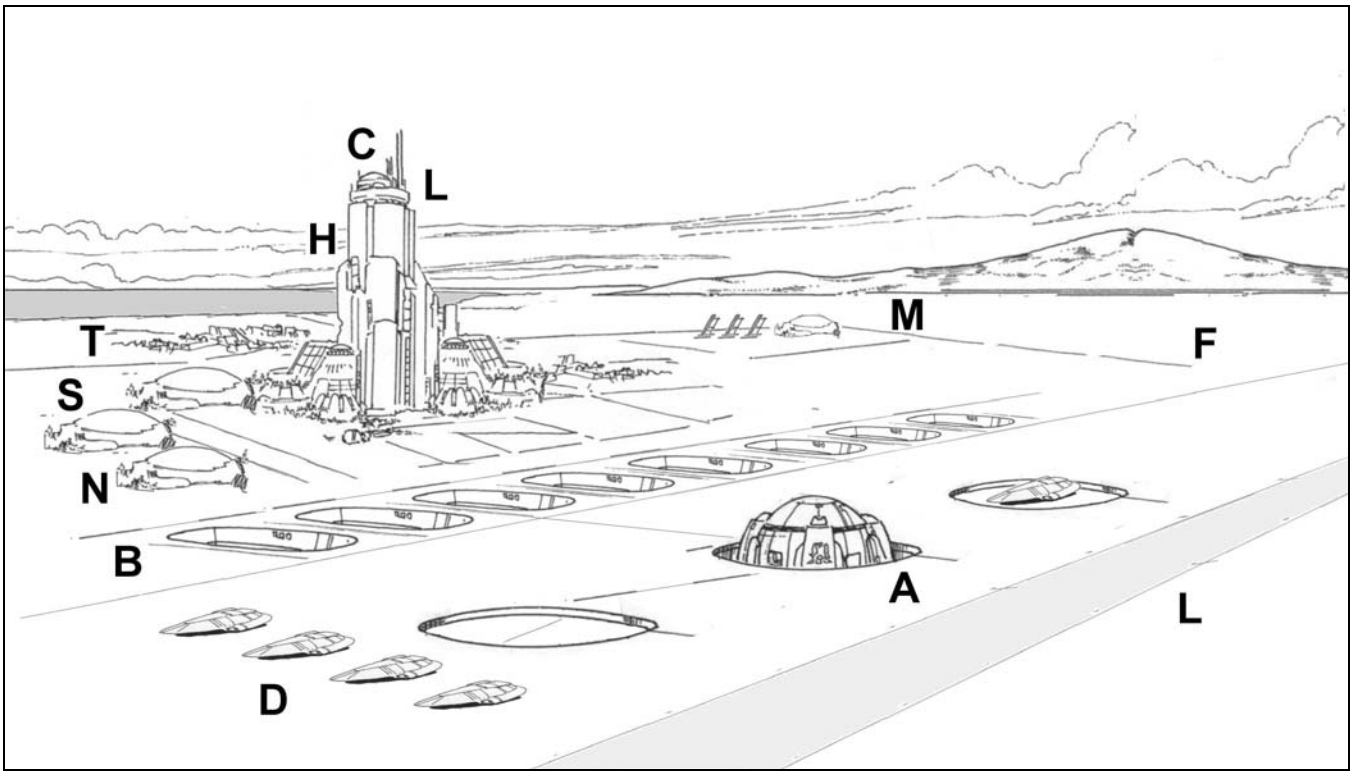
THE TYPICAL STARPORT



The Elements of a Typical Starport.

A. Premium Landing Bays. Elevator platforms retract to the subsurface level. Sheltered access; 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

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 for 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). Startown is 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 Safety Bays and the vast concourse of services available.
Not all starports will have all of the facilities shown here.

Starports

Every adventure begins and ends at a starport. They 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, a 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 the adventure 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 INSYSTEM

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.

The 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 (ranging from A to E) which details their basic facilities.

A. Excellent Quality Starport. Facility with refined and unrefined fuel available on site. Facilities include capability to perform annual overhaul and new starship construction (TNAS certified designs). A naval base may be present. A scout base is usually not present. A surface installation is present. A highport may be present.

