete 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

Density * Liters = Kilograms

6 CONSTRUCTION

Value	Type
0.1	Flimsy
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=

$$V = W * L * H$$

MASS=

$$M = V * D * C$$

PROTECTION

$$P = D + Mods$$

Volume. L= Length. W= Width.
H= Height (or Depth or Thickness).
M= Mass. D= Density. C= Construction.
P= Protection.

W L H in meters = V in m3.
V*1000 = liters. D and C are dimensionless. V in liters produces M in kg (subject to Density).

BASIC PROTECTION

The basic or standard protection for any object equals its Density Modified by Construction. Minimum protection= 1.

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 provides Protection equal to its Density modified by Construction.

8 CONSTRUCTION PROTECTION

Armor	Description	Std	Solid	Foam	Hollow	Coating
Ar=	Armored	=D	x 1	/ 3	/ 3	+3
Ca=	Caged	=D	x 1	x 1	x 1	+6
Fl=	FlashProof	=D	x 1	x 1	x 1	+6
Ra=	RadProof	=D	x 1	/ 2	x 4	+3
So=	SoundProof	=D	x 1	x 3	x 2	+6
Ps=	PsiProof	=D	x 1	/ 3	/ 5	+6
In=	Insulated	=D	x 1	x 3	x 5	+6
Se=	Sealed	=D	x 1	x 2	x 2	+6

Minimum Standard Protection = 1.

Making Things-3

9 OBJECT DAMAGE

Armor	Armor	Code	Damage	
Ar=	Armored	ABCDFKMPWXY	Hit Cut	Base damage for each form of protection is its mass in kilograms times Protection Mods.
Ca=	EM-proof	E	Fry Stun	
Fl=	Flashproof	U	Blind	
Ra=	Radproof	R	Hit	
So=	Soundproof	NS	Deaf	The object is rendered unusable when all available Protection of one type is destroyed.
Ps=	Psiproof	J	Stun	
In=	Insulated	HQ	Heat Freeze	
Se=	Sealed	GIOPTVZ	Suff Hit Stun	

Kg * Mods

TYPES OF DAMAGE

Effect	Dmg	Inflicts
C Slash	Cut	Total / 3=Severity
E EMP	Fry	Inoperable for
R Rad	Fry	Rounds = Fry.
H Hot	Heat	Inop Rds = Heat.
X Pen	Hits	
B Bullet	Hits	
A Corrode	Hits	
D Blast/Blow	Hits	Total Hits / 2 = Severity
F Frag	Hits	
K Burn	Hits	
L Elec	Hits	
Y Grav	Hits	
M Magnetic	Hits	
N Bang	Hits	Depends...
U Flash	Hits	Depends...
G Gas	Hits	Depends...
I Infection	Hits	Contaminates
P Pain	Hits	ignore
T Poison	Hits	Contaminates
J Psi	Hits	Depends...
S Sound	Hits	Depends...
Z Tranq	Hits	Ignore
V Vacuum	Hits	Depends...

DAMAGE SEVERITY

H/2	Repair 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

DIAGNOSIS

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

Check Skill (2D)
Use an appropriate skill. Success makes damage:
Severity= Easy 1D and the component remains operable. Not Possible if Damage above 6D.

10 RANGE

Create objects based on a standard Range=
R=2 Short Range, R= 7 Vdistant Range, or S= 7 Space Attack Range.
Mods for increased or decreased range change Volume and Price.

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 m	x4
6 D Distant 5 km	x5

World Surface. LOS instrument.
Portable.

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=	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.
Installed. In a ship or structure.

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 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.	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
Generator.	Half Slab	8.0	0.5 Mechanism	fuel	H2	Size= 4	Requires Atm 3-9
Fusion Plus.	Cylinder	2.0	0.5 Mechanism	fuel	Water	Size= 3.5	Standard Size.
Plug In	(connects to local or ship power grid).						

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).

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.

	Era	Era	Energy	Society	Environments	Communications
Vlow Tech	0	Primitive Stone Age	Personal Effort Fire	Tribe. Clan.	Natural. Crude Shelters.	Personal Senses. Messengers.
	1	Bronze Age 3500 BC	Water Power	Ethnic Groups.	Settlement. Villages.	Memorization.
	1.3	Iron Age 1300 BC			Towns. Roads. Canals.	Writing.
	1.6	Middle Ages 600 AD		Kingdoms.	Cities.	
	2	Age Of Sail 1500 AD	Wind. Sail.	Nations.		Printing.
	3	Industrial Revolution 1700 AD	Coal. Steam.	Democracies.		
	3.3	1800 AD				
	3.6	1850 AD				Code by Wire.
Low Tech	4	Mechanization 1900 AD	Electricity.		Skyscrapers	Sound by Wire. Image Capture.
	5	1930 AD	Oil. Petrochemicals.	Dictators.		Broadcast Sound. Sound Recording.
	6	Nuclear Age 1950 AD	Nuclear Fission.	Superpowers.	Suburbs.	Broadcast Images. Video Recording.
Mid Tech	7	1975 AD	Geothermal. Solar.			
	8	2000 AD	Renewables.			Personal Comms.
	9	2020 AD	Early Fusion.		Arcologies	3D Images/ Video.
High Tech	10	2100 AD	Practical Fusion.	Non-Geographic Communities.		
	11	Imperial Average Circa Year Zero	[FusionPlus].			
	12					
Vhigh Tech	13	Imperial Maximum Circa 550		Robots.		CommPlus.
	14					
	15	Imperial Maximum Circa 1107				
Xhigh Tech	16	Darrian Maximum	Anti-Matter.	Artificial Persons. The Under Society.		
	17					
	18		Exotics. Collectors.			
Uhigh Tech	19	The Far Far Future				
	20					Limited Matter Transport.
	21				Scattered Site Dwellings.	

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= 000000).

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 Cell 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 in three modes:

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.

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

* Item is typically a nonworking artifact.

Comm

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 circum-

stance 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	var.	5 varies	(see entry)	

* Item is typically a nonworking 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 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. AV 12, Insulated 8. Burden=+3.

Assault Armor, Heavy

TL 16, Size 5, 46 kg, KCr 240.

A Darrian pre-Maghiz suit of combat armor. AV 32. Protections are: EMCage 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 1, 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

Miscellaneous	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

Item	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-CO2-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. While primarily sold on the starship and space station market, it also can be used for other purposes. Other common users are 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, Selaed 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.

C CABLES AND SURFACE GEAR

Item	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	9	2	0.15	1,000
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

Items use for exploration or non-standard movement on world surfaces

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 de-

creases the difficulty of crossing ice. Also includes an ice axe, which is useful in making climbs in snow and ice.

Inertial Navigator

TL 9, Size 2, 150 g, Cr 1000.

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

Item	TL	Size	Kg	Cr
Activity Sensor	B	4	4	800
Atmosphere Tester	9	2	1	800
Binox	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 Counter	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 Trinnox, 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 Counter

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

Item	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	100
Jammer MP	8	4	5	10,000
Light (portable)	4	3	0.5	10
Mirror	2	1	0.25	10
Psionic Emitter	E	4	5	2,500
Sound Amplifier	5	4	1	120
Spotlight	7	4	10	100
Wiretap	see Bug			

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 cell, 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 100.

Pistol-grip launcher for flares. A tube launcher Flare Rocket version is Size 4, 1 kg, and Cr 250. Flares weigh 100 grams and cost Cr100 each. Flares are visual marker and countermeasure 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. 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 - Range). Jammer is a negative Mod on the attempting Active or Passive Radar, EMS, or Scanner Sensor Task, or operation of DataCaster.

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.

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

Item	TL	Size	Kg	Cr
Energy Drinks	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

Watersee 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

Item	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

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 UNCLASSIFIED

J UNCLASSIFIED



K CONTAINERS

Item	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

Items intended to contain, hold, 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

Item	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

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, 200g, Cr 1. A half-liter of water.

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.

TL-C. Fortified 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

Item	TL	Size	Kg	Cr
Construction Materials	all	5	varies	
Cutting Torch	8	3	20	6,000
Eternity Circuit Module	R	5	1t	MCr 100
Hatch	7	5	-	1,000
Hoist	8	4	25+	100+
Iris Valve	8	5	-	1,000
Lock	6	2	0.5	50
Matter Teleporter*	M	4	32	100,000
Molecular Dissembler*	P	6	1t	MCr 1
Planetary Core Tap	P	8	-	TCr 1
Polymer, Structural	see Block			
Portal, Cargo*	Q	6	5t	MCr 10
Portal, Personal*	Q	5	50	MCr 1
Portal, Ship*	Q	7	100t	MCr 100
Portal Generator	Q	8	-	TCr 1
Slap Tape	see Tape			
Star Energy Tap	S	8	-	TCr 1
Tape	7	2	0.1	1
Teleport Platforms, Early*	K	4	20	400,000
Teleport Platforms*	L	4	10	200,000
Teleport Platforms, Adv*	P	4	5	400,000
Welding Torch	8	3	3	150

* 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.

