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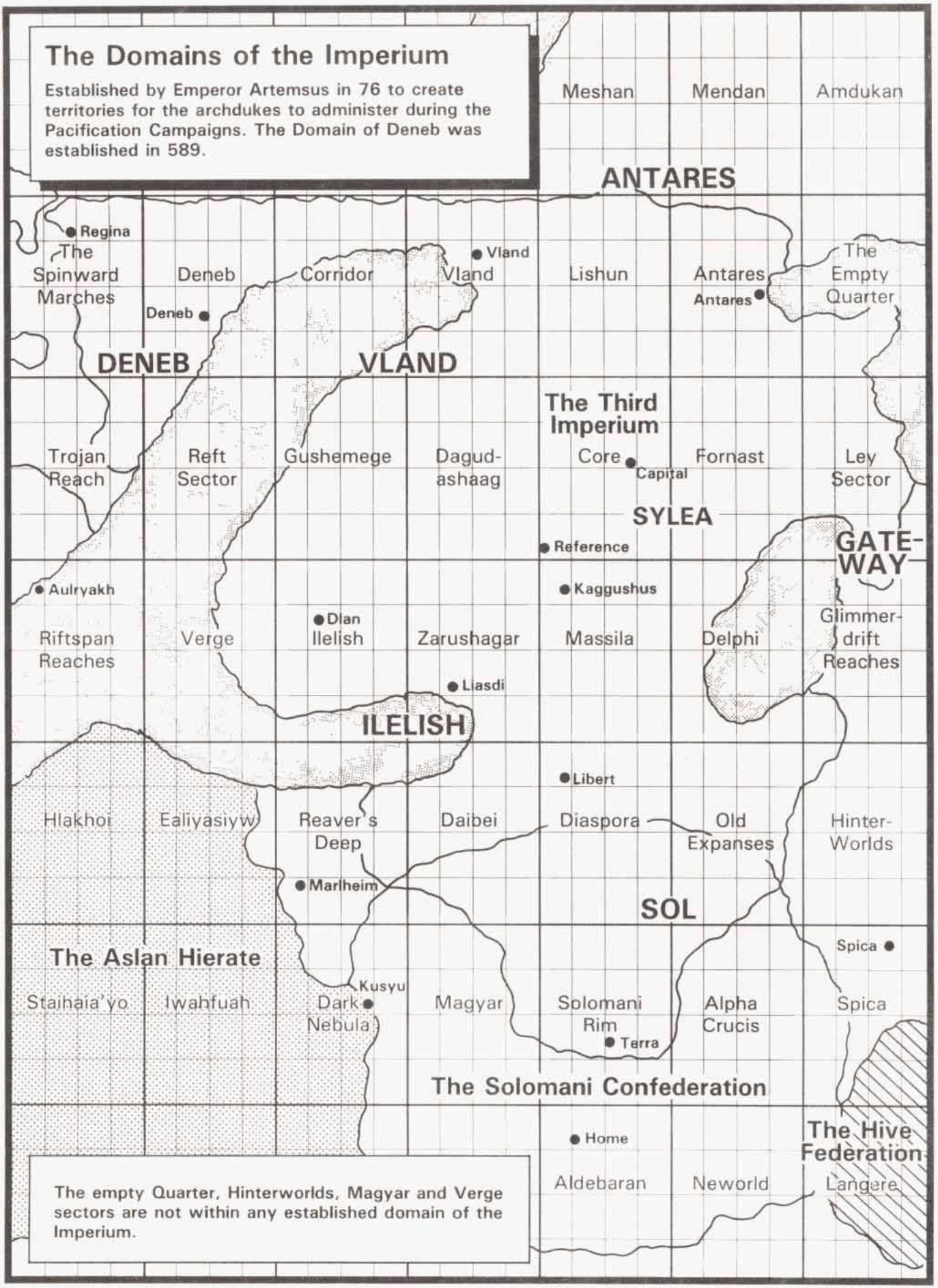
MEGATRAVELLER™

REFEREE'S MANUAL

Marc W. Miller

Science-Fiction Adventure in the Shattered Imperium

GDW


The Domains of the Imperium
Established by Emperor Artemsus in 76 to create territories for the archdukes to administer during the Pacification Campaigns. The Domain of Deneb was established in 589.
Meshan
Mendan
Amdukan
ANTARES
Regina
The Spinward Marches
Deneb
Corridor
Vland
Vland
Lishun
Antares
Antares
The Empty Quarter
Deneb
DENEB
VLAND
The Third Imperium
Trojan Reach
Reft Sector
Gushemege
Dagud-ashaag
Core
Capital
Fornast
Ley Sector
SYLEA
Reference
GATE-WAY
Aulryakh
Kaggushus
Dlan
Ilelish
Riftspan Reaches
Verge
Zarushagar
Massila
Delphi
Glimmer-drift Reaches
Liasdi
ILELISH
Libert
Hlakhoi
Ealiyasiyw
Reaver's Deep
Daibei
Diaspora
Old Expanses
Hinter-Worlds
Marlheim
SOL
The Aslan Hierate
Spica
Staihaia'yo
Iwahfuah
Kusyu
Dark Nebula
Magyar
Solomani Rim
Terra
Alpha Crucis
Spica
The Solomani Confederation
Home
The Hive Federation
Aldebaran
Neworld
Langere
The empty Quarter, Hinterworlds, Magyar and Verge sectors are not within any established domain of the Imperium.


The Rule of Man
Dingir was capital from -2204 to -2176
Kaggushus (originally Hub/Ershur) was capital from -2176 to -1776.
Meshan
Mendan
Amdukan
Regina
The Spinward Marches
Deneb
Corridor
Vland
Vland
Lishun
Antares
Antares
The Empty Quarter
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Kusyu
Staihaia'yo
Iwahfuah
Dark Nebula
Magyar
Solomani Rim
Terra
Alpha Crucis
Spica
Terran Confederation
Home
Aktifao
Uistilao
Ustral Quadrant
Canopus
Aldebaran
Neworld
Langere

MEGATRAVELLER™

REFEREE'S MANUAL

The thousand-year empire has fallen in an instant. An assassin has cut down the emperor and his heirs in one bold stroke and thrown the largest, most stable interstellar empire in history into chaos. There are many candidates for the empty throne, and without agreement on their qualifications, the worlds of the Imperium are divided in their allegiances. By a curious twist of fate, the assassin himself controls three rebellious sectors. The emperor's nephew, considered by many to be a murderer himself, has assumed the throne over the objections of the Imperial Assembly. Other pretenders have stepped forward. Star fleets battle throughout the disputed territories. Sectors are stripped of their fleets to fight in the rebellion, and imperial territory is invaded by alien forces sensing weakness and plunder. Sector after sector secedes from the Imperium to manage its own defense. Sector after sector falls to external forces.

And on this stage of rebellion and interstellar chaos, **Traveller** sets an ongoing drama of role-playing adventure....Players travel from star system to star system, taking sides in the rebellion, fighting for their cause while fighting to stay alive. The dangers of the interstellar environment combine with the dangers of a shattered Imperium to challenge players and referees, and provide never-ending excitement in the far future.

The *Referee's Manual*. This book is intended as a rules reference for the **Traveller** referee. It includes coverage of vehicle and starship design, starship combat, world and star system generation and description, animal encounters, trade and commerce, detailed task resolution, and administration of adventures.

Other **Traveller** Rules Books. This book is part of a three-book set which provides the basic rules and background for playing the game.

The companion *Players' Manual* is a basic compilation of **Traveller** rules and concepts for the individual player. It includes coverage of character generation, combat resolution, psionics, and tasks.

The companion *Imperial Encyclopedia* is a basic reference for both players and referees. It includes historical essays on the Imperium an other interstellar empires, descriptions of starships and vehicles, lists of equipment and prices, maps of territories,and other information valuable to players and referees.

Traveller is a role-playing game. **MegaTraveller** is the name of this **Traveller** rules system set against the background of star-spanning rebellion in the Imperium. Individual players assume the roles of adventurers in the universe of the far future. A referee (responsible for administering the game for the players) plots out the adventures that the players will face, constructs backgrounds and situations, and finally conducts the players through these adventures in exciting sessions. Each session is a gripping adventure where the players make their own decisions about their own fate and fortune.

MegaTraveller *Referee's Manual*. Intended for **Traveller** referees. Intermediate complexity. Suitable for some solitaire play. Requires two or more six-sided dice (not included).

GDW Game Designers' Workshop Since 1973
PO Box 1646, Bloomington, IL 61702-1646

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ERRATA ENTERED

Marc W. Miller

MEGATRAVELLER™

REFEREE'S MANUAL

Science-Fiction Role-Playing
in the Shattered Imperium

Edited by Joe D. Fugate, Sr. and Gary L. Thomas

GAME DESIGNERS' WORKSHOP

MegaTraveller is the current edition of the rules for the **Traveller** science-fiction role-playing system. **MegaTraveller** incorporates rules changes, revisions and additions which have been made over the years in order to maintain it as a leading state-of-the-art rules system.

Credits

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Editing.....Joe D. Fugate Sr. and Gary L. Thomas
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Interior Illustrations.....Tom Peters, Liz Danforth, Steve Crompton, Rob Caswell, Richard Hentz, Bryan Gibson
Typography.....Michelle Sturgeon

The following **Traveller** rules and supplement sets are incorporated (in part) in the *Referee's Manual:* **Traveller,** *Mercenary, High Guard, Scouts, Merchant Prince, The Spinward Marches, Citizens of the Imperium, Azhanti High Lightning, Striker, Traders and Gunboats, Library Data (A-M), Library Data (N-Z).*

MegaTraveller
Referee's Manual

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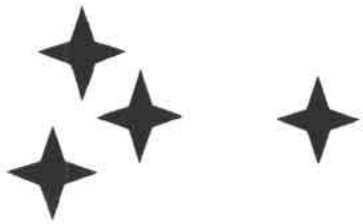
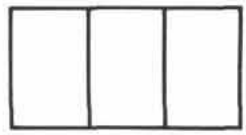
FACTIONS OF THE REBELLION

Antares
Archduke Brzk of Antares has declared his sectors independent and aligned with the Julian Protectorate.



Aslan Aorlakht
Landless Aslan *Aorlakht* (New Lords) have invaded in search of developed worlds to conquer.



Daibei
Daibei sector, ordered by Lucan to commit its fleet against Ilelish, has declared its independence.

Dulinor
Dulinor, the Emperor's assassin, has retreated to Ilelish to rally forces for his own drive for the throne.

Lucan's Imperium
Lucan, controlling the Imperial bureaucracy, has drained border sectors of their fleets to crush Dulinor.

Margaret
Margaret, supported by moderates in the Moot, has established a base of power in her own Massilia sector.

Norris
Norris, recently appointed Archduke of the Domain of Deneb, maintains his loyalty to the Imperium.

Solomani
With the collapse of the Imperium, the Solomani have become the largest human empire in existence.

Strephon's Imperium
Strephon, claiming his double was the one murdered, has established a base of power in Gushemege.

Vargr
Vargr raiding bands, both private and government, have invaded coreward sectors of the Imperial border.

Vland
Vilani megacorporations have joined forces to reestablish the Ziru Sirka, the Vilani Grand Empire of Stars.

Zhodane
The Zhodani Consulate has seemed content to let events gradually dismember its only real rival.

"The fact that the Imperium was the largest, the strongest, the single most dominant force in interstellar politics for more than a thousand years misled even its most vocal detractors. Critics talked about change rather than revolution. Dissidents talked about escape rather than change.

"Five hundred years of stable interstellar government produced an understandable complacency on the part of every member of the Imperial nobility. Every noble had a vested interest in maintaining the status quo; that was the source of their power and their fortunes.

"Imperial succession had been a smooth process for centuries. When Dulinor's bullets killed not only the emperor but also his immediate heirs, they created a turmoil that would ripple throughout the galaxy. Every noble could be counted on to support the obvious choice; but when there is no obvious choice, each noble supports a successor based on his own conscience, and there are as many consciences as there are souls in the universe."

"Honor and enlightened self-interest held the Imperium together. Nobles could be depended on to decide for the status quo. But what decisions could they make when there was no clear status quo?

"The Imperial court supported Lucan. More sensitive nobles, believing the charges that Lucan had killed his own brother in order to become the leading contender for the throne, chose to support the less controversial Margaret. Nobles in Ilelish supported Dulinor. Solomani nobles decided the time was ripe to support their homeland. Nobles on the fringes found their territories were not a priority when compared with the factional infighting; they were soon forced to abandon the Imperium in order to survive. Others found they preferred to be big fish in little ponds rather than small fish in an Imperial ocean.

"The very forces that pulled the stable Imperium together now pulled the shattered Imperium apart."

—Norris Aella Aledon, *The Last Days of the Imperium,* Imperial Books (Regina: 1144).

MEGATRAVELLER

The *Referee's Manual* provides science-fiction role-playing rules aimed primarily at the **Traveller** referee. It assumes that the reader is familiar with the *Players' Manual* and the basic concepts presented there. If you have not read the *Players' Manual*, do so before going any further in this book. Traditionally, the *referee* is the one member of the group who knows the rules the best. Indeed, the rest of the group doesn't even have to know the rules to play, but the session is enhanced if everyone knows something about the game. And as the term *referee* implies, a referee serves as an "impartial expert" for dealing with new situations the rules may not cover; after all, no set of rules can totally define every minute aspect of the imaginary universe. Since this book is primarily addressed to the referee, when we use the pronoun "you," we are talking directly to the referee.

REFEREE RESPONSIBILITIES

Your purpose as a referee is to present obstacles for players to overcome as they go about seeking their goals, not to constantly make trouble for them. This is a very subtle distinction and one which many beginners have trouble with.

Attributes of a Good Referee: Other than the right attitude, what characteristics must a good referee have?

First of all, imagination. Without an imaginative referee, the game is merely rolling dice and reading tables.

Second, the ability to improvise. Situations will arise where you must make up something on the spot, such as the cargo of a randomly encountered starship or the personality of a patron. The necessity to improvise can be minimized through planning, but it cannot be eliminated entirely.

Third, a sense of proportion is required. Rewards should be proportionate to the risk. A common way beginning referees maintain player interest is to hand out massive sums of money for the most insignificant actions. The players rapidly accumulate enormous wealth and rapidly overwhelm Traveller's carefully balanced economic system. The players cease to find the game a challenge and become bored. If you try to get tough later, players will demand to know why they are not paid as much anymore and will become dissatisfied. Either way, the game is a loser.

Lastly, it is important for you to be organized. Nothing slows a game down more than a referee who must rummage through a briefcase filled with hundreds of random-sized sheets of paper, searching for the details of a particular world or installation. The exact system of organization is not important; use whatever you feel like (manila folders, index card files, ring notebooks, home computers, and so on) as long as you can rapidly retrieve information from it.

Preliminary Steps: Once you have become familiar with the background of the **Traveller** universe, accumulated a group of players, and created characters, then what?

You still have a few duties to perform before the first adventure. In all likelihood, the players will be dumped into the middle of a new situation. If the adventure were "real life," the people involved would know what they had done with their lives up until that time, they would know where they were and how they got there, and they might have a familiarity with the geography of the region.

It is necessary for you to divide the information about the universe into four parts for the player characters:

- Information known by virtue of what they are (how to behave in polite society, data about a planet if the character has Navigation skill, etc.),
- Information found with little or no cost (data obtained from a library, from asking around at bars, hotel lobbies, and so on, or obtained by direct observation of some event or condition).
- Information found only with great effort or risk (the theft of one or more documents, the bribery of some official, etc.).
- Information ordinarily unavailable no matter what (perhaps the fact that the information contained in the library is false with regard to the planet mentioned above, referee's background details of a situation, etc.).

Tasks are a convenient way to make the characters work for their answers. Feel free to modify the results of task mishaps if you do not like the way they turned out. Change a death result to a severely wounded result if you feel a character has behaved heroically and deserves a second chance, or kill off a character who has done something incredibly dumb but lucked out on the die roll. Be fair in doing this, however, and try not to be too heavy-handed. Most players feel better if their character is done in by a die roll rather than by a heartless referee.

Non-Player Characters: There are four types of non-player characters: spear carriers, informants, patrons, and trouble-makers.

Spear carriers (called extras in the movies) serve to provide atmosphere, needed skills, or cannon fodder (in case you want to demonstrate to the players what great danger they are in but do not want to do in one of the players).

Informants serve to give the players information and are ideal for giving the players data without just speaking to them directly. Informants may be experts (such as a university professor or scholar), passengers or crew of a starship, or people casually met in the course of seeking rumors or employment.

A *patron* is a non-player character who has a job offer for one or more of the players. The patron provides some of the information the players will need to carry out the job (rarely will all information be provided; the players must find some things out for themselves), and he will offer a reward of some sort.

Trouble-makers are specifically intended to cause problems for the characters. Trouble-makers include police, customs, tax and immigration officials, other government red-tapers, thugs, ruffians, hijackers, thieves, con-men, religious fanatics, and so on. The presence of trouble-makers may or may not be immediately obvious to the players.

Many NPCs must have as detailed a character development as player characters do, and they should be given a great deal of careful attention if they are intended to stay around for a while. NPCs are often needed on the spur of the moment; the chapter about encounters provides a system for quick NPC generation to aid in developing fleshed-out NPCs on a moment's notice.

The use of non-player characters is one of the most important things for a referee to learn. Non-player characters are the inhabitants of the universe. Through non-player characters, you can give the players rumors, hints, threats, help them out of tight spots, lure them into tight spots, get them back on the track, lure them away from their objective, and generally help or hinder the characters as much as necessary. Non-player characters provide a major link between player characters and the referee and offer you a chance to get in on the role-playing fun.

ADMINISTERING ADVENTURES

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 and on the complexity of the situation. Each type of scenario has its own special appeal.

Patron Encounters: The smallest, easiest encounter is with a patron, who will provide purpose and possibly limited funds.

One method of administering a patron encounter is to write a short paragraph for the players to read which briefly details the information which is 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 players. In addition, several details should be included to establish some opinions in the minds of the characters.

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 than is the above patron. This description often helps the adventurers determine the attitudes or opinions of the patron, which help to guide their decisions. You will already have established a single purpose, mission, or task for the patron, and you 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, you may be called upon to role-play the patron (taking care not to take over the action or to provide too much guidance).

Amber Zones: An amber zone is a travel zone code promulgated by the Travellers' Aid Society to ward 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 present a problem or predicament to the players and usually include a general outline for you to follow when refereeing the situation. You must provide deck plans or maps where called for, and you must be prepared to deal with problems with 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, other necessary information, and an overview to explain the situation to you. 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: 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 NPCs, 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 within 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 continues (at least until death or retirement) to adventure within the same framework of history and background while gradually building up his knowledge and skills.

STARFARERS

Humanity calls its region of the galaxy by a variety of names, all of which amount to the same idea: Charted Space. This is an area roughly 500 parsecs across within which are concentrated more than a thousand starfaring races on, or regularly visiting, more than 80,000 worlds. Expeditions toward the galactic core have explored (and settled parts of) a narrow corridor some 30 parsecs wide and more than 7000 parsecs long. Expeditions toward the galactic rim have reached nearly 3000 parsecs toward intergalactic space. Lateral expeditions have reached kiloparsecs in each direction.

The results have always been the same:

First, there is life everywhere. Worlds naturally spawn their own life forms, and many produce intelligent species.

Second, nowhere beyond Charted Space has intelligence produced the jump drive that makes interstellar travel possible. Worlds are full of life; space is empty.

CONDUCT OF THE ADVENTURING SESSION

Sessions should be conducted in some relatively quiet, comfortable place where there is room for you to lay your materials out of the direct vision of the players, but close enough for conversation. If the quarters are too close, it may be necessary for you to use a screen of some sort (a passable screen can be made by taping sheets of cardboard together, accordion-style) to prevent the players from reading your information sheets.

Beginning: During the first adventuring session of a campaign or at the beginning of a scenario, take a moment out to determine a little background data. Why are the characters where they are, and why are they together? Working out this background data will help the players get into their roles.

When the players' initial actions are made clear to you (don't be afraid to ask questions), figure out what will happen to them as a result of those actions. If, for example, the group wishes to adjourn to a library to search for information, you should consider where they are and how long the trip will take. If they are hundreds of kilometers from a settlement, it may take some time just to get to the library. If they are in a hotel lobby and there is a computer terminal ten meters away which hooks into a planetwide information grid, only a few seconds will pass.

You, as the referee, must decide what information the group can find out, how long it will take them, and what kinds of tasks they can use to see if they can find the information they want. You must reveal the information the players have discovered (which may or may not be totally accurate) and tell them any other details they may have noticed (like the fact that someone is following them as they leave the library).

Many times it will be useful to think of a situation in present-day terms, scaled down a little. For example, for a starport think of an airport or seaport. For a world think instead of a continent. The use of analogies will help you to resolve most situations easily.

Game Time: The passage of game time is of great importance. Player characters' actions (often done by using tasks) take time. One of the most important parts of being a good referee is keeping proper track of the passage of game time.

One of the greatest tools available to you is the ability to make players waste game time on tasks which do not further the adventure especially if the group is working against a specific deadline. By simply causing the players to become sidetracked, you can upset their schedule and force them to revise their inticately planned schemes.

You should watch out, however, for situations which take almost no game time but take a great deal of real time. For instance, if a player wants to know certain details of a door he is about to go through he might ask "How big is it?" On being told, he might ask "Is it shut or open? Can I see anything through it or is the area beyond it dark?" All of this information could be gained in a few seconds of observation; it is the artificial nature of the game that makes it take so long. Do not count this against the passage of game time.

In addition, time may pass just because of necessity. Characters must eat and sleep. Characters who are sick or injured may require medical care. Starships, vehicles, and robots must all be maintained at regular intervals or they will deteriorate.

Other Influences: The actions of forces in the universe other than the players should not be neglected and must be constantly on your mind as you referee the session. For example, a group of characters might run afoul of the law while completing a job, or they might anger some local criminal organization. If you decide that something of this nature has happened, you must also decide what action (if any) the offended party (or parties) will take, how long before that action is put into motion, and what effect the action will have on the players. Sometimes it will be necessary for you to keep track of several such "plots" at once while the players continue blissfully unaware of the events developing behind the scenes.

As the session continues, the players will often engage in discussions of varying lengths. Encourage the conversations to stay on track (don't let them stray to outside events such as a replay of last night's football game or a blow-by-blow of a similar situation in another game), but otherwise let them run their course.

As these discussions take place, you should consider what is really happening to the characters and how long it takes in game terms. If the characters begin a loud argument in the middle of a restaurant, for instance, the restaurant owner will interrupt them and ask them to leave. If the adventurers are having the argument in the privacy of their own spaceship, however, you need only figure out how much game time the discussion takes and let it run its course.

The End of the Session: It may not be possible to resolve a particular scenario in one session. When a stopping point is reached (usually some temporary lull in the action when the players are guaranteed safety for the next few minutes of game time), make written notes of the situation. The session can then be picked up where it stopped during the next session even if considerable time passes.

When the players have accomplished their goal, the scenario is over. If this scenario is part of an ongoing campaign, you must determine whether the players receive the reward they were promised (this should usually be the case, but having a patron skip out without paying is a useful plot device).

Obnoxious or obstreperous player behavior should not be tolerated. A word or two of warning may be adequate, but a continually disruptive player should be ejected from the group. You, as the referee, owe this to yourself and to the other players. By the same token, you have a duty to the players to remain calm and collected. Losing your temper is no fun for anybody involved. As time passes, you will gain experience, and the sessions will run smoother.

In a way, **Traveller** is a contest between the referee and the players since the referee represents to the players all the nasty things the universe can be. As such, you may be tempted to view the players as "the enemy" and to thwart their every move, taking every opportunity to make things tough on them. Obviously, this can make even the most enthusiastic player sullen and suspicious, and it spoils all the entertainment value of **Traveller**.

Your fun when acting as referee is different from a player's fun. While players plot and scheme on the basis of (often) incomplete data, you see all and know all. Observing the reactions of different people to the same problem, or watching an intricate plan unfold (and often take some quite unexpected turns) are **Traveller**'s rewards for you as referee.

AN ADVENTURE GUIDE

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.

An adventure need not be of one type; often mixing several types together results in more excitement. The types of adventures include: the chase/pursuit, the assault/rescue, discovery/exploration, enrichment, the enigma/mystery, and novelty.

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.

THE FIRST STARFARERS

We place the age of the universe at more than fifteen billion years.

The oldest stars in Charted Space are dim red dwarfs some ten billion years old.

Intelligent life first appeared in Charted Space more than two billion years ago.

Intelligent life first began sublight travel between the stars more than a billion years ago. Short-lived beings found sublight travel tedious and frustrating and contented themselves with confinement to a few star systems. Longer lived races ranged far and wide using generation ships, cold sleep, and even electronic personality transfers.

The first jump drive was an unrealized dream until only 300,000 years ago. By a fluke of evolution, a single supergenius was born to the pastoral Droyne, and under his leadership this ancient race travelled extensively throughout a region nearly 1000 parsecs across. The race worked wonders throughout Charted Space and then destroyed themselves in a wide-ranging war that shattered worlds and destroyed civilizations.

Today, the Droyne live in independent communities on many separate worlds. They avoid entanglements and political disputes; they live peacefully with their neighbors; and their hand-built jump drives are the best that can be found anywhere.

Discovery/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 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.

Catalysts serve to spark an adventure by providing interest and direction. They include danger (which forces action through threats), opportunity (which forces action through a promise of reward), and puzzles (which prompt action through curiosity). By assembling these aspects of adventures together, you can produce interesting and ever-changing adventures for the players.

TRAVELLER CAMPAIGNS

Traveller campaigns can be a simple string of adventures and encounters, set against the background of a pregenerated sector in which the adventurers 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.

With a small bit of effort on your part, however, a campaign can be structured to be much, much more. There are several seeds to a good campaign: the basics, the gimmick, the pull, the push, and (optionally) the enigma.

The Basics: Maybe the thought of the basics is obvious, but it often gets overlooked. At a minimum, the basics should address the subsector maps, interstellar governments, and local technological levels. As needed, you may add more basics to the campaign, including animal encounter tables, local organizations of importance, world and local laws, history, and other foundations. But there is more than just the basics to the good campaign.

The Gimmick: Any campaign needs gimmicks to appeal to the players. Early on they have no idea what is of importance in a grand sense, and they tend to be self-centered. Gimmicks are designed to appeal to the players, enabling them to search for obviously valuable items while they also learn about their universe.

In **Traveller** gimmicks rank above money or ordinary ships; they represent some advantage, such as high technology or special talents. The Psionic Institute is an example of such 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 which then serve the person (and the group) for the rest of the campaign.

The Pull: The pull is a simple name for a goal that attracts adventurers much like a magnet attracts iron. It can be as simple as a fabled mineral deposit on a distant world or as complex as a secret formula that will keep the sun from going nova.

Pulls need thought and often must be tailored to players. When one is an anthropologist interested in primitive cultures, the pull can be the secret of some race on a far-off world.

Often, campaigns can do with two pulls. One may be major and the other minor—one important and the other dormant until needed. Shifting emphasis can make the campaign realistic.

The Push: The push is the opposite of the pull—something players do not especially like, but it keeps cropping up anyway. It can be simple like law officers, or 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 can come into play when the referee wants to push someone. If the group is wasting time, then over the hill come barbarians that have been following the group, and everyone knows they are bloodthirsty killers. The group moves on.

The Enigma: There is always something the players do not understand. The enigma is, on a large scale, the secret of the universe; on a smaller scale, it is a secret worth knowing. Early in a campaign, players may not know what the enigma is. Later, when presented with clues, they may realize there is a puzzle, but they'll have no idea of its solution. Still later, they may have all of the information and need to find an analyst to decode it. 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 campaign an intense, interesting cliffhanger until the very end.

CHARTS

The Referee's Guide contains many additional **Traveller** rules. To make learning and using these rules as fast and easy as possible, many are in visual form using charts. Instead of wading through rules, just follow the paragraphs. For any step, the instructions, tables, and any supporting text are in the same place. No page-flipping or hunting for associated data is needed.

All chart pages share the following features:

- Each starts with a box labeled 1. For reference purposes, paragraphs are numbered.
- When a chart is long enough to need another page, the next page immediately follows the first.
- Each chart page contains the name of the chart, so you always know which chart you are on.
- Each chart paragraph represents a step in a given rules process; each paragraph states what you are to do at that point.
- If a table or chart is needed, it is in the box when and where you need it.
- Sometimes, in order to save space, a chart may branch or loop back over some previous steps. These are indicated by labeled paragraphs (such as "Do Another Animal.")
- Text describing helpful information that is not essential is in italics.

Because many rules are in chart form, text in the chapter only introduces the chapter's concepts and defines terms. Once familiar with the charts, you should be able to work from the chart and only refer to the text when you have forgotten what something means.

RESOLVING TASKS

The Universal Task Profile (UTP) provides you with a simple (but still comprehensive) method of codifying tasks. So how does the UTP system work?

A UTP answers these questions about a task:

- How hard is the task?
- What skills and characteristics are crucial to this task?
- How long does this task typically take?
- Does this task involve any special risks?

The UTP provides a list of answers to these questions. A task uses the predefined answers in response to questions.

The predefined answers are specified in real-world terms. Even if you don't know the task system, you can quickly understand a task defined by a Universal Task Profile.

WHAT DOES A UTP LOOK LIKE?

The UTP always follows the same format. For example:

To locate the source of the strange hum:
Routine, Recon, Int, 1 min (hazardous, unskilled OK).
Referee: Any **Major** or **Destroyed** mishaps automatically become **Minor** mishaps.

The UTP is always separated from the surrounding text by a blank line both above and below.

HOW HARD IS THE TASK?

When setting the difficulty, select from four difficulty levels:

Simple: Success is highly likely. Roll 3+ on 2D to succeed.

Routine: Success is likely. Roll 7+ on 2D to succeed.

Difficult: Success is unlikely. Roll 11+ on 2D to succeed.

Formidable: Success is rare. Roll 15+ on 2D to succeed; success is only possible with DMs.

Note that the 2D roll for each level is easy to remember because it is 4 more than the prior level. If a 2 is rolled, a *fumble* occurs and the task attempt fails no matter what.

WHAT IS CRUCIAL TO THE SUCCESS?

When crucial skills and characteristics are chosen as task modifiers (DMs), a task uses related skills (like Pilot and Ship's Boat), or one skill and one characteristic.

A skill level must be added directly as a DM on the task roll. Characteristics are *always* divided by 5 (drop fractions) when used in tasks. Never add characteristics directly.

HOW LONG DOES THIS TASK TAKE?

The time increment on a task profile is 10 percent of the typical task duration. A roll of 3 dice (whose average result is 10) determines how many increments the task takes. The increment is always *one-tenth* of the typical task duration.

If the duration of the task doesn't matter, the task is *Instant* and that's that. No time roll is made.

If the duration *always* takes the same time, the task is *Absolute*. No time roll is made.

The duration of an attempt equals the increment times 3D (after any DMs are applied). The minimum is 3 increments.

DOES THIS TASK INVOLVE ANY SPECIAL RISKS?

The standard task assumes a normal amount of risk. Other levels of risk are possible:

Safe: With *safe* tasks if a mishap occurs, it is never damaging.

Hazardous: With *hazardous* tasks, there is a high likelihood of a serious mishap if the task fails.

Fateful: With *fateful* tasks, a mishap is guaranteed if the task fails. Don't confuse this with hazardous, which indicates the *severity of mishap*. "To avoid a mishap" situations are good examples of fateful tasks because if they fail, the mishap has not been avoided.

Uncertain: With *uncertain* tasks, the result of the attempt is largely opinion or cannot be confirmed. Those individuals associated with the task have some idea of how successful the task attempt was; however, they are not certain of the outcome.

Sensor readings, interchanges between characters (including any task which might require a reaction roll), psionics, computer programming, repairs, and research are all good candidates for uncertain tasks.

Unskilled OK: When a task states *unskilled OK*, the specified skills are useful, but not required. There is no penalty for not having the specified skills.

Confrontation: When two opposing sides are working at cross-purposes, the task becomes a *confrontation*.

HASTY OR CAUTIOUS TASKS

The standard task attempt assumes the character is taking a reasonable amount of care while performing the indicated task. The player can change this amount of care.

Hasty: When a player is in a hurry, he can specify that he would prefer a *hasty* task. The time required is shorter, but the task becomes harder. The task DMs are doubled before subtracting them from the time roll; the task difficulty increases one level.

Cautious: When it is more important to reduce danger than to finish quickly, a player can specify a *cautious* task.

A determination roll is required first. If successful, the task is cautious. If unsuccessful, the task is increased in difficulty one level.

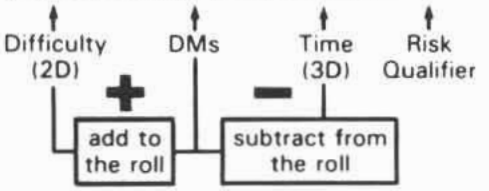
In a cautious task, the time roll is doubled before subtracting DMs; the task difficulty decreases one level.

TASKS THAT FAIL

The details of handling failed tasks are the realm of the referee and are covered more fully in this *Referee's Manual*.

UNIVERSAL TASK PROFILE FORMAT

Task Phrase
To diagnose damage done to an air/raft:
Task Specification
Routine, Gravitics, Edu, 15min (uncertain)



Referee's Guide to Tasks

Most actions that characters in **Traveller** will try to undertake can be reduced to a series of simple tasks. These tasks, expressed in terms of their difficulty and the skills and characteristics that will affect their outcome, provide the players with a consistent, readily understood statement of what is expected of them, and they provide the referee with simple yet challenging situations.

The Universal Task Profile (UTP) provides players and referees with a simple (but still comprehensive) method of codifying tasks. To set up a UTP for a task, simply answer these questions:

- How hard is the task?
- What skills and characteristics are crucial to the success of this task?
- How long does this task typically take?
- Does this task involve any special risks?

The task profile provides a list of ready-made answers to all of these questions. To define a UTP for the task, select one of the predefined answers for each question. The predefined answers are specified in real-world terms. Even a player who doesn't know the UTP system can quickly understand a task defined by a Universal Task Profile.

WHAT DOES A TASK LOOK LIKE?

When the UTP is presented in an adventure, it always looks like the following:

To locate the source of the strange hum:
Routine, Recon, Int, 1 min (hazardous, unskilled OK).
Referee: Any Major or Destroyed mishaps automatically become Minor mishaps.

Note the UTP stands out in this body of text. It is easy to find; this is done deliberately. Nothing is more frustrating while playing an adventure than trying to locate a die roll that is buried in a solid page of text.

Follow the format religiously: inconsistencies are confusing. To summarize, the format is:

1. Initial blank line.
2. A indented one-line statement (beginning with "To") specifying what the task is.
3. The task profile on its own line in the order of the following list:
   A. Difficulty,
   B. DMs,
   C. Time
   D. (Risk qualifiers).

Each entry on the UTP line is separated by commas, and risk qualifiers are always in parentheses.

If the time is omitted, the task is automatically Instant.

4. The optional Referee paragraph. If it exists, always start the Referee paragraph with the word "Referee" indented. Do not embed any blank lines in the Referee paragraphs.
5. Final blank line. Signal the end of the entire UTP and the referee paragraph (if any) by a blank line.

HOW HARD IS THE TASK?

When setting task difficulty, select from the following predefined levels:

Simple: Success is highly likely. Roll 3+ on 2D to succeed.
Routine: Success is likely. Roll 7+ on 2D to succeed.
Difficult: Success is unlikely. Roll 11+ on 2D to succeed.
Formidable: Success is rare. Roll 15+ on 2D to succeed; success is only possible with DMs.
Impossible: Success cannot be achieved. Roll 19+ on 2D to succeed; success is possible only with DMs. More reasonably, success is possible only if some situation or information changes the difficulty level from Impossible to Formidable or less.

Note that the 2D roll for each level is easy to remember because it is 4 more than the prior level: 3-7-11-15-19.

If the roll is ever a natural 2 (regardless of DMs), a *fumble* occurs and the task attempt fails.

WHAT IS CRUCIAL TO SUCCESS?

When selecting the crucial skills and characteristics as task modifiers (DMs), try to select two related skills (such as Pilot and Ship's Boat), or as an alternative, select one skill and one characteristic. If you are tempted to select more than two skills or characteristics, alter the difficulty level rather than increase the number of DMs. Long lists of DMs are cumbersome and slow down a session.

If it seems that two DMs are just not enough, try defining two separate tasks for the situation instead of one.

Skills: Skill levels are always added directly as a DM on the task roll.

Characteristics: Characteristics are always, always divided by 5 (drop fractions) when used in tasks. Never add

characteristics directly.

Exceptional Success: If the player's task roll exceeds what is needed for success by 2+ (including DMs), then the character has achieved *exceptional success.*

For example, a player is rolling on a Difficult task and has a total DM of +3. Since the player needs 11+ to succeed on a Difficult task, if he manages to roll 13 or better (including his DM of +3, so his actual roll only needs to be 10 or better), he will have achieved exceptional success. Some tasks (such as combat) may state additional benefits for achieving exceptional success.

Exceptional Failure: If the player's task roll fails, and is less than what is needed by 2 or more, then *exceptional failure* has occurred. Following the same example above, the player needs 11+ to succeed on the difficult task. If the player fails, and his final roll (including his DM of +3) was 9 or less (an actual roll of 6 or less, since he has a DM of +3), then exceptional failure will have occurred.

HOW LONG DOES THIS TASK TAKE?

Estimate how long the task typically takes using whatever time increment is most convenient. Approximations are fine.

Divide the time estimate by 10 for use in the UTP. A roll of 3D (whose average result is 10) is used to determine how many of these time increments the task actually takes. Remember the UTP time increment is always one-tenth of the total estimated task duration.

If the time duration of the task doesn't matter, declare the task to be Instant and that's that. No time roll is made.

Some tasks may state Absolute in addition to a period of time; in this case the task always takes the stated amount of time; no time roll is made.

Duration: The actual duration of a task attempt equals the increment time times 3D (after any DMs are applied). The minimum time is 3 increments (because the minimum roll on 3D is 3).

DOES THIS TASK INVOLVE ANY SPECIAL RISKS?

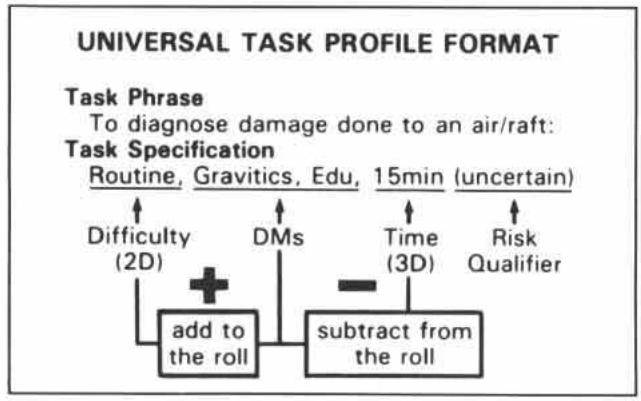
The basic task assumes the task requires the specified skills to avoid an increase in difficulty. The task outcome is certain, and the task involves a mild risk of mishap. Other types of risks are possible:

Safe: With some tasks, if a mishap occurs, it is never damaging: such tasks are *safe*. On a safe task, if a fumble occurs, the mishap type is always Superficial (no roll is needed on the Mishap Table).