B. Good Quality Starport. Refined and unrefined fuel available on site. Facilities include capability to perform annual overhaul and new spacecraft construction (TNAS certified designs). A naval base may be present. A 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 indigenous space access capability.

Spaceport Types (and Capabilities)

Worlds other than the mainworld in a system may also have spaceports.

F. Routine Quality Spaceport. Unrefined fuel available on site and minor repair facilities. A system defense field may be present. A military base may be present. A surface installation is present. There is no highport. This designation is a poor cousin to starport type B.

G. Poor Quality Installation. 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 a poor cousin to starport type C.

H. Primitive Quality Installation. 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 poor cousin to 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 tolerable, then life support and labor costs are minimized. Some worlds can't justify at the expense of both a Downport and a Highport, and a surface port is easier to maintain..

Highport. If circumstances justify the costs, a world may also have Highport (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 to foster 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.

STARPORT AVAILABILITY

Every world with a starport has a surface location.
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.

STARPORT DETAILS

Type	Quality	Yards	Repairs	Fuel	Down	Highport
A	Excellent	Starships	Overhaul	Both	yes	if Pop 7+
B	Good	Spacecraft	Overhaul	Both	yes	if Pop 8+
C	Routine	--	Major Damage	Unrefined	yes	if Pop 9+
D	Poor	-	Minor Damage	Unrefined	yes	--
E	Frontier	-	-	-	Beacon	--
X	None				no	

SPACEPORT DETAILS

F	Good	-	Minor Damage	Unrefined	yes	no	equivalent to D
G	Poor	-	Superficial	Unrefined	yes	no	equivalent to D
H	Primitive	-	-	-	Beacon	no	
Y	None	-	-	-	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.

The Starport	**The Terminal**	**Peripherals**	**Startown**
Beacon.	Passenger Concourse.	Bases	Hiring Hall.
Landing Pad.	Freight Docks.	Scout Base.	Lone Star.
Traffic Control Facility.	Customs.	Naval Base.	Traveller's Aid Society.
Auxiliary Control Facility.	Cargo Market.	Military Base	Scout Lounge.
	Accommodations.	SDB Field.	
	Data Terminals.	SDE	
	Message Center.	Sensor Array.	
	Emergency Medical.	Shipyard.	
		Repair Shops.	
		Transport Hub.	

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 tone which allows ships to home on its position. In more complex systems, the beacon provides range and position information for ships in the system, traffic control information on sister frequencies.

The Landing Pad and Runways. Starships approach from beyond the atmosphere. When starships set down, most make 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 lifting surfaces, the landing pad includes long, broad runways.

For highports and beltports, this is a designated holding area.

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 memories; on yet others, they are librarians).

Message Center. Access to communications, including physical mail, electronic mail, 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 is established 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.

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).

Shipyard. Ships are built at shipyards. For ships of moderate size which will be streamlined and capable of landing on worlds, construction often takes place on world surfaces at starport shipyards.

Most shipyards specialize in the construction of a specific assembly (which local industry has shown itself capable of producing) such as jump drives, avionics, detectors, or even stateroom modules. Other components are purchased from other shipyards and imported as part of the TNAS-certified parts system.

Warehouses on-site store components until they are ready for assembly. Ships themselves are constructed in open-air bays (or in enclosed assembly structures if the local environment requires).

Repair Shops. Minor repairs to ships are often performed on the landing pad. More complex or extensive repairs require that the ships be moved to repair bays at the edge of the starport. Support installations near the bays house the instrumentation and equipment necessary for repairs.

Transport Hub. The starport is usually integrated into the global transportation net, and arriving passengers transfer from the terminal to the transport hubs. Depending on the world, the hubs may support sea or undersea transport, air transport, or ground rail transport. In addition, personal vehicle rental is available.

Industry. Many industrial processes are best carried out in zero-G and/or vacuum. What better place for such operations than adjacent to a major orbital transportation center? Industrial modules attached to the Highport create products or commodities which benefit from immediate access to the ships calling at the port. Some factories have long-term supply contracts with the highport itself.

Organization

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.

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.

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 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.

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 Traveller's Aid Society. Some individuals make travel their primary vocation. If they are able, they join the Traveller's Aid Society, which provides facilities to its members. The Traveller's 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.