Different materials have different armor values; standard TL and AV per centimeter depth are as follows:

TL	AV	Material
3	1	Leather
3	2	Bone
3	4	Wood
7	6	Fiberglass
3	20	Block, stone
B	30	Block, ceramic
8	35	Aluminum
3	38	Copper
3.5	41	Bronze
4	50	Iron
F	50	Structural polymer (self-healing)
C	60	Structural metals
8	70	Steel
9	80	Titanium
TL x 10		Starship armor AV

Cutting Torch

TL 8, Size 3, 20 kg, Cr 6,000.

Ruggedly-built metal cutter, designed to work on ma-

terials 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 Dissembler, 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

TL 6, Size 2, 500 g, Cr 50.

Matter Teleporter.

TL M, 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 teleported within a few seconds out to the range and direction set by the operator. The black rubber strip is used to set the teleportation 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 teleportation 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 teleport to take place. If any part of an object extends outside of the compartment, it will not be teleported. [Knightfall, p72]

Molecular Dissembler.

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 Dissembler 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 which provides 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 shelter). 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

TL19, Size 4, 20 kg each, Cr 400,000 total.

Range=5, Ease of Use=-1, Burden=+1, Safety=-1.

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 20 model has QREBS=0. The advanced TL 23 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

Item	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

Items related to information and data processing. Includes equipment to acquire, transmit, process, and display data.

* Item is typically a nonworking artifact.

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-pro-

grammed 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

Item	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.

Items related to the production, transmission, storage, and supply of energy.

Ambient Array

TL B, Size 6, 1,000 kg, Cr 100,000.

Large array of ambient cells 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 cell 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 cells 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 SMALLCRAFT (OMITTED)

R DRUGS (RX) AND MEDICAL

Item	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
Panacaea	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, Mil. *	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 animation 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 (=0) 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 storing 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 heals severe wounds or trauma. It repairs, reattaches, or, if necessary, regrows a damaged or removed 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 a cocktail of tailored regrowth drugs and nutrients costing KCr100 (one dose per treatment).

Military. Doubles cost, mass, volume, number of individuals held, and maximum off-line battery duration. Used to keep 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 its 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.

TL A, Cr 750.

Taken by fighters (usually military personnel) prior to combat, this drug increases personal strength and 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.

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. Used to reattach severed limbs, encourage mending, and remove infection. Treatment puts the patient into 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 Boost. TL 9. Adds 1D to the patient's PSI rating for 1D hours.

Psi Double. TL A. Doubles PSI for 1D hours.

Psi Special. TL B.

Restorative

TL C, Cr 1,000.

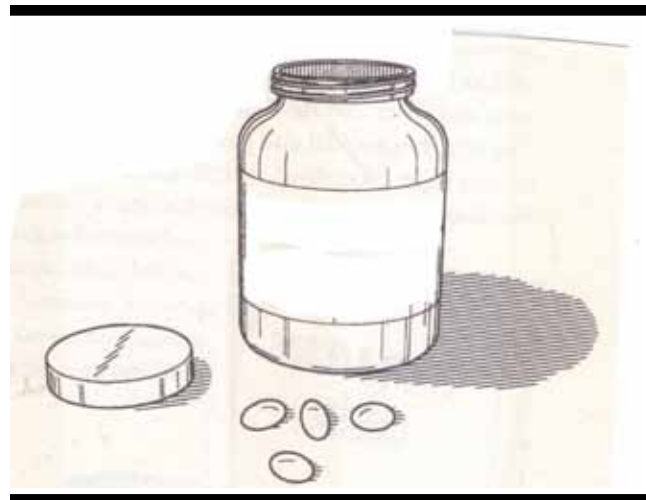
Returns the patient to its full original SAN.

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.

S STRUCTURES, SHELTERS

Item	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.

Protections: AV = 100. All protections except Psi = 4 x TL.

Airlock.

TL A, Size 6, Cr 100,000.

Displaces 1 ton for human-sized sophonts.

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.

Protections: AV = TL = Cage, Flashproof, Radproof, Insulated, Sealed.

Hangar

TL 8, Size 7, Cr 20,000

An open structure, made from standard construction materials, designed for holding aircraft, sometimes very large ones, plus plenty of space to perform maintenance.

Temporary Hangars, Size 6, Cr 5,000, are designed to hold one aircraft with minimal space for maintenance. Typically 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.

Protections: 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. Can be carried in the hold of a starship.

Protections: 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.

Protections: 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.

Protections: 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 20-ton moon pool, a 20-ton vehicle maintenance bay, and 100 extra tons for living space, lab space, etc.

Protections: 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 continental shelves.

Protections: AV = 100. Insulated = Sealed = 4 x TL.

T TOOLKITS

Kit Classification	Size	Kg	Vol	Cr
Portable kit	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.

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

Item	TL	Size	Cr
Challenge Coin, IN	C	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	49.9 (new)

* Item is typically a nonworking artifact.

Imperial Navy Challenge Coin.

TL C, Size 1, Cr 10. An iridium-plated service coin.

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 MUCF 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 MUCFs 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, Gratlina 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, Cr49.9 by auto-deduction, plus shipping. Order Now!

Values vary online at the Collector's Exchange. Also occasionally found in thrift stores = Cr5.

V VEHICLES (OMITTED)

V VEHICLE WEAPONS (OMITTED)

W WEAPONS (OMITTED)

X EXPLOSIVES (OMITTED)

Y ROBOTICS (OMITTED)

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 broadly 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 unknown 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 could be a novelty to some characters.

Settings

are locations for adventures. The setting may remain the same during the adventure, 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

ADVENTURES IN MANY SIZES

- 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 string many adventures together.
-

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

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. Each type of scenario 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.

One method of administering a patron encounter is to write a short paragraph for the players to read briefly 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 further complicate the situation, a selection of perhaps six possible rationales or outcomes to the situation can be made up (for example: the patron is lying, the patron is crazy, the patron is honest, the patron has been swindled, the patron is deviously trying to achieve something he hasn't mentioned, or the patron is dishonest), and the true outcome picked by the referee from the list, influencing the referee's description of the encounter and the ensuing job.

Rumors encountered in the course of adventures may add to what the players know about their patron and the situation. In some cases, a rumor may be treated as an absent patron, leading the characters off on a search of their own.

Casual Encounters

Somewhat more detailed than the patron encounter is the casual encounter. A patron appears, but is more fully detailed and described. This description often helps the adventurers determine attitudes or opinions of the patron, helping guide the players' decisions. 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). Casual encounters are usually more detailed than are patron encounters.

Amber Zones

An amber zone is a travel zone code promulgated by the Travellers' Aid Society to warn off individuals from dangerous worlds. This same name has been assumed for situations which present a danger to characters and to warn them to use caution. An amber zone situation need not take place on an amber zone world. These situations usually 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. 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.

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

Any adventure can use gimmicks to appeal to the players. Early on, they have no idea what is of importance in a grand sense, and will be self-centered to a certain extent. Gimmicks are designed to appeal to the players, enabling them to search for obviously valuable items while they also learn about their universe.

Gimmicks (some say the word is derived from "gimnee") are things that players want: things they are fascinated with. In **Traveller**, gimmicks rank above money or ordinary ships; they must represent some advantage, such as high technology or special talents. The Psionic Institute is an example of a gimmick sought early on by most characters—it meets one definition of a gimmick: an advantage the player has over most people.

Gimmicks are things which cannot be bought—they must be earned through hard work, clever planning, and good fortune. Keep in mind that gimmicks are things that are acquired early by the players, and which then serve the person (and the group) for the rest of the adventure.

The Pull

The pull is a simple name for a goal that attracts adven-

turers, 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 need a lot of thought, and often must be tailored to players in the adventure. When one player is an anthropologist and is interested in primitive cultures, the pull can be the secret of some race on a far-off world, one which allows the player to use his talents to puzzle it out after long expeditions. If a player tends to be a violence-prone soldier, then the pull may be a long-sought bit of training from a military society, available only after he has proven his worth.

Often, an adventure can do with two pulls. One may be major and the other minor, but a multiplicity of pulls allows one to be important while the other lies dormant until needed. 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 (obviously) the opposite of the pull. It is something the players do not especially like, but it keeps cropping up anyway. The push can be relatively simple, like law officers, or relatively complex, like a nefarious group or race intent on conquering the universe. As with pulls, there can be multiple pushes, some large and some small.

Pushes also have a benefit for the referee: they can come into play when the referee wants to push someone. If the group is wasting time in some place 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, in order to gain political control. 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, the secret of the universe; on a smaller scale, it is still a secret worth knowing.

Early in an adventure, the players may not even know what the enigma is. Later, when presented with several clues, the group may realize that there is a puzzle, but have no idea of its solution. 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. Doling out the clues and information slowly can make the adventure an intense, interesting cliffhanger until the very end.

The Distraction

Related to the push after a fashion, distractions involve situations which can lead to setbacks for the characters, or deliberately misdirect or mislead the players about the nature of the universe. 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 dilemma for the referee is, of course, that it can be easy to forget that an adventure is not a competition between the referee and the players, but a story where both players and referee have storytelling elements. 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.

E

Easy:

Implemented with minimum effort by the Referee and no new playing techniques for the players.

P

Playable:

Oriented to situations which reveal information and allow its use to move the game events forward.