Hazardous: Some tasks are extremely dangerous with a high likelihood of a serious mishap if the task fails: such tasks are *hazardous*. On a hazardous task, a 2D mishap occurs on exceptional failure. A fumble mishap on a hazardous task is a 3D mishap. Thus, as one would expect, hazardous tasks run a much higher risk of mishap if they fail.

Fateful: For some tasks, a mishap is guaranteed if the task fails (don't confuse this with hazardous, which indicates the severity of mishap): when this is the case, the task is *fateful*. "To avoid a mishap" situations are good examples of fateful tasks because if they fail, the mishap has not been avoided.

On a fateful task, if failure occurs, roll 2D on the Mishap Table. Mishaps are guaranteed if a fateful task fails. If the task



is listed as fateful and hazardous, roll 3D on the Mishap Table instead of rolling 2D. If the task is listed as fateful (but not hazardous), implement a Superficial mishap: no mishap roll is required.

Uncertain: If the result of a task attempt is largely "opinion" or if, because of the nature of the task, immediate feedback on how successful the task has been is not possible, then declare the task to be *uncertain*. With an uncertain task, those associated with the task have some idea of how successful the task attempt was, but they are not certain of the outcome.

Sensor readings, interchanges between characters (including tasks that may require a reaction roll), psionics, computer programming, repairs, and research may be uncertain tasks.

Both the player and referee roll for the attempt. The referee's roll is hidden from the player and modifies the player's roll.

- If both fail, the result is *no truth*. The player is misled about the success of the task attempt. Erroneous information is given.
- If one succeeds and one fails, the result is *some truth*. Some valid information is given. The player may fail the attempt and still get information, although he cannot know for sure.
- If both succeed, the result is *total truth*. Totally valid information is given, although the player may still not believe it.

A character may know whether he has succeeded. If the player achieves exceptional success, the referee may elect to tell the player the result of the hidden roll. The referee must decide if this is warranted; however, sometimes it is not.

Unskilled OK: If the specified skills are not essential to a successful task attempt, then the task is *unskilled OK*.

Confrontation: If two sides are working to counter the success of each other in some way (such as in a debate, or in hand-to-hand combat), the task is a single confrontation task.

One side is designated as the offender and the other is the defender. The offender applies his expertise in the task's listed skills and characteristics as + DMs, while the defender applies his as −DMs on the task. The offender is trying to make the task succeed, but the defender is trying to make the task fail. Many confrontation tasks list the particular DMs for the offender and defender, as shown in this task example:

To get NPCs to go along with a counter-intuitive attack plan: Difficult, Off = Leader, Persuasion, Def = Tactics, Recon.

If the task does not differentiate attacker and defender DMs, they apply equally to both. If the offender succeeds, the defender fails; if the offender achieves success, the defender

MISHAP TABLE

Die Roll	*Result*
2	Reroll
3+	Superficial (1D)
7+	Minor (2D)
11+	Major (3D)
15+	Destroyed (4D)

Note this table has the same 3-7-11-15 die roll sequence as the Task difficulty. This makes the Mishap Table easy to remember.

Explanation of Mishap Table results:

Superficial (1D): Impose superficial damage on some device/vehicle involved in the task and/or 1D wounds to the character.

Minor (2D): As above, except impose minor damage and/or 2D wounds.

Major (3D): As above, except impose major damage and/or 3D wounds.

Destroyed (4D): As above, except impose destroyed damage and/or 4D wounds.

A specific mishap is preferred to these general results: where possible, spell out specific mishaps in the Referee paragraph. If mishap results seem inappropriate, retroactively declare the task to have been a safe task, and implement a Superficial mishap.

must roll 2D on the Mishap Table.

HASTY OR CAUTIOUS TASKS

The standard task attempt (in the absence of any other specification by the player) assumes that the character is taking a reasonable amount of care while performing the task. This is the normal task attempt.

Hasty: When a player is in a hurry, he can specify a *hasty* task. The time required tends to be shorter, but the task becomes harder. Task DMs are doubled before subtracting them from the time roll, and the task difficulty increases one level. Hasty attempts tend to take less time, but they are harder.

Cautious: When it is more important to reduce danger than to finish quickly, a player can specify a *cautious* task. The opposite of a hasty attempt, a cautious attempt provides a way to reduce the risk of failure when attempting a task at the expense of time and perhaps an increase in difficulty.

Before a player may try a cautious attempt, he must first make a determination roll: if successful, he may continue with the cautious attempt. If he fails to stay determined, the task increases in difficulty by one level.

If the determination roll was successful, the player may perform a cautious attempt. To perform the cautious attempt, decrease the task difficulty by one level and double the 3D time roll before subtracting the DMs from it (a cautious attempt may take more time).

WHAT HAPPENS WHEN A TASK ATTEMPT FAILS?

When a task attempt fails, the character may retry the task without penalty if exceptional failure has not occurred. However, if exceptional failure has occurred, the character must stay determined to retry the task without penalty. Staying determined is a special task with its own UTP:

To stay determined:
Difficult, Det.

Referee: Endurance and Intelligence combined represent a character's Determination (or force of will).

- If the character is successful at staying determined, the character can retry the failed task with no penalty.
- If the character fails to stay determined, the task difficulty increases *one* level. A Formidable task increased in difficulty becomes impossible—that is, failure is permanent— no more retries are possible until circumstances change enough to allow a new UTP to be defined for the task.

Jack-of-all-trades skill provides one free retry per level of skill (representing the character's resourcefulness).

Automatic Failure: If the task roll is exactly 2 (disregarding DMs), a fumble mishap occurs. On a hazardous task, a mishap occurs on exceptional failure. On a fateful task, a mishap always occurs when the task does not succeed (whenever any level of failure occurs).

MISHAPS

If a mishap occurs, roll 2D on the Mishap Table. If the task is hazardous and a fumble mishap occurs, roll 3D on the Mishap Table.

On any failed fateful task, roll 2D on the Mishap Table. If the task is fateful and hazardous then roll 3D on the Mishap Table.

GENERAL DAMAGE AND REPAIR

Whenever an object (device or vehicle) is damaged in the absence of detailed rules for diagnosis and repair, use the following procedure:

1. Diagnose the problem. The standard diagnosis task is Routine (uncertain); the referee must determine the applicable skill DMs and time.

2. Once the player's diagnosis task roll is successful, establish a UTP for performing the repairs based on the damage level, as per the General Damage and Repair Table below. Repairs in the shop can be made without a successful diagnosis at an additional cost multiplier of 1D (just replace the entire assembly if it can't be determined what's wrong).

WORKING WITH TASKS

As you work with the task system, here are a few pointers:

- Don't overdo predefined tasks. Many of the published tasks are suggestions, not absolute requirements.
- A Destroyed mishap can only occur from a fumble on a hazardous task or from failure on a fateful, hazardous task.
- Task subdivision invites mishaps.
- Don't implement mishaps if they seem out of place.
- Don't bother rolling for time unless it is important.
- Use tasks with a difficulty level of Simple to see how long something will take.
- The goal is always to keep the game moving; don't become a slave to the rules.

- When establishing the difficulty level of a task, assume a skill level of zero in the crucial skill. Then if the character doesn't have the crucial skill, raise the established task difficulty one level (see DM notes, below).
- The task system is intended to provide instant "substance" to a situation without getting bogged down in game rules. Use only as much of a task as seems appropriate.

NOTES ABOUT DMS

These pointers will help you as you use tasks and work with the DMs on tasks.

- If the character does not have the crucial skill, increase the task difficulty one level.
- Occasionally, the character's Experience (Intelligence ÷ 5 plus Education ÷ 5) may be substituted for the lacking crucial skill.
- When the DMs are listed with commas, the sum of all available values may be used.
- When the DMs are joined by "or" only the highest value present may be used.
- When "average of" is stated, the average of the indicated values may be used (counting nonpresent skills as zero and reducing the average accordingly).
- DMs shown with a minus sign are detriments; they work against success (subtract from the task attempt rather than adding) and increase the task duration (add to the time roll rather than subtracting).
- Special case DMs are enclosed in brackets []; see the Referee paragraph for instructions.
- In any case, the absolute maximum net DM is plus or minus 8.

COMPUTER AUGMENTATION

Certain computerized devices have the ability to augment a character's chance of success when that character is in the process of attempting a technical task. This way, if a task lists Education as a characteristic or is obviously highly technical, the character can temporarily gain an additional +1 DM by using *computer augmentation*.

For example, using a hand computer with a technical database, a character can look up the operational details of his air/raft and gain a +1 when performing repairs.

However, a character with *no skill at all* can also use computer augmentation to gain a temporary Technical skill level-0 with the appropriate computerized device.

To gain a temporary skill level-0 through computer augmentation:

Formidable, Int, Edu, 1 hour.

Referee: Success at this task gives a skill level-0 for the next series of task rolls on a certain task using the temporary skill level-0. This task is not possible if the skill being sought is nontechnical in nature or if the task is uncertain.

EFFECTS OF TECH LEVEL ON SKILL LEVEL

No one would dispute that a doctor at Tech Code Industrial (Tech Level 4 to 5) would have difficulties using Tech Level 15 medical instruments. A doctor from a High Stellar (Tech 14 to 16) world would have trouble with Tech Level 5 instruments.

Simulating such Tech Level effects on a characters *effective* skill level is easy if the character's homeworld Tech Code is known. For each Tech Level above the highest Tech Level represented by the Tech Code, subtract one from the character's skill level.

For example, a character who has a skill level of Pilot-3. The character is from an Average Stellar world (Tech Level 11 to 13) but wants to pilot a Tech Level 15 starship. Tech Level 15 is two Tech Levels above the highest Tech Level represented by Average Stellar (Tech Level 13). Thus, the character whas an effective skill level of Pilot-1 when piloting a Tech Level 15 starship.

To simulate the effect of skill level when working with lower tech items, subtract one from the character's skill level for each *Tech Code* below the character's homeworld Tech Code. If our character above with wants to pilot a Tech Level 9 starship he would do so with a skill of Pilot-2. Since Tech Level 9 is Early Stellar (Tech Level 9 to 10), it is one Tech Code below Average Stellar, so our character's Pilot skill level is only one less.

Skill level can never be reduced below 1 by these effects.

GENERAL DAMAGE AND REPAIR TABLE

Damage	*Operate*	*Task*	*Shop Repair Cost*
Superficial	Yes	Simple	1D% of new price
Minor	No	Routine	1D% × 1D% of new price
Major	No	Difficult	2D × 5% of new price
Destroyed	No	Formidable	2D × 2D × 5% of new price

For Repairs in the Field, increase the task difficulty one level.

For Lack of Proper Tools, increase the task difficulty one level.

For Lack of Spare Parts, increase the task difficulty one level.

All of the above difficulty increases are cumulative.

The "field" is any location without shop facilities of an adequate Tech Level.

If the party performs the repairs themselves (as is almost always the case in the field), the cost of labor is saved. Labor is 50 percent of the repair cost.

For repairs in the field, the cost of repairs is paid once the party returns to "civilization."

Superficial damage affects appearance but not function or operation. An object may take any number of Superficial damage mishaps without impairing its operation.

Unrepaired damage levels above **Superficial** are added together. Two **Minor** damage mishaps become **Major** damage; **Minor** and **Major** damage combined become **Destroyed**.

Destroyed mishaps are possible only on hazardous tasks or through cumulative mishaps on standard tasks.

If an object has **Major** damage that was repaired in the field (not yet taken into the shop), any task using that object is automatically Hazardous (high risk of another breakdown). This lasts until the original **Major** damage is totally repaired in the shop.

Generating Star Systems and Worlds

The Scout Service has long had the responsibility for the survey and mapping of the star systems of the Imperium. In the execution of their duties, the Scouts have established a standard format for referring to worlds. This format—the Universal World Profile (UWP)—provides essential information necessary for the identification of the characteristics, benefits, and hazards of specific worlds.

Although the Scouts' interest extends to all of the planets and satellites of the system most trade, commerce, and travel deals with the main world in a star system. The mainworld is the single most important world in a system. In most cases, the remainder of any system is essentially an undeveloped frontier.

The Basic Mainworld Generation Flowchart covers the procedures of system generation. The UWP code charts define the meanings of the codes produced by Basic Mainworld Generation.

IMPORTANT CONCEPTS AND DEFINITIONS

The Basic Mainworld Generation Flowchart introduces several important concepts and terms concerning star systems in **Traveller**.

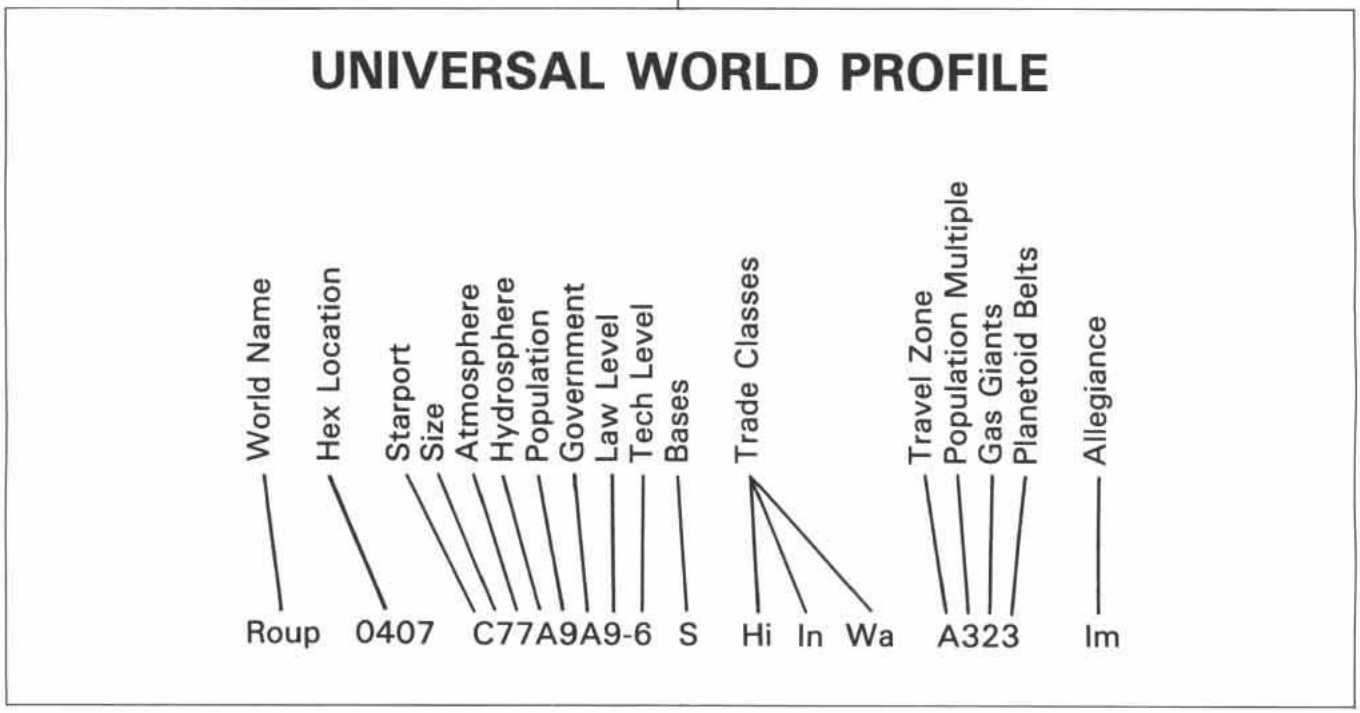
Basic and Enhanced Generation: There are two distinct approaches to star system generation. Basic Mainworld Generation allows the referee to focus on just the main world in the system in the interest of saving time. Extended System Generation allows the referee to create an entire star system detailing the system's star(s), planets, gas giants, moons, and planetoid belts.

Extended System Generation is designed to pick up where the basic procedure leaves off. Thus, extended generation allows you to put off completely detailing a star system until later, or it allows you to produce detailed star systems from existing **Traveller** star maps with a minimum of difficulty.

While the expanded method produces the most realistic adventure settings, it also requires a tremendous time commitment to generate all of a star system, complete with every attendant planet and satellite.

Universal World Profile (UWP): Traveller makes use of a series of letters and numbers called the Universal World Profile (UWP) to code the qualities and characteristics of a world. The codes for the UWP are explained in the World Data tables.

Sectors and Subsectors: The **Traveller** universe is grossly mapped into sectors, each measuring 32 parsecs by 40 parsecs. Each sector is further divided into sixteen subsectors,



each being an area of hexagonal cells measuring eight hexes by 10 hexes. Each hex covers one parsec (3.26 light years). A subsector provides enough world and system data for an extended **Traveller** adventure; a sector is large enough to support an extended **Traveller** campaign.

Mapping subsectors consists of two sequences: *star mapping* and *mainworld creation*. When using a published **Traveller** subsector or sector map, the star mapping has already been done for you.

The Subsector Grid in this book is intended to be photocopied by the referee and filled in as worlds are generated. Additional copies can be made as mapping continues to other subsectors.

The System Hex Format Table shows the coding and placement of information about worlds within a subsector. This format allows players to note the information that would normally be available to them.

The Basic Mainworld Generation Flowchart provides the steps you must follow to map a subsector and to generate data about the system's mainworld.

Star System Presence: The presence of a star system depends on a system density determined by the referee. The System Presence Table indicates various levels of probability for star systems. Once a system is determined to exist, its presence should be marked on the subsector grid map.

Starport Type: Many worlds have starports, and their presence is essential to interstellar trade and commerce. The various starport types provide a variety of facilities for use by space vessels.

Each system must be checked for its mainworld starport type; mark the system with the starport letter on the subsector map. Various starport probabilities exists depending on how well travelled a subsector is.

Backwater: A backwater is an untravelled interstellar outback. Exploration has not found resources or novelties that would make this area an important trade route, and it has been bypassed by major trading companies. Examples: Reaver's Deep, and many client state regions outside the Imperium.

Frontier: A frontier is a region on the borders of settlement and exploitation. Examples: Spinward Marches, Antares, Diaspora.

Mature: A mature region is a well-travelled region which has a history of civilization and well-established trade. Examples: Vland, Core.

Clustered: A clustered region is a well-travelled region, but some areas are bypassed which concentrates and intensifies the travel through certain key worlds. Examples: Old Expanses, Solomani Rim.

Bases: Stellar systems may have bases for military forces, the Navy, the Scouts, or for other arms of interstellar government. If a base is present, it should be marked in the hex. You may elect to include other types of bases, perhaps army bases, merchant exploration or trade bases, and defense establishments.

You may decide to make the base a naval depot to support large-scale naval activities, but there should be no more than one naval depot per sector.

You may also impose a Scout way station at selected worlds along communication routes.

Scout way stations are never co-located with naval depots.

These bases serve as points for veterans to renew acquaintances, to find potential patrons, and to scrounge or buy surplus equipment of use to them.

Gas Giants: A star system may have one or more gas giant planets. A gas giant is a large planet composed primarily of gaseous hydrogen and hydrogen compounds (similar to Jupiter or Saturn). Such planets may or may not have a solid core.

The most notable use for gas giants is in refuelling of spacecraft. The hydrogen atmosphere of gas giants may be skimmed by ships in order to fill their tanks and later use the material as fuel for their jump drives and powerplants. This eliminates fuel cost for the vessel and increases profit. It also allows refueling at systems that do not have starports. The system's hex is marked with the gas giant symbol if a gas giant is present.

Gas giants are generally divided into two sizes: large and small.

Large gas giants range in size from 60,000 kilometers in radius to perhaps 120,000 kilometers in radius. Small gas giants range from about 20,000 kilometers in radius to just under 60,000 kilometers in radius.

System Name: Each system is generally named for the primary world within the parsec.

Travel Zones: Most worlds are assumed to be civilized or at least amenable to travellers and visitors. Some, however, are caught in the throes of war, plagued by disease, or are simply not ready for interstellar visitors. Such worlds are classified by travel zones to denote such status.

In most cases, you should indicate travel zones based on the information available. Three such zone types exist: green, amber, and red.

Green travel zones indicate that no special hazards exist to

SUBSECTORS WITHIN A SECTOR

A	B	C	D
E	F	G	H
I	J	K	L
M	N	O	P

Although subsectors are named, they are routinely referred to by their letters from the above chart.

travellers. Any unmarked world is a green travel zone by default.

Amber travel zones indicate that travellers should exercise caution when visiting such worlds. The amber code may mean that the citizens of the world are xenophobic, that the political situation is chaotic, or that some other danger exists within the system.

Red travel zones usually indicate that a major danger exists within the system. This danger may be disease and the world may be quarantined. The system may be involved in a war, and surface or space battles may be probable. Red travel zones are also used to show a government edict prohibiting entry to the system or world. This may be to protect a local civilization which is still developing and not yet ready for interstellar contacts or to protect valuable resources until the government can mine them.

You, as the referee, should establish the reason for an amber or red travel zone.

Communications Routes: Within the subsector, local governments will have established communications or trade routes connecting some (but not all) worlds. These routes serve as a conduit for messages between businesses and between governments as well as between people. They also serve as the basic routes that both liners and large freighters travel.

You should examine the subsector map and connect key worlds with communications routes. Typically, express boat communications routes connect, or pass within, three hexes of worlds with type A or B starports.

If the subsector is an isolated community, the routes may not leave the map; if it is part of a larger confederation or empire, the routes will probably leave the edges to join with other parts of the sector.

Communications routes should be carefully drawn so as to avoid making all parts of the subsector accessible; a subsector should reserve some areas as backwaters for exploration and adventure. Communications routes are drawn as single lines connecting hexes on the subsector grid.

The star map, once generated, shows the distribution of star systems in space and shows their relationships to each other in terms of relative distance and commercial spacelane connections.

MAINWORLD CREATION

The term *world* refers to the various bodies that are contained in a stellar system; it encompasses planets, satellites, and asteroid belts. For example, the single most important world in a system may not be a planet; it could be a satellite of a gas giant or a planetoid within an asteroid belt.

This world creation process applies only to the single most important world in a star system; to generate additional details of the star system, see Extended System Generation.

The main world within a system is the single most important planet or satellite in the system: most often the world with the greatest population, the dominant local government type, and the star system's starport.

In addition to the information generated here, each mainworld should be allocated at least one page (and preferably several) in a central notebook maintained by the referee. As characteristics are generated, they should be recorded along with the name of the world and its location (generally its subsector and hex number). Record any other data which may be pertinent; the types of terrain present on the planetary surface, unique encounter tables (prescribed by the section on animal encounters), data on flora and fauna, industrial or agricultural capacity, social structure and government, or possibly actual maps of the planetary surface.

The specific procedures for generating the main world are given on the Basic Mainworld Generation Flowchart.

EXTENDED SYSTEM GENERATION

Use the Extended System Generation when you wish to completely detail a star system's entire complement of planets and satellites.

System Nature: Star systems may be solitary, having one central star, or multiple, having two or more stars. In an extreme situation, the star system may be quadruple, with two widely separated binary systems, each effectively a distinct system.

Primary Star Type: Star types range through a variety of spectral types using the codes O B A F G K M. These letters indicate in descending order the temperature of the stars. (A mnemonic for remembering this sequence is "Oh, Be A Fine Girl, Kiss Me.")

Spectral types O and B are extremely rare and will not normally be encountered. You may establish an O or B type star when and where necessary (although there should not be more than one or two type O or B stars in a sector).

Spectral Decimal Classification: The spectral type for stars is usually further specified by a decimal classification (using the digits 0 to 9). Thus a type F1 star is one-tenth of the way between F and G while a type F9 is nine-tenths of the way to G. All stars are treated this way with the exception of type O, which ranges from 5 to 9 only, and dwarf stars, which do not have decimal classifications.

Companion Orbit: A result of *Close* indicates that the companion star is effectively touching the primary star; its orbit is so very close to the primary that it has practically no effect on orbits of planets. Other results on the column indicate the planetary orbit which the companion star occupies. If the planetary orbit for a companion is coded as within the sphere of the primary star on the table of zones, then the companion orbit is changed to close.

Far indicates that the companion star is outside the realm of the primary star's system.

Maximum Orbits: Orbits for planets, gas giants, and planetoid belts are available around the primary star and certain eligible companion stars. The maximum orbits table indicates the highest numbered orbit available for the star.

Zones: The orbits around a star are classified as inside star, unavailable, inner, habitable, and outer. The table of zones indicates (for each star type and size) the orbit number and its zone classification.

- Inside star orbits are physically inside the sphere of the star. They cannot be occupied by planets.
- Unavailable orbits are subject to intense heat from the star: a planet in such an orbit would be converted to vapor and dissipated. Such orbits cannot be occupied by planets.
- Inner zone orbits expose worlds to relatively large amounts

of radiation, and such worlds are hot and inhospitable.

- Habitable zone orbits are in a temperate region where stellar radiation is neither too much nor too little. If other factors are right, life may exist on worlds in this region.
- Outer zone orbits do not provide enough radiation for worlds, and they are cold and inhospitable.

Empty Orbits: Some orbits may be empty because of ancient collisions or through other effects of worlds and stars.

Empty orbits have no planets in them (although a companion star already placed in one remains there). Empty orbits are usually indicated as empty when describing a system, if only to show that no oversight was made in listing contents.

Planetoids: Planetoid belts (or asteroid belts) are accumulations of small chunks of rock or ice not large enough to be called planets. In basic system generation, a world size (Zero) is used to designate an asteroid belt. For the purposes of distinction, the term "asteroid belt" describes a planetoid belt which is also the mainworld in a system; "planetoid belt" refers to any other group of planetoids in a system.

Asteroid and planetoid belts hold between 1000 and 10,000 asteroids or planetoids each. Asteroids and planetoids are generally under 200 kilometers in diameter.

Placing Known Components: Once the components of the system are determined, they must be placed within the system. The flowchart calls for component placement among the available orbits to be done randomly.

To perform the random selection of an orbit, assign equal probability to each available orbit, and roll one die. If there are six or fewer candidate orbits, one number is assigned to each orbit; extra or unused numbers indicate a reroll is required.

If there are more than six candidate orbits, divide the orbits evenly into two, three, or more groups (each of six or fewer candidate orbits), and roll a die to first determine which group the known component should be placed in. Then, the actual choice within the group may be randomly made using another die roll.

Planet Generation: Planets outside the habitable zone are produced in a fashion very similar to those in the habitable zone, but various modifications are included for orbital position and other details.

Satellites: For the purposes of this system, satellites produced are at least 200 kilometers in diameter; potentially any planet may have one or more satellites (captured planetoids) less than 200 kilometers in diameter.

Subordinate Government: Subordinate governments reflect the small, relatively powerless governments which can exist off the mainworld. Nevertheless, such subordinate governments may wield great power on their own territory.

Subordinate Facility: Possible subordinate facilities include farming, mining, colony, research laboratory, and military base.

Farming indicates that the world supports agriculture and is exploited to produce farm products.

Mining indicates the world or satellite has recoverable ores and is being exploited for industrial reasons.

Colony indicates that a settlement has been established on the world or satellite. A colony may represent any of several types of establishment, including a model or demonstration settlement, a penal or deportation colony, or simply a group intent on settling and exploiting new territory.

Research Laboratory indicates that a scientific establishment has been located on the world or satellite. A research lab may be operated under the control of the government, or it may be privately operated.

Military Base indicates that the world or satellite has a military force stationed on it. The military force is generally non-naval: it is an army or marine troop establishment. Often, a military

WORLD NAMING CONVENTIONS

A system carries two names: the name of its star and the name of its mainworld. Of the two, the mainworld name is more important and is more frequently encountered.

The other worlds within a system carry their own names, but they are just as often referred to in terms of their position with relation to their star.

Conventions: The current Imperial world naming conventions were established during the Rule of Man, when Second Imperium scout ships thoroughly mapped the star systems and planets of the conquered First Imperium. Since the Second Imperium was directly formed from the Terran Confederation Navy, it seemed only natural that Terran conventions should be used.

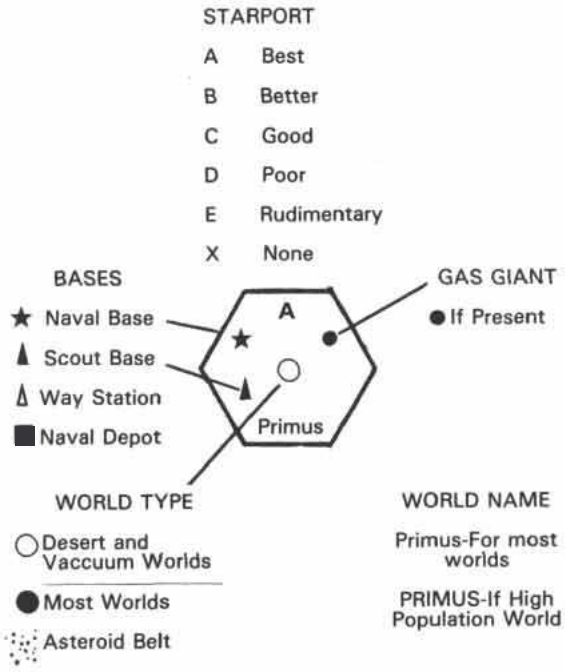
Planets were identified by Greek letters, with the innermost planet labelled Alpha.

Satellites were identified by Anglic letters, with the innermost satellite identified as Ay.

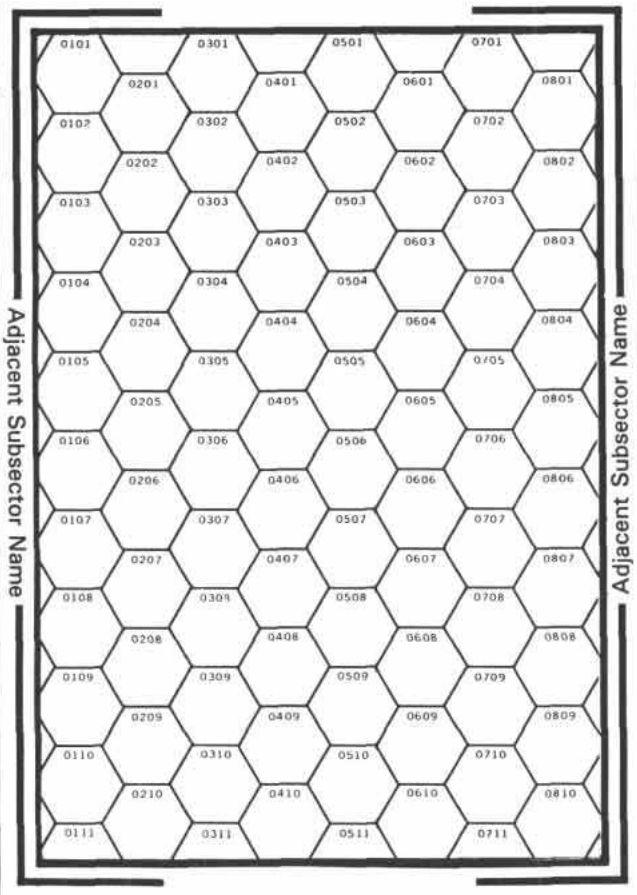
For example, Terra is commonly known as Terra. It is also technically Sol Delta (Sol's orbit zero is empty). Luna, as Terra's only satellite, is Sol Delta Ay.

No.	*Greek*	*Anglic*
0	Alpha	Ay
1	Beta	Bee
2	Gamma	See
3	Delta	Dee
4	Epsilon	Ee
5	Zeta	Eff
6	Eta	Gee
7	Theta	Aitch
8	Iota	Eye
9	Kappa	Jay
10	Lambda	Kay
11	Mu	Ell
12	Nu	Em
13	Xi	En
14	Omicron	Oh
15	Pi	Pee
16	Rho	Cue
17	Sigma	Are
18	Tau	Ess
19	Upsilon	Tee
20	Phi	You
21	Chi	Vee
22	Psi	Double-You
23	Omega	Eks
24	—	Wye
25	—	Zee

MAPPING SUBSECTORS



STANDARD SUBSECTOR GRID



base can be noted with the symbol *M* in the base column of the statistics for the system, as well as with a comment in the remarks area. If, however, Naval or Scout bases are already present on the world, then no symbol for the military base should be used, and it should be noted in the remarks instead.

Scout and Naval Base Components: Both Scout bases and Naval bases are always assumed to have components at the major starport (the starport on the main world) in the system. However, you may elect to establish components of Scout or Naval bases throughout the system. The chart explains how to do this.

Spaceport: The major traffic center in the system is the starport; all others are called spaceports. While it is possible for spaceports to accept starships, they are called (if only for convenience and for terminology) spaceports.

Naming System Bodies: In any system, the name used for identification is the name of the mainworld.

MAINWORLD DETERMINATION AFTER THE FACT

If desired, you can generate the entire star system first by using extended star system generation, and then determine the mainworld.

When this approach is used, the mainworld is the world in the system which has the greatest population. If more than one world has the same population, then select the world which is in the habitable zone, or failing that, which is the closest to the central star.

The mainworld need not be a planet; it can be a satellite or an asteroid belt, or a small world. It may not, however, be a ring.

The mainworld need not orbit the central star in the system; it may be in orbit around the binary companion, or it may orbit a gas giant or other world.

Atmosphere: The atmosphere code represents the breathing environment encountered on the world. Some atmospheres require specific personal equipment for survival and protection.

Vacuum or Trace Atmosphere: The atmosphere has a pressure of less than 0.1 atmospheres, which requires the use of a vacc suit.

Very Thin Atmosphere: The atmosphere has a pressure of 0.1 to 0.42 atmospheres, which requires the use of a compressor to ensure sufficient oxygen.

Tainted Atmosphere: The atmosphere contains an unusual taint such as such as disease, a hazardous gas mix, pollutants, or sulfur compounds which requires the use of a filter mask. Tainted, very thin atmospheres require a combination respirator/filter mask for survival.

Thin Atmosphere: The atmosphere has a pressure of 0.43 to 0.70 atmospheres. The atmosphere is a standard oxygen/nitrogen mix, which is breathable without assistance.

Standard Atmosphere: The atmosphere has a pressure of 0.71 to 1.49 atmospheres. The atmosphere is a standard oxygen/nitrogen mix, which is breathable without assistance.

Dense Atmosphere: The atmosphere has a pressure of 1.50 to 2.49 atmospheres. The atmosphere is a standard oxygen/nitrogen mix, which is breathable without assistance.

Exotic Atmosphere: An unusual gas mix which requires the use of oxygen tanks, but protective suits are not needed.

Corrosive Atmosphere: A concentrated gas mix or unusual

temperature creates a corrosive environment, which requires the use of a protective suit or vacc suit.

Insidious Atmosphere: The atmosphere is similar to a corrosive atmosphere, but extreme conditions cause the corrosive effects to defeat any protective measures in 2 to 12 hours.

Dense, High Atmosphere: Pressure at or below sea level is too great to support life but is breathable at higher altitudes.

Ellipsoid: The world's surface is ellipsoidal, not spherical. Because the atmosphere remains spherical, surface atmospheric pressure ranges from very high at the middle to very low at the ends. Breathable bands may exist at some point within the range of pressure.

Thin, Low Atmosphere: The world is large and massive, with a thin atmosphere which settles to the lowest levels of the terrain. The atmosphere is unbreathable at most altitudes except the very low ones (as in depressions or deep valleys).

Hydrosphere: For normal worlds, the hydrosphere will be water; on other worlds (with exotic, corrosive, or insidious atmospheres), it may be other liquids or fluids such as ammonia.

Some worlds with vacuum atmospheres may have hydrographic percentages greater than 0: the world has ice caps present; the water will not be free-standing liquid. A Desert World may have up to 4% free-standing water and still be considered a Desert World. Conversely, a Water World may have a 95% hydrosphere and still be considered a Water World.

Population Density: The following population densities are from 20th century Earth. Earth has a population of three billion (Population Level 9), with five persons per square mile or 16 persons per square mile of land area. Europe is populated at about 151 persons per square mile, the equivalent of Population Level 10. The Netherlands contain 1500 persons per square mile, or about Population Level 11. Hong Kong has 10,000 persons per square mile, about Population Level 12.

Government: Government types indicate the general type of authority; each listed type provides a guide to the referee for administering encounters on the world. The Planetary Government table describes characteristics of each government type. Balkanization is a special result which indicates that there is no world government; instead several rival territorial governments exist. In such cases, you should generate the specific qualities of each territory on the planet separately.

Law Level: Law Level is an indication of the relative oppressiveness of the world. The digit is classified on the Law Level table to show prohibitions against weapons. It also influences the difficulty of the task used to avoid being harassed or arrested by local authorities (see the Encounters chapter).

The Law Level defines local restrictions on possession and use of weapons by individuals. The referee (or players) may find combinations of features which may seem contradictory or unreasonable. Common sense should rule. In such cases strive to generate a rationale which explains the situation.

Technological Level: The degree of technological expertise, and thus the capabilities of local industry, depends greatly on the basic characteristics of a world. World Technological Levels may vary from zero to 20, more commonly ranging from 4 to 10. Higher numbers indicate greater capability.

The Tech Level of a world determines the type, quality, and sophistication of the products commonly available on a world in urban areas or near the starport. Large areas of the world away from the starport or away from large population centers may be one or even two Tech Levels lower.

Local citizenry will usually not be armed with weapons of a type which cannot be produced locally, but law enforcers or the military may be.

Tech Level also indicates the general ability of local technology to repair or maintain items which have failed or malfunctioned.

Trade Classifications: Trade classifications are covered in more detail in the Trade and Commerce chapter.

Finally, you should always feel free to create worlds which have been deliberately (rather than randomly) generated.

THE REGINA SYSTEM

Worlds in the Regina system are named for a variety of topics. Most planets orbiting Lusor (the primary star, and dwarf companion Speck) are named for persons and places associated with St. Regina. Planets orbiting Darida (Lusor's far companion) are named in the Vilani language.

Although Regina boasts the highest population in the system, its companion satellites of Harcourt and Brumaire have been colonized, and the other satellites have been settled.

Orbit	*Name*	*UWP*	*Remarks*
Primary	Lusor	F7 V	DM companion
0	Clement	Y100000-0	
1	Ausun	Y300169-9	
2	Burgund	Small GG	
3	Cent	Y400367-9	
7	Thermidor	Y560000-0	
3	Olybrius	F75022A-9	
25	Alise	Y20016C-9	
4	Assiniboia	Large GG	
3	Redes	F595269-9	Farming.
6	Printemps	F20036C-A N	
7	Brumaire	F564669-9	Farming. Colony.
30	Harcourt	H43556C-A M	Research Lab. Military Base. Colony.
55	Regina	A788899-C	A Rich. Subsector Capital.
Companion	Darida	M6 V	
0	Augur	YS00000-0	
1	Kirunda	Y210000-0	
8	Irkirka	YS00000-0	
11	Arkurer	HS00137-9	
13	Irgurkar	Y10046A-A	
2	Elazair	Small GG	
3	Lashir	YS00000-0	
8	Diuur Imar	G200269-9	
9	Shamardae	Y500000-0	
20	Arapan	Y200000-0	
50	Edaku	Y210000-0	
125	Gagamshir	F534328-A M	Military Base.