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.

Starport is not a city so much as a neighborhood of the city.

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.

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 interdictive: the location presents such a level of danger that travel to the location is prohibited. The Red Travel Zone label may be applied by the Travellers' Aid Society, or by an interstellar

government (for the worlds within a system), or by local government (for a world within a system).

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 resource 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

The ambience of the starport is of prime importance. 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. This impression (and the elaboration of this impression) develops over time.

The appearance of a starport may range from modern or new to old and decayed.

The staff of a starport may be respectful and attentive, or rude and obnoxious.

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 beltport..

Storms. 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 btween 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 destination.

THE SPECIAL CASES

There are two special cases for starports: the Depot and the Way Station.

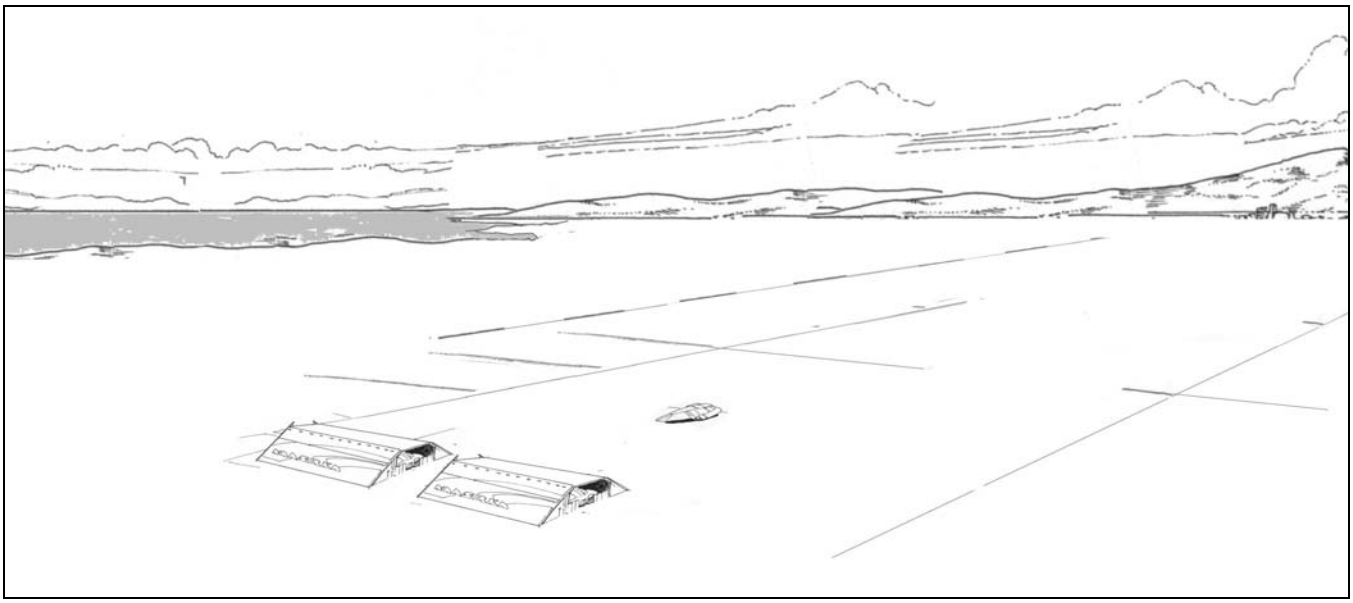
The Depot. A depot is a world-dominating naval base capable of supporting extraordinary numbers of ships and extraordinary levels of repairs.

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.

CLASS E STARPORT



A Typical Frontier Starport

No facilities beyond a broad flat expanse capable of supporting a starship landing peds.
The bay in the background allows ships to refuel.
Note the trading company sheds providing temporary shelter for cargo.

Arriving In A System

A major part of astrogation is planning the journey from one system to the next.

Arrival

ARRIVAL

A starship's arrival in a system is fraught with danger. One moment, the ship is (relatively) safe in Jump Space; the next it is in a new location in totally new circumstances.

Momentum is Conserved. A ship retains its speed and direction in Jump. When it emerges, it continues in its original direction and at its original speed. The final direction may seem random, but it is not. For example, two ships from the same origin jumping to the same destination will emerge at the same speed and direction relative to each other.