I

Interactive:

Responsive to the interests, goals, whims and needs of the Players and the Referee.

C

Checklist:

Simple, easy to use Player and Referee record-keeping for all aspects of the Adventures.

The ultimate goal and intended result is an adventure that is structured but not necessarily predictable, interesting, 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.

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 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

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.

THE TYPICAL EPIC

Four **Acts**, each advancing some part of the plot.

Five **Scenes** within each Act.

The **Climax**, bringing everything together.

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.

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 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 played with soldiers and marines is totally different from the same situation played by rogues or craftsmen or scholars.

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 common 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 pres-

SPECIAL PRESENTATION CONVENTIONS

Wipe. Eliminates distracting or non-productive scene changes.

Flashback. Transports characters to some previous historical event (in lieu of descriptive text).

Metaphor. Transforms alien or unusual situations into understandable events.

ent 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 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.

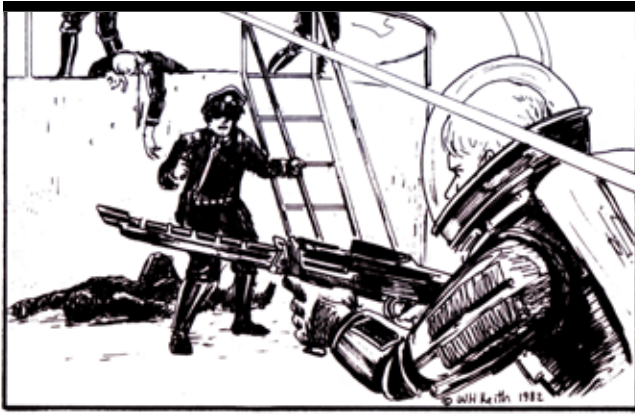
The referee administers the sequence as a **metaphor**: the plasma beings see themselves as swimming in a vast sea that is their star. The characters resolve the situation as a sea diving challenge as they strive against pressure and cold with only their base characteristics.

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



**SEH ENERI DINSHA
AND**

THE FINAL VICTORY AT DARKHAMMAR

with triple options Dream Sequence, Edited Narrative, and Full-Evening Adventure.

Wake-up tomorrow remembering the bone-crushing disastrous orbital assault, the desperate forced march across the Desert of Chimes, the comic interlude through the wreckage of the Rake Factory, the frantic climb up the sheer rock walls of the Citadel, and the final hand-to-hand battle with the evil Plexxan Guardians! Cap it all off with the formal victory celebrations as the Duke pins on the Starburst for Extreme Heroism and whispers his sincere congratulations.

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 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.

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.

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 is unharmed with memories of an exciting set of 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 to the Space Battles chapter."

Deviations From The Checklist 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.

USING

THEMES

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 Theme table to determine 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.

36 THEMES

1D	1	2	3	4	5	6	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 Choices	1	2	3	4	5	6
Abandonment	Contagion	Flawless	Jobless	Patriotism	Tedious	
Absurdity	Coordinated	Flimsy	Jumbled	Peaceful	Thirsty	
Accidental	Courteous	Foolhardy	Knowledge	Perfidy	Tiresome	
Adorable	Crabby	Fragile	Knowledgeable	Preparedness	Traitorous	
Agility	Craftsmanship	Frantic	Labored	Pricey	Treason	
Air	Cumbersome	Freezing	Lackadaisical	Principle	Ubiquitous	
Ambiguous	Death	Frightening	Loud	Puzzling	Unarmed	
Arrogant	Defective	Fuzzy	Lucky	Quaint	Unique	
Art	Deranged	Gaudy	Ludicrous	Quarrelsome	Unusual	
Autumn	Deserted	Goofy	Macabre	Quiet	Unwieldy	
Average	Diligent	Grace	Maddening	Quirky	Utopian	
Beautiful	Disagreeable	Graceful	Magenta	Red	Vagabond	
Belligerent	Disgusting	Grandiose	Majestic	Redundant	Valuable	
Bewildered	Distraction	Grieving	Makeshift	Repulsive	Vast	
Big	Duplicative	Gruesome	Materialistic	Resolute	Vigor	
Blue	Dystopian	Hard-To-Find	Mediocrity	Responsibility	Violent	
Boorish	Earth	Harsh	Mercy	Rotten	Voiceless	
Boredom	Efficient	Hedonism	Military	Roughing It	Wasteful	
Brawn	Endurance	Hellish	Morality	Sacrifice	Water	
Breakable	Energetic	Helpful	Muddled	Scary	Weak	
Bustling	Erratic	Helpless	Murky	Science	Weary	
Calm	Extra-Large	Hissing	Mysterious	Secretive	Weather	
Cautious	Extra-Small	Hope	Naive	Shiny	Wet	
Charity	Faded	Huge	Noisy	Silent	Wholesale	
Charming	Faint	Icky	Obnoxious	Slippery	Wild	
Cheap	Faithful	Ignorant	Obsolete	Spring	Winter	
Chivalrous	Faithless	Impolite	Old	Storms	Wisdom	
Clever	Fast	Incompetent	Ordinary	Strange	Wonderful	
Cluttered	Fear	Instability	Overrated	Strength	Worthless	
Conspiracy	Fierce	Intelligence	Pacifistic	Sudden	Wrong	
Comfortable	Filthy	Invincible	Painful	Summer	Young	
	Fire	Irate	Painstaking	Suspicious	Zany	

CREATING AN EPIC

CREATING AN EPIC

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. The Act and Scenes. Fill in a short description of each Scene.

C. The 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, society is 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, however, 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.

B THE ACTS AND SCENES

Act 1 Waypoints In The Solar System

- 1 Visit the Solar Power Fields of Mercury
- 2 Visit the Terraforming Satellite Orbiting Venus
- 3 Visit the Subterranean Warrens below Olympus
- 4 Visit Prospector Central on Ceres
- 5 Visit the UN Outpost on Io

Act 2 Encounters

- 1 Encounter Professor Huerta
- 2 Encounter Space Patrol Captain John Jamison
- 3 Encounter the Mad Hermit of St. Helena
- 4 Encounter UN Functionary Frank Repczynski
- 5 Encounter the Martian Ambassador

Act 3 The Desperate Hours

- 1 Mayday! Desperate Appeal for Help
- 2 Air Riots On Luna
- 3 Professor Huerta's Daughter In A Coma
- 4 Cast Adrift In The Asteroid Belt
- 5 Haven: The Clandestine Laboratory in the Belt

Act 4 All Becomes Hazy

- 1 The Computer Control Dilemma
- 2 The Energy Containment Problem
- 3 The Overclock Issue
- 4 A Mole In Their Midst
- 5 The Inspector From The UN

The Grand Finale

In the hidden laboratory in the Belt, Professor Huerta is on the verge of a breakthrough while the 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 free from the confines of the Solar System.

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

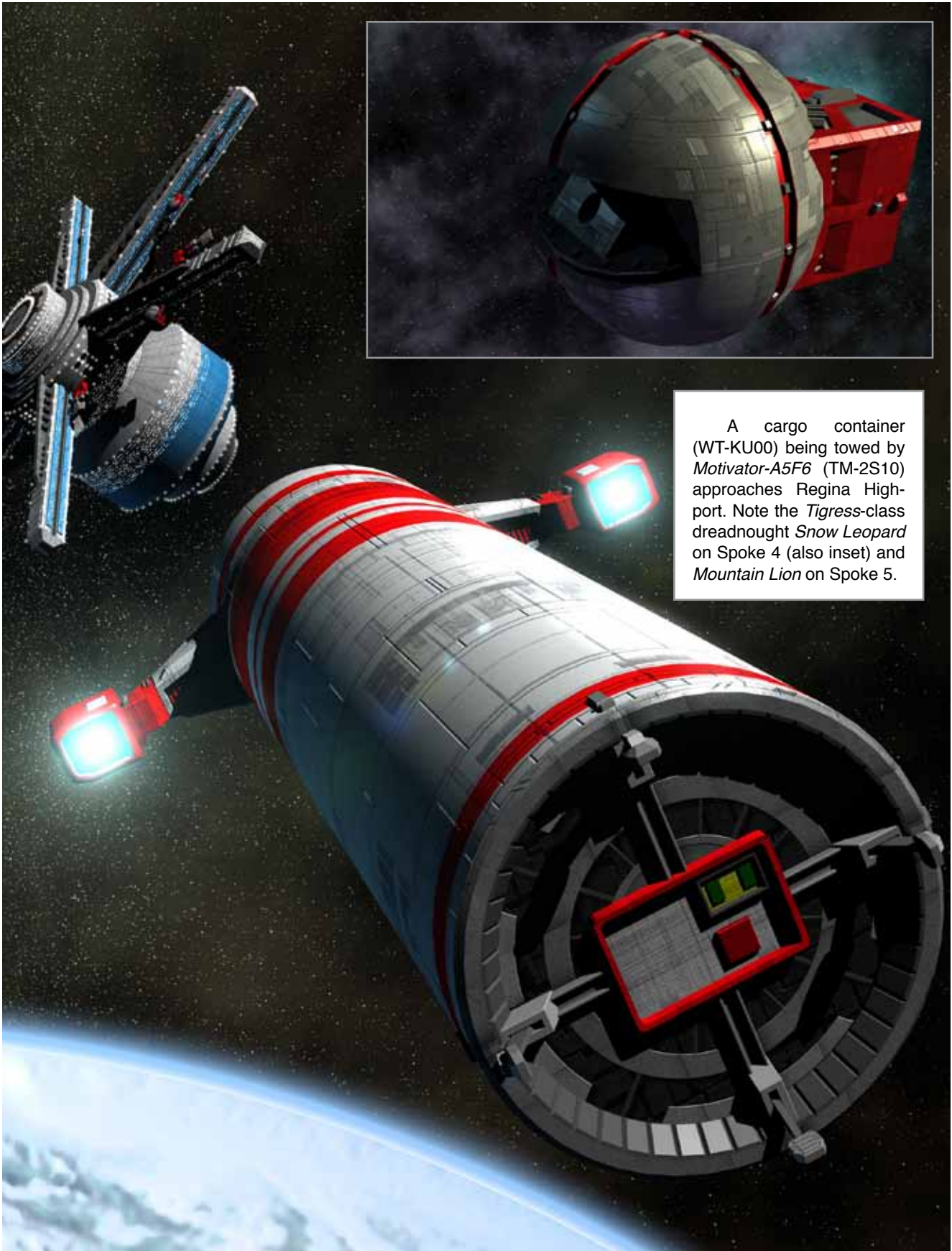
Major interstellar government maintain their own recognition guides: Aslan, Zhodani, Hiver, K'kree, Solomani, and others. Such guides are most knowledgeable about ships within their territory, and their data fades with distance. Such guides, even the older and out-of-date editions, are much-sought-after 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.