UNIVERSAL WORLD PROFILE TABLES 1

WORLD SIZE

Code	General Description	Minimum Diameter	Maximum Diameter
R	Asteroid/Planetoid Ring	Multiple Bodies	Under 1 km
S	Very Small (400 km)	200 km	799 km
0	Asteroid/Planetoid Belt	Multiple Bodies	Under 200 km
1	Small (1,600 km)	800 km	2,399 km
2	Small (Luna; 3200 km)	2,400 km	3,999 km
3	Small (Mercury; 4800 km)	4,000 km	5,599 km
4	Small (Mars; 6400 km)	5,600 km	7,199 km
5	Medium (8000 km)	7,200 km	8,799 km
6	Medium (9600 km)	8,800 km	10,399 km
7	Medium (11,200 km)	10,400 km	11,999 km
8	Large (Terra; 12,800 km)	12,000 km	13,599 km
9	Large (14,400 km)	13,600 km	15,199 km
A	Large (16,000 km)	15,200 km	16,799 km
SGG	Small Gas Giant		
LGG	Large Gas Giant		

R: A Ring orbits a world.
S: A small body orbits a world or star.
0: A planetoid or asteroid orbits a star.

WORLD ATMOSPHERE

Code	General Description	Minimum Pressure	Maximum Pressure
0	Vacuum	—	0.00
1	Vacuum (trace)	0.001	0.09
2	Vacuum (very thin tainted)	0.10	0.42
3	Vacuum (very thin)	0.10	0.42
4	Thin (tainted)	0.43	0.70
5	Thin	0.43	0.70
6	Standard	0.71	1.49
7	Standard (tainted)	0.71	1.49
8	Dense	1.50	2.49
9	Dense (tainted)	1.50	2.49
A	Exotic	varies	varies
B	Exotic (corrosive)	varies	varies
C	Exotic (insidious)	varies	varies
D	Exotic (dense, high)	varies	varies
E	Exotic (ellipsoid)	varies	varies
F	Exotic (thin, low)	varies	varies

Vacuum requires a vacc suit. Tainted requires a filter mask. Very thin requires a respirator. Very thin tainted requires a combination respirator/filter mask.

WORLD HYDROGRAPHICS

Code	General Description		Minimum %	Maximum %
0	Desert World	(0%)	0%	4%
1	Dry World	(10%)	5%	14%
2	Dry World	(20%)	15%	24%
3	Wet World	(30%)	25%	34%
4	Wet World	(40%)	35%	44%
5	Wet World	(50%)	45%	54%
6	Wet World	(60%)	55%	64%
7	Wet World	(70%)	65%	74%
8	Wet World	(80%)	75%	84%
9	Wet World	(90%)	85%	94%
A	Water World	(100%)	95%	100%

WORLD POPULATION

Code	General Description	Minimum Population	Maximum Population
0	Low (less than ten)	0	9
1	Low (tens)	10	99
2	Low (hundreds)	100	999
3	Low (thousands)	1000	9999
4	Mod (ten thousands)	10,000	99,999
5	Mod (hundred thousands)	100,000	999,999
6	Mod (millions)	1,000,000	9,999,999
7	Mod (ten millions)	10,000,000	99,999,999
8	Mod (hundred millions)	100,000,000	999,999,999
9	High (billions)	1,000,000,000	9,999,999,999
A	High (ten billions)	10,000,000,000	99,999,999,999

WORLD GOVERNMENT

Code	General Description
0	**No Government Structure.** In many cases, family bonds predominate.
1	**Company/Corporation.** Government by a company managerial elite; citizens are company employees.
2	**Participating Democracy.** Government by advice and consent of the citizen.
3	**Self-Perpetuating Oligarchy.** Government by a restricted minority, with little or no input from the masses.
4	**Representative Democracy.** Government by elected representatives.
5	**Feudal Technocracy.** Government by specific individuals for those who agree to be ruled. Relationships are based on the performance of technical activities which are mutually beneficial.
6	**Captive Government/Colony.** Government by a leadership answerable to an outside group; a colony or conquered area.
7	**Balkanization.** No central ruling authority exists; rival governments compete for control.
8	**Civil Service Bureaucracy.** Government by agencies employing individuals selected for their expertise.
9	**Impersonal Bureaucracy.** Government by agencies which are insulated from the governed.
A	**Charismatic Dictator.**Government by a single leader enjoying the confidence of the citizens.
B	**Non-Charismatic Leader.** A previous charismatic dictator has been replaced by a leader through normal channels.
C	**Charismatic Oligarchy.** Government by a select group, organization, or class enjoying overwhelming confidence of the citizenry.
D	**Religious Dictatorship.** Government by a religious minority which has little regard for the needs of the citizenry.
E	**Religious Autocracy.** Government by a single religious leader having absolute power over the citizenry.
F	**Totalitarian Oligarchy.** Government by an all-powerful minority which maintains absolute control through widespread coercion and oppression.

WORLD LAW LEVEL

Code	General Description
0	No law (no prohibitions).
1	Low law (body pistols, explosives, poison gas prohibited).
2	Low law (portable energy weapons prohibited).
3	Low law (machineguns, automatic rifles prohibited).
4	Moderate law (light assault weapons prohibited).
5	Moderate law (personal concealable weapons prohibited).
6	Moderate law (all firearms except firearms prohibited).
7	Moderate law (shotguns prohibited).
8	High law (blade weapons controlled; no open display).
9	High law (weapon possession outside the home prohibited).
A	Extreme law (weapon possession prohibited).
B	Extreme law (rigid control of civilian movement).
C	Extreme law (unrestricted invasion of privacy).
D	Extreme law (paramilitary law enforcement).
E	Extreme law (full-fledged police state).
F	Extreme law (all facets of daily life rigidly controlled).
G	Extreme law (severe punishment for petty infractions).
H	Extreme law (legalized oppressive practices).
J	Extreme law (routinely oppressive and restrictive).
K	Extreme law (excessively oppressive and restrictive).
L	Extreme law (totally oppressive and restrictive).

UNIVERSAL WORLD PROFILE TABLES 2

TECHNOLOGY LEVEL

Code	General Description	Approximate Historical Equivalent
0	Pre-Industrial (primitive)	stone age
1	Pre-Industrial (bronze, iron)	middle ages
2	Pre-Industrial (printing press)	circa 1600
3	Pre-Industrial (basic science)	circa 1800
4	Industrial (int. combustion)	circa 1900
5	Industrial (mass production)	circa 1930
6	Pre-Stellar (nuclear power)	circa 1950
7	Pre-Stellar (mini. electronics)	circa 1970
8	Pre-Stellar (superconductors)	circa 1990
9	Early Stellar (fusion power)	circa 2010
A	Early Stellar (jump drive)	circa 2100
B	Average Stellar (large starships)	
C	Average Stellar (sophisticated robots)	
D	Average Stellar (holo data storage)	the Imperium
E	High Stellar (anti-grav cities)	
F	High Stellar (anagathics)	
G	High Stellar (global terraforming)	
H	Extreme Stellar	
J	Extreme Stellar	
K	Extreme Stellar	
L	Extreme Stellar	the Ancients

STARPORTS

Type	Quality	Shipyards	Repair	Fuel
A	Excellent	Starships	Overhaul	Refined
B	Good	Spacecraft	Overhaul	Refined
C	Routine	—	Major Damage	Unrefined
D	Poor	—	Minor Damage	Unrefined
E	Frontier			
X	None			

Starports are established primarily to foster interstellar trade and commerce.

SPACEPORTS

Type	Quality	Repair	Fuel
F	Good	Minor Damage	Unrefined
G	Poor	Superficial	Unrefined
H	Primitive	—	
Y	None		

Spaceports are established primarily to foster in-system travel.

WORLD HORIZONS

Radius		Range to Horizon
800	(1)	Very Long
1600	(2)	Distant
2400	(3)	Distant
3200	(4)	Distant
4000	(5)	Distant
4800	(6)	Distant
5600	(7)	Very Distant
6400	(8)	Very Distant
7200	(9)	Very Distant
8000	(A)	Very Distant

ATMOSPHERE PENETRATION MODIFIERS

Atmosphere Type	Penetration Modifiers
Vacuum	+3 bands
Trace	+2 bands
Very Thin	+1 band
Thin	No change
Standard	No change
Dense	No change
Exotic	−1 band
Corrosive	−1 band
Insidious	−1 band
Dense High	−1 band
Ellipsoid	No change
Thin Low	No change

WORLD GRAVITY TABLE

Surface Gravity	√ of G Factor	Jump/ Throw
0.01	0.10	1000%
0.05	0.22	450%
0.10	0.32	300%
0.20	0.45	225%
0.30	0.55	180%
0.40	0.63	160%
0.50	0.71	140%
0.60	0.77	130%
0.70	0.84	120%
0.80	0.89	110%
0.90	0.95	105%
1.00	1.00	100%
1.10	1.05	95%
1.20	1.10	90%
1.30	1.14	88%
1.40	1.18	85%
1.50	1.22	82%
1.60	1.26	80%
1.70	1.30	77%
1.80	1.34	75%
1.90	1.38	73%
2.00	1.41	71%
2.10	1.45	69%
2.20	1.48	67%
2.30	1.52	66%
2.40	1.55	65%
2.50	1.58	63%
2.60	1.61	62%
2.70	1.64	61%
2.80	1.67	60%
2.90	1.70	59%
3.00	1.73	58%

WORLD PHYSICAL DATA

UWP	Code Size	Digit Size	Code Atmosphere	Digit Atmosphere	Code Hydrographics	Digit Hydrographics
0	Asteroid	Asteroid Belt	Vacuum	Vacuum	Desert	0% water
1	Small	1600 km	Vacuum	Vacuum (trace)	Desert	10% water
2	Small	3200 km	Vacuum	Very Thin (tainted)	Dry World	20% water
3	Small	4800 km	Vacuum	Very Thin	Dry World	30% water
4	Small	6400 km	Thin	Thin (tainted)	Wet World	40% water
5	Medium	8000 km	Thin	Thin	Wet World	50% water
6	Medium	9600 km	Standard	Standard	Wet World	60% water
7	Medium	11200 km	Standard	Standard (tainted)	Wet World	70% water
8	Large	12800 km	Dense	Dense	Wet World	80% water
9	Large	14400 km	Dense	Dense (tainted)	Wet World	90% water
A	Large	16000 km	Exotic	Exotic	Water World	100% water
B			Exotic	Corrosive		
C			Exotic	Insidious		
D			Exotic	Dense (high)		
E			Exotic	Ellipsoid		
F			Exotic	Thin (low)		

This table shows the UWP digit for the physical data for worlds, and provides both the code meaning from the *Players' Manual* and the UWP digit meaning from the world generation systems in the *Referee's Manual*.

BASIC MAINWORLD GENERATION 1

1 System Presence

For all hexes within a subsector, determine which hexes have a system present based on the referee-mandated stellar density.

SYSTEM DENSITY

Density	*Density Percentage*	*Throw per subsector hex*
Rift	4%	12+ on 2D
Sparse	16%	6+ on 1D
Scattered	33%	5+ on 1D
Standard	50%	4+ on 1D
Dense	66%	3+ on 1D

2 System Details

For each system, generate the details of the mainworld.

3 Mainworld Starport

Roll 2D to determine the mainworld starport type based on how well-travelled this particular subsector is.

STARPORT TYPE

Die	*Backwater*	*Standard*	*Mature*	*Cluster*
2	A	A	A	A
3	A	A	A	A
4	B	A	A	A
5	B	B	B	A
6	C	B	B	B
7	C	C	C	B
8	C	C	C	C
9	D	D	D	C
10	E	E	E	D
11	E	E	E	E
12	X	X	E	X

The referee must select the nature of the mainworld system and then roll on the appropriate column.

Backwater is out of the mainstream of interstellar culture and communication.

Standard is the expected norm.

Mature is an older, more established system.

Cluster has many worlds close together.

4 World Size

Throw 2D – 2 for World Size.

5 Atmosphere

Throw 2D – 7 + Size for Atmosphere.
If World Size is 0, then Atmosphere is 0.

6 Hydrographics

Throw 2D – 7 + World Size for Hydrographics.
If World Size is 1 or less, Hydrographics is 0.
If Atmosphere is 1 or less, or A or more, apply DM – 4.

7 Population

Throw 2D – 2 for Population.

8 Government

Throw 2D – 7 + Population for Government.

9 Law Level

Throw 2D – 7 + Government for Law Level.

10 Technology Level

Roll 1D and add the technology DMs for all possible characteristics of the mainworld in order to determine its Technology Level.

TECHNOLOGY DIE MODIFIERS

Level	*Star-port*	*World Size*	*Atmo-sphere*	*Hydro-graphics*	*Popula-tion*	*Govern-ment*
0		+2	+1	—	—	+1
1		+2	+1	—	+1	—
2		+1	+1	—	+1	—
3		+1	+1	—	+1	—
4		+1	—	—	+1	—
5		—	—	—	+1	+1
6		—	—	—	—	—
7		—	—	—	—	—
8		—	—	—	—	—
9		—	—	+1	+2	—
A	+6	—	+1	+2	+4	—
B	+4		+1			—
C	+2		+1			—
D	—		+1			−2
E	—		+1			—
F			+1			—
X	−4					

Determine all possible die modifiers from this table, and apply them to a throw of 1D. The result is the mainworld's Technology Level. Treat adjusted die rolls of less than zero as zero.

The maximum possible adjusted roll for Tech Level is 20 (Starport A, World Size 1, Atmosphere 3, Population A, Government 5); the minimum possible is 0.

11 Scout and Naval Bases

Determine the types of bases in the system.

Imperial **Naval bases** support the operations of interstellar naval units. Imperial **Scout bases** support the operations of the Imperial Interstellar Scout Service.

Non-Imperial **military bases** undertake some or all of the functions of Imperial Naval and Scout bases.

BASE PRESENCE

Starport	*Imperial Naval Base*	*Imperial Scout Base*	*Non-Imperial Military Base*
A	8+ on 2D	10+ on 2D	10+ on 2D
B	8+ on 2D	9+ on 2D	9+ on 2D
C	—	8+ on 2D	8+ on 2D
D	—	7+ on 2D	—

Bases are not present at type E and X starports.

Codes: Use the following letter codes to denote bases:

N. Imperial Naval Base.
S. Imperial Scout Base.
A. Imperial Naval Base and Scout Base both present.
B. Imperial Naval Base and Scout Way Station both present (a Way Station is an extensive Scout base).
M. Non-Imperial Military Base.

BASIC MAINWORLD GENERATION 2

12 Trade Classifications

Analyze all characteristics of the mainworld and determine its trade classifications.

TRADE CLASSIFICATIONS

Code	*Size*	*Atmo-sphere*	*Hydro-graphics*	*Popula-tion*	*Govern-ment*	*Law Level*	*Code Definition*
Ag	—	4-9	4-8	5-7	—	—	Agricultural
As	0	0	0	—	—	—	Asteroid
Ba	—	—	—	0	0	0	Barren
De	—	2+	0	—	—	—	Desert
Fl	A+	1+	—	—	—	—	Fluid
Hi	—	—	—	9+	—	—	High Population
Ic	—	0-1	1+	—	—	—	Ice-Capped
In	—	2-4,7,9	—	9+	—	—	Industrial
Lo	—	—	—	3−	—	—	Low Population
Na	—	0-3	0-3	6+	—	—	Nonagricultural
Ni	—	—	—	0-6	—	—	Nonindustrial
Po	—	2-5	0-3	—	—	—	Poor
Ri	—	6,8	—	6-8	4-9	—	Rich
Va	—	0	—	—	—	—	Vacuum
Wa	—	—	A	—	—	—	Water World

Determine all possible trade classifications from this table. However, an Asteroid Belt (As) is automatically a Vacuum World, and need not have the Va code. Aslan worlds are Rich (Ri) without regard to Government type. A Vargr world is disqualified from the Rich classification if it is Government type 7.

13 Supplemental Remarks

Determine if the mainworld merits any supplemental remarks. Supplemental remarks are imposed by the referee after considering the general circumstances of the world. Supplemental remarks include:

An. Ancients' Site. A high-tech remnant of the now-vanished Ancients.

Cp. Subsector Capital. The capital of the local region.

Cx. Sector or Regional Capital. The capital of the local sector.

Ex. Exile Camp. A dumping ground for political dissidents.

Mr. Military Rule. A world under overall control of the local military (regardless of government type).

Pr. Prison Camp. A prison for criminals.

Rs. Research Station. An experimental facility.

Xb. Xboat Station. An Imperial facility for rapid message transmission.

14 Population Multiplier

Determine the population multiplier for the mainworld.

Roll 1D and determine if the result is odd or even.

If *even*, roll 1D−1 for a result from 0 to 4. Ignore and reroll a result of 5.

If *odd*, roll 1D+4 for a result from 5 to 9. Ignore and reroll a result of 10.

15 Gas Giants

Roll 5+ on 2D to determine if gas giants exist in the system.

If gas giants exist, determine how many from the Gas Giant Quantity table.

GAS GIANT QUANTITY

Die	*Quantity*
2	1
3	1
4	2
5	2
6	3
7	3
8	4
9	4
10	4
11	5
12	5

16 Planetoid Belts

Roll 8+ on 2D to determine if planetoid belts exist in the system.

If planetoid belts exist, determine how many from the Planetoid Belt Quantity table.

PLANETOID BELT QUANTITY

Die	*Quantity*
2	1
3	1
4	1
5	1
6	1
7	1
8	2
9	2
10	2
11	2
12	2
13	3

17 Travel Zones

Determine if the world presents any dangers or apparent dangers to travellers. Travel zones are imposed by the referee after considering the general circumstances of the world. There are three travel zone codes:

Green. No danger. Green travel zones are not usually stated.

Amber. Caution. Circumstances dictate caution because of local, natural, or social conditions.

Red. Danger. Access to the world is prohibited.

Class X starports are almost always red zones. Amber and red zones are also imposed by the referee.

The combination of high Government and Law Level also produces the following travel zones.

TRAVEL ZONE MATRIX

Govt Type	*Law Level G*	*H*	*J*	*K*	*L*
A	—	—	—	—	A
B	—	—	—	A	A
C	—	—	A	A	A
D	—	A	A	A	R
E	—	A	A	R	R
F	A	A	R	R	R

A: Amber Zone. **R:** Red Zone.

18 Allegiance

Designate the allegiance of the world. Most worlds are Imperial. Worlds outside the Imperium may have a variety of allegiances. These include, but are not limited to:

As. Aslan. Dominated by one or more Aslan clans.

Im. Imperial. A member of the Imperium. May be loyal to any one of a number of factions within the Imperium.

Va. Vargr. Populated by a Vargr majority population.

Zh. Zhodani. A member of the human Zhodani Consulate.

1 System Presence

For all hexes within a subsector, determine which hexes have a system present, based on the referee-mandated stellar density.

This system may be a mainworld already generated by Basic Mainworld Generation.

Allegiance: An allegiance may have been specified for the system by previous mapping data or by the referee. If there is no allegiance for the system, the referee must determine it.

SYSTEM DENSITY

Density		*Throw per subsector hex*
Rift	(4%)	12+ on 2D
Sparse	(16%)	6+ on 1D
Scattered	(33%)	5+ on 1D
Standard	(50%)	4+ on 1D
Dense	(66%)	3+ on 1D

2 System Details

For each system present, generate the details of the entire system.

3 System Nature

Roll 2D to determine the nature of the star system.

SYSTEM NATURE

Die	Nature
2	Solo
3	Solo
4	Solo
5	Solo
6	Solo
7	Solo
8	Binary
9	Binary
10	Binary
11	Binary
12	Trinary

Solo has one star. Binary has two stars. Trinary has three stars.

Later developments may return to this table to create a quadruple system. Use DM -1 when returning to this table for a far companion.

4 Primary Star Type and Size.

Roll 2D to determine the primary star type; then roll 2D for the star's size.

PRIMARY STAR TYPE AND SIZE

Die	*Type*	*Size*
2	A	II
3	M	III
4	M	IV
5	M	V
6	M	V
7	M	V
8	K	V
9	G	V
10	F	V
11	F	VI
12	F	D

DMs For Type and Size: If a mainworld has already been created, and mainworld Atmosphere 4-9 or Population 8+, DM+4.

Type O and B stars, and size Ia and Ib stars, are extremely rare; the referee should establish when they occur (but never more than one or two per sector).

5 Decimal Classification

Determine the specific decimal classification of the star (ranging from 0 to 9).

1. Roll 1D and determine if the result is even or odd.
2. If even, roll 1D-1 for a result of 0 to 4. Ignore and reroll a result of 5.
3. If odd, roll 1D+4 for a result of 5 to 9. Ignore and reroll a result of 10.
4. Add the single digit produced to the star type letter. For example, if the digit produced was 3, and the star type generated was G, the star type becomes G3.
5. Star types K5 to M9 are not available with star size IV: change star size to V.
6. Star types B0 to F4 are not available with star size VI: change star size to V.

6 Companion Star Type and Size

If the system nature was binary or trinary, roll 2D to determine the companion star type; then roll 2D for the star's size.

COMPANION STAR TYPE AND SIZE

Die	*Type*	*Size*
2	A	II
3	F	III
4	F	IV
5	G	V
6	G	V
7	K	V
8	K	V
9	M	V
10	M	V
11	M	VI
12	M	D

DM For Type: Use the previous throw for primary star type as a +DM.

DM For Size: Use the previous throw for primary star size as a +DM.

Decimal Classification: Determine the decimal classification for the companion star using the procedure in step 5.

7 Companion Orbit

Roll 2D to determine the orbit of the companion star.

COMPANION ORBIT

Die	*Orbit*
2	Close
3	Close
4	1
5	2
6	3
7	4+1D
8	5+1D
9	6+1D
10	7+1D
11	8+1D
12	Far

DMs: For the first companion star, use this table as presented. For a second companion star, use DM +4. for the companion of a star that is itself a far companion, use DM-4.

8 Far Companion?

If the companion orbit is far, go to step 9.

Otherwise, go to step 11.

9 Far Orbit

Far indicates that the star is outside the realm of the primary star's system. Orbit distance is 1D x1000 AU.

10 Additional Stars

If a companion is far, it may itself have a companion. Proceed to step 3 and determine if the far companion is not a solo star and then return here. If the far companion is itself a binary, go to step 6 to determine the binary companion's characteristics.

11 Maximum Orbits

Throw 2D for the maximum number of orbits around the primary star.

Throw 2D for the maximum number of orbits around the far companion star (if any).

DMs (for both rolls): If star size III, DM+4; if star size Ia, Ib, or II, DM+8. If star type M, DM-4; if star type K, DM-2.

12 Available Orbits

Determine what orbits are available for the placement of planets.

AVAILABLE ORBITS

B Orbit	*Between B and A*	*Beyond B*	*B Itself*
0	—	2+	—
1	0	3+	0
2	0-1	4+	0-1
3	0-1	5+	0-1
4	0-2	6+	0-2
5	0-2	7+	0-2
6	0-3	8+	0-3
7	0-3	9+	0-3
8	0-4	10+	0-4
9	0-4	11+	0-4
10	0-5	12+	0-5
11	0-5	13+	0-5
12	0-6	14+	0-6

A is the primary star. B is the companion star. This table shows the orbits which are *available* for worlds to be placed Between A and B, Beyond B, and Around B Itself.

13 Orbit Zones

The tables show the conditions in the orbits around stars.

- \- Inside the sphere of the star. No worlds in this zone.
- — Unavailable (planet would be vaporized). No worlds in this zone.
- I Inner Zone (hot and inhospitable). Worlds may be in this zone.
- H Habitable Zone (life may exist). Worlds may be in this zone.
- O Outer Zone (cold and inhospitable). Worlds may be in this zone.

Select the table for the star size and determine the zones for the orbits around the star.

14 Orbit Zones for Star Size Ia

Orbit	B0	B5	A0	A5	F0	F5	G0	G5	K0	K5	M0	M5	M9
1	—	—	-	-	-	-	-	-	-	-	-	-	-
2	—	—	—	—	-	-	-	-	-	-	-	-	-
3	—	—	—	—	—	—	-	-	-	-	-	-	-
4	—	—	—	—	—	—	—	-	-	-	-	-	-
5	—	—	—	—	—	—	—	—	-	-	-	-	-
6	—	—	—	—	I	I	—	—	—	—	-	-	-
7	—	I	I	I	I	I	I	I	I	I	I	-	-
8	I	I	I	I	I	I	I	I	I	I	I	I	I
9	I	I	I	I	I	I	I	I	I	I	I	I	I
10	I	I	I	I	I	I	I	I	I	I	I	I	I
11	I	I	I	I	I	H	I	I	I	I	I	I	I
12	I	H	H	H	H	O	H	H	H	H	H	H	H
13	H	O	O	O	O	O	O	O	O	O	O	O	O
14	O	O	O	O	O	O	O	O	O	O	O	O	O

15 Orbit Zones for Star Size Ib

Orbit	B0	B5	A0	A5	F0	F5	G0	G5	K0	K5	M0	M5	M9
1	—	—	—	—	—	—	—	-	-	-	-	-	-
2	—	—	—	—	—	—	—	—	-	-	-	-	-
3	—	—	—	—	—	—	—	—	-	-	-	-	-
4	—	—	—	—	—	I	I	—	—	-	-	-	-
5	—	—	I	I	I	I	I	I	I	—	-	-	-
6	—	I	I	I	I	I	I	I	I	I	I	-	-
7	—	I	I	I	I	I	I	I	I	I	I	I	-
8	I	I	I	I	I	I	I	I	I	I	I	I	I
9	I	I	I	I	I	I	I	I	I	I	I	I	I
10	I	I	I	H	H	H	H	H	H	I	I	I	I
11	I	H	H	O	O	O	O	O	O	H	H	H	H
12	I	O	O	O	O	O	O	O	O	O	O	H	H
13	H	O	O	O	O	O	O	O	O	O	O	O	O
14	O	O	O	O	O	O	O	O	O	O	O	O	O

16 Orbit Zones for Star Size II

Orbit	B0	B5	A0	A5	F0	F5	G0	G5	K0	K5	M0	M5	M9
1	—	—	—	—	—	—	—	—	—	-	-	-	-
2	—	—	—	I	I	I	I	I	I	—	-	-	-
3	—	—	I	I	I	I	I	I	I	I	-	-	-
4	—	—	I	I	I	I	I	I	I	I	I	-	-
5	—	I	I	I	I	I	I	I	I	I	I	-	-
6	—	I	I	I	I	I	I	I	I	I	I	I	I
7	I	I	I	I	I	I	I	I	I	I	I	I	I
8	I	I	I	H	H	H	H	H	I	I	I	I	I
9	I	I	H	O	O	O	O	O	H	H	I	I	I
10	I	I	O	O	O	O	O	O	O	O	H	I	I
11	I	H	O	O	O	O	O	O	O	O	O	H	H
12	H	O	O	O	O	O	O	O	O	O	O	O	O
13	O	O	O	O	O	O	O	O	O	O	O	O	O

17 Orbit Zones for Star Size III

Orbit	B0	B5	A0	A5	F0	F5	G0	G5	K0	K5	M0	M5	M9
1	—	—	I	I	I	I	I	I	I	I	—	-	-
2	—	—	I	I	I	I	I	I	I	I	I	-	-
3	—	—	I	I	I	I	I	I	I	I	I	-	-
4	—	I	I	I	I	I	I	I	I	I	I	I	-
5	—	I	I	I	I	I	I	I	I	I	I	I	I
6	—	I	I	I	H	H	H	I	I	I	I	I	I
7	I	I	I	H	O	O	O	H	H	I	I	I	I
8	I	I	H	O	O	O	O	O	O	H	H	I	I
9	I	I	O	O	O	O	O	O	O	O	O	H	H
10	I	H	O	O	O	O	O	O	O	O	O	O	O
11	I	O	O	O	O	O	O	O	O	O	O	O	O
12	H	O	O	O	O	O	O	O	O	O	O	O	O
13	O	O	O	O	O	O	O	O	O	O	O	O	O

18 Orbit Zones for Star Type IV

Orbit	B0	B5	A0	A5	F0	F5	G0	G5	K0
0	—	—	—	I	I	I	I	I	I
1	—	—	I	I	I	I	I	I	I
2	—	—	I	I	I	I	I	I	I
3	—	I	I	I	I	I	I	I	I
4	—	I	I	I	I	I	I	I	H
5	—	I	I	I	I	H	H	H	O
6	—	I	I	H	H	O	O	O	O
7	I	I	H	O	O	O	O	O	O
8	I	I	O	O	O	O	O	O	O
9	I	H	O	O	O	O	O	O	O
10	I	O	O	O	O	O	O	O	O
11	I	O	O	O	O	O	O	O	O
12	H	O	O	O	O	O	O	O	O
13	O	O	O	O	O	O	O	O	O

19 Orbit Zones for Star Size V

Orbit	B0	B5	A0	A5	F0	F5	G0	G5	K0	K5	M0	M5	M9
0	—	—	I	I	I	I	I	I	I	H	H	O	O
1	—	—	I	I	I	I	I	I	I	O	O	O	O
2	—	—	I	I	I	I	I	H	H	O	O	O	O
3	—	—	I	I	I	I	H	O	O	O	O	O	O
4	—	—	I	I	I	H	O	O	O	O	O	O	O
5	—	I	I	I	H	O	O	O	O	O	O	O	O
6	—	I	I	H	O	O	O	O	O	O	O	O	O
7	I	I	H	O	O	O	O	O	O	O	O	O	O
8	I	I	O	O	O	O	O	O	O	O	O	O	O
9	I	H	O	O	O	O	O	O	O	O	O	O	O
10	I	O	O	O	O	O	O	O	O	O	O	O	O
11	I	O	O	O	O	O	O	O	O	O	O	O	O
12	H	O	O	O	O	O	O	O	O	O	O	O	O
13	O	O	O	O	O	O	O	O	O	O	O	O	O

20 Orbit Zones for Star Size VI

Orbit	F5	G0	G5	K0	K5	M0	M5	M9
0	I	I	I	I	O	O	O	O
1	I	I	H	H	O	O	O	O
2	I	H	O	O	O	O	O	O
3	H	O	O	O	O	O	O	O
4	O	O	O	O	O	O	O	O

21 Orbit Zones for Star Size D

Orbit	DB	DA	DF	DG	DK	DM
0	H	O	O	O	O	O
1	O	O	O	O	O	O
2	O	O	O	O	O	O
3	O	O	O	O	O	O

22 Empty Orbits

Roll 5+ on 2D to determine if gas giants exist in the system.

If gas giants exist, determine how many from the Gas Giant Quantity table.

GAS GIANT QUANTITY

Die	*Quantity*
2	1
3	1
4	2
5	2
6	3
7	3
8	4
9	4
10	4
11	5
12	5

The number of gas giants may already be known from the mainworld data; if so, skip this step.

23 Planetoid Belts

Roll 8+ on 2D to determine if planetoid belts exist in the system.

If planetoid belts exist, determine how many from the Planetoid Belt Quantity table.

PLANETOID BELT QUANTITY

Die	*Quantity*
2	1
3	1
4	1
5	1
6	1
7	1
8	2
9	2
10	2
11	2
12	2
13	3

The number of planetoid belts may already be known from the mainworld data; if so, skip this step.

DM+ if ok ch present.

24 Empty Orbits

Determine if any empty orbits are present in the star system.

1. Roll 5+ on 1D to determine if any empty orbits exist in the system. DM+1 if star type A or B.
2. If empty orbits exist, roll 1D on the table to determine how many empty orbits exist. DM+ if star type A or B.

EMPTY ORBITS

Die	*Quantity*
1	1
2	1
3	2
4	3
5	3
6	3

3. Roll 2D-2 (for a result from 0 to 10) to determine each empty orbit number. If the roll does not fall in the range of possible orbits, or if it duplicates an already determined empty orbit, reroll.

25 Captured Planets

Determine if the system has any captured planets in unusual orbits.

1. Roll 5+ on 1D to determine if captured planets exist in the system. DM+1 if star type A or B.
2. If a captured planet exists, consult the table for the number present.

CAPTURED PLANETS

Die	*Quantity*
1	1
2	1
3	2
4	2
5	3
6	3

3. For each captured planet, roll 2D (for a range between 2 and 12) to determine which orbit to use as a baseline. Then roll 2D-7 and multiply by 10% (for a range between -50% to +50%) for the positive or negative deviation of the orbit from the baseline. Record the resulting orbit as a decimal number: Baseline orbit 5+40% is recorded as orbit 5.4; Baseline orbit 2-20% is recorded as orbit 1.8.

26 Place Gas Giants

Gas giants are placed randomly in available orbits within certain restrictions. Throw 2D-3+habitable orbit number for the orbit for a gas giant. Reroll duplicate orbits. When no other orbits are available, gas giants may be placed in the inner zone.

27 Planetoid Belts

Planetoid belts are placed randomly in available orbits, with certain preferences. If a gas giant is available, place a planetoid belt in the next orbit in from the gas giant. For example, if a gas giant is in orbit 8, place the planetoid belt in orbit 7 (if that is an available, nonempty orbit).

28 Place Mainworld

Place the mainworld randomly, with these restrictions.

1. If the world is World Size 1 or greater and Atmosphere is 4 to 9, place the world in the habitable zone.
2. If a gas giant is already in the habitable zone orbit, place the mainworld as a satellite of the gas giant.

29 Other Worlds

Generate all other worlds for the system, beginning with the lowest numbered orbit. All available orbits around a star should be filled before continuing to the next star.

30 World Size

Determine each World Size.

Gas Giants: If the world is a gas giant, roll 1D. On a result of 1, 2, or 3, the planet is a Small Gas Giant; on a result of 4, 5, or 6, the planet is a Large Gas Giant. No other attributes are generated for gas giants. Once size has been generated, proceed to the next orbit.

Worlds: Roll 2D-2 for World Size. If orbit 0, DM-5; if orbit 1, DM-4; if orbit 2, DM-2. If star type M, DM-2 for all orbits.

Treat less than 1 as S (for very small world); used in place of size 0 (planetoid belt or mainworld asteroid belt).

31 Atmosphere

Roll 2D-7+Size for Atmosphere. If inner zone, DM-2. If outer zone, DM-4. If World Size 0, Atmosphere is 0. If the world is at least 2 orbits beyond the habitable zone, roll 2D for 12 exactly: if the roll succeeds, Atmosphere is A.

32 Hydrographics

Roll 2D-7+Size for Hydrographics. If inner zone, Hydrographics is 0. If outer zone, DM-2. If World Size 0 or S, Hydrographics is 0. If Atmosphere 0, 1, or A+, DM-2.

33 Population

Roll 2D-2 for Population. If inner zone, DM-5. If outer zone, DM-3.

34 Satellites

For each world, determine if it has satellites.

World Size S or 0: None.
World Size 1 to A: 1D-3.
Small GG: 2D-4.
Large GG: 2D.

35 Satellite Size

For each satellite, determine its Size.

For Large GG: Roll 2D-4.
For Small GG: Roll 2D-6.
For Worlds: Roll 1D/World Size.

If the result is exactly 0, the satellite is a ring: use Size R.

If the result is less than 0, use Size S.

36 Satellite Orbit

Consult the table for the orbit number. If the satellite is a ring, roll 1D. Otherwise, roll 2D to determine which column to roll on: on 2-7, the satellite is Close; on 8-12, the satellite is Far. On a result of 12 (if the planet is a gas giant), then the satellite is Extreme.

SATELLITE ORBIT NUMBERS

Die	*Ring*	*Close*	*Far*	*Extreme*
1	1	—	—	—
2	1	3	15	75
3	1	4	20	100
4	2	5	25	125
5	2	6	30	150
6	3	7	35	175
7		8	40	200
8		9	45	225
9		10	50	250
10		11	55	275
11		12	60	300
12		13	65	325

Orbit distance is in radii of the central planet. Two satellites cannot occupy the same orbit: reroll if this occurs.

37 Satellite Atmosphere

Roll 2D-7+Satellite Size for Atmosphere. If inner zone, DM-4. If outer zone, DM-4. If Size R, S, or 1, Atmosphere is 0.

If satellite is at least 2 orbits beyond the habitable zone, roll 2D for 12 exactly: if the roll succeeds, satellite Atmosphere A.

38 Satellite Hydrosphere

Roll 2D-7+Size for Hydrographics. If inner zone, Hydrographics is 0. If outer zone, DM-4. If Size R or S, Hydrographics is 0. If Atmosphere is 0, 1, or A+ DM-4.

39 Satellite Population.

Roll 2D-2 for Population. If inner zone, DM-5. If outer zone, DM-4. If Size 0-4, DM-2. If Size R, Population is 0. If Atmosphere is not 5, 6, or 8, DM-2.

40 Social Data

Determine social data (Population, Government, Law Level, Technology Level, and Bases) for all worlds and satellites.

41 Subordinate Government

Roll 1D for subordinate government.

SUBORDINATE GOVERNMENT

Die	*Code*	*Description*
1	0	No government.
2	1	Company
3	2	Participating Democracy.
4	3	Self-Perpetuating Democracy.
5+	6	Captive Government.

DMs: If mainworld Government 6, DM+subordinate Population. If mainworld Government 7+ DM-1. If Population 0, then Government 0.

42 Subordinate Law Level

Roll 1D-3+mainworld Law Level. If Government 0, then Law Level 0.

43 Facilities

Note all facilities which are possible on planets and satellites. These notes do not apply to the mainworld.

Farming (Fa): If in habitable zone, Atmosphere 4-9, Hydrographics 4-8, Population 2+.

Mining (Mi): If mainworld has trade class Industrial, subordinate Population 2+.

Colony (Co): If subordinate world Government 6 and Population 5+.

Research Lab (Re): Mainworld must have Tech Level 9+ and Population 1+ Roll 11+ on 2D for a research lab to be present; DM+2 if mainworld Tech Level 10+.

Military Base (Mi): Mainworld must have Population 8+ and cannot be trade classification Poor. Roll 12+ on 2D for a military base to be present; DM+1 if mainworld Population 8+; DM+ if subordinate world Atmosphere is the same as mainworld Atmosphere.

Naval Base (Nv): A naval base will be present if the mainworld has a naval base and subordinate Population is 3+.

Scout Base (Sc): A scout base will be present if the mainworld has a scout base and subordinate population is 2+.

44 Subordinate Tech Level

Subordinate Tech Level equals mainworld Tech Level minus 1. If a military base, naval base, or research lab is present on the subordinate world, use the mainworld Tech Level.

45 Subordinate Spaceport

Roll 1D for the subordinate spaceport.

SUBORDINATE SPACEPORT

Die	*Code*	*Description*
1	Y	No spaceport.
2	Y	No spaceport.
3	H	Primitive facilities.
4	G	Poor quality.
5	G	Poor quality.
6	F	Good quality.