ASTROGATION

An Astrogator calculates a Jump based on the intended distance in Parsecs.

Calculating Jumps

To calculate an interstellar jump-1.
Easy (1D) < Int + Astrogator
Uncertain (1D)

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

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

The difficulty of manually confirming the jump calculation is one level higher than the automated calculation difficulty. Many Astrogators omit this step.

The Astrogator's Role. The Astrogator's responsibility is to plan a straight line course to the destination and avoiding objects which may forces it out of jump before the destination.

Uncertainty. If the jump calculation is wrong (the calculation task fails) and it is used, the actual jump destination is random.

THE 100D RULE

A ship automatically breaks out of Jump Space if its straight line course intersects a sphere 100 Diameters out from a gravity source larger than the ship.

THE 100D RULE

Gravity Source	S=	Comment
Spectral A F Star	12	(usually
Spectra G Star	11	(just beyond
Spectral K M Star	10	(the HZ.
Gas Giant Size	9	includes all Satellites.
World Size 15+	8	
World Size 3+	7	most worlds.
World Size 1, 2	6	
World Size 0	5	Asteroids
Oort Cloud Objects	4	

TYPES OF ARRIVAL

There are three general types of arrival.

The Easy Way

Most Astrogators plot a straight line course from their startpoint to the destination world; in fact, they aim for the center of mass of the destination world. The 100D automatically forces Breakout at 100D from the world.

Planned

Astrogators can plan a breakout anywhere in a system at least 100D from all gravity sources.

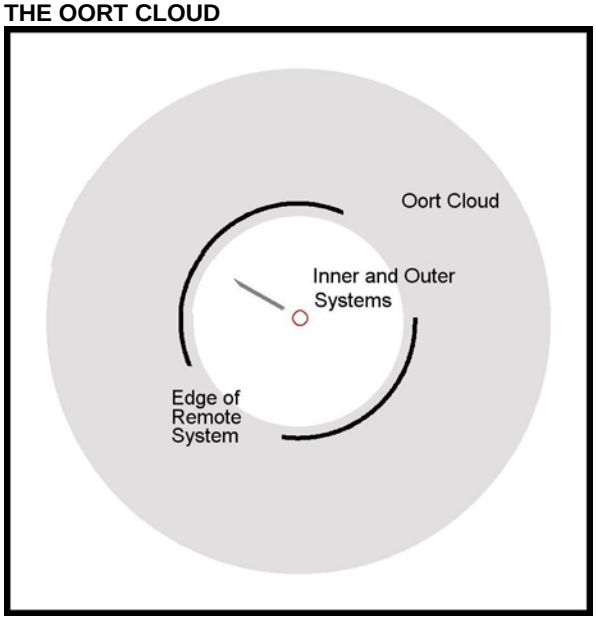
Unplanned

A straight line course may intersect the 100D limit of an object (an asteroid, a comet, a remote system object) which forces the ship out of Jump before reaching the destination world.

Some Pilots plan for this contingency by jumping at zero velocity (so they don't crash into the asteroid that knocked them out of Jump).