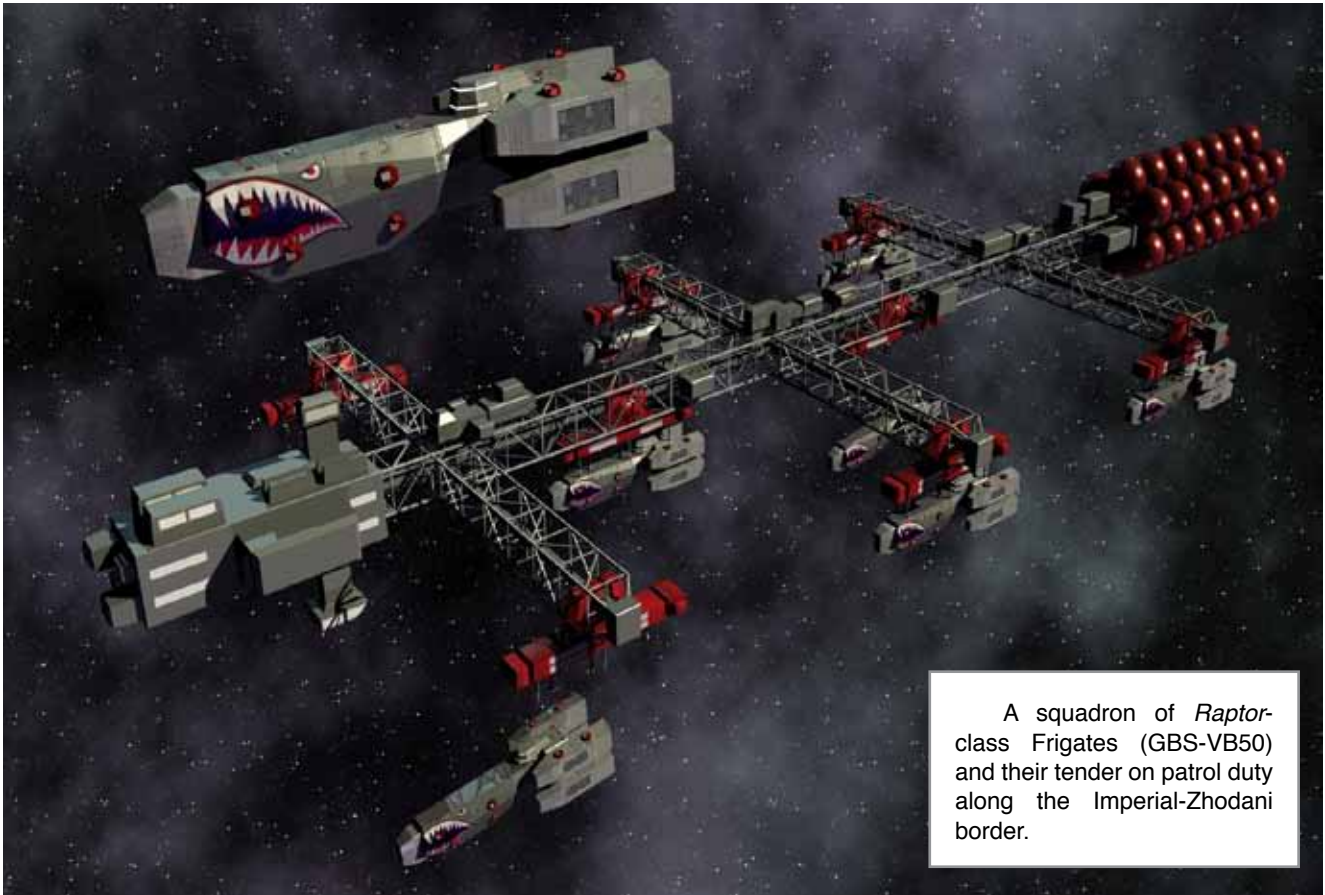


Solomani *Surname*-class Fleet Couriers are common in the Solomani Rim, but rarely in Imperial territory. Note the distinctive circled cross symbol of the Solomani.

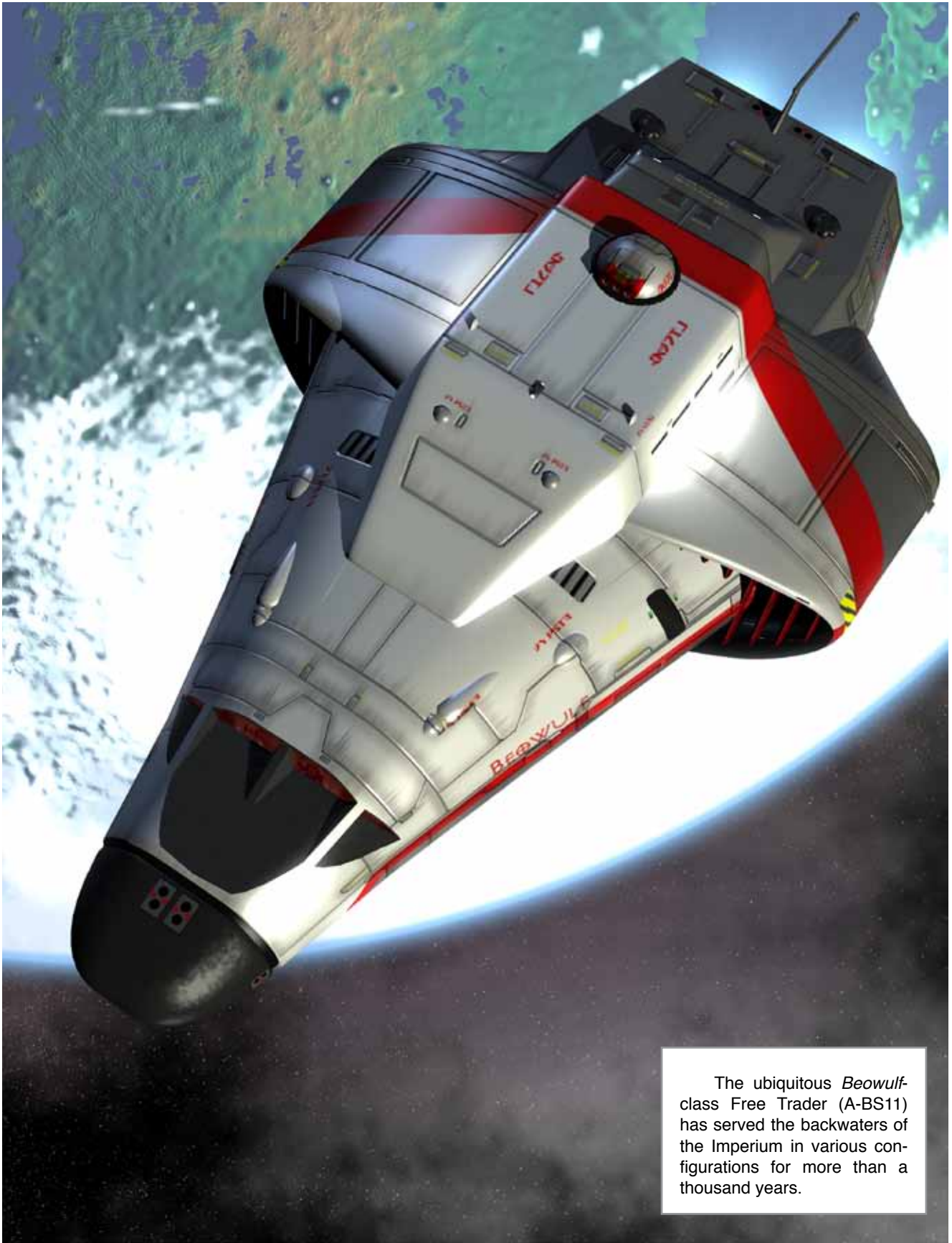


A cargo container (WT-KU00) being towed by *Motivator-A5F6* (TM-2S10) approaches Regina High-port. Note the *Tigress*-class dreadnought *Snow Leopard* on Spoke 4 (also inset) and *Mountain Lion* on Spoke 5.