DMs: If subordinate Population 6+, DM+2. If subordinate Population 1, DM-2. If subordinate Population 0, DM-3.

Animals

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 will naturally encounter the animals of the system.

The referee should create one set of unique encounter tables for each world the players may travel to. This set should consist of one table for each terrain type found on the world.

Once a set of tables has been created, it is used with the encounter procedure (covered in the chapter on encounters) to determine if and when animals are encountered. Although the precise nature of animals may change (and may prove to be quite alien), **Traveller** assumes most will conform to four categories based on their position in the food chain: herbivore, omnivore, carnivore, and scavenger.

The Animal Tables chart covers the steps for generating Animal Encounter Tables.

IMPORTANT CONCEPTS AND DEFINITIONS

The Animal Tables chart introduces many important concepts and terms concerning animals.

Animal Encounter Table Format: Two formats are typically used for animal tables: a one-die table and a two-dice table.

A two-dice table is more complex and works best for a table that is frequently used; use a one-die table when the situation does not merit such a detailed representation. The suggested format indicates a predetermined sequence of animal categories that is preferable for most cases.

Events: When the encounter table calls for events, insert an event from those described in these rules, or generate additional events appropriate to the situation.

Animal Types and Quantity: The animal types table indicates the types of animals which occur within the animal categories. Sometimes an animal type is followed by a die roll in parentheses. This roll represents the number of animals to list for this entry in the animal table. If no roll is listed, the animal quantity is automatically one.

Special Attributes: Although the animals which adventurers will encounter tend to be walkers, some may be flyers, swimmers, amphibians, or even triphibians:

Flyers: These are animals capable of flying through the use of wings, levitating gas sacs, or other mechanisms.

Swimmers: These are animals that live in liquid and swim through the use of fins, flippers, jets, or other mechanisms.

Amphibians: These are animals that live in liquid but are capable of emerging onto land.

Triphibians: These are animals that live in liquid but are capable of walking on land and of flying in the air.

Certain entries on the table are followed by a parenthetical DM which must be applied to the Animal Size throw; its general effect is to make flyers smaller and swimmers larger.

Animal Size: Animal size is expressed in kilograms and may be taken as a general indication of size in relation to human beings (humans are approximately 100 kilograms). All sizes may be construed to cover a range of plus or minus 20 percent.

Animal Hits: The hits column indicates the number of hits an animal can take. When an animal has received wounds equaling or exceeding the first number, the animal is unconscious. When it has received wounds equaling or exceeding the second number, it is dead.

If an animal receives wounds equal to twice its hits, it is destroyed and has lost any food or pelt value.

Animal Wounds: The wounds column indicates the general effect of size on an animal's ability to cause damage when it hits. The formula is noted and applied to the effects of the animal's weapons when they are determined.

If, for example, the animal has a thrasher as its weapon, the weapons list (in the *Player's Manual*) states that a thrasher inflicts 2 hits of damage. A wound alteration of -1D-3 indicates that the referee should roll 1D-3 and subtract the result from 2 to determine the actual number of hits inflicted. If the wound alteration is +2D, then the thrasher will inflict two +2D hits. If the wound alteration is ×2D, then the thrasher will inflict 2×2D hits. A roll of 0 or less equals 1; an animal always has the ability to do some damage.

Thus, for two animals armed with the same weapon, the larger generally inflicts a heavier wound.

Animal Weaponry: Animals naturally have weapons which enable them to attack and defend. Entries such as teeth+1 indicate a direct DM to the combat task using the weapon, making it more effective. The specific weapons are covered in the *Players' Manual*.

In some cases, unusual weaponry is described as a certain weapon type: for example, "as pike" or "as body pistol." The combat effect is descriptive of the result rather than of the strict process.

Animal Armor: Some animals possess armor protecting them from attacks by other animals. Only the general effectiveness of the armor is indicated, not its specific construction. Entries such as battle+4 indicate an addition to the armor value, making the armor more effective.

Animal Characteristics: Because animals have predispositions to attack or to flee, these details are noted on the animal encounter table entry. Three codes are used: A, F, and S. Each is followed by a number which indicates the dice throw involved.

A indicates attack predisposition. A7 indicates the animal will attack on a 2D throw of 7+. Special cases also exist, and they are indicated by a lower case letter following the A. See the flowchart for details.

F indicates predisposition to flee. F7 indicates the animal will flee on a throw of 7+. Special cases are indicated by a lower case letter following the F (see the flowchart).

S indicates speed. S0 indicates that the animal is immobile. S1 indicates normal or ordinary speed; S2 indicates double speed; S3 indicates triple speed; S4 indicates quadruple speed.

Referee's Additions: You may want to invent new animal characteristics. Larger or smaller animals may be invented; other animal weaponry and armor types may be invented, with or without DMs, such as cloth-1 (cloth minus 1), ablat+1, foil, stinger-1, and so on.

ANIMAL MOTIVATIONS

Animals may be provided with more complex motivations than the simple dice rolls for attack and flight.

Carnivores base their decisions on the size of the party and size of the individuals in the party.

Large herbivores will be less likely to flee than small ones; instead they tend to ignore a party unless it approaches too close. Humans may resemble a carnivore's natural prey or a herbivore's natural predator.

Any animal may attack if the party threatens its young, nest, territory, or meal. Any animal may flee if startled or if the party appears sufficiently threatening; even the most vicious carnivore is reluctant to risk its life for a meal.

Other responses are possible beyond attack or flight. A carnivore may stalk a party, hoping to attack an isolated member. An armored animal may curl up into a ball or retract its extremities into its shell. Animals may find certain parts of the group's equipment attractive. They may fasten themselves to the outside of an ATV or try to eat clothing. There may be responses analogous to that of the skunk or the opossum. An animal may be friendly or want to play; it might even mistake a party for members of the opposite sex.

COMMON SENSE

Airless worlds will almost never have any life of consequence on them; if they do, animal life will still tend to follow the same broad guidelines given above. Still, flyers and liquid breathers should be nonexistent.

Always be prepared to alter or restrain prescribed procedures if you feel they contravene logic or reason.

Greater Complexities: Events may be used to trigger rolls on special encounter tables; for example, if an event describes a forest clearing, a special table may be made up to handle encounters in that clearing. An event may be made specifically applicable to an adventure in which a party is involved; for example, if a party is prospecting the location of a mineral outcropping this could be an event. Events may trigger small adventures that are separate from the main adventure; for example, an event could involve the party in the exploration of a cave previously mapped by the referee.

ANIMAL TYPES

Animals can be described by the ecological niche they occupy. The following broad categories describe effectively all animal types.

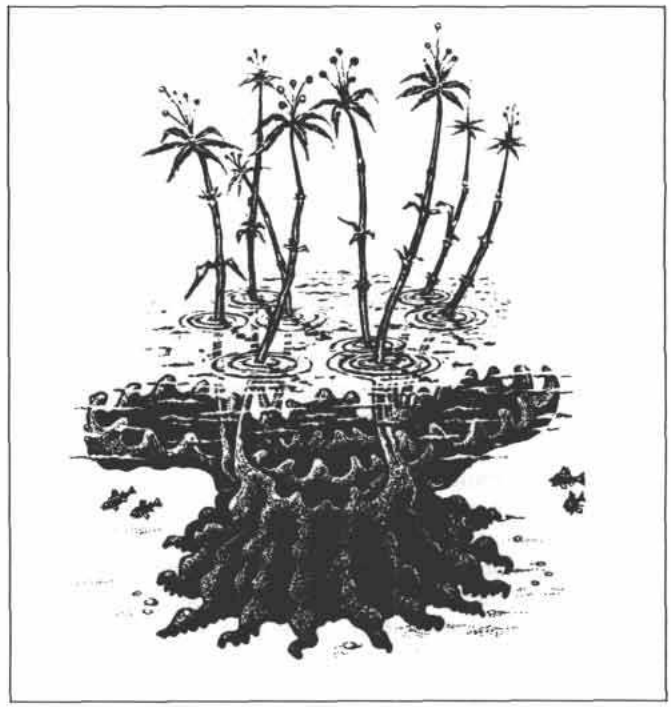
Herbivores: Animals which eat unresisting food are generally classed as herbivores. While this is usually means plant eaters, the definition here includes the eating of unresisting animals as well. Herbivores are of three types:

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 gain 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 weight. 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.



To free one's self from an attacking filter:
Routine, Str, 6 sec (hazardous).
Referee: This task represents a prompt struggle by an adventurer; success secures an escape. Up to four other characters may assist and thus may add their strength as a DM to the character's. This task is hazardous: if any mishap occurs, one of the characters who was aiding in the escape has also been caught. If no other characters were helping, ignore any mishaps.

Omnivores: Animals which eat food without regard to its resistance. The bear, which will eat fruits and berries as readily as it will hunt for animals, is an omnivore. Omnivores are of three types: gatherers, hunters, and eaters.

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.

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.

Generally, any character who is surprised by a trapper at close or short range is trapped.

To escape a trapper's trap:
Difficult, Str, 6 sec (hazardous).
Referee: This task represents a prompt struggle by an adventurer; success secures an escape. Up to four other characters may assist and thus may add their strength as a DM as well. This task is hazardous: if any mishap occurs, one of the characters who was aiding in the escape has also been caught. If no other characters were helping, ignore any mishaps.

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.

EVENTS

In addition to animals, the referee may include one or more events in the encounter tables. An event may be almost anything: an unusual animal, an interesting terrain feature, the weather, even a natural disaster. An event's purpose is to add interest, atmosphere, and perhaps a bit of danger to the adventurers' travels.

Events should be specifically tailored to the terrain in which they occur and should make allowances for the nature of the party, its weapons, and its vehicles. A number of sample events are given below. In order to present as many ideas as possible, the descriptions of individual events are short; a referee's complete description of an event may require more information.

Animals

An event is a convenient form to use in describing an unusual animal; the animal's statistics, in standard format, may follow the description, or the event may describe unusual behavior by an animal found elsewhere on the table. An event may also describe the animal's lair or spoor, rather than the animal itself.

Some catagories of animal events are:

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.).

To avoid an attack by hidden poisonous pests:
Routine, Dex, Int (fateful).

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.

To turn a stampeding herd of grazers:
Difficult, Equestrian, Int (hazardous).

Plants

Although plants generally remain just part of the scenery, some may be interesting or dangerous enough to qualify as events.

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 off the vines.

To free one's self from animated vines:
Routine, Blade, Str (hazardous).

Referee: This task represents a prompt struggle by an adventurer; success secures an escape. Up to four other characters may assist, and they may add their Strength and Blade skill as a DM as well. This task is hazardous: if any mishap occurs, one of the characters who was aiding in the escape has also been caught. If no other characters were helping, ignore any mishaps.

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 1D × 5 kilometers to the travel distance.

To avoid a mishap when driving through wirebushes:
Routine, Vehicle, Dex (hazardous).

Referee: Make this task Routine if the characters' vehicle has tracks. Wheeled vehicles simply roll for a mishap if they attempt to enter an area of wirebushes.

If a mishap occurs, one possibility is that the vehicle has become entangled. If so, the referee must define a task for the characters' to free their vehicle.

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 Str/Dex/End of each member in the group.

NATURAL DISASTERS

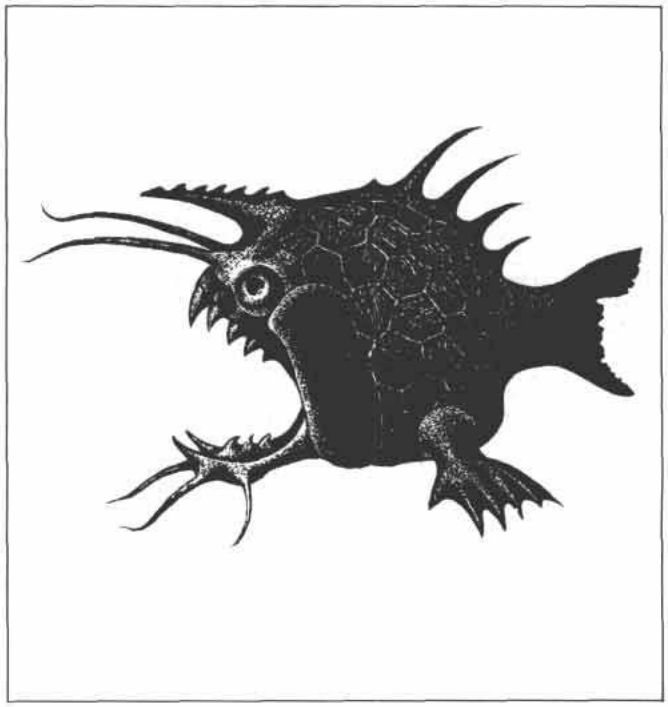
Local phenomena may also provide interesting events.

Avalanche: Throw 8+ for a loud noise (vehicle, conversation, etc.) to precipitate an avalanche.

To avoid damage from an avalanche:
Difficult, Vehicle or Str, Dex (fateful, hazardous).

Referee: This task works equally well for characters on foot or riding in a vehicle.

Prairie Fire: A line of fire can be seen on the horizon. The fire is 20 kilometers across and must be detoured. Animals



PRODUCING ANIMAL ENCOUNTER TABLES 1

1 World Size and Atmosphere

Using information about the world for which the animal encounter table is being produced, determine the World Size and Atmosphere.

BASIC WORLD DATA

UWP	*World Size*	*Atmosphere*
0	Asteroid	Vacuum
1	Small	Vacuum
2	Small	Thin
3	Small	Thin
4	Small	Standard
5	Medium	Standard
6	Medium	Standard
7	Medium	Dense
8	Large	Dense
9	Large	Exotic
A+	Large	Exotic

These characteristics correspond to the World Size and Atmosphere codes given in the *Players' Manual*.

2 Terrain Types

Determine the terrain types present on the world. For each terrain type, generate an animal encounter table.

3 Animal Type and Weight DM

Determine the animal type and weight DMs from the Animal Type and Weight DM Table. These DMs show propensity for the animal to be larger or smaller based on the terrain type they inhabit.

ANIMAL TYPE AND WEIGHT DMS

Terrain	*Terrain Equivalent*	*Type DM*	*Wt DM*
Clear	Road, Open	+3	—
Prairie	Plain, Steppe	+4	—
Rough	Hills, Foothills	—	—
Broken	Badlands	−3	−3
Mountain	Alpine	—	—
Forest	Woods	−4	−4
Jungle	Rainforest	−3	−2
River	Stream, Creek	+1	+1
Swamp	Bog	−2	+4
Marsh	Wetland	—	−1
Desert	Dunes	+3	−3
Beach	Shore, Sea Edge	+3	+2
Surface	Ocean, Sea	+2	+3
Shallows	Ocean, Sea	+2	+2
Depths	Ocean, Sea	−4	—
Bottom	Ocean, Sea	−2	—
Sea Cave	Sea Cavern	−2	—
Sargasso	Seaweed	−4	−2
Ruins	Old City	−3	—
Cave	Cavern	−4	+1
Chasm	Crevasse, Abyss	−1	−3
Crater	Hollow	—	−1

4 Select Animal Table Format

Select a 1D or 2D format for the animal encounter table to be produced.

ANIMAL ENCOUNTER TABLE FORMATS

1 Die Table		2 Dice Table	
Die	*Category*	*Die*	*Category*
1 S	Scavenger	2 S	Scavenger
2 H	Herbivore	3 O	Omnivore
3 H	Herbivore	4 S	Scavenger
4 H	Herbivore	5 O	Omnivore
5 O	Omnivore	6 H	Herbivore
6 C	Carnivore	7 H	Herbivore
		8 H	Herbivore
		9 C	Carnivore
		10 E	Event
		11 C	Carnivore
		12 C	Carnivore

5 Animal Type and Quantity

For each entry line in the Animal Encounter table being produced, determine the animal type and quantity and note it on the table.

ANIMAL TYPE AND QUANTITY

Die	*Herbivore*	*Omnivore*	*Carnivore*	*Scavenger*
0	Filter (1D)	Gatherer	Siren	Carrion-Eater (1D)
1	Filter	Gatherer	Pouncer	Carrion-Eater (2D)
2	Filter	Eater	Siren	Reducer (1D)
3	Intermittent	Gatherer	Pouncer	Hijacker (1D)
4	Intermittent	Eater (2D)	Killer (1D)	Carrion-Eater (2D)
5	Intermittent	Gatherer	Trapper	Intimidator (1D)
6	Intermittent	Hunter	Pouncer	Reducer
7	Grazer	Hunter (1D)	Chaser	Carrion-Eater (1D)
8	Grazer (1D)	Hunter	Chaser (3D)	Reducer
9	Grazer (2D)	Gatherer	Chaser	Hijacker
10	Grazer (3D)	Eater (1D)	Killer	Intimidator
11	Grazer (2D)	Hunter (1D)	Chaser (2D)	Reducer (1D)
12	Grazer (4D)	Gatherer	Siren	Hijacker
13	Grazer (5D)	Gatherer	Chaser (1D)	Intimidator (1D)

Use the animal type DM from step 3 on the die roll on this table.

The animal quantity is assumed to be 1 unless an instruction is in parentheses: then roll the dice shown for the animal quantity.

6 Special Attributes

Determine if any animal entries in the table have special attributes.

SPECIAL ATTRIBUTE TABLE

Die	*Beach*	*Marsh*	*River*	*Sea*	*Swamp*	*Other*
2	S+1	S−6	S+1	S+2	S−3	—
3	A+2	A+2	A+1	S+2	A+1	—
4	A+2	A+1	—	S+2	A+1	—
5	—	—	—	A+2	—	—
6	—	—	—	A	—	—
7	—	—	—	S+1	—	—
8	—	—	—	S−1	—	—
9	—	—	—	T−7	—	—
10	—	—	—	T−6	—	F−6
11	F−6	F−6	F−6	F−6	F−6	F−6
12	F−5	F−5	F−5	F−5	F−5	F−3

Use this table according to the terrain type of the encounter table. Apply the following DMs on this table. If World Size Large, DM-1; if World Size medium, DM+1; if World Size Small or Asteroid, DM +2. If Atmosphere Thin, DM-1; if Atmosphere Dense or Exotic, DM+2.

Results: If S, animal is Swimmer. If A, animal is Amphibian. If F, animal is Flyer. If T, animal is Triphibian.

The number on this table is a further animal weight DM, in addition to the animal weight DM from step 3.

PRODUCING ANIMAL ENCOUNTER TABLES 2

7 Animal Weight Effects

Roll 2D once for animal weight effects: animal mass in kilograms, hits, wounds modifier (which modifies weapons hits).

ANIMAL WEIGHT EFFECTS

Die	Wt	Hits	Wound	Wound Modifier
1	1	1	0	-1D-3
2	3	1	1	-1D-3
3	6	1D	1	-1
4	12	1D	2	—
5	25	1D	3	—
6	50	1D	1D+0	—
7	100	1D	1D+1	—
8	200	2D	1D+1	+1
9	400	2D	1D+1	+1D-3
10	800	2D	1D+3	+1D+0
11	1600	3D	1D+3	+2D+0
12	3200	3D	1D+4	+3D+0
13	(+6)			
14	6000	3D	2D+0	×1D+0
15	12000	3D	2D+2	×1D+0
16	24000	4D	3D+0	×1D+1
17	30000	5D	3D+0	×2D+0
18	36000	5D	3D+3	×2D+0
19	40000	5D	3D+6	×2D+2
20	44000	6D	3D+6	×3D+0

DMs: Apply any weight DM from the kind of terrain or special attribute. If World Size Small or asteroid, DM+1. If World Size Large, DM-1.

A result of (+6) requires a reroll with a DM+6; continue to reroll without a DM if (+6) is rolled.

8 Animal Weaponry

Determine the weaponry for each individual animal.

ANIMAL WEAPONRY

Die	Weapons	Hits
1	horns and hooves	2
2	horns	2
3	hooves and teeth	2
4	hooves	2
5	horns and teeth	2
6	thrasher	2
7	claws and teeth	2
8	teeth	2
9	claws	2
10	claws	2
11	thrasher	2
12	claws and teeth	2
13	claws+1	2
14	stinger	3
15	claws+1 and teeth+1	2
16	teeth+1	2
17	as blade	2
18	as pike	2
19	as broadsword	3
20	as body pistol	3

DMs: If carnivore, DM+8. If omnivore, DM+4. If herbivore, DM-3.

9 Animal Armor

Determine what armor, if any, each individual animal has.

ANIMAL ARMOR

Die	Armor
1	(+6)
2	—
3	—
4	jack
5	—
6	—
7	—
8	—
9	—
10	jack
11	—
12	(+6)
13	mesh+1
14	cloth+1
15	mesh
16	cloth
17	combat+4
18	reflec
19	ablat
20	battle

DMs: If carnivore, DM-1. If herbivore, DM+2. If scavenger, DM+1.

A result of (+6) requires a reroll with a DM+6; continue to reroll without a DM if (+6) is rolled.

10 Animal Behavior

Determine the precise range of animal behaviors and reactions that are possible.

ANIMAL BEHAVIORS

Type	To Flee	To Attack	Typical Speed
Herbivore			
Filter	1D+2(3-8)	if possible	1D-5(0-1; min 0)
Intermittent	1D+3(4-9)	1D+3(4-9)	1D-4(1-2; min 1)
Grazer	1D-1(0-5)	1D+2(3-8)	1D-2(2-4; min 2)
To Attack	To Flee	Typical Speed	
Omnivore			
Gatherer	1D+3(4-9)	1D+2(3-8)	1D-3(1-3; min 1)
Hunter	1D+0(1-6)	1D+2(3-8)	1D-4(1-2; min 1)
Eater	1D+0(1-6)	1D+3(4-9)	1D-3(1-3; min 1)
Carnivore			
Pouncer	if surprise	if surprised	1D-4(1-2; min 1)
Chaser	if more	1D+3(4-9)	1D-2(2-4; min 2)
Trapper	if surprise	1D+2(3-8)	1D-5(0-1; min 0)
Siren	if surprise	1D+3(4-9)	1D-4(0-2; min 0)
Killer	1D+0(1-6)	1D+3(4-9)	1D-3(1-3; min 1)
Scavenger			
Hijacker	1D+1(2-7)	1D+2(3-8)	1D-4(1-2; min 1)
Intimidator	1D+2(3-8)	1D+1(2-7)	1D-4(1-2; min 1)
Carrion-eater	1D+3(4-9)	1D+2(3-8)	1D-3(1-3; min 1)
Reducer	1D+3(4-9)	1D+2(3-8)	1D-4(1-2; min 1)

For herbivores (unlike most other animals) consult their flee characteristic before they consult their attack characteristic.

Each roll is a single digit and should follow the letter A (for attack), F (for Flee), or S (for Speed).

In some cases, animals will behave according to the situation. These special cases are:

If Possible: A filter will attack if it possibly can. Use the code Ap.

If Surprise: The animal will attack if it has surprise. Use the code As.

If Surprised: The animal will flee if it is surprised (as soon as it becomes aware that the other side had surprise). Use the code Fs.

If More: The animal will attack if there are more if it than there are potential prey. Use a code Am.

Continue generating entries for the animal table by doing another animal. Once an animal table for this type of terrain is completed, do another animal encounter table.

which are fleeing from the fire will ignore the party unless their escape path is blocked. Detour will add 2D × 10 kilometers to the travel distance. Roll for three animal encounters during that time.

Seismic Quake: A seismic disturbance shakes the ground.

To avoid damage from a seismic quake:
Simple, Vehicle or Str, Dex (fateful).
Referee: This task applies to characters riding in a ground vehicle. For characters on foot, make this task Routine.

Volcano: A nearby volcano errupts, and the party must flee or be overcome by poisonous gases. After the erruption, ash and lava flow have sealed the mountain pass, preventing forward progress.

Terrain Features

Adventurers may encounter variations in local terrain too small to show up on planetary maps.

Bad Water: Local water is contaminated with heavy metal concentrations. Bathing in or drinking the water will cause illness for one to six days.

Broken Ground: The terrain becomes very rough; an ATV must slow to quarter-speed or any travel tasks become hazardous.

Crevasse: A deep crevasse blocks the group's forward progress, and the party must travel 2D × 5 kilometers to detour around it.

Ford: Sandbars in the river create a shallow area, allowing vehicles to cross.

Oasis: The party approaches an oasis with a pool of water surrounded by heavy vegetation. Throw 8+ for the water to be drinkable. If it is not, moisture may still be recovered from reservoirs inside one species of plants.

Radiation Area: An area in the forest is devoid of life, and a radiation sensor shows very high levels of radiation near the center. Individuals who spend more than 10 minutes in the area will suffer from radiation sickness, taking 1 point of damage to Str/Dex/End every day for the next two weeks for every 10 minutes spent in the area. For instance, a character who spends an hour in the area will take 6 points of damage each day for the next two weeks.

Sun Crystals: At about midday, light from the sun strikes crystaline outcroppings, is concentrated and converged by them, and flashed about as a powerful energy bolt.

To avoid being hit by a sun crystal energy bolt:
Routine, Survival, Dex (fateful).
Referee: If a mishap occurs, roll for wounds as a laser carbine hit; reflec protects.

Curiosities

Some events may have no importance whatsoever and merely provide atmosphere to an adventure.

Jungle Drums: Distant drums are heard at night; periodically they fall silent and are answered from another direction. If the party investigates, they may be able to discover that these are the mating calls of a large omnivore.

Marsh Gas: Moving lights are seen in the distance, and they are apparently following the party. They may temporarily be mistaken for the running lights of an air/raft.

Mirage: An oasis appears on the horizon, but it dissolves into nothing as it is approached by the group. This continues until nightfall.

Statues: The party finds a large stone statue half buried; the torso is human but the head is that of a local carnivore. Natives of the area, if consulted, will state that such finds are common and will give varying opinions of their origin and present significance.

Vacuum Worlds

Encounter tables for Vacuum Worlds (or for any world without life) must be largely composed of events.

Dust Pool: Microfine dust fills a crater. If any character walks through the pool, or drives a vehicle through, roll the following task:

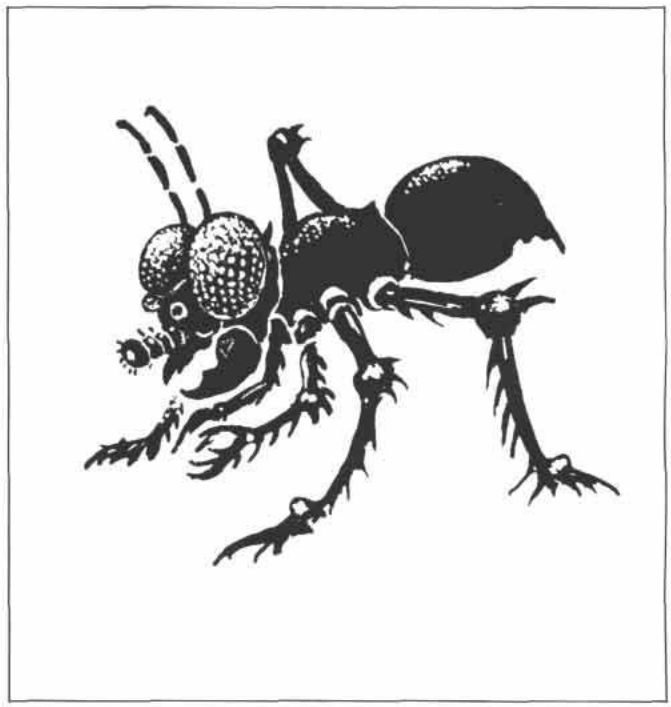
To avoid a malfunction caused by excessive dust:
Difficult, Vacc Suit or Vehicle, Dex (fateful).

Magnetic Anomaly: A large underground metal deposit deflects compass readings by as much as 60 degrees. Travellers who do not notice this will be steered off of their course.

Pressure Tent: The party comes upon a small inflatable shelter. There is breathable air inside but no heat or light, for the shelter's power pack has run down. If anyone undertakes a lengthy search, the owner's body may be found under a rockslide several hundred meters away.

Solar Storm: Increased solar activity makes routine radio communication Formidable for 1D days.

Tracks: ATV tracks cross the party's path. If the party follows them in the right direction, they will be led eventually to civilization.



Encounters

Through encounters in **Traveller**, player characters meet and interact with non-player characters (NPCs), events, animals, and other interesting phenomena. The direction and the tone of an adventure depends in a large measure on the types of individuals encountered by the adventurers as they travel about.

Encounters occur in three basic settings: urban, wilderness, and space; the specific types of encounters vary, depending on the setting. You, as the referee, must evaluate the players' activities, select one of the three settings to use, and determine when an encounter occurs. When an encounter does occur, the appropriate details must be generated, and you present the encounter to the players. As the encounter progresses, you must build on the situation, present any appropriate reactions, and administer any activity that may be called for.

Encounters with non-player characters serve as your vehicle for direction and input during adventures. The proper presentation of non-player characters can provide players with transportation, information, or other assistance given that the NPCs' reactions are appropriate. NPCs can also use violence (or the threat of violence) to redirect activity toward more reasonable goals.

Encounter Flowchart: Established encounter tables serve as a prod to the referee's imagination and aid in the efficient management of an adventure. The encounter tables are presented in standard flowchart form.

IMPORTANT CONCEPTS AND DEFINITIONS

The encounter flowchart contains many important concepts and terms, which are described here in the text.

Time Periods: Depending on what is appropriate to the moment, you must select a certain time period in order to aid in keeping an accurate record of the passage of game time. The flowchart lists several recommended time periods to use. You should make it a practice to inform your players of the current time period in effect, and they should have a say in which time period you are currently using.

The current time period being used has a great effect on the relevancy of the time increment used on tasks. For example, if time passage is being marked in days and if a certain task has a basic time increment of 5 seconds, the duration of the task has little effect on the passage of time. On the other hand, if a task has a basic time increment of 2 days, the final duration of the task can have a dramatic effect on the passage of time.

As shown on the flowchart, the time period being used has an effect on the frequency and number of encounters that occur.

Ordinary (Nonrandom) Encounters: Many encounters are dictated by the adventurers' activity and cannot be generated randomly. Adventurers meet ordinary people in the course of ordinary activity. In many cases, adventurers actually ignore the persons (and are themselves little noticed) and concentrate on their current activity instead. Personal reactions are rarely of importance, and the encountered individual merely performs his or her duties. For example, an encounter with a store clerk in the course of buying equipment is rarely of importance, and the process usually continues without trouble. Ordinary encounters occur as called for by the situation and at your discretion as referee.

At times, you may use an otherwise ordinary encounter to further the events of the adventure. In such cases, the encounter is no longer ordinary; it is instead a predetermined encounter.

Clerks: The most common form of an ordinary encounter is meeting a clerk. When an adventurer enters a store to buy equipment, a shop to procure repairs, or a restaurant to buy a meal, meeting a clerk is an ordinary encounter. There should be no problem in achieving the stated goal, and the clerk or waiter will perform the job adequately, if not perfectly. It is not necessary for you to know the UPP of the clerk or even to deal with the clerk at any great length.

Employees and Hirelings: One form of an ordinary encounter is the employment interview, where the adventurers are the potential employers. When travellers themselves need employees (for any purpose, from bodyguards to crewmembers), they must find them in the course of their various activities.

Advertising, visiting local union hiring halls, or actively spreading the word at local establishments are all possibilities for the location of potential hirelings. You, in response to this activity, must then generate several non-player characters and present them as applicants for employment. The interview consists of a conversation interpersonal task (using Interview skill), in which the players try to determine the character's UPP and skill levels.

The player characters then decide whether to hire or not based on the information determined in the interviews. Of course, applicants will be limited (perhaps 1D; one to six applicants per week), and the adventurers cannot be too choosy.

Random Encounters: As they travel about in any populated setting, adventurers have random encounters with a wide variety of individuals or groups. Such individuals are themselves performing various tasks which may complement, supplement,

oppose, or be irrelevant to the goals of the adventurers. Some random encounters are mandated by the adventure at hand: see Predetermined Encounters, below.

The list provided is only an example, and other lists may be generated for specific adventures or situations. For example, if the adventuring group is on a world embroiled in civil war, the random encounter list might be full of troops, refugees, guerrillas, war profiteers, petty warlords, and members of various factions.

Rumors: Information is a valuable commodity to travellers, and rumors are the source of much useful information. The term *rumor* is a catchword covering a wide variety of presentations of information. Rumors may be newspaper or broadcast information; they may be conversations overheard on public transport or in local eating establishments; they may be bits and pieces brought together by the listener. In any case, the idea of the rumor allows the player characters to learn of new, exciting, and potentially rewarding (or potentially deadly) situations. In many **Traveller** situations, a rumor is simply information leading to a patron, a job, or a potential treasure; in **Traveller** adventures or campaigns, rumors serve to educate and direct the player characters toward the essential basis of the adventure.

Rumors are faceless. The player character's own decision to act on a rumor makes him or her responsible for the results. There is no one to pin the blame on if the rumor proves false.

Rumors are untraceable. No one can definitely point to the source of a rumor and state that it originally began there. Rumors are, in effect, absent patrons, providing information that allows player characters to act, and having once acted, to win or lose on their own merits.

Rumors are valuable, and once player characters know of their potential, they will seek them out. Ultimately, all available rumors should be given to the player characters, but they should be doled out slowly in order to insure each rumor is dealt with and understood (if possible).

Legal Encounters: The law level of each world determines the degree of permissiveness or oppression which prevails. In addition to stating what weaponry is or is not allowed, the Law Level addresses the problem of harassment by local enforcers or police. Permissive worlds allow individuals to settle their own differences and to protect themselves. The likelihood of the local police bothering anyone is remote. On oppressive worlds, the local enforcers are charged with great responsibility and spend much of their time protecting local law and order. As a result, they are much more likely to stop and question strangers, which often reduces this procedure to a simple form of harassment.

Patrons: The key to adventure in **Traveller** is the patron. When a band of adventurers meets an appropriate patron, they have a person who can give them direction in their activities and who can reward them for success. The patron is the single most important non-player character possible.

A patron will, if he or she decides to hire a band of adventurers, specify a task or deed to be performed and then finance reasonable expenses for the pursuit of that task. Some tasks are ordinary in nature, such as employment as armed guards or escorts; other tasks may include the location and procurement of items of great value.

Generally, a patron's agreement with a band of adventurers will specify that the patron will receive the item he or she is seeking, and all other goods or items acquired will belong to the adventurers. Other possible agreements may call for the adventurers to receive shares in the total profit of the venture, from which their current salaries will be deducted.

Two patron lists are provided on the flowchart; in the case of a specific adventure or campaign, you may want to create a special patron list which will more closely reflect the situation in the game. For example, if the current adventure centers on exploration and survey of a poorly charted subsector, then the range of patrons might include merchants eager for trade franchises or news of new markets, mercenaries looking for new wars to fight, smugglers in search of goods, and government officials attempting to restrain access to the new area.

Animal Encounters: The animal life to be encountered on various alien worlds may pose dangers to the adventurers, and animal encounter tables based on world type and terrain type are used to determine what kinds of animals may be met and how they will react. Animal encounter tables are produced using the generation procedure shown in the chapter on Animals.

Animal encounters can occur while the band is travelling or while the band is halted (for rest, exercise, encampment, or whatever). In addition, specific encounters at specific locations are always possible. For example, you may already have populated a location (perhaps a ruin) with specific animals.

Special Effects: Animal encounters constitute the only general possible access that characters have to food, furs, or other valuable items. Guides may be hired or present for the purpose of assisting in the location of specific animals, thereby contributing DMs to a task to locate a specific type of animal. Animals are usually edible (throw 5+ to be edible, DM −3 if the atmosphere is tainted) provided the planetary atmosphere is between 2 and 9 and the animal does not have a poison weapon. Otherwise, the animal is inedible. From 5% to 30% (throw one die times 5%) of an animal's weight will be edible meat. A person requires one kilogram of meat per day when living off the hunt.

You may elect to describe animals in order to allow a better image in the adventurers' minds. The basic system may be used without this aspect, but descriptions such as lion-like, amoeboid, canine, or others may prove useful.

Starship Encounters: As the players travel through space, especially when in orbit around a populated, high tech world, they will encounter other space vessels. The specific types of ships encountered are listed in the *Imperial Encyclopedia*. However, the flowchart lists these various missions which spacegoing vessels may be engaged in:

Business: The vessel is travelling on some form of business, perhaps adventurers working for a patron or bureaucrats on business.

Charter: The vessel has been chartered for some special purpose (a group of adventurers on a safari, a religious group on a sojourn, or whatever).

Communication: The vessel is carrying information, typically express boat information.

Courier: The vessel is carrying goods and/or personnel. Courier missions may be interpreted as a form of errand-running.

Distress: The vessel is in danger. The distress call may be legitimate or a decoy to lure the player's ship to a pirate vessel.

Escort: The vessel accompanies other ones to protect them.

Maneuvers: The vessel is engaged in military excercises.

Patrol: The vessel is checking the vicinity to ensure all is well.

Piracy: The vessel is illegally preying on other starships with the goal of taking hostages or stealing cargo.

Pleasure Tour: Travel is for passenger enjoyment.

Privateering: The vessel is engaged in "legalized" piracy via a letter of marque.

Prospecting: The vessel is scanning asteroids or desolate planets for minerals.

Research: The vessel is involved in scientific research.

Smuggling: The vessel is carrying illegal goods and/or wanted passengers. Such missions portray themselves as transport missions to avoid betraying their true nature.

Survey: The vessel is conducting a slow examination of a system to determine new data or to correlate old data.

Trade: The vessel is carrying speculative cargo.

Transfer: The vessel is on its way to its next mission.

Transport: The vessel is carrying goods and passengers.

Predetermined Encounters: In the course of an adventure, certain encounters cannot be random; they form an integral part of the adventure plot line. Predetermined encounters are generated by the referee ahead of time.

Predetermined encounters may include interviews with witnesses, discussions with police or private investigators, observations of likely suspects, conversations with data librarians, observations of guards at the kidnappers' hideout, and rescue of the daughter herself. No table of random personalities can provide these individuals; the referee must produce them in anticipation of the player characters' actions.

Many pregenerated adventures provide the predetermined encounters and NPCs necessary for running the adventure. Because provision is made for predetermined encounters as a part of the normal encounter process, predetermined encounters can be disguised as another type of encounter, which makes the game more fun for all since the players will never be sure when an encounter is a preplanned.

NON-PLAYER CHARACTERS

Player characters will encounter people not manipulated by another player. These may be thugs or assailants, potential hirelings or patrons. Their skills and abilities must be determined by you. You may use the Quick NPC procedure to end up with an NPC in a hurry or character generation to create a full-fledged character. Most new **Traveller** players spend time generating characters. You can save these characters for future use as non-player characters.

Loyalty and Dedication: Usually, non-player characters will be dependable and loyal; but a seemingly loyal non-player character may have foul play at heart.

Use the uncertain portion of interpersonal tasks to determine an NPCs loyalty, with the level of truth representing the level of loyalty. Continued loyalty is dependent on the quality of treatment and level of skill of their employing player characters.