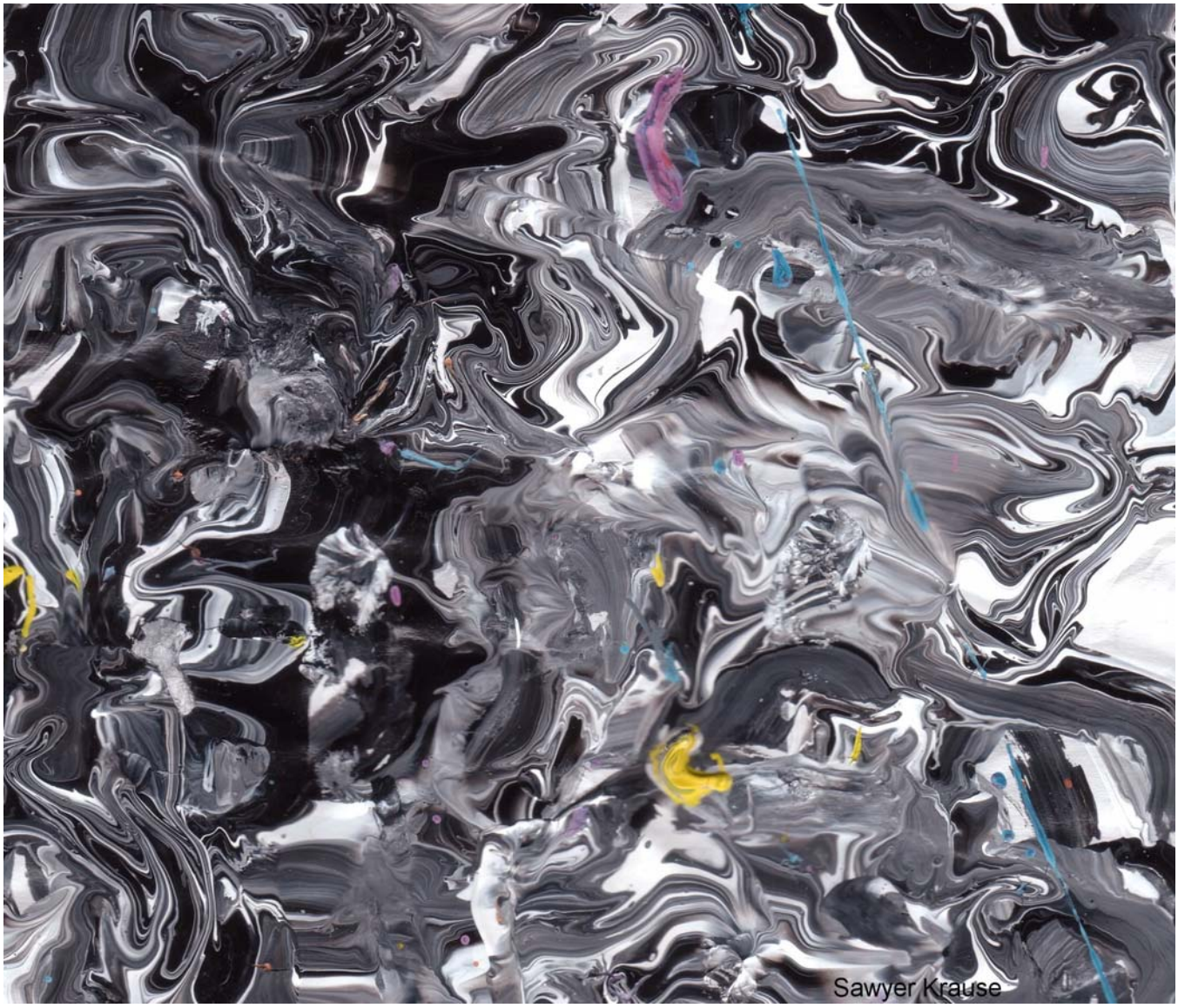
It is impossible to foresee an object this small at such great distances, so an unplanned destination arrival is always a possibility.

THE OORT CLOUD



The OOrt Cloud is a potential problem: its swarm of many small objects potentially ends jump short of the destination.

What Jump Space Looks Like



WHAT'S OUTSIDE THE SHIP?

Jump space is an alternate universe controlled by alien laws of physics. By its very nature, it is destructive to matter and deadly to life.

Jump is the secret to interstellar travel: jump allows ships to travel around the ordinary distances of interstellar space and re-emerge light-years distant in about a week.

Jump Space is an alternative space in which the laws of physics from the true universe do not apply. Jump Space itself is 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.

JUMP DRIVES

Ships enter jumpspace by activating an installed jump drive. The jump drive initiates the connection to jumpspace, maintains the ship within jumpspace, and precipitates the ship out of jumpspace.

INITIATION

Initiation is the transition from realspace to jumpspace. Initiation is centered on the jump drive, and extends out for some distance.

Jump Entry Flash. A ship entering jumpspace emits a blinding flash of energy equal to Ship Size plus Mod +4.

The ship's gravitational signature vanishes from any sensors.

Entry Flash is subject to lightspeed. For example, Jump entry at S=12 (= 30 Light-minutes) is detectable to sensors 30 minutes later.