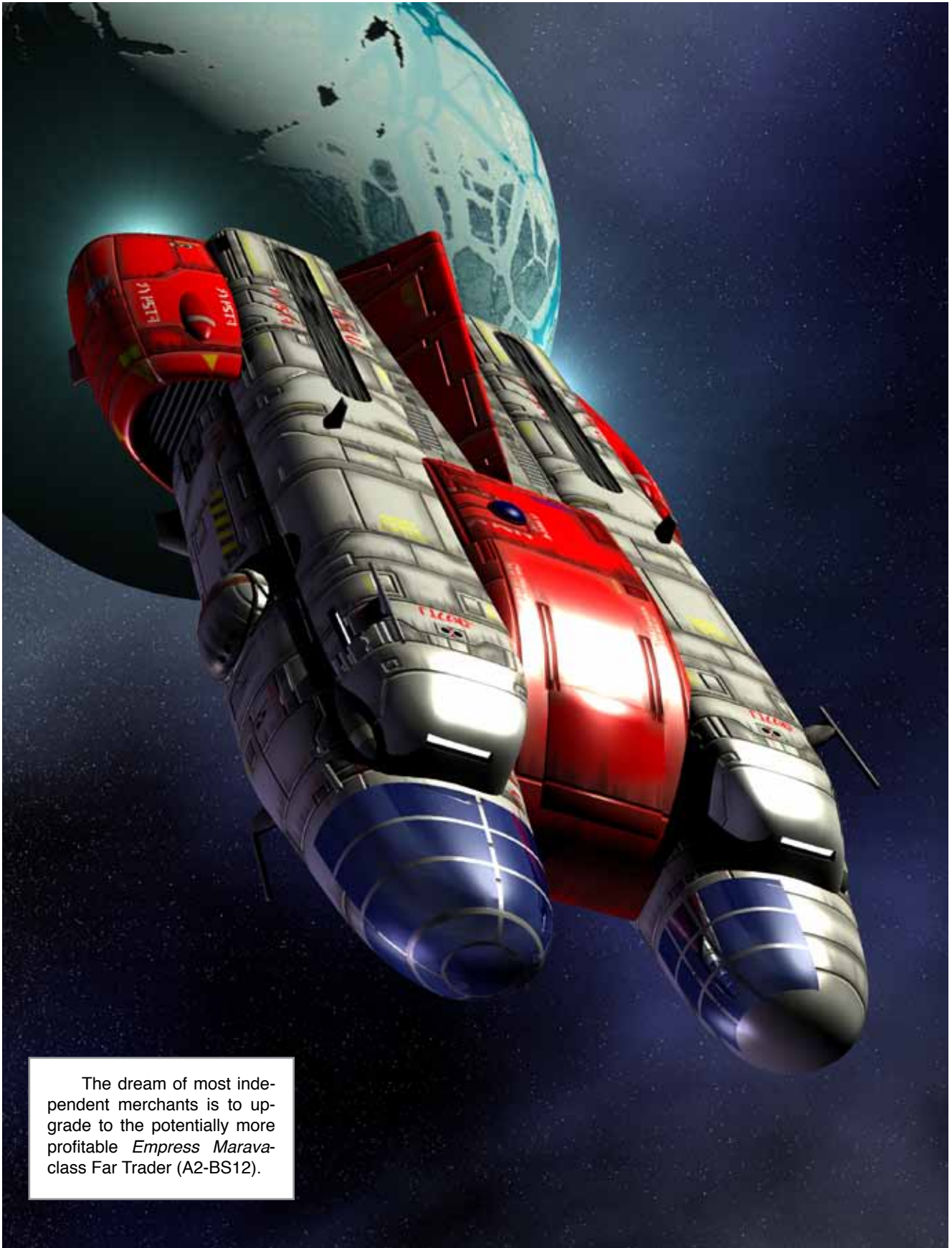
Ghalalk, a 50,000-ton armored cruiser, is one of a series of similar hulls with capabilities ranging from Light Cruiser to Exploratory Cruiser to Battle Cruiser.



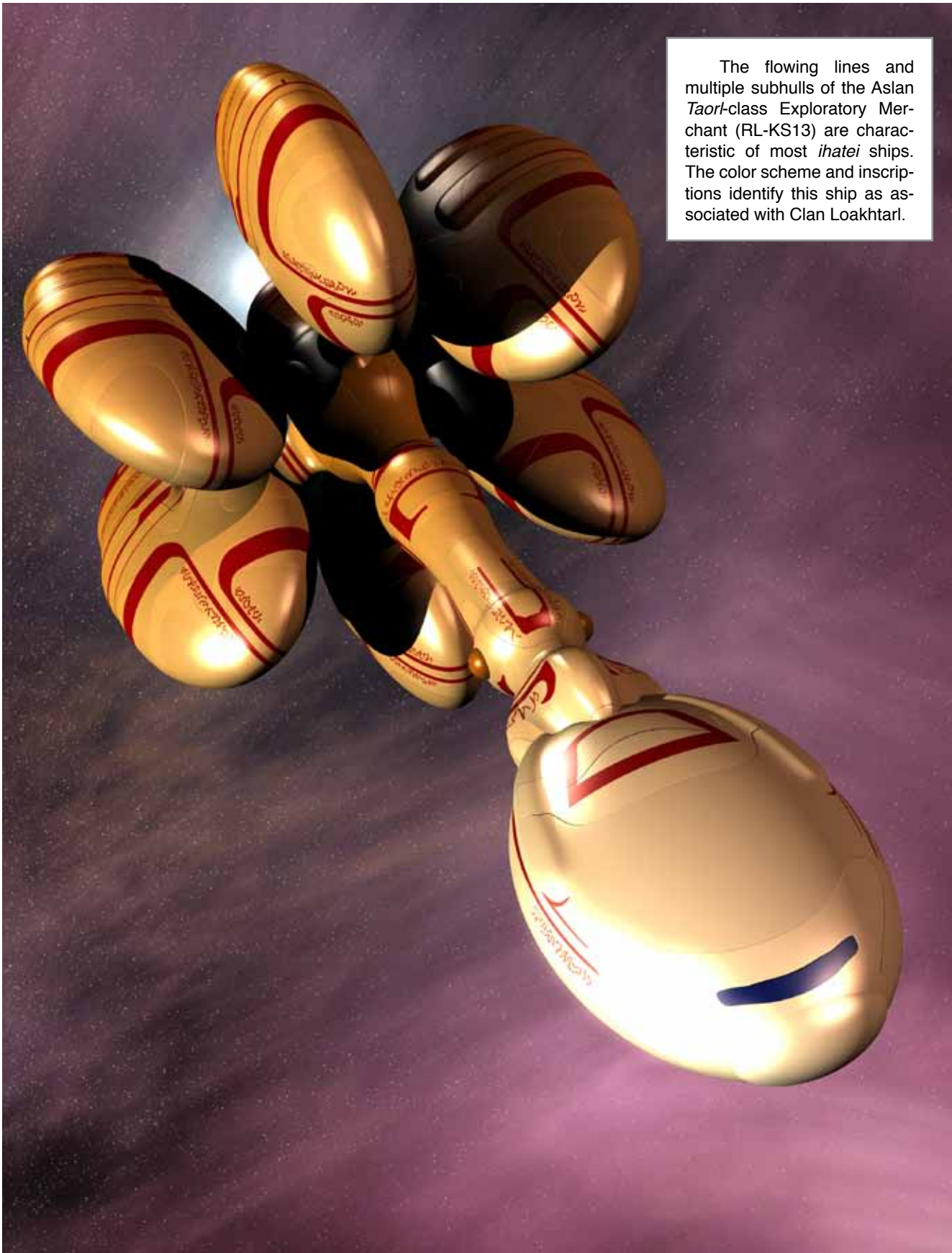
A squadron of *Raptor*-class Frigates (GBS-VB50) and their tender on patrol duty along the Imperial-Zhodani border.



The ubiquitous *Beowulf*-class Free Trader (A-BS11) has served the backwaters of the Imperium in various configurations for more than a thousand years.