Attitude: Non-player characters' attitudes will indicate their basic stance. If players wish to deal with any NPC at length, you should use the interpersonal task procedure.

REFEREE'S RESPONSIBILITIES

In administering any encounter, you must be responsible for the details of the situation.

Presenting Encounters Effectively: Each encounter can be defined by these questions: Who or What? How Many? Why? How? When? Where?

Who or What?: Detail the identity of the encountered individuals (Who? for intelligent beings; What? for animals). For individuals, know the UPP plus any skills, weapons, and other data, which can be generated on the spot by using the Quick NPC procedure, by deriving from pregenerated lists or tables, or simply by faking, depending on how important it is. For animals, you should know the details of the animal (from Animals) including Hit Value, Weaponry, Wounds Caused, Armor, and Reactions. The data can be taken from animal encounter tables or just improvised on the spot.

How Many?: Determine the number of encountered individuals or animals. In some cases, an encounter table may indicate a precise number, or a die roll may be called for.

Why?: You should determine a reasonable motivation for the encounter. Motives may range from rowdiness to robbery to protection of territory; for animals, motives may involve food, fear, bad temper, or protection of young.

How?: Determine the details of the encounter, including the specifics of the situation. Is transport available, and how is each side organized or arranged when they meet?

When?: The precise time should be determined, which in turn affects lighting, weather, and other conditions.

Where?: You should determine the specifics of terrain, including terrain type (generally already known), the details of possible cover and concealment, and any other pertinent facts. Do not present all of this information to the players in one lump. They should be told only what they can see or otherwise determine. As the encounter progresses, unfold more details.

ENCOUNTERS 1

1 Appropriate Time Period

The referee must select the most appropriate time period at this point in the adventure. The table shows commonly used time periods.

ENCOUNTER TIME PERIODS

Description	Duration
Combat Round	6 seconds
Ten Cbt Rds	1 minute
Short Interval	10 minutes
Hour	1 hour
Quarter Day	6 hours
Full Day	24 hours
Week	7 days
Month	30 days
Year	365 days

The Quarter Day is a particularly convenient way to measure time during an adventure when the players are busy with a lot of detailed activities. The Quarter Day divides a day into four uniform time segments: morning, afternoon, evening, and night.

2 Number of Encounters

Determine the number of encounters that occur during the time period.

ENCOUNTER QUANTITY

Time Period	*No. of Encounters*
Combat Round	optional
Ten Cbt Rds	optional
Short Interval	optional
Hour	1 encounter on 11+
Quarter Day	1 encounter on 7+
Full Day	1D important encounters
Week	1D memorable encounters
Month	2D memorable encounters
Year	3D memorable encounters

Note: Important encounters have application to any current activities. Memorable encounters are important encounters that will be remembered when character look back on their activities.

3 Encounter Setting

The referee must select (based on the environment) whether the setting is urban, wilderness, or space.

When multiple encounters occur, the referee must determine how much of the time period is spent in each encounter.

Encounters can generally be categorized as Urban, Wilderness, or Space Encounters.

4a Urban Encounters

Determine the specific type of encounter by rolling 2D.

URBAN ENCOUNTER TYPES

Die	*Type*
2	Rumor
3	Random
4	Animal
5	Predetermined
6	Rumor
7	Random
8	Rumor
9	Predetermined
10	Patron
11	Random
12	Rumor
13	Legal

DMs: If Low Law (1-3), DM+1. If Mod Law (4-7), DM+2. If High Law (8-9), DM+3. If Ext Law (A+), DM+4.

4b Wilderness Encounters

Determine the specific type of encounter by rolling 2D.

WILDERNESS ENCOUNTERS

Die	*Type*
2	Animal
3	Animal
4	Animal
5	Predetermined
6	Animal
7	Animal
8	Animal
9	Predetermined
10	Rumor
11	Random
12	Patron
13	Legal

DMs: If Low Pop (0-3), DM+1. If Mod Pop (4-8), DM+2. If High Pop (9+), DM+3.

4c Space Encounters

Determine the specific type of encounter by rolling 2D.

SPACE ENCOUNTERS

Die	*Type*
2	No encounter
3	No encounter
4	No encounter
5	Predetermined
6	Merchant
7	Merchant
8	Merchant
9	Predetermined
10	Civilian
11	Non-starship
12	Naval/Scout/Xboat
13	Naval/Scout/Xboat

DMs: If Starport A or B, DM+1. If Starport E, DM-1. If Starport X, DM-5. If Scout Base, DM+2. If Naval Base, DM +2, If High Pop (9+), DM+1.

Go to the Space Encounters chart (in the *Imperial Encyclopedia*).

5 Rumors

Provide an item of information from a newspaper, broadcast, or overheard conversation. Information may be:

- True Information.
- False Information.
- Misleading Information.
- Irrelevant Information
- Background Information
- Potential Clue.

Rumors may include:

- Leads to potential jobs or patrons.
- Locations of potentially valuable finds or discoveries.
- Warnings about hazards.
- Education about the universe.

6 Patron Encounters

Generate a patron encounter. If the course of the adventure calls for a patron, the referee may devise a specific encounter. Otherwise, the Patron Encounter Tables may be used.

Go to the Patron Encounter Tables.

6a Patron Encounters

Select one of the two patron lists below. Roll 1D twice and consult the list.

PATRON LIST 1		PATRON LIST 2	
Die	*Patron*	*Die*	*Patron*
11	Arsonist	11	Naval Officer
12	Cutthroat	12	Scout Official
13	Assassin	13	Marine Officer
14	Hijacker	14	Hunter
15	Smuggler	15	Port Warden
16	Terrorist	16	Naval Officer
21	Crewmember	21	Reporter
22	Peasant	22	Technician
23	Rumor	23	Doctor
24	Clerk	24	Rogue
25	Soldier	25	Noble
26	Shopkeeper	26	Govt Official
31	Shipowner	31	Barbarian
32	Tourist	32	Scout Pilot
33	Merchant	33	Pirate
34	Police	34	Researcher
35	Scout	35	Writer
36	Rumor	36	Professor
41	Diplomat	41	Crime Leader
42	Courier	42	Scientist
43	Spy	43	Belter
44	Scholar	44	Architect
45	Governor	45	Steward
46	Administrator	46	Financier
51	Mercenary	51	Navigator
52	Naval Officer	52	Swindler
53	Marine Officer	53	Broker
54	Scout	54	Arms Broker
55	Army Officer	55	Doctor
56	Mercenary	56	Pilot
61	Noble	61	Merchant
62	Playboy	62	Rogue
63	Avenger	63	Embezzler
64	Emigre	64	Belter
65	Speculator	65	Bureaucrat
66	Rumor	66	Diplomat

DMs on List 1:

On 1st die roll:

If character is merchant, DM-1.

If noble (Soc B+), DM+1.

On 2nd die roll:

If character is rogue or diplomat, DM-1.

If marine or army, DM+1.

DMs on List 2:

On 1st die roll:

If character is navy, DM-1.

If merchant, DM+1.

On 2nd die roll:

If character has Streetwise, DM-1.

If Admin, DM+1.

Unless players are actively seeking a patron, most patron encounters should be ignored or converted to other types of encounters.

6b Patron Mission

The following are a list of suggestions for a patron's mission.

- Transport Self.
- Transport Others.
- Transport Cargo.
- Pick Up Others.
- Pick Up Cargo.
- Vehicle Crew.
- Capture Animal.
- Rescue Another.
- Find Lost Cargo.
- Find Lost Person.
- Surveillance.
- Infiltration.
- Act as Agent.
- Guard Self.
- Guard Others.
- Guard Place.
- Guard Cargo.
- Guard Vehicle.
- Provide Opinion.
- Investigate Mystery.
- Join Expedition.
- Smuggling.
- Sabotage.
- Kidnap Another.
- Kill Another.
- Steal Cargo.
- Destroy Cargo.
- Steal Vehicle.
- Harrass Others.
- Frame Others.
- Coerce Others.
- Perform Repairs.
- Aid in Speculation.
- Perform Military Action.
- Find Place.
- Act as Guides.
- Provide Expert Skill.
- Manage Assets.

7 Predetermined Encounter

A predetermined encounter is any predefined encounter that the adventure states must occur as a part of accomplishing the goal of the adventure.

Properly done, the players may not be able to distinguish a predetermined encounter from a purely random one.

Implement A Predetermined Encounter.

8 Legal Encounter

The characters are stopped by local law enforcers.

Reasons for a legal encounter include: ID check, questioning about a local event, or a broken local law.

9 Random Encounters

Random encounters are situations which provide diversion and excitement.

RANDOM ENCOUNTERS

Die+ Die	Qty	Type	Remarks
11	1D	Peasants	−3
12	2D	Peasants	−2
13	2D	Workers	−1
14	3D	Rowdies	L
15	2D	Thugs	L
16	4D	Riotous Mob	−1
21	2D	Soldiers	+1 LG
22	2D	Soldiers	LGAV
23	1D	Police Patrol	+1 GA
24	2D	Marines	LGA
25	3D	Security Troops	+1 GA
26	2D	Soldiers	LGA
31	1D	Adventurers	+2 GA
32	2D	Noble	LGAV
33	2D	Hunters	+1 LG
34	2D	Tourists	+2
35	1D	Researchers	+3V
36	1D	Police Patrol	VG
41	1D	Fugitives	V
42	2D	Fugitives	G
43	3D	Fugitives	G
44	2D	Vigilantes	G
45	3D	Bandits	L
46	3D	Brigand Ambush	LGA
51	1D	Merchants	+1 LA
52	2D	Traders	GV
53	2D	Religious Group	
54	1D	Beggars	L
55	5D	Pilgrims	A
56	3D	Guards	A
61	1D	Media Crew	LV
62	2D	Students	
63	1D	Athletes	
64		Event: Witness Accident.	
65		Event: Trash Dump	
66		Event: Local Shop	

Note: Unless otherwise stated, each individual has a small blade weapon, no armor, and is on foot.

L: Leader present (typically has the best equipment for the tech level).

G: Has guns of proper tech level.

A: Has armor of proper tech level.

V: Has a vehicle of proper tech level (possibly riding animals).

+N: or −N: Increase or decrease the group's equipment tech level by that number. Robots may be among a group's number if the group is tech level 12+.

10 Animal Encounter

One or more animals have been encountered.

Use an established or pre-generated animal encounter table for the current terrain type.

If a table is not available, generate such a table.

10a Animal Encounters

Roll 2D on the animal encounter table appropriate to the terrain.

10b Animal Quantity

If the quantity column shows a die roll, roll for the number of animals.

10c Animal Reactions

Roll for animal reactions. Determine if the animal attacks or flees before reporting the encounter to the characters.

In some cases, animals will react in special ways.

Ap: The animal attacks if possible.

As: The animal will attack if it has surprise.

Am: The animal will attack if it outnumbers its potential prey.

Fs: The animal will flee if it is surprised.

10d Encounter Range

Roll 2D for encounter range.

ENCOUNTER RANGE

Die	*Range*
1-	Short
2	Close
3	Short
4	Medium
5	Short
6	Medium
7	Medium
8	Long
9	Medium
10	Very Long
11	Long
12	Very Long
13+	Very Long

Terrain DMs for Encounter Range: Apply the following DMs to the roll for encounter range based on the current terrain type.

Clear, Road, Open	+3
Plain, Prairie, Steppes	+3
Rough, Hills, Foothills	+2
Broken, Highlands	+2
Mountain, Alpine	+3
Forest, Woods	+1
Jungle, Rainforest	0
River, Stream, Creek	+1
Swamp, Bog, Marsh	-4
Desert, Dune, Sand Sea	+4
Maritime Surface	+2
Maritime Subsurface	-1
Arctic	-4
City, Building Interior	-5
Cave	-5

10e Special Animal Cases

If the animal is a filter or a trapper, the attack is handled differently.

Filters

Filters inflict automatic wounds of 1D per 150 kilograms of filter animal mass attacking. They attack by reflex. If a character is caught in a filter, use the following:

To free oneself from an attacking filter:
Routine, Str, 6 sec (hazardous).
Referee: This task represents a prompt struggle by the adventurer. Success secures an escape. Up to four others may assist and add their strength to the task. If any mishap occurs, one of the assistors is also caught.

Trappers

A character surprised by a trapper at close or short range is trapped.

To escape a trapper's trap:
Difficult, Str, 6 sec (hazardous).
Referee: This task represents a prompt struggle by the adventurer. Success secures an escape. Up to four others may assist and add their strength to the task. If any mishap occurs, one of the assistors is also caught.

11 NPC Attitude

Determine the attitude of the non-player character. Roll 2D for NPC attitude (only if at short range or less).

NPC ATTITUDE

Die	*Attitude*
4-	Rude
5-7	Neutral
8+	Polite

DMs: Extreme Law, DM-2.

11a Quick NPC Physical Stats

Roll 2D on the table below for basic NPC physical characteristics.

QUICK NPC PHYSICAL

Die	*Physical*	*Life Force*	*Hits*
2	333	9	2/2
3	474	15	3/3
4	744	15	3/3
5	447	15	3/3
6	774	18	3/4
7	777	21	3/5
8	77A	24	4/5
9	7AA	27	4/6
10	AA7	27	4/6
11	AAA	30	4/7
12	CCC	36	5/8

11b Quick NPC Mental Stats

Roll 2D on the table below for basic NPC mental characteristics.

QUICK NPC MENTAL

Die	*Mental*
2	33
3	55
4	66
5	47
6	74
7	77
8	99
9	7A
10	A7
11	AA
12	CC

11c Quick NPC Social Stat

Roll 2D for the NPC Social Standing.

11d Quick NPC Age

Roll 2D for the NPC's age.

QUICK NPC AGE

Die	*Age*
2	18
3	22
4	28
5	30
6	34
7	38
8	40
9	44
10	52
11	60
12	66

11e Quick NPC Skills

Compute the NPC's significant skills level based on the formula below. Create an appropriate mix of skills.

$$\text{Significant Skills Level} = \frac{}{\text{Age} + 10 + 1\text{D (round up)}}$$

For example, if the result is 5, the NPC may have one skill-5, or one skill-3 and one skill-2, or five skill-1. Any combination is possible if the combination does not exceed the significant skill level.

If another quick NPC is required, cycle through the chart again.

Interpersonal Tasks

As the characters move about and encounter others, they must by necessity deal with those around them in order to achieve their goals. Few real life encounters involve threats and gun play; neither should violence be the only option in **Traveller**. In fact, true to the real world, violence in **Traveller** can be deadly; talking out your differences is preferable. Suddenly, Liason skill may be more important to saving the characters' necks than Laser Rifle skill.

Just as the combat rules describe tasks to use when fighting, this chapter provides rules and predefined tasks for playing out interpersonal encounters. These tasks also give the players a chance to exercise their characters' hard earned noncombat skills as they attempt to gain the cooperation of others.

DEALING WITH PEOPLE

Interpersonal tasks are simple, everyday activities that are frequently used when dealing with other people. Their purpose is to gain an advantage, whether social, physical, or financial.

Persuasion skill can always be used as an applicable skill in an interpersonal task (regardless of the specified skills for the task, and in addition to the specified skills) unless the task specifically excludes it.

Reactions: An interpersonal task attempts to achieve a positive reaction from the person it is directed at. Even when the initial reaction is not positive, it is possible to keep trying in hopes of a better subsequent reaction.

On the first attempt of an interpersonal task, consult the Initial Reaction table. If the initial reaction is not satisfactory and retrying the interpersonal task is allowed and attempted, then consult the subsequent reaction table for all later attempts which are made.

Estimating Others' Characteristics: When meeting and dealing with other characters (especially NPCs), characters must often estimate the UPP characteristics of the individuals they meet. Characters can use tasks to perform this estimation.

To estimate a physical characteristic:
Routine, Medical, Int (uncertain).
Referee: Roll one task for each physical characteristic (Str, Dex, End). If the result of the uncertain task is: **No Truth:** Misrepresent the physical characteristic by 2D-7. **Some Truth:** Misrepresent the physical characteristic by 1D-3. **Total Truth:** Provide the correct physical characteristic value.

To estimate a mental characteristic:
Routine, Int, Edu (uncertain).
Referee: Roll one task for each mental characteristic (Int, Edu). If the result of the uncertain task is: **No Truth:** Misrepresent the mental characteristic by a 2D-7. **Some Truth:** Misrepresent the mental characteristic by 1D-3. **Total Truth:** Provide the correct mental characteristic value.

To estimate Social Standing:
Routine, Liason or Streetwise or Bribery, Int (uncertain).
Referee: If the result of the uncertain task is: **No Truth:** Misrepresent Social Standing by 2D-7. **Some Truth:** Misrepresent Social Standing by 1D-3. **Total Truth:** Provide the correct Social Standing value.

To estimate any UPP characteristic:
Routine, Interview, Edu, 5 min (uncertain).
Referee: Roll one task for each UPP characteristic (Str, Dex, End, Int, Edu, Soc, Lif, Det, Exp). If the result of the uncertain task is: **No Truth:** Misrepresent the characteristic by 2D-7. **Some Truth:** Misrepresent the characteristic by 1D-3. **Total Truth:** Provide the correct value.

Characters can also estimate secondary characteristics. An estimate of Lif provides a check on the accuracy of the estimate of its components (Str, Dex, End); an estimate of Det provides a check on the estimate of End and Int; an estimate of Exp provides a check on the estimate of Int and Edu.

Determining the Skills of Others: As with characteristics, when meeting and dealing with other characters (especially NPCs), the referee may not simply read the character's skills to the players. The players must roll tasks to estimate another character's skills and skill levels:

To estimate a skill level by observation:
Difficult, [skill], Edu, 5 min (unskilled OK, uncertain).
Referee: The skill in brackets is the skill being estimated. If the character attempting the task also has the skill in question, he can use it as a DM while attempting to determine if another character also has the skill. If the result of the uncertain task is: **No Truth:** Misrepresent the skill level by 2D-7 (but treat a result of less than 0 as no skill). **Some Truth:** Misrepresent the skill level by 1D-3 (but treat a result of less than 0 as no skill). **Total Truth:** Specify what the true skill level is for that character.

Interpersonal Conversation

Conversation between individuals is a primary way of gather

ing information and assistance. Any time the players want to talk to an NPC at length in a casual setting with the goal of learning some valuable piece of information, use the Conversation task.

To gain useful information from a conversation:
Routine, Carousing, skill (confrontation, uncertain).
Referee: The other unnamed skill is some skill which is appropriate to the conversation or setting (such as Streetwise, Admin, etc).

The referee should set a rather long time increment on this task; it takes a lot of conversation for a character to gain useful information. To deliberately pump for information, increase task difficulty.

Interpersonal Negotiation

Negotiation is an attempt to produce cooperation, whether in setting rules, contracts, or agreements.

To negotiate with the aim of gaining cooperation:
Routine, Liaison, skill, (confrontation, uncertain).
Referee: The other unnamed skill is some skill appropriate to the negotiation (Admin, Trader, etc).

If the time increment doesn't seem to matter in the context of the current activities, ignore time.

Interpersonal Bribery

Bribery is an attempt to gain cooperation through the payment of money.
Bribery requires two steps: preparation and action.
When a preparation task fails (or is less than Total Truth, if an uncertain task), and the character insists on continuing, increase the difficulty of the subsequent task by one level.

To evaluate an individual's susceptibility to bribery:
Impossible, Bribery, Soc (confrontation, uncertain, hazardous).
Referee: An uncooperative individual should not be bribed. This is a preparation task to determine if the individual is cooperative. This task assumes a Law Code of No Law; Low Law is Formidable, Mod Law is Difficult, High Law is Routine, Ext Law is Simple.

To bribe an individual:
Routine, Bribery, Soc (confrontation, uncertain, hazardous).
Referee: The character must make a cash offer based on the Social Standing of the individual being bribed: Soc 2 times 5. If the cash offer is inadequate, increase the task difficulty.

Initial Reaction: If a mishap occurs, the individual reports the character making the bribe to the authorities. Do not inform the players of the mishap until it is implemented.
Subsequent Reaction: For each bribery attempt that fails, double the minimum cash offer required. If the cash offer is more than double the minimum required, roll 2D on the Mishap Table: if a Major Mishap occurs, the individual reports the character making the bribe to the authorities.

Interpersonal Interrogation

Interrogation is an attempt to question an individual.

To gain useful information from an interrogation:
Difficult, Interrogation, End, Int (confrontation, uncertain).
Referee: Only the defender can use End and Int as a DM. Up to three interrogators may participate at one time; they may combine their skill as a +DM, but the maximum DM limit is ±8.

If this task succeeds, the defender must roll on the mishap table. Those performing the interrogation select how many dice the defender must roll: 1D, 2D, or 3D. The damage is applied to physical characteristics. At tech level 8+, up to half the damage may be applied to Int.

Interpersonal Impersonation

The referee may want to play out the first task in more detail.

To prepare a disguise for an impersonation:
Difficult, Disguise, Dex (uncertain).
Referee: This is a preparation task. Difficulty depends on who is being fooled. If those being fooled *know* the impersonated one personally, the task is Formidable. If the individuals being fooled *know of* the impersonated, the difficulty of the task is as stated. If the impersonation involves only an occupation (starship engineer, etc), the task becomes Routine.

INITIAL REACTION

Task Result	*Individual's Reaction*
Exceptional Success	Passively Cooperative
Success	Neutral
Failure	Passively Uncooperative
Exceptional Failure	Actively Uncooperative

SUBSEQUENT REACTIONS

Task Result	*Individual's Reaction*
Exceptional Success	+2 levels (more cooperative)
Success	+1 level (more cooperative)
Failure	No change
Exceptional Failure	-1 level (less cooperative)

CERTAINTY LEVELS

Certainty Level	*Effect on the Reaction*
Total Truth	NPC statements are objective.
Some Truth	NPC statements are opinion.
No Truth	NPC statements are exaggerated.

POSSIBLE NPC REACTIONS

Reaction	*Explanation*
Hostile/Flee	As stated (referee's choice).
Actively Uncoop	Rude; doesn't want involved.
Passively Uncoop	Polite; doesn't want involved.
Neutral	Polite; provides no assistance.
Passively Coop	Polite; provides some assistance.
Actively Coop	Friendly; provides valuable assistance.
Totally Coop	As stated.

Trade and Commerce

Trade between planets depends on demand for goods at each end of the trading route. Because of the expense of interstellar transportation, most worlds strive to be self-supporting; they produce their own building materials, food, and necessities. But there are still a wide variety of trade goods that can and must be carried between the stars.

The trade and commerce flowcharts present the procedure for locating goods to be shipped and locating markets.

TRADE DEFINITIONS

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 kiloliters). 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 which 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 Cr1000 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. Postal services are operated by governments; express services are operated by private companies.

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 Cr5000.

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: he may become a speculator and buy cargo in order to fill unused freight space. The prime 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 which 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.

Sourceworld: A sourceworld is the world where goods originate. The UWP of the sourceworld 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.

Marketworld: A marketworld is the world where goods are to be shipped; it is the market or destination for trade goods. The UWP of the marketworld 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 at its sourceworld.

Price: Price is the amount a cargo is expected to sell for at its marketworld. It is possible to compute the base price of goods before arriving at a world simply by analyzing the marketworld's UWP. Careful merchants do this to predict the relative marketability of goods at various accessible worlds.

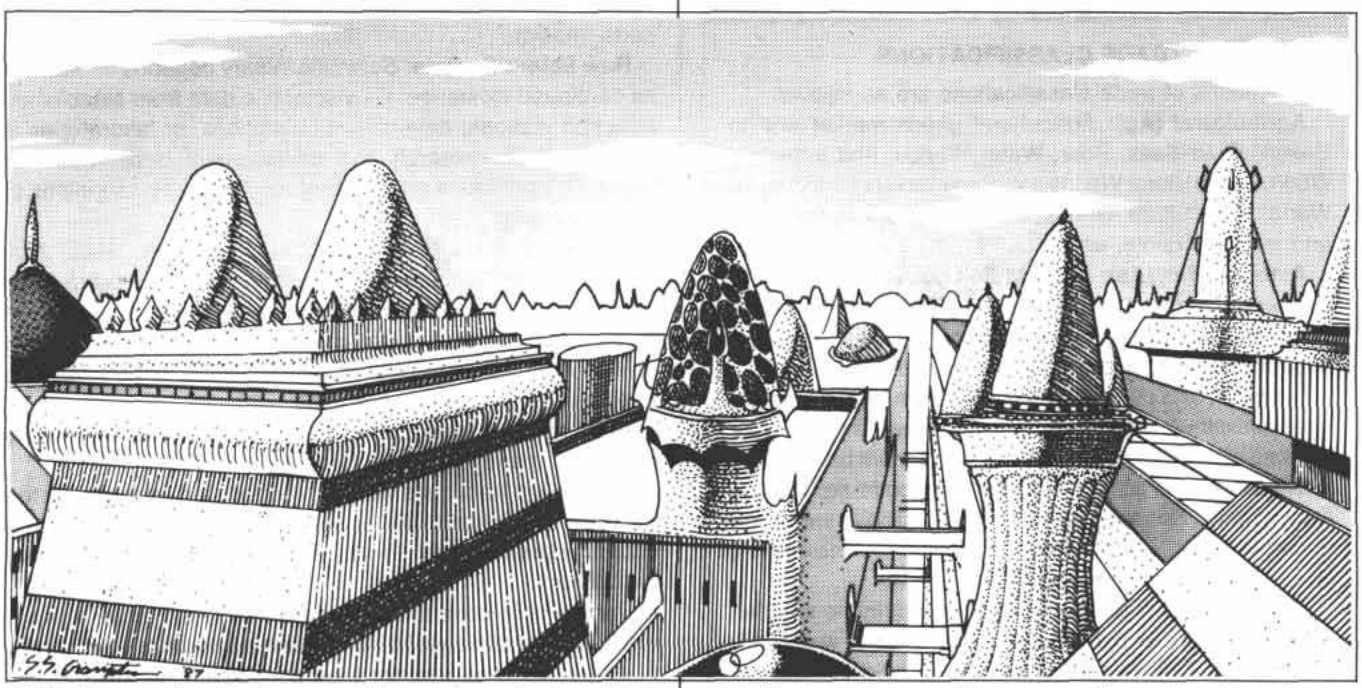
Price is an expected price; selling price is the actual price determined at the moment of sale.

Selling Price: Selling price is the amount a cargo actually sells for at its marketworld through the use of the Actual Value Table. Selling price for goods varies as the actual market 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 sourceworld are delivered when off-loaded on the surface of the destination world. This custom applies to both cargo and passengers.

CARGO IDENTIFICATION

A cargo can be identified by stating its sourceworld's Starport Type, Tech Level, Trade Classifications, and cost. Starport Type and Tech Level are derived directly from the sourceworld



UWP. All trade classifications possible are determined and then listed together (the determination of trade classifications is covered below). Cost is then determined using the cost system (cost is what the trader pays to buy trade goods; price is what the trader is paid when he or she sells the goods; the difference is gross profit). If the cargo is not of Imperial origin, it should be labeled as to origin.

For example, a cargo from Regina in the Spinward Marches could be identified as: A-A Ri Cr7000.

A cargo from Zivije in the Spinward Marches is identified as: C-B Hi Fl Cr8100.

A cargo from Chronor (a Zhodani world in the Spinward Marches) is identified as: B-C Na Ni Ic Cr8200 Zh.

Lower cost cargoes are always preferable because they allow more potential profit.

Estimating the Sales 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).

The trade and commerce flowcharts contain the exact procedure to use for estimating the sales price beforehand.

TYPES OF INTERSTELLAR TRADE GOODS

Interstellar trade goods may be many things, some of which are more probable than others. The flowcharts in this chapter provide a procedure for determining the precise nature of the goods in each cargo lot. The following are examples of possible trade goods:

Natural Resources: One of the basic trade goods in interstellar trade is natural resources. The exploration of space is driven in part by a search for essential basic raw materials in the hopes that they can be found and made available at competitive prices even after the cost of their transportation over interstellar distances. Such natural resources include unprocessed ores, raw crystals and gems, various compounds, plants, and animals.

Processed Resources: Once the basic raw resources have been collected, they need to be processed into refined raw materials and basic finished goods. Processed resources include processed ores (from which the basic contaminants have been removed), raw organics (harvested plant or animal materials usable as food or in further manufacturing processes), and processed compounds (raw materials typically not found in nature, such as industrial chemicals).

Manufactured Goods: Some manufactured goods may be produced in excess quantity and made available for export in order to help bring down the costs of overall production. Some goods are best processed or manufactured close to the source of raw materials; the finished product is then exported to other worlds. Manufactured goods include pharmaceuticals (both for the treatment of all manner of illness or disability, and those in special demand for their effects on healthy individuals, such as anagathics to increase the human lifespan), various consumables (spices, beverages, aromatics and perfumes, disposable goods), clothing, protective gear, and various durable goods (mechanical parts, weapons, tools, vehicles, electronic devices, furniture, appliances, computers, and robots).

Information: A perennial trade good is information. Books, tapes, and software all enjoy a continuing market as individuals pursue educations and find a need for basic materials.

Creative Works: The products of the artistic sense are always in demand as decoration and ornamentation for homes and businesses. Creative works include:

Art (paintings, sculpture, holographics, photographs);

TRADE CLASSIFICATIONS

Definitions of trade classifications are as follows:

Agricultural (Ag): Agricultural goods market well to Desert, Fluid Seas, Poor, Water Worlds, and Industrial Worlds. Agricultural Worlds are good markets for Industrial Worlds, Agricultural Worlds, Barren Worlds (for new plant and animal strains), and Rich Worlds.

Asteroid Belt (As): Asteroid Belt goods market well to Industrial, Nonagricultural, Vacuum Worlds, and Asteroid Belts. Asteroid Belts are good markets for Agricultural, Industrial, Nonagricultural, and Vacuum Worlds.

Barren World (Ba): Goods from Barren Worlds are raw materials mined or gathered by a ship crew. They are poor sources of cargoes and resources and cannot be markets.

Desert World (De): Desert World goods sell well to Desert and Nonagricultural Worlds. They are good markets for Agricultural, Desert, Industrial, Nonagricultural, and Rich Worlds.

Fluid Oceans (Fl): Nonwater oceans may be sources of raw materials, and the World's products sell well on Industrial and Fluid Worlds. Worlds with fluid oceans are good markets for Fluid and Industrial Worlds.

High Population (Hi): High Population World goods, because of the economy of scale for production, sell well on High Population, Low Population, and Rich Worlds. High Population Worlds are good markets for Agricultural, Industrial, High Population, and Rich Worlds.

Ice-Capped (Ic): Goods from Ice-capped Worlds sell well on Industrial Worlds; the worlds are poor markets.

Industrial (In): Industrial goods sell well on most worlds, and Industrial Worlds are good markets for most goods.

Low Population (Lo): Low Population World cargos sell well to Industrial and Rich Worlds. Low Population Worlds are rarely self-supporting; they are excellent markets for High Population and Agricultural Worlds.

Nonagricultural (NA): Nonagricultural Worlds are good sources for Asteroid Belts, and Nonagricultural, Desert, and Vacuum Worlds.

Nonindustrial (NI): Nonindustrial Worlds are markets for goods from Industrial Worlds. They are sources of goods for Industrial Worlds; their goods sell poorly on Nonindustrial Worlds.

Poor (Po): Poor Worlds are markets for Industrial Worlds. They are not good sources of cargoes.

Rich (Ri): Rich Worlds are good markets for Asteroid Belts, and Agricultural, High Population, Industrial, Low Population, Rich, and Water Worlds. They are good sources of cargos for Agricultural, Desert, Industrial, High Population, Rich, and Nonagricultural Worlds.

Vacuum World (Va): Vacuum Worlds are markets for goods from Asteroid Belts, and Industrial, Nonagricultural and Vacuum Worlds. They are good sources of cargoes for Asteroid Belts, Industrial Worlds, and Vacuum Worlds.

Water World (Wa): Water Worlds are good markets for Industrial and Water Worlds. They are good sources of cargoes for Industrial, Rich, and Water Worlds.

Recordings (videos, audios, flat projections, movies, concerts, music).

Raw Scientific Data: Scientific inquiry depends on data for its continued existence. Raw scientific data from established research stations, data collection stations, or laboratories is marketable to research and development departments of various corporations and to research faculty at institutions of higher learning.

Social scientists also need raw materials for their researches. Historians need accounts of historical events; sociologists need data on alien or alternate societies; psychologists need data on individuals. After a period of time, the information available on one world becomes picked over; social scientists begin to look to other worlds for new data.

Units of Exchange: 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.

Some worlds have their own currencies, and some of those are produced offplanet (at higher tech level worlds). Shipments of money for local use are thus periodically necessary.

Not only governments create and administer money. Some corporations may also create money for use within their organizations, especially when local governments are unable to maintain stable currencies.

Bureaucratic Records: Because there are interstellar governments, the products of a bureaucracy must be distributed through its area of authority. Such shipments include originals or reproducible masters of regulations, files of information about citizenry and companies, and reports.

Much of the information shipped between worlds is not sold; it is transported as cargo 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 might indicate likely customers for specific goods; reports might provide clues (after analysis) for prediction of future bureaucratic decisions.

Novelties: New products never before seen (or sometimes just never before marketed) are powerful commodities in the marketplace.

Some products are *exotics*: an exotic wood that adds interest as a decoration or flavor as when burned for cooking; an herb which provides a special flavorcing; an iridescent feather which becomes fashionable for a limited time; a pebble that makes gentle noises when heated.

Others are just *cheap*: bright pebbles that respond to body heat; twisted metal puzzles that can be assembled more cheaply on a high population world where costs are lower; costume jewelry in alien styles.

Some are *prototypes*: when the inventive mind produces new ideas, they are translated into prototypes which can be shipped to other worlds and are there translated by manufacturing processes into row after row of finished goods.

Some are *uniques*: Uniques are specific items which cannot be duplicated or imitated due to their specific nature. They may be antiques, objects of art, specimens of alien culture,

memorabilia, souvenirs, archaeological specimens, or ancient artifacts.

Some novelties may be *fads*: they fade from fashionability after a few weeks or months.

Others become *staples*: society may produce customs which call for a specific novelty to be given as a gift of love, a token of respect or admiration, or perhaps as an obligatory room decoration.

Special Handling Characteristics: Several of the possible trade goods may require special handling by the cargo carrier. If a questionable cargo handling situation arises, you, as referee, should define an appropriate fateful "To avoid a mishap" task and make the players roll to prevent damage to their cargo. The types of special handling characteristics include:

Corrosive: This cargo is hazardous and needs special containers to prevent it from doing corrosive damage to the cargo vehicle, cargo handlers, and so on. If any of the cargo containers' sealed integrity is broken in transit, mishaps and damage will result.

Flammable: This cargo is flammable. If anything that could ignite the cargo enters the cargo hold (for example, sparks from an electrical short, a laser weapon fire exchange, and so on), the cargo will burst into flames. One obvious way to save the cargo is to immediately evacuate the cargo hold's atmosphere, placing it in a vacuum, which would effectively snuffing out the fire.

Explosive: This cargo is hazardous, and extreme heat or heavy shock may cause it to explode. Heat from a burning flammable cargo or a cargo hold hit during a starship battle are two examples of the types of conditions that could cause an explosive cargo to detonate. In some cases, a heavy jolt (for example, a jolt resulting from a rough landing) could cause an explosive cargo to detonate. Inertial compensators should minimize this problem, unless, of course, they are not working properly.

Radioactive: This cargo is hazardous and must be stored in special sealed and shielded containers. If the cargo container's sealed integrity is broken, radiation damage to nearby life forms is sure to result.

Perishable: This cargo requires a special environment to ensure it is properly preserved and kept during the journey to market. If the narrow environmental conditions vary to a significant degree from optimum, the quality of the cargo may be seriously damaged or destroyed. For example, if the cargo hold is hit during a starship battle, and explosive decompression occurs, the perishable cargo will be seriously damaged, at the very least.

Perishable cargos have an additional complication: they must get to market fast. A perishable cargo lot must be shipped the same day it is delivered for shipment.

Fragile: This cargo is delicate, and cannot stand rough handling or severe jolts. If a fragile cargo is damaged, its worth may be only slightly diminished, or it may be reduced to complete junk.

Living: Some cargo is listed as living. In effect, this cargo is an extreme case of both perishable and fragile. Life support, cages, and perhaps even special caretakers may need to be provided.

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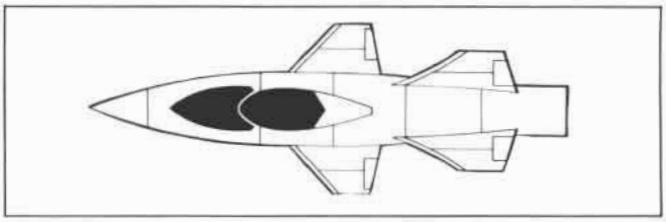


TRADE AND COMMERCE 1

1 Sourceworld Details

Determine sourceworld's Population and Tech Level.

2 Destination World Details

The ship captain must select and designate a destination world within jump range. Determine destination world's Population, Tech Level, and travel zone.

3 Shipments

Passengers are determined at step 4.

Cargo and freight are both determined beginning at step 5.

4 Passengers

Determine how many passengers are available for the ship.

Roll once on the High column, once on the Middle column, and once on the Low column.

PASSENGER TABLE

World Digit	*Available at Sourceworld*		
	High	*Middle*	*Low*
0	—	—	—
1	—	1D-2	2D-6
2	1D-1D	1D	2D
3	2D-2D	2D-1D	2D
4	2D-1D	2D-1D	3D-1D
5	2D-1D	3D-2D	3D-1D
6	3D-2D	3D-2D	3D
7	3D-2D	3D-1D	3D
8	3D-1D	3D-1D	4D
9	3D-1D	3D	5D
A	3D	4D	6D

DMs: If destination world Population 0-4, DM-3. If destination world Population 8+, DM+1.

If any crewmember has **Steward** skill, apply it as a +DM on the roll for High passengers.

If any crewmember has **Admin** skill, apply it as a +DM on the roll for Middle passengers.

If any crewmember has **Streetwise** skill, apply it as a +DM on the roll for Low passengers.

DM+(sourceworld TL minus destination world TL).

If destination world is red zone, DM-12, and no Middle or Low Passengers.

If destination world is an amber zone, DM-6.

Passengers may not exceed the passenger capacity of the ship.

This table may be consulted once per week.

Income: Credit the ship with Cr10,000 per High passenger, Cr 8000 per Middle passenger, and Cr 1000 per Low passenger.

5 Freight and Cargo

Freight consists of paid shipments of goods. Cargo is purchased at the sourceworld and sold at the destination world. Determine the available lots from the table. Roll once in the major column, once in the minor column, and once in the incidental column. For each lot, determine its size by rolling the lot size.