FOR SIMPLICITY

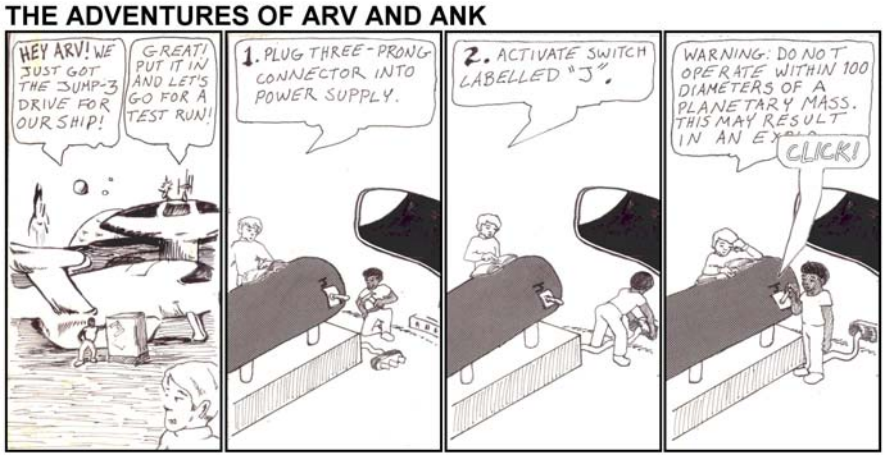
Jump moves a ship from one star system to another in about a week. Travel from the Start World to the Jump Point takes about a day, as does travel from the Jump Point to the Destination World. Only if the unusual happens should details of jump be considered.

Jump Grid Versus Jump Bubble

Two alternate technologies are used for jump drives.

A **Jump Bubble** creates a Jump Field which extends outward from the Jump Drive and encloses the entire ship (and some distance of space beyond). Jump Bubbles allow non-continuous hulls and ships attached to other objects (if they fit within the Jump Bubble) to Jump.

A **Jump Grid** embeds a grid of Jump Field conducting wires with the hull, making the Jump Field conform to the Hull.



Initiation Interference

The vicinity of a jump initiation is a hazardous place. Any ship initiating jump affects smaller objects around it, and is affected by larger objects around it.

Smaller. Smaller objects within 100 diameters of the jumper at the moment the ship transitions into jumpspace suffer a mishap. The opening of Jump Space attempts to carry the smaller objects along, but generally fails, and they are dissipated into component molecules.

Larger. A jumper within 100 diameters of an object larger than itself at the moment the ship attempts to transition into jumpspace finds the larger object interferes with the process. The jump process usually fails and often the jumper is dissipated into component molecules.

Ships must move to 100 D or farther from every possible object (100 world diameters from a world' 100 star diameters from a star; 100 ship diameters froma ship) to attempt a safe jump.

Example: Drop Tanks. Drop tanks illustrate this hazard nicely. In preparation for a jump, drop tanks may be jettisoned at some stage prior to actually entering jumpspace. Being individually smaller than the jumping ship, the tanks suffer mishaps. If a jettisoned drop tank were larger than the jumping ship, the ship would suffer the mishap instead!

Example: Kinunir. A Kinunir-class ship is swarmed by several fighters, all within 100D of it. The ship jumps. At the moment the ship jumps, the fighters each suffer a mishap.

Extreme Example: The Ancients' War. Once upon a time, one of the rebel Grandsons parked a squadron of planet-killers in orbit around a small world and lay siege to one of Grandfather's bases. Grandfather then sprung his trap: he jumped the entire world. The ships of the squadron suffer mishaps.

The Jump Mishap

If Jump produces a Mishap, it cascades through a ship. Consult the Battle Damage charts once for each major component on the ship hit location chart. Determine the Severity of the Damage and the Severity of the Diagnosis for each.

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.

That same ship with two 25 ton droptanks, provided that the tanks are not dropped when jumping, is capable of Jump.

SHIPS IN JUMPSPACE

A ship normally remains in jump for 168 hours, plus or minus 10%. Well-tuned ships (usually military) can *choose* the variation, within 1% accuracy.

Time in jump is independent of the distance travelled, or even of events in realspace.

Undetectable. Ships in jumpspace are undetectable. There is no known system available to detect the presence of ships in jumpspace.