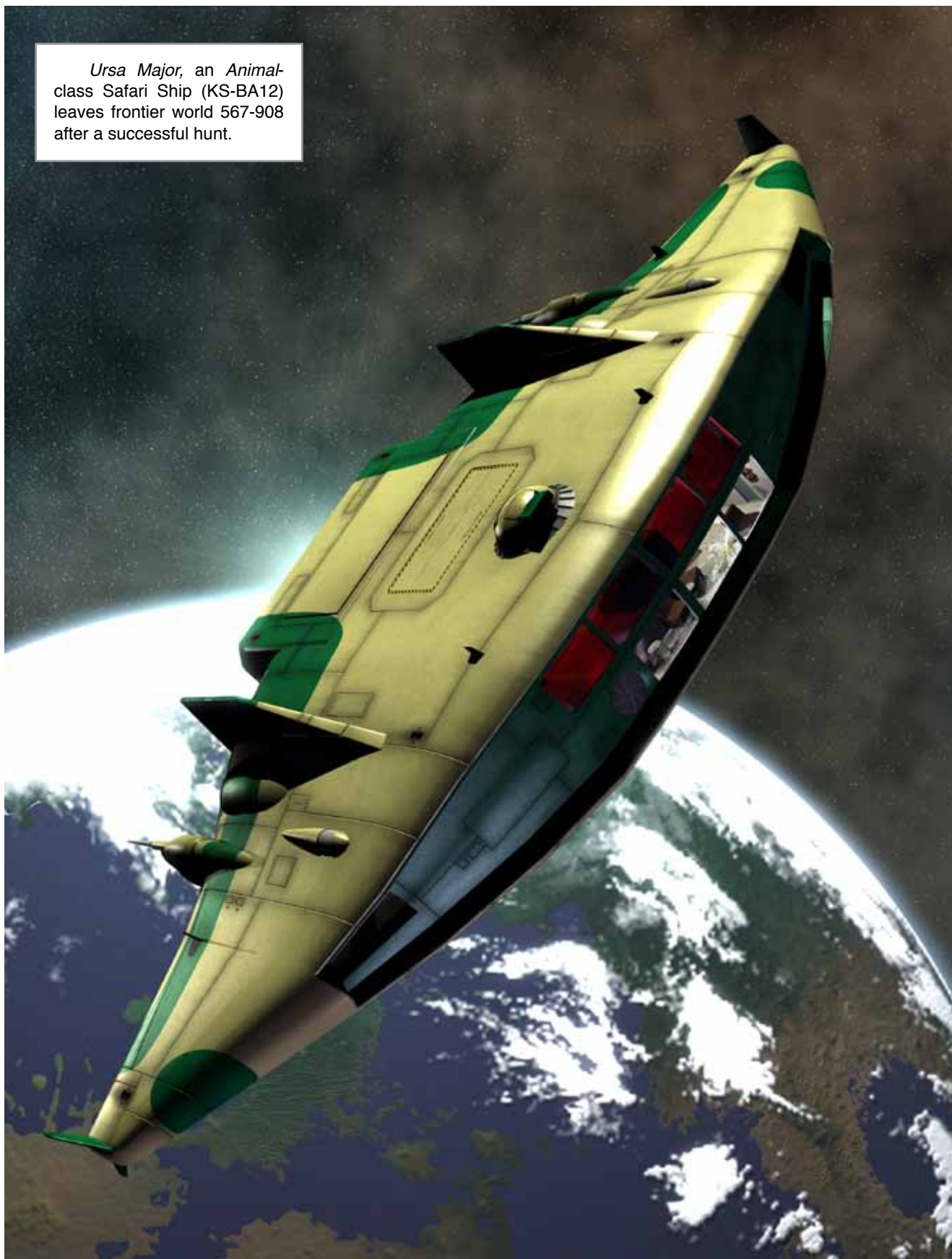


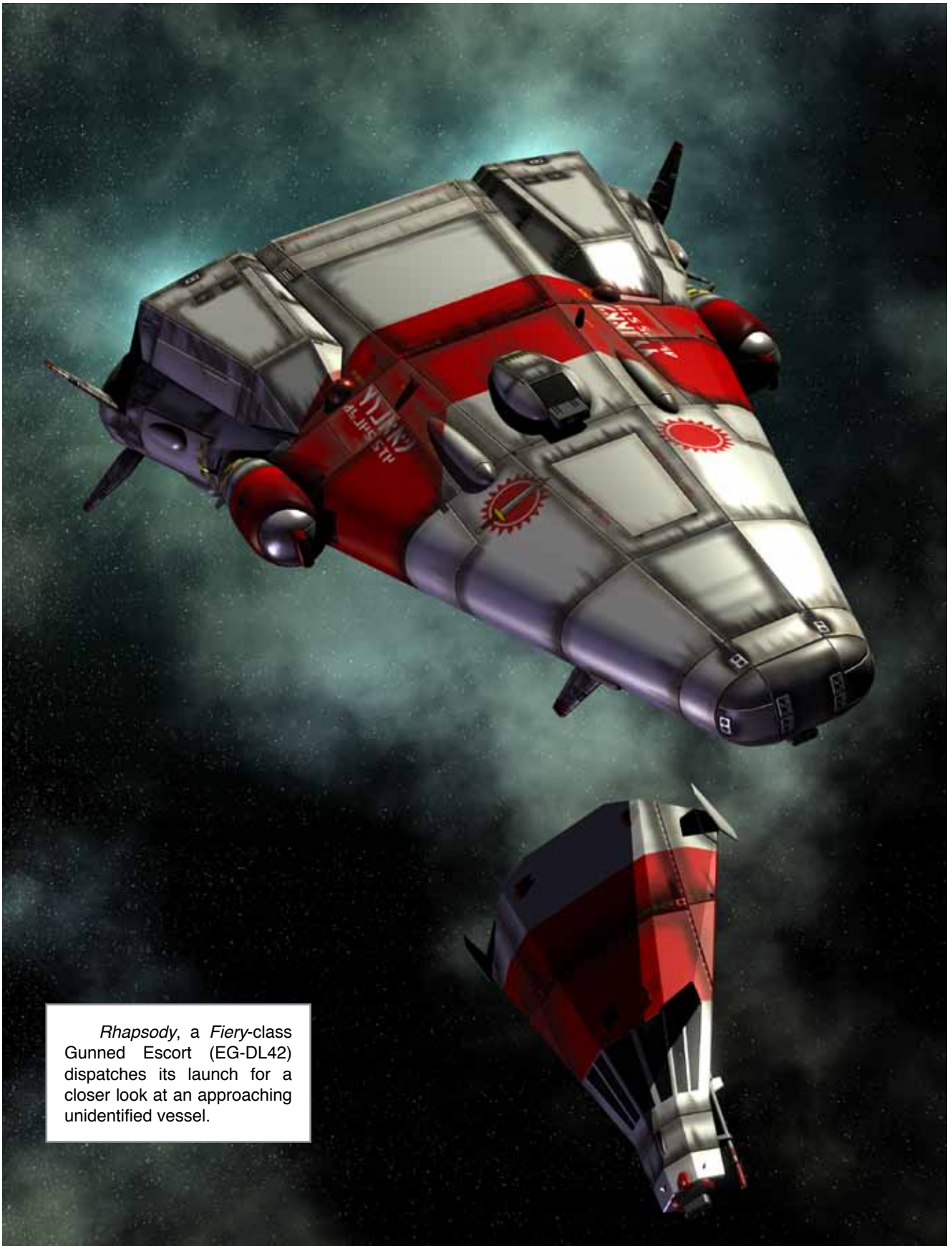
The dream of most independent merchants is to upgrade to the potentially more profitable *Empress Marava*-class Far Trader (A2-BS12).



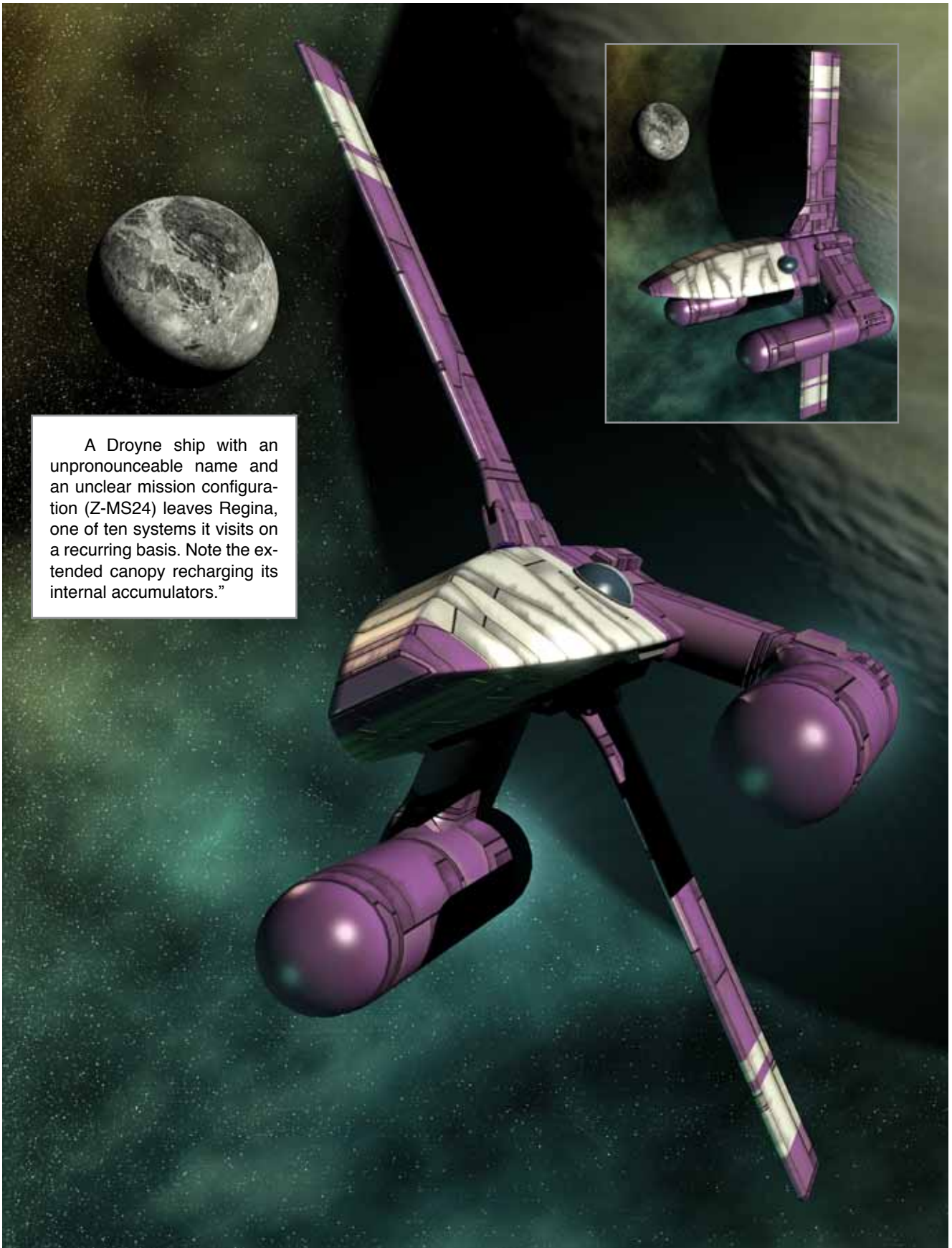
The flowing lines and multiple subhulls of the Aslan *Taori*-class Exploratory Merchant (RL-KS13) are characteristic of most *ihatei* ships. The color scheme and inscriptions identify this ship as associated with Clan Loakhtarl.