AVAILABLE LOTS

Pop Digit	*Available at Sourceworld*		
	Major	*Minor*	*Incidental*
0	—	—	—
1	1D-4	1D-4	—
2	1D-2	1D-1	—
3	1D-1	1D	—
4	1D	1D+1	—
5	1D+1	1D+2	—
6	1D+2	1D+3	1D-3
7	1D+3	1D+4	1D-3
8	1D+4	1D+5	1D-2
9	1D+5	1D+6	1D-2
A	1D+6	1D+7	1D

Lot Size: *Major Cargos:* 1D+10. *Minor Cargos:* 1D+ 5. *Incidental Cargos:* 1D.

DMs: If destination world Population 0-4, DM-3. If destination world Population 8+, DM+1.

If any crewmember has **Liaison** skill, apply it as a +DM on the roll for minor cargos.

DM+(sourceworld TL minus destination world TL).

If destination world is red zone, there is no freight. If destination world is an amber zone, there is no major freight.

If the goods are cargo (carried for a fee of Cr1000 per ton) and their identity does not matter, ignore further steps.

The sum of cargo and freight cannot exceed the cargo hold capacity of the ship.

This table shows the limit of freight available to a ship in a period of one week. A crewmember with **Broker** skill may consult this table again once (to find last-minute cargo, but not freight).

6 Sourceworld Trade Classifications

Determine the trade classifications of the sourceworld.

TRADE CLASSIFICATIONS

Code	*Size*	*Atmosphere*	*Hydrographic*	*Population*	*Government*	*Law Level*	*Code Definition*
Ag	—	4-9	4-8	5-7	—	—	Agricultural
As	0	0	0	—	—	—	Asteroid
Ba	—	—	—	0	0	0	Barren
De	—	2+	0	—	—	—	Desert
Fl	A+ →	1+ →	—	—	—	—	Fluid
Hi	—	—	—	9+	—	—	High Population
Ic	—	0-1	1+	—	—	—	Ice-Capped
In	—	2-4,7,9		9+	—	—	Industrial
Lo	—	—	—	3−	—	—	Low Population
Na	—	0-3	0-3	6+	—	—	Nonagricultural
Ni	—	—	—	0-6	—	—	Nonindustrial
Po	—	2-5	0-3	—	—	—	Poor
Ri	—	6,8	—	6-8	4-9	—	Rich
Va	—	0	—	—	—	—	Vacuum
Wa	—	—	A	—	—	—	Water World

Determine all possible trade classifications. An Asteroid Belt (As) is automatically a Vacuum World, and does not have the Va code. Aslan worlds ignore Government type for Rich (Ri). Vargr worlds cannot be Rich if government type 7.

7 Identify Cargo and Freight

Create a standard identifier for each shipment of cargo and freight.

Freight: If the shipment is freight, its identity may not matter. The referee may assume that freight is a standard, safe, nonperishable shipment properly packaged. Its tonnage is already known. No further information is required.

Cargo: If the shipment is cargo, it should be given a standard identifier, which consists of

1. Sourceworld Starport Type.
2. Sourceworld Tech Level.
3. All possible sourceworld trade classifications.
4. Cost.
5. Cargo origin (if not Imperial).

For example, a cargo from Regina in the Spinward Marches is identified as A-C Ri Cr7000.

A cargo from Chronor (a Zhodani world) is identified as C-B Hi Fl Cr8100 Zh.

8 Nature of Cargo

More information can be determined about cargo (and about freight, if desired).

Cargo and freight can be broadly classified as one of the following types:

Natural Resources.
Processed Resources.
Manufactured Goods.
Information.
Novelties.

For each shipment of cargo or freight, note the trade classifications in its identifier and consult tables 9a through 9f in order until one of the trade classifications in its identifier is matched. Roll on the first table that matches to determine the broad nature of the goods.

9a Ag Goods

Any goods with Ag (Agricultural) in its identification may use this table.

AGRICULTURAL GOODS

Die	*Trade Good Category*
2	Natural Resources
3	Natural Resources
4	Natural Resources (41-66)
5	Natural Resources (41-66)
6	Natural Resources (41-66)
7	Processed Resources (41-66)
8	Processed Resources (41-66)
9	Manufactured Goods
10	Information
11	Information
12	Novelties

DMs: If Government 9+, DM +1, If Law Level 9+, DM+1.

9b Wa, Ri Goods

Any goods with Wa (Water World) or Ri (Rich World) may use this table.

WATER AND RICH WORLD GOODS

Die	*Trade Good Category*
2	Natural Resources
3	Natural Resources
4	Natural Resources
5	Natural Resources
6	Processed Resources
7	Processed Resources
8	Manufactured Goods
9	Information
10	Information
11	Information
12	Novelties

DMs: If Government 9+, DM +1. If Law Level 9+, DM+1. If Population 9+, DM+1.

9c As, Va, De, Na Goods

Any goods identified as As (Asteroid Belt), Va (Vacuum), De (Desert), or Na (Nonagricultural) may use this table.

ASTEROID, VACUUM DESERT, OR NONAGRICULTURAL

Die	*Trade Good Category*
2	Natural Resources (11-36)
3	Natural Resources (11-36)
4	Natural Resources (11-36)
5	Natural Resources (11-36)
6	Natural Resources (11-36)
7	Processed Resources (11-36)
8	Manufactured Goods
9	Manufactured Goods
10	Information
11	Information
12	Novelties

DMs: If Government 9+, DM +1. If Law Level 9+, DM+1. If Population 9+, DM+1. If Barren World, DM-5.

9d Ni Goods

Any goods identified as Ni (Non-industrial) may use this table.

NONINDUSTRIAL GOODS

Die	*Trade Good Category*
2	Natural Resources
3	Natural Resources
4	Natural Resources
5	Natural Resources
6	Natural Resources
7	Processed Resources
8	Manufactured Goods
9	Manufactured Goods
10	Information
11	Information
12	Novelties

DMs: If Government 9+, DM +1. If Law Level 9+, DM+1. If also Barren World, DM-5.

9e In Goods

Any goods identified as In (Industrial) may use this table.

INDUSTRIAL GOODS

Die	*Trade Good Category*
2	Natural Resources
3	Natural Resources
4	Processed Resources
5	Processed Resources
6	Manufactured Goods
7	Manufactured Goods
8	Manufactured Goods
9	Manufactured Goods
10	Information
11	Information
12	Novelties

DMs: If Government 9+, DM +1. If Law Level 9+, DM+1.

9f Ba, Fl, Hi, Ic, Lo, Po Goods

Any goods identified as Ba (Barren), Fl (Fluid Oceans), Hi (High Population), Ic (Ice-Capped), Lo (Low Population), or Po (Poor) may use this table.

ALL OTHER GOODS

Die	*Trade Good Category*
2	Natural Resources
3	Natural Resources
4	Natural Resources
5	Information
6	Processed Resources
7	Processed Resources
8	Processed Resources
9	Manufactured Goods
10	Information
11	Information
12	Novelties

DMs: If Govt 9+, DM +1. If Law 9+, DM+1. If Pop 9+, DM+1. If Ba, DM-7.

9 Nature of Cargo and Freight

Determine the specific nature of the goods by consulting the appropriate table.

If Natural Resources, go to step 10a.
If Processed Resources, go to 10b.
If Manufactured Goods, go to 10c.
If Information, go to 10d.
If Novelties, go to 10e.

TRADE AND COMMERCE 3

10a Natural Resources

D+ D	Trade Good	Cor	Fla	Exp	Rad	Per
11	Ferrous Metal Ore	—	—	—	—	—
12	Ferrous Metal Ore	—	—	—	—	—
13	Ferrous Metal Ore	—	—	—	—	—
14	Nonmetal Ore	10+	—	12+	—	—
15	Nonmetal Ore	10+	—	12+	—	—
16	Radioactive Ore	—	—	—	6+	—
21	Radioactive Ore	—	—	—	6+	—
22	Nonferrous Ore	11+	—	11+	11+	—
23	Nonferrous Ore	11+	—	11+	11+	—
24	Raw Crystals	—	—	—	—	—
25	Raw Crystals	—	—	—	—	—
26	Raw Crystals	—	—	—	—	—
31	Raw Precious Gems	—	—	—	—	—
32	Nitrogen Compounds	10+	—	9+	—	—
33	Nitrogen Compounds	10+	—	9+	—	—
34	Raw Hydrocarbons	11+	9+	11+	—	—
35	Raw Hydrocarbons	11+	9+	11+	—	—
36	Raw Hydrocarbons	11+	9+	11+	—	—
41	Plants (wood)	11+	9+	—	—	11+
42	Plants (wood)	11+	9+	—	—	11+
43	Plants (bales)	11+	9+	—	—	10+
44	Plants (fibers)	11+	6+	—	—	9+
45	Plants (herbs)	11+	6+	—	12+	9+
46	Wild Plants (living)	11+	6+	12+	—	11+
51	Food Plants (living)	11+	11+	—	—	—
52	Food Plants (living)	11+	11+	—	—	—
53	Food Plants (living)	11+	11+	—	—	—
54	Food Plants (living)	11+	11+	—	—	—
55	Animals (living)	11+	—	—	—	—
56	Animals (living)	11+	—	—	—	—
61	Livestock (living)	11+	—	—	—	—
62	Livestock (living)	11+	—	—	—	—
63	Livestock (living)	11+	—	—	—	—
64	Livestock (living)	11+	—	—	—	—
65	Rare Plants (living))	11+	11+	—	—	—
66	Rare Animals (living)	11+	—	—	—	—

10b Processed Resources

D+ D	Trade Good	Cor	Fla	Exp	Rad	Per
11	Iron	—	—	—	—	—
12	Steel	—	—	—	—	—
13	Steel	—	—	—	—	—
14	Steel	—	—	—	—	—
15	Aluminum	—	—	—	—	—
16	Aluminum	—	—	—	6+	—
21	Copper	—	—	—	6+	—
22	Tin	—	—	—	11+	—
23	Zinc	—	—	—	11+	—
24	Special Alloys	12+	10+	—	—	—
25	Gold	—	—	—	—	—
26	Silver	—	—	—	—	—
31	Precious Metals	—	—	—	—	—
32	Nonmetals	11+	9+	10+	—	—
33	Crystals	—	—	—	—	—
34	Radioactives	—	—	—	5+	—
35	Rare Earths	11+	12+	12+	12+	—
36	Isotopes	—	—	—	3+	—
41	Grain	—	6+	4+	—	10+
42	Grain	—	6+	4+	—	10+
43	Vegetables	11+	9+	12+	—	8+
44	Fruit	11+	10+	12+	—	8+
45	Meat	12+	—	—	—	5+
46	Herbs	12+	9+	10+	—	10+
51	Plant Compounds	10+	9+	10+	—	11+
52	Animal Compounds	10+	9+	10+	—	11+
53	Petrochemicals	10+	7+	8+	—	—
54	Petrochemicals	10+	7+	8+	—	—
55	Textiles	—	9+	—	—	11+
56	Explosives	12+	10+	3+	—	10+
61	Polymers	—	9+	—	—	—
62	Polymers	—	9+	—	—	—
63	Fertilizers	10+	9+	9+	—	9+
64	Plants (lumber)	12+	6+	12+	—	9+
65	Plants (paper)	—	5+	—	—	12+
66	Plants (paper)	—	5+	—	—	12+

10c Manufactured Goods

D+ D	Trade Good	Cor	Fra	Exp	Rad	Per
11	Pharmaceuticals	11+	10+	—	—	9+
12	Pharmaceuticals	—	10+	—	—	9+
13	Preserved Foods	—	9+	—	—	9+
14	Spices	—	11+	—	—	10+
15	Spices	—	11+	—	—	10+
16	Gourmet Foods	—	11+	—	—	10+
21	Flavored Water	—	10+	—	—	12+
22	Alcoholic Beverages	—	8+	—	—	9+
23	Alcoholic Beverages	11+	8+	—	—	9+
24	Consumable Milks	—	10+	—	—	8+
25	Consumable Nectars	—	10+	—	—	10+
26	Consumable Syrups	—	11+	—	—	11+
31	Consumable Teas	—	11+	—	—	12+
32	Exotic Fluids	—	8+	—	—	9+
33	Aromatics	—	10+	9+	—	11+
34	Aromatics	—	10+	—	—	11+
35	Disposables	—	11+	—	—	—
36	Disposables	—	11+	—	—	—
41	Clothing	—	12+	—	—	—
42	Clothing	—	12+	—	—	—
43	Protective Gear	—	9+	—	—	—
44	Weapons	—	9+	—	—	—
45	Weapons	—	9+	11+	—	—
46	Weapons	—	9+	—	11+	—
51	Metal Parts	—	11+	—	—	—
52	Electronic Parts	—	10+	—	—	—
53	High Tech Parts	—	10+	—	—	—
54	Tools	—	11+	—	—	—
55	Tools	—	11+	—	—	—
56	Vehicles	—	12+	—	—	—
61	Entertainment Equip	—	10+	—	—	—
62	Computers	—	11+	—	—	—
63	Robots	—	11+	—	—	—
64	Robots	—	11+	—	—	—
65	Appliances	—	10+	—	—	—
66	Furniture	—	9+	—	—	—

10d Information

D+ D	Trade Good
11	Writings (paper)
12	Writings (data)
13	2D Still Pictures
14	2D Still Pictures
15	Computer Software
16	Computer Software
21	Robotic Software
22	Robotic Software
23	Starship Software
24	Starship Software
25	3D Still Pictures
26	3D Still Pictures
31	Sculpture
32	Paintings
33	Exotic Artforms
34	Audio Recordings
35	2D Video Recordings
36	3D Video Recordings
41	Raw Data (paper)
42	Raw Data (data)
43	Raw Data (data)
44	Currency (valuables)
45	Currency (valuables)
46	Currency (paper)
51	Currency (paper)
52	Currency (paper)
53	Currency (paper)
54	Records (paper)
55	Records (paper)
56	Records (paper)
61	Records (data)
62	Records (data)
63	Records (data)
64	Records (data)
65	Records (data)
66	Records (data)

10e Novelties

D+ D	Trade Good
11	New Natural Resources
12	New Process Resources
13	New Mfd Goods
14	New Mfd Goods
15	New Information
16	New Information
21	Uniques
22	Uniques
23	Uniques
24	Uniques
25	Uniques
26	Uniques
31	Uniques
32	Uniques
33	Artifacts
34	Artifacts
35	Antiques
36	Antiques
41	Antiques
42	Antiques
43	Original Information
44	Original Information
45	Original Information
46	Original Information
51	Original Information
52	Original Information
53	Original Information
54	Fad Information
55	Fad Information
56	Fad Information
61	Fad Mfd Goods
62	Fad Mfd Goods
63	Prototype Mfd Goods
64	Prototype Mfd Goods
65	Prototype Mfd Goods
66	Prototype Mfd Goods

TRADE AND COMMERCE 4

1 Cargo Cost

Cargo cost is the amount of money that a shipment is sold to the speculator or starship captain for.

Start with base cost of Cr4000 per ton.

2 Trade Cost Modifiers

Trade cost modifiers are determined from the sourceworld characteristics.

TRADE COST MODIFIERS

Code	*Trade Class*	*Cost Mod*
—	No Class	0
Ag	Agricultural	−1000
As	Asteroid Belt	−1000
Ba	Barren World	+1000
De	Desert World	+1000
Fl	Fluid Oceans	+1000
Hi	High Population	−1000
Ic	Ice-Capped	0
In	Industrial	−1000
Lo	Low Population	+1000
Na	Nonagricultural	+1000
Ni	Nonindustrial	+1000
Po	Poor	−1000
Ri	Rich	+1000
Va	Vacuum World	+1000
Wa	Water World	0

If As, ignore the effects of Va.

Total all modifiers and add to base cost.

Tech Level Modifier: Multiply sourceworld's tech level by Cr100 and add to base cost.

3 Starport Cost Modifiers

The type of starport involved in the transaction influences the cost of the goods.

Consult the Starport Effects Table using the sourceworld Starport Type.

STARPORT EFFECTS

Starport	*Cost Modifier*
A	−1000
B	0
C	+1000
D	+2000
E	+3000
X	+5000

Add sourceworld's Starport cost modifier to base cost.

4 Delivery

Normal delivery to the ship is four days. Add 10 percent to the final cost for each day of advance delivery to the ship.

For example, instant (same day) delivery costs 40 percent extra.

5 Negotiation

This step is optional. Undertaking negotiation as a task is possible.

- Active Cooperation −2000
- Passive Cooperation −1000
- Neutral or less 0

1 Cargo Price

Cargo price is the amount of money that a buyer is expected (on the average) to pay for goods when delivered at a world. Cargo price is applied to the Actual Value Table to determine the final price for which the goods are actually sold.

Start with a base price of Cr5000.

2 Cargo Price Modifiers

Total all intersections between sourceworld and destination world codes and multiply by Cr1000. Add to base price.

CARGO PRICE

Source Code	*Destination Code* —	*Ag*	*As*	*Ba*	*De*	*Fl*	*Hi*	*In*	*Lo*	*Na*	*Ni*	*Po*	*Ri*	*Va*	*Wa*
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Ag	—	+1	+1	—	+1	—	+1	+1	+1	+1	—	—	+1	—	—
As	—	—	+1	—	—	—	—	+1	—	+1	—	—	+1	+1	—
Ba	—	+1	—	—	—	—	—	+1	—	—	—	—	—	—	—
De	—	—	—	—	+1	—	—	—	—	+1	—	—	—	—	—
Fl	—	—	—	—	—	+1	—	+1	—	—	—	—	—	—	—
Hi	—	—	—	—	—	—	+1	—	+1	—	—	—	+1	—	—
Ic	—	—	—	—	—	—	—	+1	—	—	—	—	—	—	—
In	—	+1	+1	—	+1	+1	+1	+1	—	—	+1	+1	+1	+1	+1
Lo	—	—	—	—	—	—	—	+1	—	—	—	—	+1	—	—
Na	—	—	+1	—	+1	—	—	—	—	—	—	—	—	+1	—
Ni	—	—	—	—	—	—	—	+1	—	—	-1	—	—	—	—
Po	—	—	—	—	—	—	—	—	—	—	—	-1	—	—	—
Ri	—	+1	—	—	+1	—	+1	+1	—	+1	—	—	+1	—	—
Va	—	—	+1	—	—	—	—	+1	—	—	—	—	—	+1	—
Wa	—	—	—	—	—	—	—	+1	—	—	—	—	+1	—	+1

If the destination world is Ba, goods may not be sold. If the sourceworld is As, ignore its Va classification.

3 Tech Level Effects

Subtract destination world Tech Level from sourceworld Tech Level and multiply by 10 percent. This value may be a positive or a negative number. Multiply this value times the adjusted price.

4 Brokers

One character may act as broker if he has Broker skill. He applies his skill to the transaction and receives 5 percent (per skill level applied) of the final market price (of which half of that is spent as expenses for the transaction).

A broker may be hired at a starport to assist in the transaction.

BROKERS AVAILABLE

Starport	*Broker Available*
A	Broker-4 or less
B	Broker-3 or less
C	Broker-2 or less
D	Broker-1

A broker receives 5 percent of the final market price for each level of skill he applies to the Actual Value Table.

5 Alien Trade Effects

When a cargo has an alien source, there may be an effect on the price. Determine the source of the goods (Imperial unless otherwise noted) and the market for the goods. Consult the Alien Trade Effects table and apply any price alteration to the calculated price of the goods.

ALIEN TRADE EFFECTS

Buying Race	*Selling Race*							
	Aslan	*Droyne*	*Hiver*	*Imperial*	*K'kree*	*Solomani*	*Vargr*	*Zhodani*
Aslan	—	—	—	—	−2000	—	+1000	—
Droyne	—	—	—	—	—	—	—	+2000
Hiver	+1000	—	—	−2000	—	—	—	—
Imperial	—	—	—	—	—	—	—	−1000
K'kree	—	—	—	—	—	—	−2000	—
Solomani	—	—	+1000	−1000	—	—	—	—
Vargr	—	—	—	—	−4000	—	—	—
Zhodani	+1000	+1000	—	−2000	—	—	—	—

This table indicates the effects of local taste, prejudice, and novelty in the evaluation of goods by a market. For example, Zhodani goods are generally poorly received in Imperial markets and well-received in Droyne markets; Imperial goods are poorly received in Hiver, Solomani, and Zhodani markets.

6 Bribery

Characters may attempt bribery to gain a special merchant kickback. The modification to the Actual Value Table is +1/2 per Bribery level (round fractions down). Select any level, at a cost of 7 percent of the final market price per level used.

7 Actual Value

The actual value of a cargo (and thus the final market price paid for it) is determine only at the moment of sale using the Actual Value Table.

ACTUAL VALUE TABLE

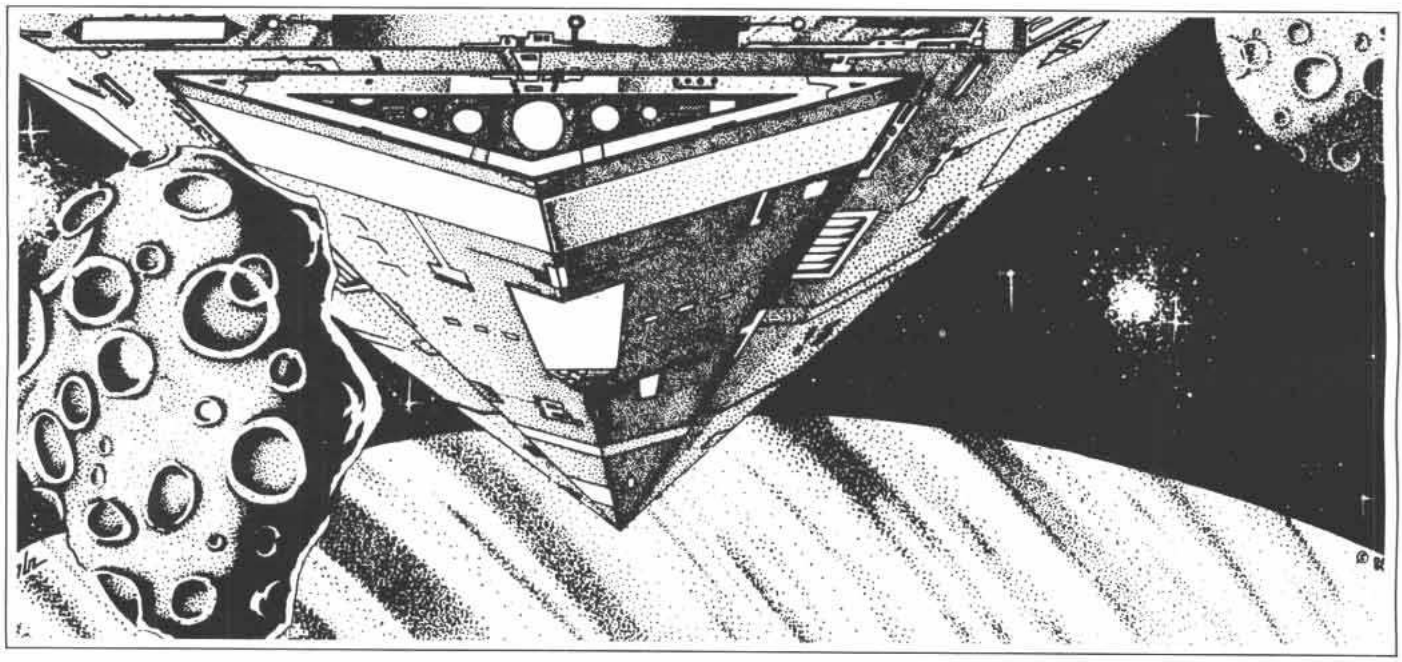
Roll	*Percentage*
2	40 percent
3	50 percent
4	70 percent
5	80 percent
6	90 percent
7	100 percent
8	110 percent
9	120 percent
10	130 percent
11	130 percent
12	170 percent
13	200 percent
14	300 percent
15	400 percent

Results of less than 2 are treated as 2; results of more than 15 are treated as 15.

DMs: + Broker skill. +1/2 Bribery skill (round down). Maximum DM is +4.

If the players rolled one die in advance (allowed for Trader skill), remember to use the prior roll on this table.

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 final die is rolled on the table. If a sale is stopped, another sale cannot be attempted on the current world in the current week.



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MAPPING SUBSECTORS

STARPORT

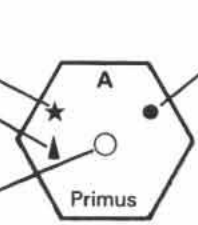
A	Best
B	Better
C	Good
D	Poor
E	Rudimentary
X	None

BASES

- ★ Naval Base
- Scout Base
- Way Station
- ■ Naval Depot

WORLD TYPE

- ○ Desert and Vaccuum Worlds
- ● Most Worlds
- Asteroid Belt



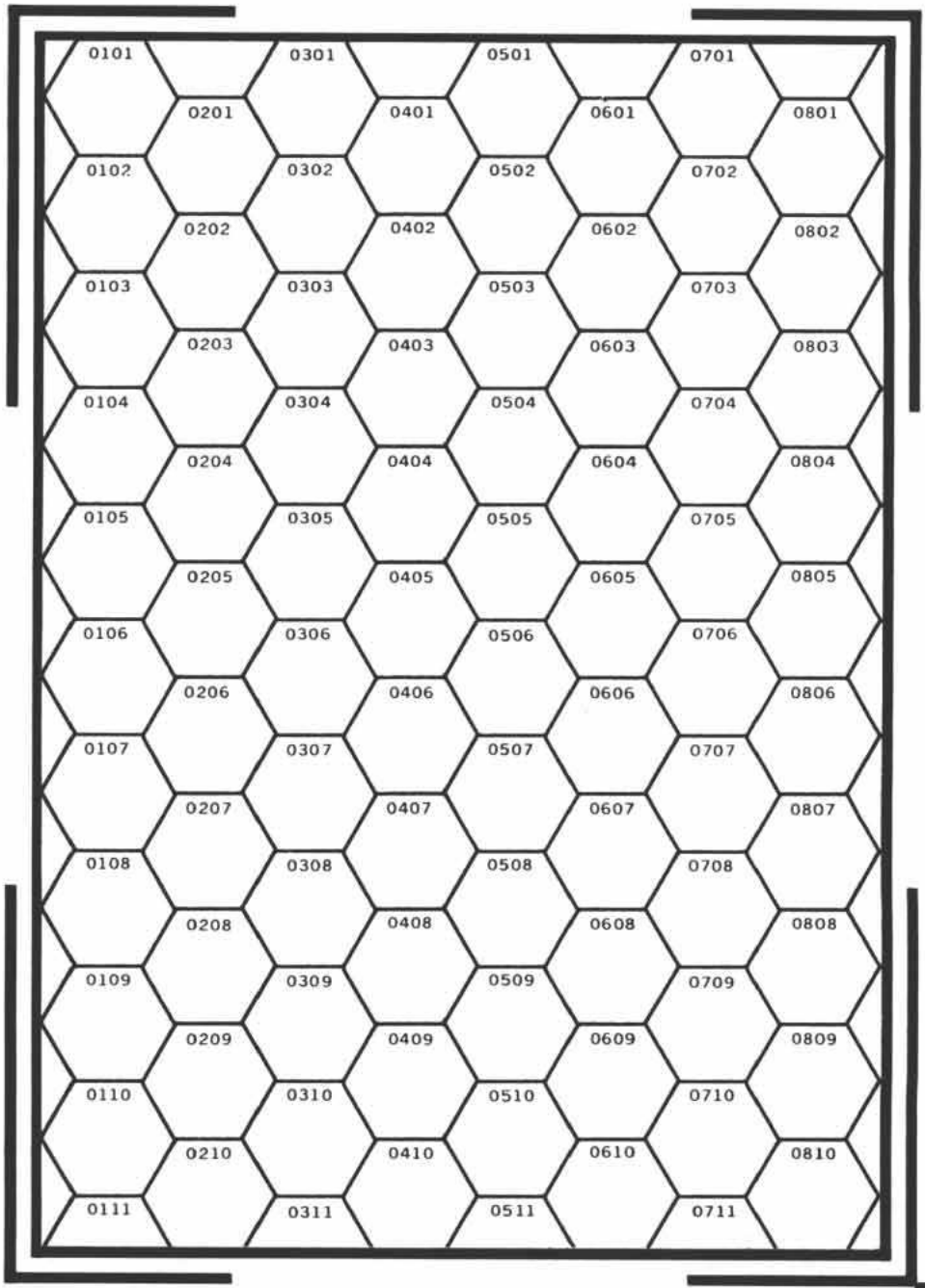
GAS GIANT

- ● If Present

WORLD NAME

Primus-For most worlds

PRIMUS-If High Population World



Craft Design

As the name **Traveller** implies, an important aspect of the game involves the players travelling from one place to another using some kind of transport. This section of the *Referee's Manual* provides the referee with a comprehensive craft design sequences to allow designing an wide variety of transport craft for the players to encounter and use in their adventures.

A craft crewmember (or even the commander) very rarely has a chance to design his own craft, and thus the design rules are not intended to give players this option. Instead, they are included as an aid to the referee in providing the widest possible variety of craft to add realism to the myriad of environments in the universe.

Realistically, it is a tremendous burden on the referee to expect her to design all the equipment. Instead, the referee should delegate players to design several craft with specified parameters (tech level, price, etc.) and then file them away for future use.

OVERVIEW OF TECHNOLOGY

Traveller makes certain assumptions about the nature of future technological developments. In addition to the progressive refinement of existing equipment and methods, several areas of future technology have been postulated. **Traveller** bases its technology on a series of logically explainable developments even if they may be far beyond any present science.

The first major advance upon which **Traveller** technology is built is the commercially viable fusion reactor. A cheap, abundant, and long-lasting source of fusion power has some far-reaching effects on all areas of technology, and it tends to force all other means of power generation into the background.

About the only limit to the fusion power plant is its sheer size. Where portability becomes a significant factor, fuel cells or batteries become the power source of second choice. Above **Traveller**'s common Tech Levels (late Tech Level 16 and beyond), antimatter power generation moves to the forefront, and power generation makes yet another order-of-magnitude leap in output per unit of power plant volume. The staggering levels of energy available from antimatter annihilation allow manipulating the environment in near magical ways (by today's terms).

The second major breakthrough is artificial gravity. Created by manipulating sub-atomic forces, artificial gravity is not antigravity but is instead a unique force that acts upon the natural gravity field created by all matter. Artificial gravity can be made to either push or pull. Because of its nature, artificial gravity is not a very efficient means of locomotion in deep space where there are no strong gravity wells to push against.

A third major breakthrough related to artificial gravity is damper technology. Nuclear dampers interfere with sub-atomic nuclear forces: when a nuclear warhead passes through a damper field, the warhead sheds neutrons at very low energies, which renders the warhead harmless after a very short exposure. Nuclear dampers can also work in reverse to prevent nuclear decay.

The fourth significant development came from the search for a starship maneuver drive that did not lose efficiency when away from a strong gravity well. Artificial gravity and damper technology led to yet another sub-atomic force-based technology. This new, artificially generated force pushes against a vessel's "thrust plates" themselves, which make true reactionless thrusters a reality for starship-sized vessels.

The fifth major area is meson technology. Meson devices make use of the properties of the sub-atomic particle called the pi neutral meson. Mesons have short lives, which can be prolonged to precise durations by accelerating them to relativistic speeds. Because mesons do not interact with any other types of matter, they can pass through other matter without resistance.

Mesons are created by the collision of an electron and a positron in the converging beam created by two particle accelerators. In a meson gun, the mesons are manipulated to decay inside the target, where they release high energy and radiation. In a meson communicator, a much smaller meson package travels from the transmitter to the receiver, where a special meson screen causes the meson package to decay. The beam carries a signal by amplitude modulation.

DESIGNING A CRAFT

Before starting a craft design, certain items must be considered. What is the tech level of the design? What is its purpose? Does the design have a price limit? Are there specific attributes that must be incorporated into the craft's design?

When starting a design, assign four columns of space to the right two-thirds of the page, and label the four columns from left to right: power, volume, weight, and price.

All three design sequences work in the same way: you must first select an empty chassis or hull and then install a power plant and a form of locomotion. After that, you can install various communication devices, sensors, weapons, screens, controls, computer, and crew accommodations to tailor the craft for a particular purpose.

The final design must not exceed the craft's chassis or hull volume, and it must not use more power than is available from the power plant. The locomotion must provide a craft with an acceptable performance. A finished design can involve a series

of reworkings and trade-offs on the road to a design that fits its intended purpose.

Once a prototype craft has been created, additional craft of the same design may be produced with a quantity discount of 80 percent of the full price.

The research and development craft design is an exception; it may have components in a single section that are one tech level beyond its current tech level limit. Such a craft is typically one-of-a-kind, and it may not benefit from a quantity discount.

DEFINITION OF COMMON TERMS

The following definitions apply to the transportation systems.

Craft: Any transportation unit is a craft. Craft may be any size. Types of craft include vehicles, small craft, spaceships, starships, aircraft, and watercraft.

Aircraft: Any craft designed to fly in an atmosphere. Aircraft may be fixed wing, rotary wing (helicopter), or lighter-than-air craft.

Vehicle: Any craft with a volume of 270 kiloliters or less (20 tons displacement or less). Most vehicles are world surface transportation systems like groundcars, ATVs, or air/rafts.

Small Craft: Any craft with a volume of 270 to 1350 kiloliters (20 to 100 tons displacement). Small craft commonly travel in space.

Spaceships: Any craft with a volume of 1350 kiloliters or more (100 tons displacement or more) which is equipped with a maneuver drive, but not a jump drive.

Starships: Any spaceship equipped with a jump drive is a starship.

Vessel: Any craft with a volume of 1350 kiloliters or more (100 tons displacement or more). Vessels may be spaceships, starships, or other craft.

Watercraft: Any craft designed to operate in water. Watercraft may be small watercraft (boats), large watercraft (ships), or hovercraft.

The following terms are common to all craft types.

Tons Displacement: A widespread method of determining a space vessel's size is to give its volume in terms of the amount of liquid hydrogen it would displace (as if it were immersed in a vast sea of liquid hydrogen). Tons displacement is not to be confused with the craft's weight in metric tons (that is, its actual mass). A starship that displaces 100 tons may actually weigh over 1000 metric tons. A displacement ton is actually a measure of volume rather than weight; one displacement ton equals 13.5 kiloliters of volume.

Power: A craft's power needs are measured in megawatts. One megawatt equals 1000 kilowatts. A term sometimes used to refer to the energy output of a space vehicle is an energy point (EP). One energy point equals 250 megawatts, or put another way, 4 energy points equal 1000 megawatts.

Volume: A craft's volume is the amount of space it takes up. Volume is measured in kiloliters, a kiloliter equals one cubic meter. Thus a cube that is one meter on a side has a volume of one kiloliter. A kiloliter contains 1000 liters; 13.5 kiloliters equals one ton of displacement.

Weight: A craft's weight is measured in metric tons. One metric ton equals 1000 kilograms.

Price: Price is usually expressed in credits (Cr). However, in the interest of saving space, some prices for very expensive items are expressed in megacredits (MCr). A megacredit equals 1,000,000 credits.

THE DESIGN FLOWCHARTS

Craft design is governed by the design flowcharts that follow. The central flowchart references several sub-flowcharts, each dealing with a specific aspect of craft design. Important concepts and definitions for each sub-flowchart section are presented below.

These charts and design rules produce vehicles, small craft, spaceships, and starships. They do not produce watercraft or aircraft (but they do produce flying anti-grav vessels).

HULL SECTION

All craft need some type of hull or chassis to which all other components are attached.

Configuration: The following configurations are possible:

Open Frame: An open skeletal frame with no exterior covering.

Needle/Wedge: A long, pointed exterior with few square edges.

Cone: An oblong rounded exterior with few square edges.

Cylinder: An oblong rounded exterior with square-edged ends.

Box: A square-edged exterior with few rounded edges.

Sphere: A ball-shaped exterior.

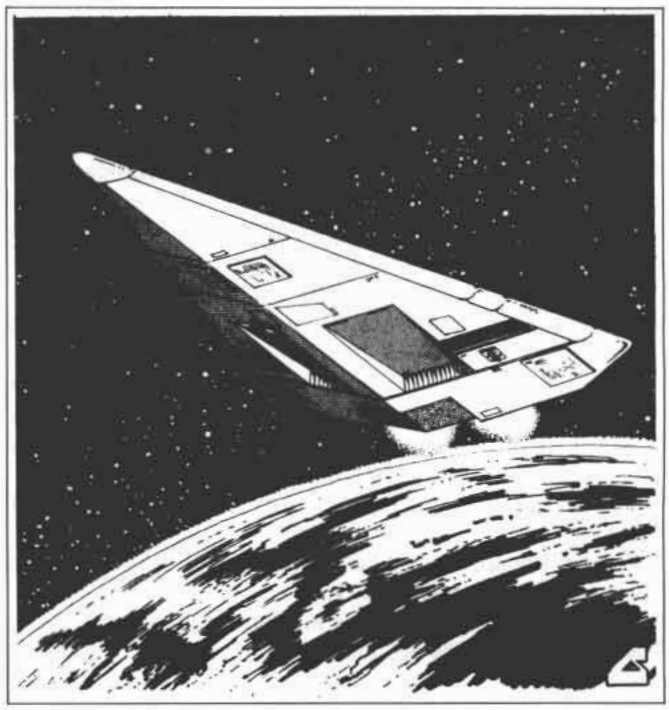
Dome/Disk: A half-sphere or flattened-sphere exterior.

Irregular Structure: A dispersed, modular exterior, which is not clearly definable as any one of the other possible configurations.

Planetoid: A metallic or rocky hollowed-out asteroid.

Buffered Planetoid: A metallic or rocky asteroid given an extra thick hull by hollowing out less of the interior.

Armor Type: Represents the type of material and method used in the hull construction.



Soft Steel: A soft ferrous metal hull.

Hard Steel: A harder ferrous alloy metal hull.

Composite Laminate: A composite metal-ceramic hull.

Light Weight Composite Laminate: A lightweight version of a composite metal-ceramic hull.

Crystaliron: A ferrous hull using metal with perfect crystal structure and carefully controlled impurities in order to gain maximum hardness and toughness.

Superdense: A hull that has had its molecular structure partially collapsed in a massive artificial gravity field (such as might be encountered in a white dwarf star), which increases its density and strength.

Bonded Superdense: Superdense armor with a small induced electronic current to strengthen the internal electron bonds which further increases the hull strength.

Coherent Superdense: Bonded superdense armor dynamically manipulated by input from the sensors and the computer so as to polarize the subatomic forces in the the hull molecules, thereby presenting maximum penetration resistance to the specific striking weapon.

Armor Factor: Represents the thickness of the hull. The added value of armor for a ship may not exceed the ship's technological level times five. In the case of planetoid hulls, an automatic hull armor factor is already present—the Tech Level armor restriction only applies to armor added to the hull of a planetoid.

Streamlining: Any ship of configuration one to six, regardless of streamlining, can land on a world with an atmosphere zero or one; for all other worlds, streamlining is required. Irregular structures and planetoids cannot land on any world.

POWER SUPPLY SECTION

All craft need some source of energy to supply power to the installed components.

Internal Combustion: The familiar hydrocarbon-burning reciprocal engine.