There are some psionicists who claim to be able to detect ships in jump, but tests remain inconclusive.

Straight Line Courses. The starting and ending points are connected by a straight line course. 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.

The maximum jump distance is theoretically unlimited but as a practical matter has a maximum of 9 parsecs.

PRECIPITATION

The end of jump is technically called Precipitation and more commonly called **Breakout**.

A ship may exit jump space in two ways: at or near the point planned for, or at a point where the straight line course crosses a 100 diameter sphere.

Planned Breakout Point

The course plotted by the Astrogator may include a predicted point for breakout. A successful jump will carry a ship to that predicted breakout point within about S=5 (roll 1D-1). Naval ships roll Good Flux instead.

Breakout points are commonly used in naval operations when maneuvers take ships to locations relatively removed from astral bodies.

Crossing The 100 Diameter Sphere

An astrogator may plot a course which crosses the 100 diameter sphere around a star or world. A ship in jump space automatically breaks out at the point where that course crosses the 100-diameter sphere (with no variation). This technique places the ship in the best possible position to continue its voyage to a world.

Natural Safeguards. The physics of jump space force a ship out of jump space when it crosses the 100-Diameter Sphere. A ship cannot exit jump space within a world, planetoid, star, or even another ship.

Time to Breakout

A typical jump takes about a week (168 hours). The actual time spent varies randomly. Military ships can take slightly less time on average.

Squadron Maneuvers. Highly tuned drives in a squadron of ships, along with highly trained crews, can make their emergence from jump very close to the same time (within about a 5 hour window).

TIME IN JUMP

Flux	Commercial	Naval	T&T	Perfect
- 5	158	162	163.5	165.0
- 4	160	163	164.0	165.2
- 3	162	164	164.5	165.4
- 2	164	165	165.0	165.6
- 1	166	166	165.5	165.8
0	**168**	**167**	**166.0**	**166.0**
+1	170	168	166.5	166.2
+2	172	169	167.0	166.4
+3	174	170	167.5	166.6
+4	176	171	168.0	166.8
+5	178	172	168.5	167.0

Time to breakout is shown in hours.

Commercial. Commercial and private ships using standard drives.

Naval. Military ships in service.

T&T. Trained and tuned. Military ships with highly trained crews and carefully tuned drives.

Perfect. If the rolls produce a perfect jump +/- 0, reroll on the Perfect column.

DETECTION

Ships entering and leaving jump space can be detected.

Entering Jump: A ship entering jump disappears from detector screens. There is a pulse of energy which is detectable to Radar.

Leaving Jump. A ship leaving jump emits a pulse of energy which is detectable to Radar.

In Jump: A ship in jump cannot be detected. A ship in jump is incapable of detecting anything also in jump, or outside of jump.

Emergence Flash. A ship emerging from jumpspace emits a blinding flash of energy equal to Ship Size plus Mod +4.

The ship's gravitational signature appears to sensors.

Emergence Flash is subject to lightspeed (emergence at S=12 = 30 Light-minutes is detectable to sensors 30 minutes later.

Deliberate Precipitation. A ship can deliberately leave jump based on astrogation choices made at Initiation. An astrogator can pre-select (before jump initiates) any point in space (outside any 100D limits) and the ship will exit jump at that point.

Planned Precipitation. An astrogator can plot a straight line course which intersects a 100D volume. At the end of the time in jump, the ship precipitates out at the edge of that volume.

Typically, the 100D volume is centered on the ship's destination world.

Unplanned Precipitation. A straight line course may (inadvertently) intersect a 100D volume. As a result the ship is precipitated out of jumpspace at the edge of that volume (after about 168 hours in jump).

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 100D limit of an object bigger than the ship, triggering an Unplanned Precipitation.

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.

BASIC PERFORMANCE

Jump takes time, energy, and the appropriate drive.

Jump Ranges. The jump drives for a ship determine how far it can jump. Jump capacity can range from 1 to 9 (which is possible range in parsecs). A ship can make a jump equal to or less than its jump capacity. A ship with Jump-1 can travel one parsec in about a week; a ship with jump-6 can travel six parsecs in about a week.

Jump Time. All jumps take about a week: 168 hours plus or minus about 10%. Time spent in jump has no relation to the distance travelled.