Ursa Major, an *Animal*-class Safari Ship (KS-BA12) leaves frontier world 567-908 after a successful hunt.

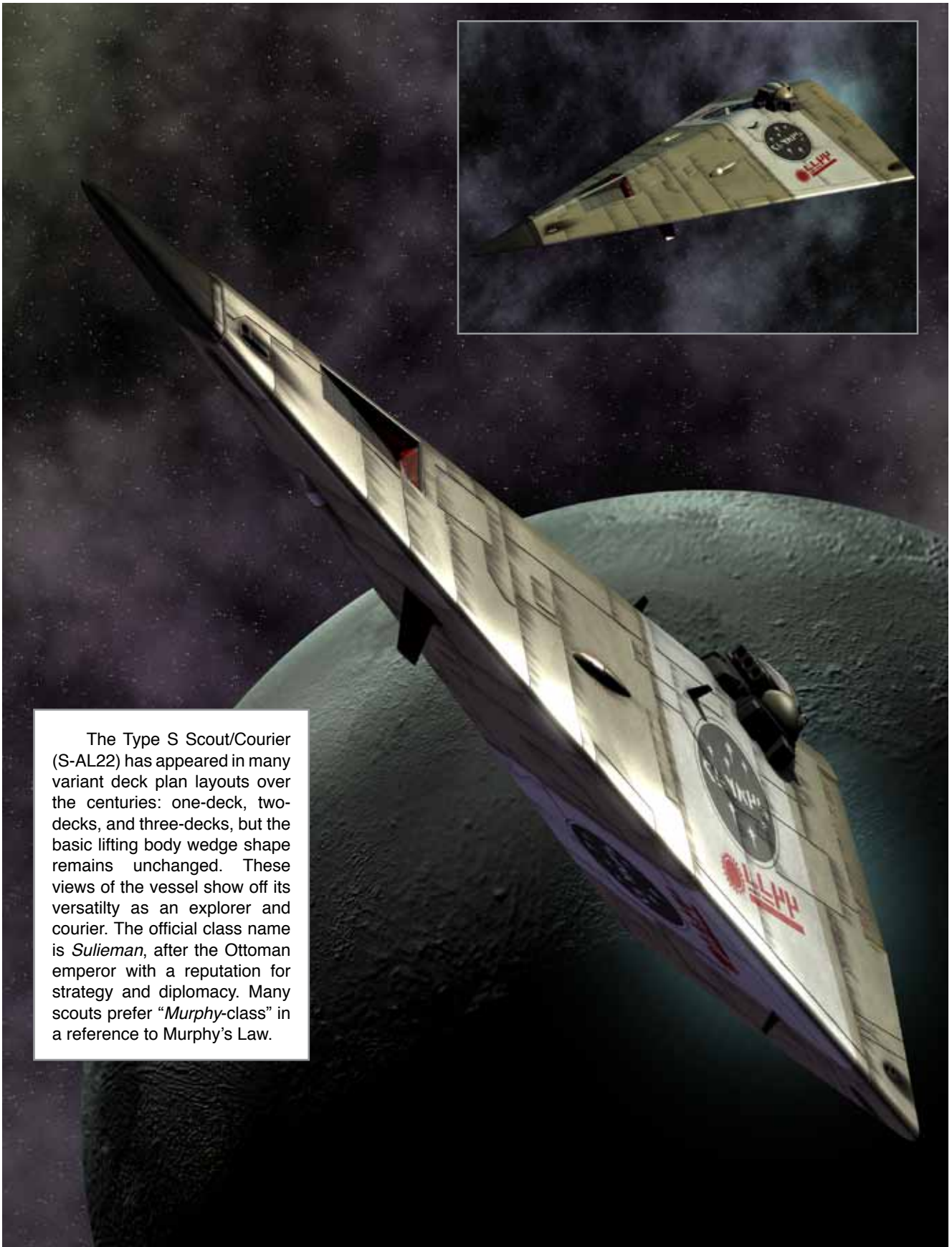




Rhapsody, a *Fiery*-class Gunned Escort (EG-DL42) dispatches its launch for a closer look at an approaching unidentified vessel.



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.”

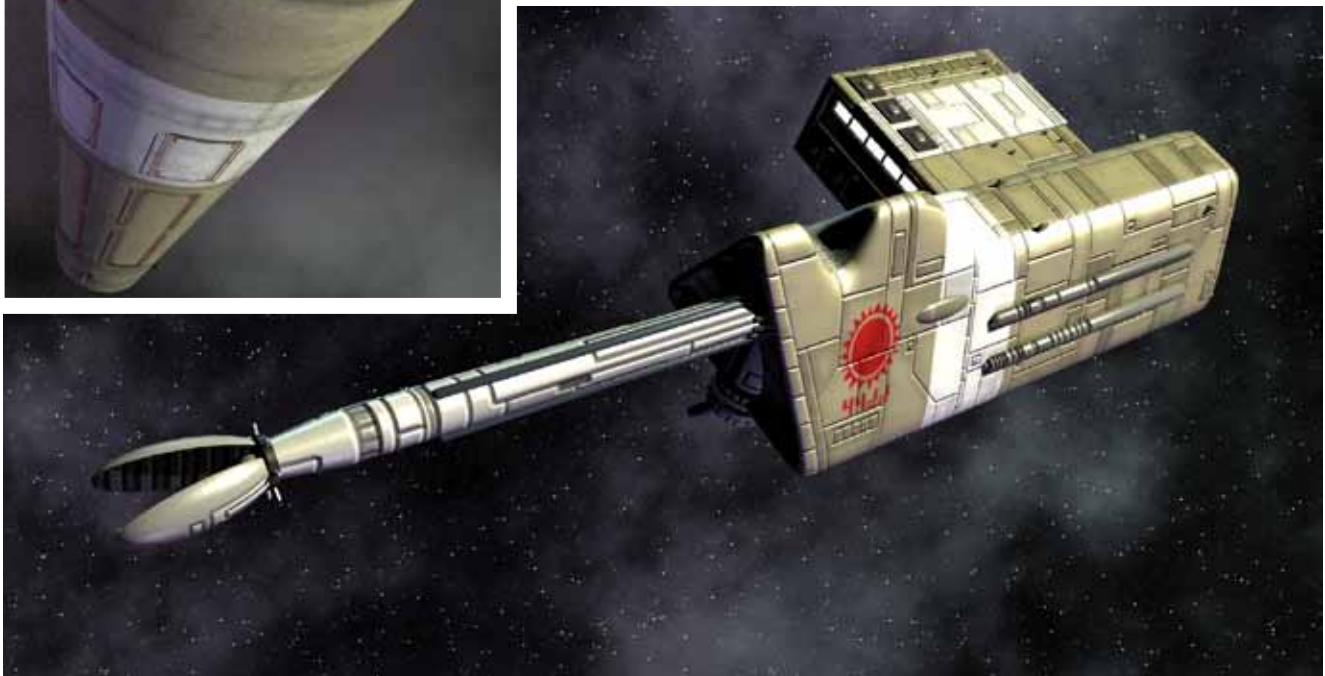


The Type S Scout/Courier (S-AL22) has appeared in many variant deck plan layouts over the centuries: one-deck, two-decks, and three-decks, but the basic lifting body wedge shape remains unchanged. These views of the vessel show off its versatility as an explorer and courier. The official class name is *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.