Turbine: A hydrocarbon burning rotary engine.

Nuclear Fission: The familiar nuclear fission power plant using radioactives as fuel.

Fuel Cell: Advanced hydrogen/oxygen fuel cell. The fuel consumption listed on the table assumes a closed hydrogen/open oxygen design. Such a fuel cell carries its own supply of hydrogen, but draws its supply of oxygen from the air. If the craft must operate in a hostile or vacuum atmosphere, oxygen must be provided as well. Multiply the fuel consumption rate in this case by 9 to account for the relative mass of oxygen molecules to hydrogen molecules.

Fuel cells produce pure water as a waste by-product. The amount of water produced is 9 times the fuel consumption rate on the table. High-tech fuel cell technology typically eliminates the waste water through an evaporation process, so the problem of what to do with the waste water can easily be ignored if desired.

Fusion: Cheap, efficient fusion reactor. However, by its very nature, a fusion reactor can only be made so small, even at higher Tech Levels. Below the minimum volume for a given Tech Level, fuel cells are the preferred choice.

Batteries: Battery technology makes great strides at higher Tech Levels, with sustained power output for a given volume and weight increasing dramatically. These "super batteries" are, however, quite expensive.

Batteries can be used either as the primary power source (at a greater cost and weight than fuel cells or fusion), or to supplement the normal power plant by allowing the craft to continue to function even though the regular power plant is not operating.

Solar Cells: Photoelectric cells that produce electrical energy from light. The thought of gaining free electrical power from light and never needing to refuel may at first seem to be the ideal solution to a craft's energy needs (as long as there is a source of light). However, the level of energy needed by most high-tech craft far outstrips the ability of solar cells to produce it. Cheap fusion power turns out to be the ideal solution—solar cells are only used for very specialized, low-power applications.

LOCOMOTION SECTION

All craft need some form of locomotion for travelling from place to place.

Two basic types of vehicle locomotion exist:

Contact-Based: Locomotion based on friction contact with a surface. This includes:

Legs: The craft uses flexible-limb legs to move about. Most leg-based craft designs use 2 to 8 legs, with 4 legs being by far the most common. Occasionally designs use more than 8 legs. Legs are ideal for rough-terrain ground vehicles.

Wheels: The craft uses wheeled locomotion to move about. Wheels are most common in ground vehicle designs limited to urban areas or used indoors. Wheels do poorly in rough terrain.

Tracks: The craft moves about using tracked locomotion. Tracks provide a ground vehicle with a slightly better dexterity than do wheels. Tracks are better than wheels in rough terrain.

Thrust-Based: Locomotion based on noncontact thrusting of the craft. This includes:

Antigravity: The craft uses antigravity modules (or more simply, "grav modules") to move about. Three types of grav modules are available: Standard (relatively cheap, with adequate power to thrust ratio); Low Power Heavy (moderately priced, with good power to thrust ratio); and Low Power Light (expensive, with excellent power to thrust ratio).

Air Cushion: Air Cushion locomotion (also termed "AC") allows a craft to hover about one meter off the ground on a cushion of compressed air created by ducted fans. Unlike grav locomotion, AC locomotion cannot function in a vacuum. AC locomotion is second only to grav modules in mobility.

Two basic types of space-faring locomotion exist:

Maneuver Drive: Space-faring craft use grav modules or thruster technology for locomotion. This mode of locomotion is called a maneuver drive. Thruster drives require massive plates and vast quantities of energy. They cannot be installed in vehicles.

Jump Drive: Starships move across interstellar distances using jump drives. Jump drives are themselves a special high-yield power plant linked to an integral net in the craft's hull for initiating and maintaining the jump field. Because a jump drive is also a power plant, it must be allocated fuel separate

and distinct from the craft's power plant.

Jump distances are calculated in parsecs (3.27 light-years), which is the scale of a subsector mapping grid. Jump-1, for example, indicates the ability to jump one parsec, or one hex.

Jump numbers range from 1 to 6; higher jump numbers are not possible in ordinary usage, although misjumps can carry ships over greater distances. Any jump, regardless of number, takes approximately one week; ships in jumpspace are untouchable and cannot communicate with other ships or stations. Although jumps are usually made at low velocities, the speed and direction which a ship held prior to jump is retained when it returns to normal space.

COMMUNICATIONS SECTION

Many craft can benefit by having some form of external communication device. By their nature, flying vehicles, small spacecraft, and starships require one or more communication devices for communication with traffic control authorities.

All of the communicator types, along with their advantages and disadvantages, are covered on the design flowchart.

See Starship Combat for details about using communicators.

SENSORS AND ELECTRONICS SECTION

Many craft can benefit from having sensors and sensor-related electronics installed. By their nature, flying vehicles, small spacecraft, and starships cannot rely on just the operator's vision as their only source of sensory input.

All of the sensor types, along with their advantages and disadvantages, are covered on the design flowchart.

See Starship Combat for details about using sensors.

WEAPONS SECTION

If the craft is expected to be used in some offensive or defensive capacity, give serious consideration to installing weapons. The following terms and definitions apply to the weapons flowchart.

Hard Point: A hard point is a necessary measurement of hull pre-allocation to allow the mounting of very large weapons without affecting the structural integrity of the hull. Of the four weapon categories, only a gun mount does not require any hard points.

Weapon Mounts

Weapons fall into one of four categories based on their mountings:

Spinal Mount: A fixed-mount major starship weapon which provides for attacks of the greatest possible power. Because a starship's entire structure is built around a spinal mount (and hence the name), no starship may have more than one spinal mount.

Bay: Very large weapon mount able to move to point at the target. The most powerful type of moving weapon mount.

Turret: Moderate weapon mount able to move to point at the target. A reasonably powerful type of moving weapon mount.

Gun: Small weapon mount able to move to point at the target. Most typically installed in vehicles, a gun can be installed in a small moveable mount on a vehicle, also called a turret or a "gun turret" in these rules (this serves to differentiate these turrets from the larger hard point-based turret mount).

Weapon Types

Types of weapons include:

Lasers: Lasers fire a concentrated light energy in beams or pulses against enemy targets.

Energy Weapons (which include plasma guns and fusion guns): These weapons fire a highly energized beam of ionized gas at the target; with the fusion gun this gas actually proceeds to fusion.

Particle Accelerators: Particle accelerators charge and accelerate electrons or hydrogen nuclei to high velocities toward a target. Hits produce both surface damage and radiation effects.

Meson Guns: These guns create high-energy mesons and direct them at a target. Mesons have short lives, which can be prolonged to precise durations by accelerating them to relativistic speeds. If the point of decay is manipulated to occur inside the target ship, the result is high energy explosions and radiation damage. Because of the nature of the meson, it can pass through armor and matter without resistance.

Missiles: Missiles are available in two types, nuclear and nonnuclear. Nuclear missiles produce surface damage and radiation effects, while nonnuclear missiles produce only surface damage.

A third type of missile is available at very high Tech Levels: the antimatter missile.

Sandcasters: Sandcasters project a granular agent which obstructs light; when they are fired, the agent interferes with incoming laser or energy weapon fire.

Repulsors: Repulsors are large, focused artificial-grav projectors. When directed at incoming missiles, they deflect them away from their target.

Tractors: Tractors are large, focused artificial-grav attracters available at very high Tech Levels. When directed at other craft, they restrict their agility.

Disintegrators: Disintegrators disrupt the strong molecular attraction that holds matter together, causing an object's molecules to fly apart. Available at very high Tech Levels.

Jump Projectors: Jump projectors induce a jump field around the target, causing it to misjump. Available at very high Tech Levels.

Jump Damper: Jump dampers inhibit a target's ability to enter jumpspace. Available at very high Tech Levels.

The following are available as guns only.

Mortars: A mortar is a very low velocity slug thrower. Indirect fire only.

CPR Guns: CPR guns are chemically propelled round slug throwers.

Autocannon: An autocannon is a very rapid fire CPR gun.

Mass Driver Gun: A mass driver gun is an electronically propelled slug thrower. Available beginning at Tech Level 8.

SCREENS SECTION

If the craft is expected to be used where it could come under attack, give serious consideration to installing defensive screens.

The types of screens available include:

Meson Screens: Screens that project an interruption of the

strong nuclear force, which prematurely causes decay of incoming mesons.

Nuclear Dampers: Screens that project a series of nodes and anti-nodes where the strong nuclear force is enhanced or degraded, rendering nuclear warheads ineffective.

Black Globe Generator: Projects a barrier which absorbs all energy and shunts it to onboard capacitors. The barrier prevents all transit across it, and a ship with its black globe is restricted in its ability to maneuver, fire its weapons, or communicate. In addition, the field may be overloaded, which causes the failure of the storage capacitors and destruction of the ship.

Proton Screens: Screens that render antimatter missiles ineffective. Available at very high Tech Levels.

White Globe Generator: Projects a glowing white barrier which absorbs all weapon fire. Unlike the black globe, it does not restrict the ship with the white globe from seeing out or using any sensors. Available at very high Tech Levels.

CONTROLS AND BRIDGE SECTION

All craft need some sort of operator controls. At the Stellar tech code (Tech Level 9+), most, if not all craft include a computer as part of their onboard controls.

Life-Support and Sealed Environment: A craft may be closed to the outside by being sealed; a craft in vacuum, trace, exotic, corrosive, or insidious atmospheres must have life support. Generally, a craft with life support must also be sealed. However, life support may be used in an unsealed craft as a substitute for oxygen tanks (although the crew must wear any required protective suits).

Grav Plates: Provides internal artificial gravity, such that "down" is always more or less constant no matter what the orientation of the craft. For the optimum in internal gravity consistency, also install inertial compensators.

Inertial Compensators: Inertial compensators, when installed, allow high-G maneuvers while interior G-fields remain normal. Inertial compensators negate the effects of inertia, so the occupants inside a moving craft have no sensation of motion at all.

Computer and Control Panels: A computer is required to aid the operator or operators in controlling the craft's functions. A computer multiplies the effects of the ship's installed control panels if the control panels are of the "linked" type.

Several types of control panels exist:

Mechanical: Basic gauges, dials, and mechanical controls.

Electronic: Digital electronic gauges and electromechanical controls.

Computer: Computerized controls with detailed and informative flat computer displays.

Dynamic: Dynamically reconfigurable flat 2D controls. The operator may reconfigure the controls in a moment's notice to fit preference or operating style. Limits the Tech Level reduction of a skill level to −1.

Holographic: Dynamically reconfigurable contoured 3D controls with tactile feedback. The operator may reconfigure the controls in a moment's notice to fit preference or operating style. Limits the Tech Level reduction of a skill level to −1.

Panel add-ons include:

Heads-Up Displays: Displays control panel information in pictorial form in the operator's field of view, which avoids the need for the operator to look at separate panel. The holographic version displays readings and output in a more informative 3D pictorial form.

Large Holodisplay: A large holographic display/plotter unit for showing all manner of 3D tactical, trajectory, flight path, and sensor information, as well as displaying 3D communications and recordings.

ACCOMMODATIONS SECTION

All craft (other than drone vehicles) must provide accommodations for any crew and passengers that are carried. The accommodations section includes the requirements for carrying subordinate craft.

Frozen Watch: Supplementary crew members may be carried in low berths; this frozen watch is then available to replace crew casualties incurred in combat.

Pilot Requirements: The frozen watch must contain at least half the total number of pilots required for the ship.

Multiple Frozen Watches: More than one frozen watch may be assigned to a ship. Each frozen watch must meet the requirement that it contain at least one crew section, and it must carry at least 50 percent of the ship's required pilots.

Sufficient low berths must be installed to carry all frozen watch personnel.

Transfers To Other Ships: Frozen watch personnel may be transferred to other ships, but only between battles. A battle must end before frozen watch personnel can be transferred to other ships in order to crew them.

Extended Accommodations: For starships, the ship's crew must have quarters allocated for them. Other types of accommodations include passenger (noncrew) accommodations, low berths, and emergency low berths.

Staterooms: Dual occupancy staterooms are computed at MCr0.25 and two tons per person. It is not necessary to purchase an entire stateroom just to accommodate an odd number of crewmembers; a half-stateroom or large triple-occupancy stateroom can be built.

Subordinate Craft (Ship's Vehicles): Whenever a ship carries other ships, small spacecraft, or vehicles as part of its complement of vessels, provision must be made for hangars and launch facilities for them.

Launch Facilities: Launch facilities must be provided for all ships and craft carried. Such facilities are automatic with irregular structures (configuration 7), and all craft may be launched in one turn. Ordinary launch facilities allow one craft to be launched per turn. Launch tubes allow up to 40 craft to be launched per turn. Recovery is at the same rate.

FUEL AND MISCELLANEOUS SECTION

Most power supplies require some sort of fuel. This section also covers the allocation of cargo space and the like.

Fuel Tankage: All craft (except those powered exclusively by batteries or solar cells) must be fitted with fuel tanks during the design and construction process. A 30-day supply is considered optimum.

Hydrogen is available for free in the atmospheres of gas giants (similar to Saturn or Jupiter) or from oceans of water. Taking such fuel from gas giants requires a craft with a

streamlined hull. Large ships carry streamlined fuel tankers, which can skim fuel and return it to the unstreamlined ship. Water may also be used to provide hydrogen; water is dipped by ships landing in the ocean and opening fuel cocks or by fuel shuttles. Skimmed or dipped fuel is unrefined, and may result in misjumps by jump-capable starships; purification plants can convert such fuel for safe use.

More fuel tankage may be allocated if desired to increase range (such as the number of jumps possible for starships) or endurance (in days of operation allowed before refueling).

Other Types of Fuel Tankage: Four varieties of fuel tankage are not integral to a ship: collapsible tanks, dismountable tanks, exterior dismountable tanks, and drop tanks. Each type is discussed on the design flowchart.

Cargo Space: Cargo space is allocated in kiloliters (or liters). Since all equipment includes a volume figure (see the *Imperial Encyclopedia)*, it is simple determine what will fit in a craft.

DESIGN-RELATED TOPICS

Developing a working knowledge of the topics and game rules in this section gives the designer more insight how his designs are used, which results in better craft designs.

SPARE SYSTEMS

Spare systems may be installed in a craft to take over in the event that the main unit is disabled.

These are backup devices and may not be in operation at the same time as the main device. The higher-output device is the mainstay; the backup device does not consume fuel or power while it is not in use. When the main device takes damage that reduces it below the level of the backup, the backup takes over. If the backup is then damaged, the main unit returns to action. Whichever unit has the highest current factor is the one in operation; when damage is received, it is applied to the unit in operation. Under no circumstances may a backup and main device be operating at the same time.

ENVIRONMENT NOTES

A craft suffering penetration is no longer sealed and is subject to explosive decompression in a vacuum or trace atmosphere, poisonous contamination in an exotic or corrosive atmosphere, or death of its occupants in an insidious atmosphere.

Air breathing engines may not be constructed for use on a world with an atmosphere type of vacuum, trace, exotic, corrosive, or insidious. They must have intake compressors to function on very thin atmosphere worlds. All pre-fusion engines, with the exception of rockets, are air breathers; a vehicle powered by batteries is not an air breather.

SPACE-FARING CRAFT

Space-faring craft are designed by individuals, corporations, or navies using their own specifications to produce the exact type of ship desired.

Design: A navy specification for a space-faring vessel can be produced in about eight weeks. Corporations and individuals must obtain the services of a naval architect (who charges 1 percent of the final ship cost); the architect can prepare final plans and specifications (from which the shipyard works) in about four weeks.

Availability: Starships (with jump drives) may be constructed at the shipyard of any class A starport; nonstarships (without jump drives) may be constructed at the shipyard of any class A or class B starport.

Tech Level: The Tech Level of the building shipyard determines the Tech Level of the ship being constructed (a class A starport on a Tech Level 14 world constructs a Tech Level 14 ship). Equipment and components of a starship may always be equal to or less than the ship's Tech Level.

The Imperial Navy may procure ships of up to Tech Level 15, although it also procures vessels at Tech Levels 10 through 14. A subsector navy may procure ships at any shipyards within its borders. A planetary navy may procure ships at any shipyard within the borders of its subsector; alternatively, a planetary navy may construct ships on its planet, using local resources. A shipyard navy may construct ships on its planet using local resources, even if a shipyard is not present.

Construction Times: Ships of less than 60,000 kiloliters can be completed within 36 months by any competent shipyard. Ships over 60,000 kiloliters require from 24 to 60 months to complete based on conditions, volume of orders, and the degree of haste desired by the ordering government.

Ship Classes: Once a ship is built, a certain familiarity with the requirements of construction is gained by the building crews, and a shipyard can produce ships more rapidly and with greater efficiency. Additional identical ships built following the initial ship in a class can be completed in 80 percent of the original time at 80 percent of the original construction cost.

Ships of a class are named to show this relationship. For example, the first ship in a series of small, swift escort vessels might be called the *Gazelle,* prompting the formation of the *Gazelle*-class of close escorts. Other ship names in the class could be *Reindeer, Pinto, Nulope, Shasii,* or any other name for a swift herbivore found on some world.

Military Craft: Starships and vessels may be fire support.

Naval Vessel Organization: Naval vessels operate in task forces or squadrons; each ship supplements the others.

A fleet plan must consider more than the individual ships. It must deal with the way ships interact with others.

Carried Squadrons: One technique is the construction of tenders or carriers—single large ships to carry well-armed smaller ships which actually fight. When the craft being carried are in the 10,000 ton range, and the large ship is 200,000 tons or more, the ship is called a tender or transport.

The carried craft are not jump-capable, so the points of greatest danger to carried squadrons are immediately prior to jump (when craft or ships have been recalled) and after returning to normal space (when craft have not yet been launched).

The High Guard: Refuelling operations for a task force are another danger point, as forces which are both low on fuel and maneuvering in a gravity well are especially vulnerable. The high guard position, so named because the ship or ships involved are higher in the gravity well than their companions, are used to mount protective operations during refueling.

Planetoid Ships: The inexpensive nature of planetoid ships would appear to be their first attraction. Planetoids provide other benefits, including relatively inexpensive, although bulky, armor protection (especially for buffered planetoids).

0 - OVERALL CRAFT DESIGN

1 Craft Purpose

Determine the craft's purpose and the Technology Level at which it is constructed.

2 Craft Size Category

Determine the craft's size category.

Vehicle: Less than 20 tons displacement (less than 270 kiloliters volume). Vehicles are generally restricted to a world.

Small Craft: Between 20 tons and 100 tons displacement (between 270 and 1350 kiloliters volume). Small craft are generally restricted to a planet or stellar system.

Space Vessel: 100 tons or more (1350 kiloliters or more). Space vessels may be spaceships or starships.

3 Design Craft By Section

For each listed section, proceed to that section chart and follow the steps there.

A. The following sections should be designed in the order shown.

1. *Hull Section.*
2. *Power Supply Section.*
3. *Locomotion Section.*

B. The following sections may be designed in any order.

4. *Communicators Section.*
5. *Sensors and Electronics Section.*
6. *Weapons Section.*
7. *Screens Section.*

C. The following sections should be designed in the order shown.

8. *Control and Bridge Section.*
9. *Accommodations Section.*
10. *Fuel and Miscellaneous Section.*

4 Evaluate Design

Proceed to the Design Evaluation Procedure. On the basis of the evaluation, rework the design as necessary. When you are satisfied with the results, the design is completed.

1 - BASIC HULL DESIGN 1

1 Determine Craft Hull

For simplicity, a vehicle's chassis, a small craft's hull, and a space vessel's hull are all called **hull** in this chart.

2 Select Vehicle Chassis

If the craft is a vehicle, select the appropriate vehicle chassis from the Vehicle Chassis Table.

VEHICLE CHASSIS TABLE

UCP	*Volume*	*Weight*	*Price*
0.007	0.10	0.010	400
0.019	0.25	0.025	850
0.037	0.50	0.075	1200
0.056	0.75	0.075	1400
0.074	1.00	0.100	1600
0.093	1.25	0.125	1800
0.111	1.50	0.150	2000
0.130	1.75	0.175	2200
0.185	2.50	0.250	2400
0.250	3.37	0.400	2600
0.050	6.75	0.700	2800
0.075	10.12	1.100	3000
1.000	13.50	1.500	3300
2.000	27.00	2.200	3700
3.000	40.50	2.800	4200
4.000	54.00	3.500	5800
5.000	67.50	4.000	6500
6.000	81.00	4.600	7500
7.000	94.50	5.200	8500
8.000	108.00	5.700	10000
9.000	121.50	6.300	13700
10.000	135.00	6.800	17400
11.000	148.50	7.300	21100
12.000	162.00	7.800	24800
13.000	175.50	8.400	28500
14.000	189.00	8.800	30300
15.000	202.50	9.300	33000
16.000	216.00	9.800	36700
17.000	229.50	10.300	38400
18.000	243.00	10.800	40100
19.000	256.50	11.300	42800
20.000	270.00	11.800	44550

3 Select Small Craft Hull

If the craft is a small craft, select the appropriate small craft hull from the Small Craft Hull Table.

SMALL CRAFT HULL TABLE

UCP	*Volume*	*Weight*	*Price*
20.0	270	11.8	44.55
25.0	335	13.4	49.70
30.0	405	16.2	56.80
35.0	470	18.8	62.10
40.0	540	21.6	66.82
45.0	605	23.6	69.90
50.0	675	26.3	72.40
55.0	740	28.8	79.40
60.0	810	31.6	84.20
65.0	875	33.3	89.50
70.0	945	35.0	93.50
75.0	1010	36.4	100.00
80.0	1080	37.8	107.00
85.0	1150	38.5	114.00
90.0	1215	39.0	124.00
95.0	1285	39.5	127.00
100.0	1350	40.0	134.00

UCP is Universal Craft Profile displacement tonnage.

Volume is in kiloliters.

Weight is in metric tons.

Price is in credits for vehicles, and in megacredits for small craft and space vessels.

4 Select Space Vessel Hull

If the craft is a starship or spacecraft, select the appropriate space vessel hull from the Space Vessel Hull Table.

SPACE VESSEL HULL TABLE

UCP	*Volume*	*Weight*	*Price*
100	1350	40	0.134
200	2700	70	0.265
300	4050	100	0.400
400	5400	130	0.535
500	6750	160	0.665
600	8100	190	0.805
700	9450	220	0.935
800	10800	250	1.050
900	12150	280	1.200
1000	13500	310	1.350
2000	27000	600	2.700
3000	40500	900	4.000
4000	54000	1200	5.300
5000	67500	1500	6.700
6000	81000	1800	8.000
7000	94500	2100	9.400
8000	108000	2400	10.700
9000	121500	2700	12.100
10000	135000	3000	13.400
20000	270000	6000	15.600
30000	405000	8000	17.800
40000	540000	10000	20.100
50000	675000	11500	22.300
75000	1010000	15000	44.600
100000	1350000	18000	66.800
200000	2700000	29000	89.100
300000	4050000	38000	111.400
400000	5400000	46000	166.700
500000	6750000	54000	222.800
700000	9450000	67000	445.500
900000	12150000	79000	668.300
1000000	13500000	85000	891.000

1 - BASIC HULL DESIGN 2

5 Craft Configuration and Streamlining

Determine the craft's configuration. Apply the configuration weight and price modifiers to the hull figures. Determine the craft's type of streamlining; apply the streamlining modifier to hull price.

CONFIGURATION AND STREAMLINING

		Config		Streamlining Price Mod		
Type	Configuration	Wt Mod	Price Mod	Unstream-lined	Stream-lined	Air-frame
0	Open Frame	×0.5	×0.5	×1.0	NA	NA
1	Needle	—	×1.2	NA	×1.0	×1.5
2	Cone	—	×1.1	NA	×1.0	×2.0
3	Cylinder	—	—	×1.0	×1.2	×3.0
4	Box	—	×0.6	×1.0	×1.5	NA
5	Sphere	×0.8	×1.5	NA	×1.0	NA
6	Dome/Disk	×0.9	×1.2	NA	×2.0	×0.5
7	Irregular	×0.9	×.05	×1.0	NA	NA
8	Planetoid	NA	NA	×1.0	NA	NA
9	Buffered	NA	NA	×1.0	NA	NA

Note: NA means Not Available.

Vehicles and small craft may not use any planetoid configurations (configuration 8 and 9).

A spacecraft must be at least streamlined if it is to undertake wilderness refueling.

6 Planetoid Configurations

Special conditions exist for planetoid configurations:

1. Planetoid hulls are generally free for the taking, but there is a transportation charge from the belt to the orbital shipyard. Fusion tunneling is used to hollow out passages and compartments.

2. A planetoid can use only 80 percent of its volume; the remainder is unusable and must be left in place to maintain structural integrity.

3. A buffered planetoid can use only 65 percent of its volume; the remainder is unusable and must be left in place to maintain structural integrity and to serve as armor.

PLANETOID HULLS

Transport	Tunneling	Planetoid Weight	Buffered Weight
Cr10	Cr75	1.0	1.75

Prices shown are per kiloliter of hull.

Armor Values: Planetoid is armor value 50. Buffered planetoid is armor value 56.

Additional armor may be added to a planetoid: subtract the planetoid's current armor value mass factor from the desired new armor value mass factor.

7 Armor

Determine the armor type for the craft using the table below. Apply the weight and price modifiers to the hull weight and price.

ARMOR TYPE TABLE

UCP	TL	Type	Weight Modifier	Price Modifier
A	5	Soft Steel	×1.25	×1.0
B	6	Hard Steel	×1.00	×1.0
C	7	Composite Laminate	×0.44	×1.8
D	9	Lt Wt Composite Laminate	×0.35	×1.6
E	10	Crystaliron	×0.31	×1.1
F	12	Superdense	×0.26	×1.0
G	14	Bonded Superdense	×0.14	×1.0
H	17	Coherent Superdense	×0.06	×1.3

Armor may not be selected above the prevailing Tech Level.

8 Minimum Armor

Determine the minumum armor for the craft using the guidelines below.

Vehicles: No minimum.
Spacecraft: Minimum 40.
Starships: Minimum 40.

Spacecraft and starships require a minimum armor value of 40 for protection against micrometeoroids and radiation.

9 Armor

Select the armor protection using the table below.

ARMOR TABLE

Armor	Mod	Armor	Mod
1	0.25	58	160
2	0.50	59	174
3	0.75	60	190
4	1.00	61	207
5	1.25	62	226
6	1.50	63	247
7	1.75	64	269
8	2.00	65	293
9	2.25	66	320
10	2.50	67	349
11	2.75	68	381
12	3.00	69	415
13	3.25	70	453
14	3.54	71	494
15	3.86	72	538
16	4.20	73	587
17	4.59	74	640
18	5.00	75	698
19	5.45	76	761
20	5.95	77	830
21	6.48	78	905
22	7.07	79	987
23	7.71	80	1080
24	8.41	81	1170
25	9.17	82	1280
26	10.0	83	1400
27	10.9	84	1520
28	11.9	85	1660
29	13.0	86	1810
30	14.1	87	1970
31	15.4	88	2150
32	16.8	89	2350
33	18.3	90	2560
34	20.0	91	2790
35	21.8	92	3040
36	23.8	93	3320
37	25.9	94	3620
38	28.3	95	3950
39	30.8	96	4310
40	**33.0**	97	4700
41	36.7	98	5120
42	40.0	99	5580
43	43.6	100	6090
44	47.6	101	6640
45	51.9	102	7240
46	56.6	103	7900
47	61.7	104	8610
48	67.3	105	9360
49	73.4	106	10200
50	80.0	107	11200
51	87.2	108	12200
52	95.1	110	14500
53	104.0	112	17200
54	113.0	114	20500
55	123.0	116	24400
56	135.0	118	29000
57	147.0	120	34400

10 Weight and Price

The armor factor from the Armor Table determines the protection the armor provides. Multiply hull weight and hull price (already modified by the armor type weight and price modifiers) by the Armor Table modifier.

11 Open Vehicle?

Determine if the vehicle is open-topped.

If the vehicle is chassis size 9 or less, it cannot be enclosed; occupants must ride on its outside.

If chassis size A or larger, the vehicle is enclosed unless selected otherwise. If open-topped is selected, choose an open-top percentage between 5 percent and 20 percent.

Reduce chassis weight and price by the selected percentage.

12 Vehicle Cupola?

Determine if the vehicle has a **cupola** or **turret**.

A **cupola** is a fixed extension of the hull. A **turret** is a movable extension of the hull.

Select the desired size of the extension (5 percent to 40 percent of the hull volume).

Increase hull volume, weight, and price by the selected percentage.

A turret uses 0.01 megawatts of power (for movement) per kiloliter of turrent volume.

More than one turret or cupola is possible as long as the combined total increase in hull volume is not more than 40 percent.

Because a turret or cupola is typically such a large part of a vehicle, it is determined at the same time as the hull. Starships and spacecraft (on the other hand) determine turret design along with weaponry.

If you plan to mount a weapon on the vehicle, you should have some idea of the weapon volume needed—you might look ahead to the weapons design section and pick out a weapon at this time. Then return here and design the cupola or turret.

13 Hull Totals

Note the totals for:

- Power
- Volume
- Weight
- Price

2 - POWER SUPPLY

1 Power Supply

Select a power supply combination for the craft from the list of various power plants below. Install as many kiloliters as are necessary to achieve the desired power supply.

POWER PLANTS

TL	Description	Power Out	Weight	Price	Volume	Kl/Hour	Fuel Type
5	Internal Combustion	0.15	1	1000	0.005	0.135	Hydrocarbons
6	Improved Internal Combustion	0.25	1	2000	0.001	0.125	Hydrocarbons
6	Nuclear Fission	1.00	8	100000	5.000	0.002	Radioactives
7	Gas Turbine	0.40	1	5000	0.005	0.200	Hydrocarbons
8	MHD Turbine	0.60	1	10000	0.001	0.180	Hydrocarbons
9	Fusion	2.00	4	200000	10.000	0.003	Hydrogen
10	Fusion	2.00	4	200000	2.000	0.003	Hydrogen
11	Fusion	2.00	4	200000	1.000	0.003	Hydrogen
12	Fusion	2.00	4	200000	0.250	0.005	Hydrogen
13	Fusion	3.00	3	200000	0.150	0.005	Hydrogen
14	Fusion	3.00	3	200000	0.100	0.005	Hydrogen
15	Fusion	6.00	2	200000	0.090	0.009	Hydrogen
16	Fusion	7.00	1	200000	0.080	0.010	Hydrogen

TL	Description	Power Out	Weight	Price	Volume	Kl/Year	Fuel Type
17	Antimatter	500.00	6	500000	8.000	25.0	Antimatter
18	Antimatter	1000.00	5	500000	1.000	500.0	Antimatter
19	Antimatter	2500.00	4	500000	0.500	1250.0	Antimatter
20	Antimatter	15000.00	3	500000	0.100	7500.0	Antimatter
21	Antimatter	50000.00	2	500000	0.020	25000.0	Antimatter

Antimatter power output is the maximum that is possible without destroying the power plant. Fuel will last one year at maximum output; lower outputs make the fuel last correspondingly longer.

STORAGE BATTERIES

TL	Storage	Price
5	0.0001	500
6	0.0002	425
7	0.0003	300
8	0.0004	325
9	0.0006	375
10	0.0008	525
11	0.0009	675
12	0.0010	850
13	0.0030	3000
14	0.0040	5000
15	0.0070	10000
16	0.0110	15000
17	0.0180	20000
18	0.0300	26000
19	0.0550	32000
20	0.1030	38000
21	0.1800	42000

Storage: Megawatt-hours stored in 0.001 kiloliter of battery.

Price: Cr per 0.001 kiloliter of battery.

Weight: 0.001 ton per kiloliter.

Volume: 0.001 kiloliter per 0.001 tons.

FUEL CELLS

Power Output	Volume	Weight	Fuel Price	Liters/ Hour
0.01	0.020	0.020	600	0.10
0.02	0.030	0.035	800	0.15
0.03	0.040	0.055	1000	0.20
0.04	0.050	0.075	1200	0.25
0.05	0.060	0.095	1400	0.30
0.07	0.080	0.130	1500	0.35
0.09	0.100	0.165	2000	0.40

Power Output: TL 13+, ×1.5; TL 15, ×3.0; TL 16, ×3.5.

Weight: TL 13+, ×0.75; TL 15, ×0.50; TL 16, ×0.40.

SOLAR CELLS

TL	Output	Volume	Weight	Price
6	0.001	0.010	0.020	10000
7	0.002	0.010	0.018	8000
8	0.004	0.010	0.016	6000
9	0.012	0.010	0.014	5000
10	0.027	0.010	0.012	4000
11	0.045	0.010	0.010	3000
12+	0.081	0.010	0.008	2000

Solar Cell characteristics are stated per square meter.

To determine the maximum square meters of chassis surface area available for solar cells, take the square root of the chassis volume in kiloliters.

If you select a power plant that uses fuel, plan ahead on the amount of fuel volume that will be necessary in the hull. A minimum of a thirty day supply is considered optimum, although some designs (especially at lower Tech Levels) will not allow this luxury.

2 Scale Efficiency

Very large or very small power plants have scale efficiency effects. Apply any efficiency modification from the tables below.

	Large Plants Efficiency Increase		Small Plants Efficiency Decrease	
Plant Type	Volume	Output Mod	Volume	Output Mod
Internal Combustion	11+	×1.5	0.10−	×0.33
Turbines	11+	×1.5	—	×0.33
Fission	50+	×2.0	—	—
Fusion	6+	×1.5	0.75−	×0.67
Fusion	10+	×2.0	0.50−	×0.50
Fusion	14+	×3.0	0.25−	×0.25

Note: The plus sign after a plant volume means "or more;" the minus sign after a plant volume means "or less."

3 Compute Power Plant Totals

Note totals for:
- Power Output
- Volume
- Weight
- Price

3 - LOCOMOTION 1

1 Locomotion Type

Decide on the type of locomotion the craft will have.

Vehicles: Vehicles may use either thrust-based or contact-based locomotion.

- Thrust-based locomotion uses an air cushion or grav modules for propulsion.
- Contact-based propulsion uses wheels, tracks, or legs for propulsion.

Both thrust-based and contact-based locomotion require suspensions; contact-based locomotion also requires a transmission.

Small Craft and Spacecraft: Small craft and spacecraft require a maneuver drive.

Starships: Starships require a jump drive (a jump drive defines a spacecraft as a starship). A starship must displace 100 tons in order to accommodate a jump drive. Starships usually also have a maneuver drive.

2 Jump Drive Capacity

Any spacecraft over 100 tons becomes a starship if it has a jump drive. Select the maximum jump number desired.

JUMP DRIVES

Tech Level:	TL 9	TL 11	TL 12	TL 13	TL 14	TL 15
Maximum:	Jump1	Jump2	Jump3	Jump4	Jump5	Jump6

Jump number is the number of parsecs the starship can travel in one week's time.

3 Jump Units Required

Determine the number of jump units required for the ship's hull size and the desired jump number.

JUMP UNITS REQUIRED

Size	*Jump1*	*Jump2*	*Jump3*	*Jump4*	*Jump5*	*Jump6*
100	2	3	4	5	6	7
200	4	6	8	10	12	14
300	6	9	12	15	18	21
400	8	12	16	20	24	28
500	10	15	20	25	30	35
600	12	18	24	30	36	42
700	14	21	28	35	42	49
800	16	24	32	40	48	56
900	18	27	36	45	54	63
1000	20	30	40	50	60	70
2000	40	60	80	100	120	140
3000	60	90	120	150	180	210
4000	80	120	160	200	240	280
5000	100	150	200	250	300	350
6000	120	180	240	300	360	420
7000	140	210	280	350	420	490
8000	160	240	320	400	480	560
9000	180	270	360	450	540	630
10000	200	300	400	500	600	700
20000	400	600	800	1000	1200	1400
30000	600	900	1200	1500	1800	2100
40000	800	1200	1600	2000	2400	2800
50000	1000	1500	2000	2500	3000	3500
75000	1500	2250	3000	2750	4500	5250
100000	2000	3000	4000	5000	6000	7000
200000	4000	6000	8000	10000	12000	14000
300000	6000	9000	12000	15000	18000	21000
400000	8000	12000	16000	20000	24000	28000
500000	10000	15000	20000	25000	30000	35000
700000	14000	21000	28000	35000	42000	49000
900000	18000	27000	36000	45000	54000	63000
1000000	20000	30000	40000	50000	60000	70000

Each jump unit has a volume of 13.5 kiloliters, a weight of 27.0 tons, and a price of Cr3,000,000.

4 Jump Fuel Volume

Allocate jump fuel volume in the hull. The ship must have fuel tankage allocated for jump fuel to contain at least enough fuel for one jump of the highest capacity of the ship's jump drives. Jump fuel is independent of power plant fuel.

Fuel Volume at TL 9 to 16: ×5 (67.5 kiloliters per jump unit).
Fuel Volume at TL 17: ×4 (54 kiloliters per jump unit).
Fuel Volume at TL 18: ×3 (41 kiloliters per jump unit).
Fuel Volume at TL 19: ×2 (27 kiloliters per jump unit.
Fuel Volume at TL 20: ×1 (14 kiloliters per jump unit).
Fuel Volume at TL 21: ×0.5 (7 kiloliters per jump unit).

Note the extreme fuel volume a jump drive requires: a tech 9 to 16 jump drive requires **five times** that of the jump drive itself.

5 Maneuver Drive

Determine the number of maneuver drive units for the ship's hull size and desired maneuver thrust in Gs.

MANEUVER DRIVE UNITS REQUIRED

Hull	*Number of Maneuver Drive Units Required*					
Displ	*1G*	*2G*	*3G*	*4G*	*5G*	*6G*
20	0.4	1.0	1.6	2.2	2.8	3.4
25	0.5	1.3	2.0	2.8	3.5	4.3
30	0.6	1.5	2.4	3.3	4.2	5.1
35	0.7	1.8	2.8	3.9	4.9	6.0
40	0.8	2.0	3.2	4.4	5.6	6.8
45	0.9	2.3	3.6	5.0	6.3	7.7
50	1.0	2.5	4.0	5.5	7.0	8.5
55	1.1	2.8	4.4	6.1	7.7	9.4
60	1.2	3.0	4.8	6.6	8.4	10.2
65	1.3	3.3	5.2	7.2	9.1	11.1
70	1.4	3.5	5.6	7.7	9.8	11.9
75	1.5	3.8	6.0	8.3	10.5	12.8
80	1.6	4.0	6.4	8.8	11.2	13.6
85	1.7	4.3	6.8	9.4	11.9	14.5
90	1.8	4.5	7.2	9.9	12.6	15.3
100	2	5	8	11	14	17
200	4	10	16	22	28	34
300	6	15	24	33	42	51
400	8	20	32	44	56	68
500	10	25	40	55	70	85
600	12	30	48	66	84	102
700	14	35	56	77	98	119
800	16	40	64	88	112	136
900	18	45	72	99	126	153
1000	20	50	80	110	140	170
2000	40	100	160	220	280	340
3000	60	150	240	330	420	510
4000	80	200	320	440	560	680
5000	100	250	400	550	700	850
6000	120	300	480	660	840	1020
7000	140	350	560	770	980	1190
8000	160	400	640	880	1120	1360
9000	180	450	720	990	1260	1530
10000	200	500	800	1100	1400	1700
20000	400	1000	1600	2200	2800	3400
30000	600	1500	2400	3300	4200	5100
40000	800	2000	3200	4400	5600	6800
50000	1000	2500	4000	5500	7000	8500
75000	1500	3750	6000	8250	10500	12750
100000	2000	5000	8000	11000	14000	17000
200000	4000	10000	16000	22000	28000	34000
300000	6000	15000	24000	33000	42000	51000
400000	8000	20000	32000	44000	56000	68000
500000	10000	25000	40000	55000	70000	85000
700000	14000	35000	56000	77000	98000	119000
900000	18000	45000	72000	99000	126000	153000
1000000	20000	50000	80000	110000	140000	170000

TL	*Maneuver Drive Units*	*Power*	*Volume*	*Weight*	*Price*
9	One anti-grav unit:	65.0	13.5	27.0	500000
11	One thruster unit:	70.0	13.5	35.0	700000

Excess power from the power plant improves agility (computed in the design evaluation). Some starships have no maneuver drive.