Equivalent Speed. A ship which jumps one parsec in one week travels 170 times the speed of light.

TRANSLATING JUMP TO LIGHT SPEED

Jump	Approximately:
1	160 to 180 x the speed of light
2	320 to 360 x
3	480 to 540 x
4	640 to 720 x
5	800 to 900 x
6	960 to 1000 x

Astrogation. A jump must be planned before it is executed; this planning is the duty of the astrogator. Planning a jump involved plotting a straight line course from the jump point to the breakout point.

Restrictions. Jump cannot proceed within 100 diameters of body (star, gas giant, world, planetoid, or even another ship) larger than itself.

If a plotted course intersects a 100 diameter sphere around any object larger than the ship, the ship is “precipitated out” of jump space.

In System Jumps. It is possible to jump within a star system: The jump still takes a week (168 hours or so). In some cases, the jump is more efficient than maneuver drive.

Jump Points

The location at which a ship enters jump space is called a **Jump Point.** There are technically an infinite number of Jump Points, but some are more efficient that others. Jump Points must meet certain criteria.

Outside the 100 Diameter Sphere. A jump point must be at least 100 diameters from every astral body (star, planet, gas giant, planetoid, or other object).

In Vacuum/ Space. By inference, a jump point which is outside the 100 diameter sphere is in vacuum.

POWERING THE JUMP DRIVE

Initiation requires a very large input of energy in a very short time period. Once in jumpspace, the energy to maintain jump is minimal. Transition back to real space requires no additional energy (and precipitation releases a blinding flash of energy [as neutrinos and photons]). A portion of the energy generated during jump initiation is retained in jumpspace.

Power Plants

Starship Power Plants are “small” fusion generators comparable to the standard plants used on world surfaces.

The key to their importance is called *Overclock* capability. A ship 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).

First Imperium Power Plants. When the First Imperium developed jump drive, its ships had power plants with OverClock=15, barely enough to make Jump-1 work. A 1000-ton Jump-1 ship had barely 30 tons cargo capacity after filling the hull with an inefficient power plant and fuel tankage. Most ships were 2000 tons or larger.

Later Power Plants. Improvements in Overclock were the primary basis for smaller ships, for greater Jump capability, and for larger cargo capacity.

Around -5430, technological advances in OverClock achieved OC=25 and made J-2 possible. This jump superiority marked the start of the Consolidation Wars to exterminate competing technologies.

OVERCLOCK EXAMPLES

Hull	TL	OC	J	P	J-Fuel	J-Fuel%	Free Tons*
1000		10	55	310	1,000	100%	- 365
1000		15	55	207	667	67%	72
1000	9	20	55	155	500	50%	290
1000		25	55	124	400	40%	421
1000		30	55	103	333	33%	508
1000		35	55	89	286	29%	571
1000	10	40	55	78	250	25%	618
1000		45	55	69	222	22%	654
1000		50	55	62	200	20%	683
1000		55	55	56	182	18%	707
1000	11	60	55	52	167	17%	727
1000		65	55	48	154	15%	743
1000		70	55	44	143	14%	758
1000		75	55	41	133	13%	770
1000		80	55	39	125	13%	781
1000		85	55	36	118	12%	791
1000	12	90	55	34	111	11%	799
1000		95	55	33	105	11%	807
1000	**13**	**100**	**55**	**31**	**100**	**10%**	**814**
1000	14	110	55	30	95	9%	820
1000	15	120	55	26	83	8%	836
1000	17	140	55	22	71	7%	851
1000	18	160	55	19	63	6%	863
1000	21	180	55	17	56	6%	872
1000		200	55	16	50	5%	880

* Free Tons= tons available for all other functions including maneuver, weapons, quarters, and cargo.

OC=100 is the standard available.

Look through this table: as Overclock increases, Power Plant size decreases and the required Jump Fuel percentage decreases.

Overclock Rates are Historical. Within an era or milieu or culture, the same Overclock Rate predominates regardless of Technology Level.

The Fantastic Drive

The very high-tech alternatives to Jump Drive (the Hop Drive and the Skip Drive) may very occasionally be encountered. They are forms of Jump Drive, and where Jump is used, generally Hop or Skip may be substituted.