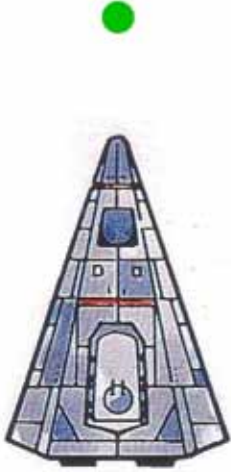




The Green List

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.

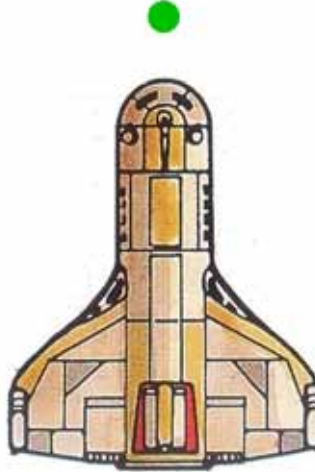
Users are invited to contact the TAS for specific details as they change constantly. Available in print and electronically.



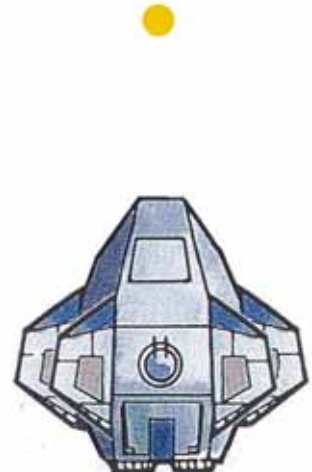
The ubiquitous IISS **Scout/Courier (S-AL22)** flits across the Imperium carrying messages and small parcels vital to the bureaucracy. Some operate on long term loan to Scout veterans.



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.



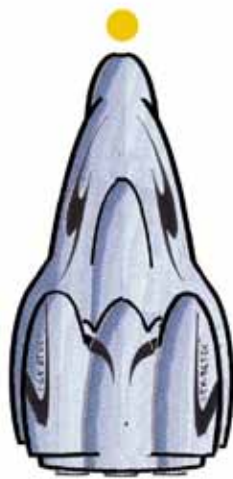
The **Fat Trader (RK-DA11)** specializes in bulky goods (although it carries anything to pay the bills). Fat Not known for passenger comfort, Fat Traders are often the only ship available..



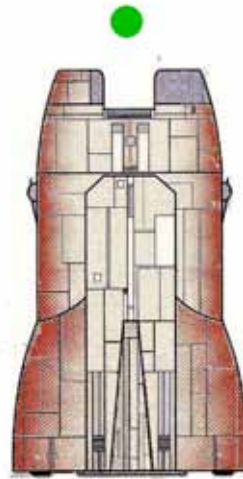
Armed Packet (UF-CA33) in unscheduled passenger service for those in a hurry. The crew can be trusted, but these little ships still find themselves jumping in harm's way.



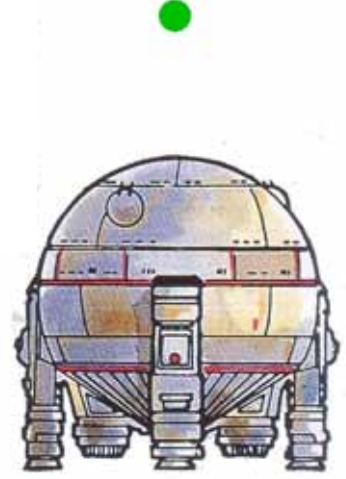
Vanderbilt class **Yacht (Y-EU42)** often in luxury service for nobles or a famous entertainer. Buying passage is impossible, but the master may take a few on board on a whim.



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.



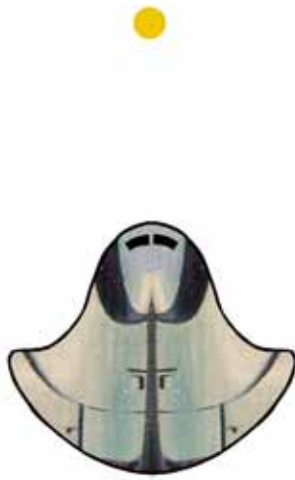
Broadsword-class Mercenary Cruiser (C-VS23) re-configured to *N'Ora'Lee* -class **Search and Rescue Ship (PR-VS23)**.

Especially helpful when disaster strikes!

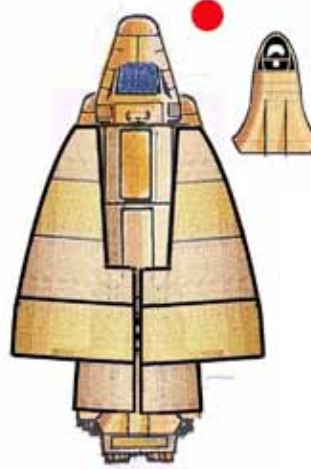


Typical Vargr **Corsair (P-DA41)** with claw-motif extensible weapons mounts and deploying fang sensors.

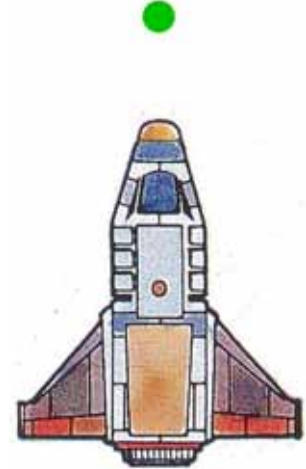
Vargr Corsairs are often captured or renegade naval vessels.



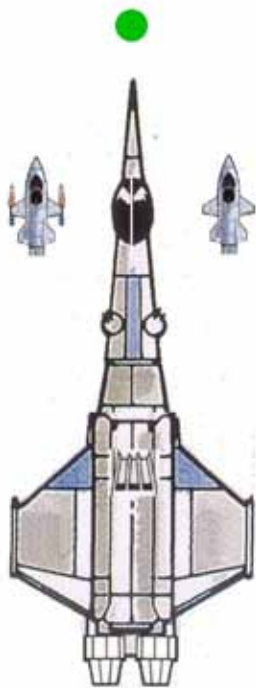
Zhodani **Border Scout (S-AL22)** encountered within 10 parsecs of Zhodani territory. Paradoxically, Zho Border scouts are usually harmless and even helpful; but beware of psi peeping!



Corsair (P-GA42) converted from various shuttle and transport components (shown with **Boarding Launch**). Pirate ships vary widely and appearances can be deceiving.

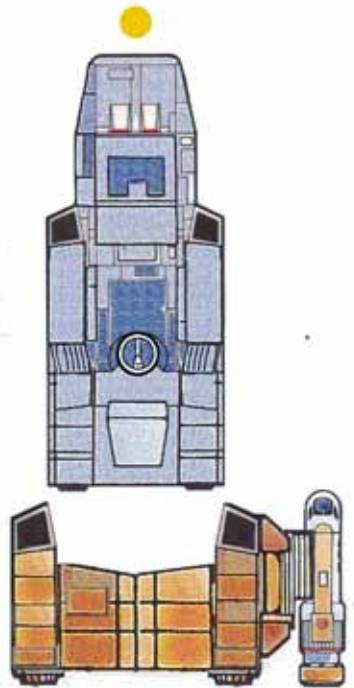


In-system interworld **Shuttle (QS-A9A20)** providing access beyond the mainworld. Scheduled trips from reputable spaceports are dependable and safe; but beware the tramp shuttle.

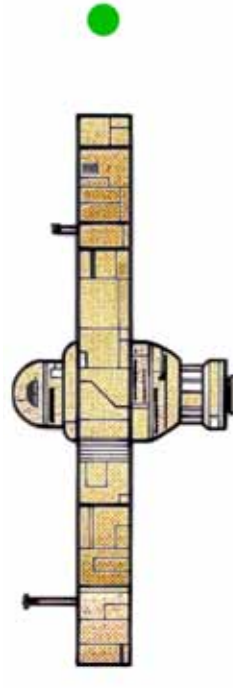


Imperial Navy **Corvette (E-DA42)** shown with typical accompanying fighters.

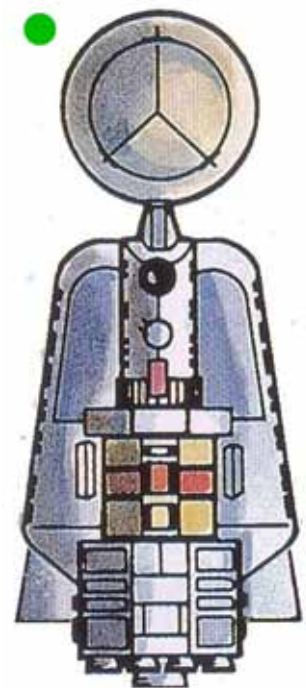
IN ships aid stranded travellers (show your TAS Card) if their mission is not compromised.



SDB System Defense Boat (DS-DS40) shown with interstellar **Jump Shuttle (TD-BU12)** and docked **Pin-nace**. 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.



Tanstaaff-class **Subsidized Liner (M-FU12)** as encountered along main trade routes in Imperial space. Scheduled service between mainworlds on major routes is the safest way to travel.



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