6 Thrust-Based Suspension

If the vehicle has a thrust-based locomotion system, it must have a thrust-based suspension system as well.

THRUST-BASED SUSPENSIONS

		Per ton of thrust				Min
TL	Type	Power	Volume	Weight	Price	Volume
7	Air Cushion	0.10	0.20	0.30	30000	0.010
9	Standard Grav	0.10	0.02	0.04	2000	0.020
10	Low Power H-Grav	0.02	0.05	0.03	25000	0.020
12	Low Power L-Grav	0.01	0.03	0.02	300000	0.003

Values shown are per ton of thrust. Thrust must exceed the total weight of the vehicle.

Minimum Value: Indicates the minimum volume for the suspensions. Suspensions cannot be made any smaller than this figure.

Thrust-based suspensions do not require a transmission.

7 Contact-Based Suspension

If the vehicle has a contact-based locomotion system, it must have a contact-based suspension system as well.

The suspension system may consist of wheels, tracks, or legs.

CONTACT-BASED SUSPENSIONS

	Per kiloliter			Min
Type	Power	Weight	Price	
Wheels	0.02	0.5	250	
Tracks	0.03	1.5	500	
Each Leg	0.04	1.0	1500	

Minimum Volume: The minimum percent of chassis volume required depends on the suspension system.

For Wheels: 15 percent.

For Tracks: 20 percent.

For Legs: 5 percent per leg. A minimum of two legs is required.

Contact-based suspensions also require a transmission.

8 Contact-Based Transmissions

Contact-based suspensions also require a transmission.

CONTACT-BASED TRANSMISSIONS

		Per Mw Power Plant Output		
TL	Type	Volume	Weight	Price
5	Tracks	5.0	5.0	5000
6	Tracks	2.0	2.0	2500
7+	Tracks	0.5	0.5	900
5	Wheels	3.0	3.0	3000
6	Wheels	1.0	1.0	1250
7+	Wheels	0.3	0.3	450
8	Leg	8.0	8.0	10000
9	Leg	2.0	2.0	2500
10+	Leg	0.4	0.4	675

Values shown are for all necessary tracks or wheels, and for each leg (minimum of two required).

Values shown are for one unit of transmission per megawatt of power plant output. One unit is required for each megawatt of power plant output.

9 Select Avionics

Avionics allows a thrust-powered vehicle to fly nap-of-the-earth (NOE) at fast speeds.

AVIONICS

TL	Type	Power	Volume	Weight	Price	NOE
	No Avionics	-	-	-	-	40
8	TL 8 Avionics	0.4	0.2	0.05	10000	120
9	TL 9 Avionics	0.4	0.2	0.04	11000	130
10	TL 10 Avionics	0.3	0.15	0.04	12000	140
11	TL 11 Avionics	0.3	0.15	0.03	13000	150
12	TL 12 Avionics	0.2	0.1	0.03	14000	160
13	TL 13 Avionics	0.2	0.1	0.02	15000	170
14	TL 14 Avionics	0.1	0.05	0.02	16000	180
15	TL 15 Avionics	0.1	0.05	0.02	17000	190
16	TL 16 Avionics	0.05	0.03	0.03	18000	200
17	TL 17 Avionics	0.05	0.03	0.03	19000	250
18	TL 18 Avionics	0.02	0.02	0.04	20000	300
19	TL 19 Avionics	0.02	0.02	0.04	22000	350
20	TL 20 Avionics	0.01	0.01	0.05	24000	400
21	TL 21 Avionics	0.01	0.01	0.06	28000	450

10 Compute Locomotion Totals

Note totals for:

Power Consumption
Volume
Weight
Price

4 - COMMUNICATORS

1 Select Communicators

Choose one or more communicators which suit the purpose. The following types of communicators are available:

- Meson Communicators
- Radio Communicators
- Laser Communicators
- Maser (Microwave) Communicators

6 Compute Communicator Totals

Note totals for:

- Power Consumption
- Volume
- Weight
- Price

2 Meson Communicators

Meson communicators can transmit through anything (planets, moons, or otherwise). They may not transmit through meson screens.

MESON COMMUNICATORS

		Weight in tons by tech level												
Range	*Price*	*5*	*6*	*7*	*8*	*9*	*10*	*12*	*14*	*15*	*16*	*17*	*18*	*20*
Regional (500km)	250000	—	—	—	—	—	—	—		0.5	0.3	0.1	0.1	—
Continental (5000km)	1000000	—	—	—	—	—	—	—		2.0	1.5	1.0	0.5	0.1
Planetary (50000km)	2500000	—	—	—	—	—	—	—	—	30.0	16.0	9.0	5.0	0.2
Far Orbit (500000km)	5000000	—	—	—	—	—	—	—	—	150.0	80.0	45.0	25.0	15.0
System (1000 AU)	20000000	—	—	—	—	—	—	—	—	500.0	220.0	160.0	85.0	50.0

Power Requirement (Mw): Weight in tons/10. **Price:** If TL 15, ×4. If TL 16, ×2.
Weight (tons): As shown above. **Volume (kiloliters):** Same as weight in tons.

3 Radio Communicators

Radios are cheap, small and take little power. They are very easy to locate and jam.

RADIO COMMUNICATORS

		Weight in tons by tech level												
Range	*Price*	*5*	*6*	*7*	*8*	*9*	*10*	*12*	*14*	*15*	*16*	*17*	*18*	*20*
Distant (5km)	75	0.020	0.001	0.0001	0.0001	0.0001	0.0001	—	—	—	—	—	—	—
V. Distant (50km)	250	0.070	0.007	0.0006	0.0005	0.0004	0.0002	0.0001	0.0001	—	—	—	—	—
Regional (500km)	500	0.150	0.015	0.0013	0.0012	0.0010	0.0007	0.0005	0.0003	0.0001	—	—	—	—
Continental (5000km)	5000	0.300	0.030	0.003	0.002	0.0015	0.0013	0.001	0.0007	0.0005	0.0003	0.0001	—	—
Planetary (50000km)	30000	0.700	0.070	0.007	0.006	0.004	0.002	0.0013	0.001	0.0007	0.0005	0.0001	—	—
Far Orbit (500,000km)	90000	—	0.150	0.015	0.013	0.012	0.010	0.007	0.005	0.002	0.0013	0.001	—	—
System (1000 AU)	150000	—	—	0.040	0.020	0.018	0.016	0.014	0.010	0.007	0.005	0.003	—	—

Power Requirement (Mw): Weight in tons. **Price:** If TL 5, ×3. If TL 6, ×2.
Weight (tons): As shown. **Volume (kiloliters):** Weight in tons ×2.

4 Laser Communicators

Laser communicators require an unobstructed line of sight to the receiver, which makes them nearly impossible to detect. While not subject to jamming, they are adversely affected by weather, smoke and anti-laser aerosols.

LASER COMMUNICATORS

		Weight in tons by tech level												
Range	*Price*	*5*	*6*	*7*	*8*	*9*	*10*	*12*	*14*	*15*	*16*	*17*	*18*	*20*
Distant (5km)	1200	—	—	—	0.004	0.002	0.0015	0.001	0.001	—	—	—	—	—
V. Distant (50km)	5000	—	—	—	0.016	0.008	0.006	0.004	0.002	0.001	—	—	—	—
Regional (500km)	11000	—	—	—	0.020	0.010	0.008	0.005	0.003	0.002	0.001	0.001	—	—
Continental (5000km)	21000	—	—	—	0.040	0.020	0.015	0.010	0.005	0.003	0.003	0.002	0.001	—
Planetary (50000km)	36000	—	—	—	0.070	0.035	0.025	0.018	0.009	0.005	0.005	0.003	0.002	0.001
Far Orbit (500,000km)	56000	—	—	—	0.110	0.055	0.040	0.028	0.014	0.007	0.006	0.005	0.003	0.002
System (1000 AU)	180000	—	—	—	—	0.120	0.070	0.050	0.030	0.015	0.010	0.010	0.007	0.005

Power Requirement (Mw): Weight in tons. **Price:** If TL 7, ×2. **Weight (tons):** As shown. **Volume (kiloliters):** Weight in tons ×2.
Note: Operating on a world with a Thin or greater Atmosphere, the range of any laser communicator is limited to continental or less.

5 Maser (Microwave) Communicators

Microwave communicators behave just like laser communicators except they are unaffected by atmospheric conditions.

MASER COMMUNICATORS

		Weight in tons by tech level												
Range	*Price*	*5*	*6*	*7*	*8*	*9*	*10*	*12*	*14*	*15*	*16*	*17*	*18*	*20*
Distant (5km)	2400	—	—	—	0.008	0.004	0.003	0.002	0.001	0.001	—	—	—	—
V. Distant (50km)	10000	—	—	—	0.32	0.016	0.010	0.008	0.004	0.002	0.002	0.001	—	—
Regional (500km)	22000	—	—	—	0.040	0.020	0.015	0.010	0.005	0.003	0.003	0.002	0.001	—
Continental (5000km)	42000	—	—	—	0.080	0.040	0.030	0.020	0.010	0.005	0.005	0.003	0.002	—
Planetary (50000km)	72000	—	—	—	0.140	0.070	0.060	0.035	0.018	0.009	0.009	0.005	0.003	0.002
Far Orbit (500,000km)	112000	—	—	—	0.220	0.110	0.075	0.055	0.028	0.014	0.014	0.007	0.005	0.003
System (1000 AU)	250000	—	—	—	—	0.250	0.200	0.130	0.060	0.045	0.040	0.025	0.013	0.007

Power Requirement (Mw): Weight in tons. **Price:** If TL 7, ×2. **Weight (tons):** As shown. **Volume (kiloliters):** Weight in tons ×2.

5 - SENSORS AND ELECTRONICS 1

1 Select Sensors and Electronics

Choose one or more sensor installations or packages which suit the craft's purpose. The following types are available:

- Radio Jammers
- Radars
- Radar Jammers
- Electromagnetic Masking Packages
- Radar Direction Finders
- Ladars
- Laser Sensors
- Visible Light and IR Enhancements
- Densitometers
- Neutrino Sensors
- Neural Activity Sensors
- EMS Active Arrays
- EMS Passive Arrays
- EMS Jammers
- Miscellaneous Devices

5 Electromagnetic Masking

An Electromagnetic Masking Package (EMM) hides a craft's electromagnetic emissions in all bands (radio, IR, visible light, UV, Xray), thus rendering it invisible to passive EMS sensors.

ELECTROMAGNETIC MASKING PKG

	Per kiloliter of hull		
Power	*Volume*	*Weight*	*Price*
0.001	0.02	0.01	5000

An EMM package does not mask any active electromagnetic sensors or emissions.

6 Radar Direction Finder

A radar direction finder enables the user to locate an enemy radar or radar jammer in operation.

RADAR DIRECTION FINDERS

Weight in tons by tech level					
6	*7*	*8*	*9*	*10*	*12*
2.500	0.250	0.025	0.013	0.010	0.005

Power Requirement (Mw): Weight in tons. **Price:** Weight ×Cr10,000,000. **Volume (kiloliters):** Weight in tons ×2.

2 Radio Jammers

A radio jammer renders an enemy's radio of equal or lesser ranges inoperative.

RADIO JAMMERS

		Weight in tons by tech level												
Range	*Price*	*5*	*6*	*7*	*8*	*9*	*10*	*12*	*14*	*15*	*16*	*17*	*18*	*20*
Distant (5 km)	150	0.04	0.002	0.0002	0.0002	0.0002	0.0002	0.0001	—	—	—	—	—	—
V. Distant (50 km)	500	0.14	0.014	0.0012	0.001	0.0008	0.0004	0.0002	0.0002	0.0001	—	—	—	—
Regional (500 km)	1000	0.3	0.03	0.0026	0.0024	0.002	0.0014	0.001	0.0006	0.0002	0.0001	—	—	—
Continental (5000 km)	10000	0.6	0.06	0.006	0.004	0.002	0.0026	0.002	0.0014	0.0014	0.0006	0.0002	0.0001	—
Planetary (50000 km)	60000	1.4	0.14	0.014	0.012	0.008	0.004	0.0026	0.002	0.0014	0.001	0.0002	0.0001	—
Far Orbit (500000 km)	180000	—	0.3	0.03	0.026	0.024	0.02	0.014	0.01	0.004	0.0026	0.002	—	—
System (1000 AU)	300000	—	—	0.08	0.04	0.036	0.032	0.028	0.02	0.014	0.01	0.006	—	—

Power Requirement (Mw): Weight in tons ×2. **Price:** If TL 5, ×3. If TL 6, ×2.
Weight (tons): As shown. **Volume (kiloliters):** Weight in tons ×4.

3 Radars

If a radar is desired, select one from the table below.

RADARS

	Weight in tons by TL			
Range	*6*	*7*	*8*	*9*
Distant (5 km)	0.25	0.025	0.003	0.001
V. Distant (50 km)	1.50	0.150	0.015	0.008
Regional (500 km)	6.50	0.650	0.065	0.033
Continental (5000 km)	20.00	2.000	0.200	0.100
Planetary (50000 km)	—	5.000	0.500	0.250
Far Orbit (500000 km)	—	—	1.200	0.600

Power Requirement (Mw): Weight in tons. **Weight:** As shown. **Price:** Weight ×Cr10,000,000. All-weather Radar is weight ×Cr15,000,000. **Volume (kiloliters):** Weight in tons ×2.

4 Radar Jammers

A radar jammer renders an enemy radar of equal or lesser range inoperative.

RADAR JAMMERS

	Weight in tons by TL			
Range	*6*	*7*	*8*	*9*
Distant (5 km)	0.5	0.05	0.005	0.003
V. Distant (50 km)	3.0	0.30	0.030	0.015
Regional (500 km)	13.0	1.30	0.13	0.065
Continental (5000 km)	40.0	4.00	0.400	0.200
Planetary (50000 km)	—	10.00	1.000	0.500
Far Orbit (500000 km)	—	—	2.400	1.200

Power Requirement (Mw): Weight in tons. **Weight:** As shown. **Price:** Weight ×Cr15,000,000. **Volume (kiloliters):** Weight in tons ×2.

7 Ladar

Ladar is a tight beam object tracing sensor. It is very difficult for an enemy (other than the target) to pick up and virtually impossible to jam.

LADARS

	Weight in tons by TL			
Range	*8*	*9*	*10*	*11*
Distant (5 km)	0.025	0.003	0.001	—
V. Distant (50 km)	0.150	0.015	0.010	0.005
Regional (500 km)	0.650	0.065	0.006	0.003
Continental (5000 km)	2.000	0.200	0.020	0.010
Planetary (50000 km)	5.000	0.500	0.050	0.025
Far Orbit (500000 km)	—	1.200	0.120	0.050

Power Requirement (Mw): Weight in tons. **Weight:** As shown. **Price:** Weight ×Cr10,000,000. **Volume (kiloliters):** Wt in tons ×2.

8 Laser Sensor

A laser sensor enables a craft to detect incoming laser or ladar beams.

LASER SENSORS

TL	*Description*	*Power*	*Volume*	*Weight*	*Price*
8	1st Generation	0.002	0.30	0.30	25000
9	2nd Generation	0.001	0.25	0.25	30000
11	3rd Generation	0.001	0.15	0.20	35000

9 Visible Light and IR Enhancement Sensors

Visible light and IR enhancement sensors improve the ability to detect objects.

SENSOR ENHANCEMENTS

TL	Description	Power	Volume	Weight	Price
5	Headlight	0.001	0.002	0.001	50
6	Active IR Sensor	0.003	0.010	0.005	1500
6	Passive IR Sensor	0.001	0.002	0.001	500
7	Light Amplification	0.001	0.002	0.001	500
8	Adv Active IR Sensor	0.001	0.002	0.001	20000
8	Image Enhancement	0.002	0.010	0.005	30000
9	Adv Image Enhance	0.001	0.002	0.001	30000
10	Synthetic Vision	0.001	0.002	0.001	30000

10 Densitometers (Grav Shielded)

Densitometers are classified as low penetration and high penetration. A densitometer with any penetration beyond surface can give a density map of an object's interior to the penetration depth shown.

LOW PENETRATION DENSITOMETERS

TL	Penetration	Power	Volume	Weight	Price
10*	Surface	0.002	0.02	0.001	10000
11*	Surface	0.001	0.01	0.001	10000
12	1 m	0.200	2.0	0.8	116000
13	50 m	0.100	1.0	0.4	145000
14	100 m	0.090	0.9	0.3	175000
15	250 m	0.080	0.3	0.1	205000
16	1 km	0.070	0.2	0.1	205000
18	25 km	0.060	0.1	0.1	205000
20	2500 km	0.050	0.1	0.1	205000

HIGH PENETRATION DENSITOMETERS

TL	Penetration	Power	Volume	Weight	Price
11	1 m	2.5	30.0	10.	750000
12	50 m	1.0	15.0	5.0	900000
13	100 m	0.9	12.0	3.0	950000
14	250 m	0.5	9.0	2.0	1000000
15	1 km	0.4	7.0	1.5	1500000
16	25 km	0.3	4.0	1.0	1500000
18	2500 km	0.2	2.0	0.8	1500000
20	2500000 km	0.1	1.0	0.7	1500000

*Nondiscriminant direction sensor only. Simply indicates the direction to the greatest mass, depending on the range setting.

11 Neutrino Sensors

Neutrino sensors point to the direction of fission or fusion reactions.

NEUTRINO SENSORS

TL	Minimum Magnitude	Power	Volume	Weight	Price
10*	—	0.005	0.008	0.004	1000
11	1 Gw	0.500	1.0	0.450	60000
12	1 Mw	0.400	0.8	0.300	75000
13	100 kw	0.300	0.4	0.170	90000
14	10 kw	0.200	0.2	0.095	110000
16	1 kw	0.100	0.1	0.070	120000
18	1 kw	0.050	0.1	0.070	120000
20	1 kw	0.025	0.1	0.070	120000

*Nondiscriminant direction sensor only. Simply indicates the direction to the highest neutrino source, depending on the range setting.

12 Neural Activity Sensors

Neural activity sensors detect and classify lifeforms according to their level of brain activity.

NEURAL ACTIVITY SENSORS

TL	Maximum Range	Power	Volume	Weight	Price
13	Medium	0.004	0.002	0.005	20000
14	Long	0.005	0.002	0.005	20000
15	Very Long	0.006	0.002	0.005	20000
16	Distant	0.007	0.002	0.005	20000
18	Very Distant	0.009	0.002	0.004	25000
20	Regional	0.010	0.002	0.003	30000

13 Miscellaneous Sensors

Miscellaneous sensors assist in a variety of functions.

MISCELLANEOUS SENSORS

TL	Description	Power	Volume	Weight	Price	Range
5	Pass Audio Sensor	0.001	0.002	0.001	200	Distant
5	Act Audio (Pinger)	0.005	0.040	0.020	5000	Distant
5	Environ Sensor	0.004	0.008	0.004	1500	—
6	Magnetic Sensor	0.001	0.002	0.001	1000	V Dist
6	Radiation	0.001	0.002	0.001	1200	V Dist

14 Miscellaneous Devices

If any of the following miscellaneous devices are desired, they may be installed in a craft.

MISCELLANEOUS DEVICES

TL	Description	Power	Volume	Weight	Price
8	Robot Arm, V Lt	0.001	0.001	0.001	750
7	Robot Arm, Lt	0.002	0.005	0.005	500
6	Robotic Arm, Med	0.005	0.020	0.020	700
5	Robotic Arm, Hvy	0.010	0.050	0.050	1000
11	Robotic Tentacle	0.010	0.020	0.020	1200
7	Video Recorder	0.003	0.004	0.004	600
13	Holorecorder	0.010	0.015	0.015	2000
14	Holorecorder	0.008	0.006	0.006	4000
15	Holorecorder	0.005	0.003	0.003	5000

15 EMS Active Array

An EMS Active Sensor Array combines radar, all-weather radar, ladar, radar jammer, radio jammer, active IR, and image enhancement into one integrated and optimized sensor array.

EMS ACTIVE ARRAY

	Weight in Tons by Tech Level						
Range	*10*	*11*	*12*	*14*	*16*	*18*	*20*
Distant (5 km)	0.002	0.001	0.001	0.001	0.001	0.001	0.001
V. Distant (50 km)	0.010	0.008	0.006	0.005	0.004	0.003	0.002
Regional (500 km)	0.030	0.016	0.010	0.008	0.006	0.005	0.004
Continental (5000 km)	0.070	0.030	0.016	0.010	0.008	0.006	0.005
Planetary (50000 km)	0.130	0.060	0.025	0.014	0.012	0.008	0.006
Far Orbit (500000 km)	0.260	0.120	0.055	0.030	0.020	0.015	0.010

Power Requirement (Mw): Weight in tons. **Price:** Weight ×Cr20,000,000. **Weight:** As shown. **Volume (kiloliters):** Weight in tons ×2.

16 EMS Passive Array

An EMS Passive Sensor Array combines laser sensor, radar direction finder, radio direction finder, radiation sensor, passive IR, light amplification, and image enhancement into one integrated and optimized sensor array.

EMS PASSIVE ARRAY

	Weight in Tons by Tech Level							
Range	*10*	*11*	*12*	*13*	*14*	*16*	*18*	*20*
V. Distant (50 km)	0.002	0.001	0.001	0.001	0.001	0.001	0.001	
Continental (5000 km)	0.014	0.009	0.007	0.005	0.004	0.003	0.002	
Interplanetary (1 AU)	0.070	0.025	0.015	0.009	0.007	0.005	0.004	
Substellar (100,000 AU)	0.130	0.060	0.025	0.015	0.012	0.009	0.006	
Interstellar (2 parsecs)	0.250	.110	0.050	0.020	0.016	0.012	0.008	

Power Requirement (Mw): Weight in tons ×10. **Price:** Weight ×Cr20,000,000. **Weight:** As shown. **Volume (kiloliters):** Weight in tons ×2.

17 EMS Jammer

An EMS jammer renders an enemy's active EMS of equal or lesser range inoperative.

An EMS jammer is available at the same ranges as Active EMS Arrays, but all values (power, volume, weight, and price) are doubled.

18 Compute Sensor and Electronics Totals

Note totals for:

- Power Consumption
- Volume
- Weight
- Price

6 - WEAPONS 1

1 Compute Available Hardpoints

A hardpoint is an installation point for a weapon. Large weapons may require more than one; hardpoints may have either fixed mounts or movable mounts installed. Divide kiloliter volume of the craft by 1350 for the number of hardpoints it can have. A craft always has a minimum of one hardpoint.

Fixed Mounts: A fixed mount weapon cannot move to point at its target; the entire craft must change its orientation to point in the required direction. Large fixed weapons are spinal mounts; their structure usually forms an integral part of the craft.

Movable Mounts: A movable mount can be trained to point at its target. Because of this attribute, a large craft will often mount many such movable mounts. If the weapon is enclosed, the mount is called a turret. A large turret (over 600 kiloliters) is called a bay. An unenclosed (open) mount is called a pintle.

2 Particle Accelerators (Spinal Mount)

If a particle accelerator spinal mount is desired, select it from this list.

PARTICLE ACCELERATORS (SPINAL MOUNT)

UCP	TL	Power	Volume	Weight	MCr	Hard-points
A	8	125000	75000	18000	3500	55
B	9	125000	65000	16000	3000	50
C	10	125000	60000	15000	2400	45
D	11	150000	55000	14000	1500	40
E	12	150000	45000	11000	1200	35
F	13	150000	40000	10000	1200	30
G	14	175000	35000	9000	800	25
H	15	175000	35000	8500	500	25
J	10	200000	60000	15500	3000	50
K	11	200000	60000	14500	2000	45
L	12	200000	55000	13500	1600	40
M	13	225000	45000	10500	1200	35
N	14	225000	40000	9500	1000	30
P	15	225000	35000	8000	800	25
Q	12	250000	60000	14000	2000	45
R	13	250000	55000	13000	1500	40
S	14	250000	45000	10000	1200	35
T	15	250000	40000	9000	1000	30
U	16	275000	35000	8000	1000	25
V	17	275000	25000	6000	800	20
W	18	275000	20000	5000	600	15
Y	18	300000	15000	3500	800	10
Z	19	325000	15000	3000	600	10

3 Meson Gun Spinal Mount

If a meson gun spinal mount is desired, select it from this list.

MESON GUNS (SPINAL MOUNT)

UCP	TL	Power	Volume	Weight	MCr	Hard-points
A	11	125000	65000	13000	3500	55
B	11	150000	110000	22000	3000	50
C	12	150000	25000	5000	2400	45
D	12	175000	65000	12500	1500	40
E	13	175000	15000	3000	1200	35
F	13	200000	25000	45000	1200	30
G	14	200000	15000	3000	800	25
H	14	225000	25000	4500	500	25
J	15	225000	15000	3000	3000	50
K	12	250000	11000	20000	2000	45
L	13	250000	65000	12500	1600	40
M	14	250000	55000	11000	1200	35
N	15	250000	25000	4000	1000	30
P	13	275000	110000	19000	800	25
Q	14	275000	95000	19000	2000	45
R	15	275000	65000	12000	1500	40
S	14	300000	110000	19000	1200	35
T	15	300000	95000	18000	1000	30
U	16	325000	110000	18500	2000	25
V	17	325000	95000	17500	1200	20
W	18	325000	65000	11500	1000	15
X	17	350000	110000	18000	2000	15
Y	18	350000	95000	17000	1200	10
Z	19	375000	65000	11000	800	10

4 Disintegrators (Spinal Mount)

If a disintegrator spinal mount is desired, select it from this list.

DISINTEGRATOR SPINAL MOUNTS

UCP	TL	Power	Volume	Weight	MCr	Hard-points
A	17	500000	60000	13000	5000	45
B	18	550000	55000	12000	3500	40
C	19	550000	45000	10000	2400	35
D	20	575000	40000	8500	1500	30
E	21	575000	35000	7500	1200	25

5 Jump Projector (Spinal Mount)

If a jump projector spinal mount is desired, select it from this list.

JUMP PROJECTOR (SPINAL MOUNT)

UCP	TL	Power	Volume	Wt	MCr	Hard-points
A	21	8000000	55000	15000	1000	40
B	21	9500000	95000	25000	1200	70

6 Bays

Parts of a craft may be designated as 100-ton or 50-ton bays.

BAYS

Type	*Volume*	*Price*	*Hardpoints*
100 ton	1350	1000000	100
50 ton	675	500000	100

Bays may be used to hold weaponry, or they may be left empty and put to a variety of uses. Cargo or freight can be carried in an empty bay up to the tonnage of the bay. Craft can be carried in a bay at 50 percent wastage: a 100-ton (1350 kiloliter) bay can hold a craft up to 675 kiloliters.

7 100-Ton Bay Weaponry

One-hundred ton bays carry a variety of armaments. Select the desired allocations.

100 TON BAYS

					TL of the weapon												
TL	*Type*	*Power*	*Weight*	*MCr*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*	*18*	*19*	*20*	*21*
7	Missile	5	50	20	7	7	8	8	9	9	—	—	—	—	—	—	—	—
8	Particle Accelerator	15000	75	35	6	6	7	7	8	8	9	9	A	A	B	B	C	C
10	Repulsor	2500	60	10	—	—	2	4	6	7	8	9	A	B	C	D	E	F
13	Meson Gun	50000	80	70	—	—	—	—	—	3	5	9	B	D	F	H	—	—
16	Tractors	50000	70	40	—	—	—	—	—	—	—	—	2	4	6	7	8	—
17	Disintegrator	65000	75	150	—	—	—	—	—	—	—	—	—	7	7	8	8	9
21	Jump Damper	200000	80	200	—	—	—	—	—	—	—	—	—	—	—	—	—	2

8 50-Ton Bay Weaponry

Fifty ton bays carry smaller armaments than do 100-ton bays.

50 TON BAYS

					TL of the weapon												
TL	*Type*	*Power*	*Weight*	*MCr*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17*	*18*	*10*	*20*	*21*
10	Missile	5	25	12	—	—	7	7	8	8	9	9	A	A	B	B	C	C
10	Particle Accelerator	7500	40	20	—	—	3	3	4	4	5	5	6	6	7	7	8	8
10	Plasma Gun	2500	35	—	—	5	2	4	6	7	8	9	A	B	C	D	E	F
12	Fusion Gun	5000	35	—	—	8	4	5	6	—	—	—	—	—	—	—	—	—
14	Repulsor	1250	30	—	—	6	—	—	—	—	3	5	7	9	A	B	C	D
15	Meson Gun	25000	40	50	—	—	—	—	—	—	—	4	6	9	B	D	F	H
18	Disintegrator	32500	40	90	—	—	—	—	—	—	—	—	—	—	6	6	7	7
20	Tractors	25000	35	24	—	—	—	—	—	—	—	—	—	—	—	—	3	5
21	Jump Damper	100000	40	120	—	—	—	—	—	—	—	—	—	—	—	—	—	1

9 Turrets

Weaponry can be allocated to turrets. Each turret uses one hardpoint.

When equipping turrets, the price is paid for the weapon (and sometimes more than one weapon can be placed in one turret). Turrets come with the weapons and are not purchased separately.

The tables show the number of turret weapons required to achieve a specific UCP factor. If more weapons than the maximum number shown in the tables (usually 30) are installed, organize them into several evenly divided batteries.

10 Missile Turrets

A missile turret has a volume of 13.5 kiloliters. Each turret can have 1, 2, or 3 weapons (missile launchers). The price shown is for one weapon. Total the weapons purchased and determine the UCP factor for the turret(s). For example, 10 turrets with 30 missile launchers (Tech Level 7) produces a UCP missile factor of 6.

MISSILE TURRETS

					UCP Factor									
TL	*Type*	*Power*	*Weight*	*Price*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*A*
7	Missile Turret- 7	1	3	750000	1	3	6	12	18	30	—	—	—	—
13	Missile Turret-13	1	2	750000	—	1	3	6	12	18	30	—	—	—
21	Missile Turret-21	1	1	750000	—	—	1	3	6	12	18	30	—	—

11 Laser Turrets

A laser turret has a volume of 13.5 kiloliters. Each turret can have 1, 2, or 3 weapons (beam laser or pulse laser, but not both). The price shown is for one weapon. Total the weapons purchased and determine the UCP factor for the turret(s). For example, 1 turret with 3 beam lasers (Tech Level 16) produces a UCP laser factor of 5.

BEAM LASER TURRETS

					UCP Factor									
TL	*Type*	*Power*	*Weight*	*Price*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*A*
7	BLaser Turret- 7	250	5	1000000	1	2	3	6	10	15	21	30	—	—
13	BLaser Turret-13	250	4	1000000	—	1	2	3	6	10	15	21	30	—
16	BLaser Turret-16	250	3	1000000	—	—	1	2	3	6	10	15	21	30

PULSE LASER TURRET

					UCP Factor									
TL	*Type*	*Power*	*Weight*	*Price*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*A*
7	PLaser Turret- 7	250	5	500000	1	3	6	10	21	30	—	—	—	—
13	PLaser Turret-13	250	4	500000	—	1	3	6	10	21	30	—	—	—
16	PLaser Turret-16	250	3	500000	—	—	1	3	6	10	21	30	—	—

12 Particle Accelerator Turrets

Each turret can have only 1 weapon (particle accelerator). The price shown is for one weapon. Total the weapons purchased and determine the UCP factor for the turret(s). For example, 8 turrets with 8 particle accelerators (Tech Level 14) produce a UCP particle accelerator factor of 5. Particle accelerator volume depends on Tech Level: at TL 14, volume is 67.5; at TL 15, volume is 40.5; at TL 16, volume is 27.0; at TL 18, volume is 13.5.

PARTICLE ACCELERATOR TURRETS

					UCP Factor									
TL	*Type*	*Power*	*Weight*	*Price*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*A*
14	PA Turret-14	1250	25	4000000	1	2	4	6	8	10	—	—	—	—
15	PA Turret-15	1250	12	3000000	—	1	2	4	6	8	10	—	—	
16	PA Turret-16	1250	9	3000000	—	—	1	2	4	6	8	10	—	—
18	PA Turret-18	1250	6	3000000	—	—	—	1	2	4	6	8	10	—

13 Plasma Gun Turrets

Each turret has a volume of 27 kiloliters. Each turret can have only 1 weapon (plasma gun). The price shown is for one weapon. Total the weapons purchased and determine the UCP factor for the turret(s). For example, 4 turrets with 4 plasma guns (Tech Level 11) produce a UCP plasma gun factor of 3.

PLASMA GUN TURRETS

					UCP Factor									
TL	*Type*	*Power*	*Weight*	*Price*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*A*
10	PG Turret-10	250	5	1500000	1	4	10	16	20	—	—	—	—	—
11	PG Turret-11	250	4	1500000	—	1	4	10	16	20	—	—	—	—
12	PG Turret-12	250	3	1500000	—	—	1	4	10	16	20	—	—	—
16	PG Turret-16	250	2	1500000	—	—	—	1	4	10	16	20	—	—

14 Fusion Gun Turrets

Each turret has a volume of 27 kiloliters. Each turret can have only 1 weapon (fusion gun). The price shown is for one weapon. Total the weapons purchased and determine the UCP factor for the turret(s). For example, 1 turret with 1 fusion gun (Tech Level 17) produces a UCP fusion gun factor of 3.

FUSION GUN TURRETS

					UCP Factor									
TL	*Type*	*Power*	*Weight*	*Price*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*A*
12	Fusion Turret-12	500	5	2000000	1	4	10	16	20	—	—	—	—	—
14	Fusion Turret-14	500	4	2000000	—	1	4	10	16	20	—	—	—	—
17	Fusion Turret-17	500	3	2000000	—	—	1	4	10	16	20	—	—	—

15 Sandcaster Turrets

Each turret has a volume of 13.5 kiloliters. Each turret can have 1, 2, or 3 weapons (sandcasters). The price shown is for one weapon. Total the weapons purchased and determine the UCP factor for the turret(s). For example, 4 turrets with 8 sandcasters (Tech Level 10) produce a UCP sandcaster factor of 6.

SANDCASTER TURRETS

					UCP Factor									
TL	*Type*	*Power*	*Weight*	*Price*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*A*
7	Sand Turret- 7	1	4	250000	1	3	6	8	10	20	30	—	—	—
8	Sand Turret- 8	1	3	250000	—	1	3	6	8	10	20	30	—	—
10	Sand Turret-10	1	2	250000	—	—	1	3	6	8	10	20	30	—
16	Sand Turret-16	1	1	250000	—	—	—	1	3	6	8	10	20	30

16 Disintegrator Turrets

Each turret has a volume of 27 kiloliters. Each turret can have 1 or 2 weapons (disintegrators). The price shown is for one weapon. Total the weapons purchased and determine the UCP factor for the turret(s). For example, 2 turrets with 4 disintegrators (Tech Level 18) produces a UCP disintegrator factor of 6.

DISINTEGRATOR TURRETS

					UCP Factor									
TL	*Type*	*Power*	*Weight*	*Price*	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*	*9*	*A*
18	Disint Turret-18	4000	6	5000000	1	4	10	16	20	—	—	—	—	—

17 Rate of Fire

Determine rate of fire for hardpoint based weapons from the table below.

RATE OF FIRE

Weapon Type	*ROF*
Spinal Mounts	1
Missile Bays	2
All Other Bays	20
Missile Turrets	1
Sandcaster Turrets	6
All Other Turrets	30

ROF is expressed in shots per minute.

18 Magazine Requirements

Missiles have ammunition storage requirements. Volume required is indicated in the table below.

MISSILE STORAGE

Type	*Volume*	*Weight*	*Price*
Standard HE	0.1	0.05	20000
Nuclear	0.1	0.07	150000
Antimatter	0.1	0.09	200000

Each weapon in a turret holds one missile. 100-ton bays can hold 100 missiles; 50-ton bays can hold 50 missiles.

The craft should have enough missiles for at least one round of fire from all missile batteries. One round of fire from a missile battery is called a battery-round.

Magazines: Additional missile storage can be allocated by designating otherwise empty bays. Missile storage should be allocated in battery-rounds. For example, the battery-round for one 3-launcher turret is 3 missiles; the battery-round for one missile bay is 2 missiles. A 100-ton bay used as an ammunition magazine can hold up to 13500 missiles.

19 Guns

Weapons which do not depend on hardpoints for mounting are called guns.

The weapons in the tables which follow are guns. Any number may be installed (subject only to normal power, volume, weight, and price limitations).

Because of their limited range, guns are best suited to vehicles or for use as ground defense weapons on larger craft.

With the limited power output of most vehicles, many of the remaining weapons are best-suited for use as turret-mounted vehicle weapons.

20 Mortars

A mortar is an indirect fire explosive thrower. Mortars must be fired on a world surface. The weapon may be vehicle mounted or towed (if towed, it needs a carriage). Set-up time increment shown is in seconds; double the time to set up a towed weapon.

MORTARS

Bore				Set-	Ind Fire		ROF by Tech Level									
(cm)	Volume	Weight	Price	up	Range	Sig	5	6	7	8	10	12	14	16	18	20
6	0.11	0.11	1400	5	V. Long (4)	M	39	42	45	45	45	45	45	45	45	45
8	0.17	0.17	2600	10	V. Long (5)	M	27	30	33	36	42	45	45	45	45	45
10	0.30	0.30	4200	15	Distant (6)	M	18	21	24	27	33	39	45	45	45	45
12	0.53	0.53	6000	20	Distant (7)	M	12	15	18	21	27	33	39	45	45	45
14	0.83	0.83	8000	30	Distant (8)	M	6	6	6	10	14	18	22	26	30	30
16	1.13	1.13	12000	30	Distant (9)	H	4	6	6	6	10	14	18	22	26	30
18	1.88	1.88	16000	40	Distant (9)	H	2	4	4	6	6	10	14	18	22	26
20	2.75	2.75	20000	40	Distant (10)	H	2	2	2	4	6	6	10	14	18	22
22	3.75	3.75	24000	50	Distant (10)	H	1	2	2	2	4	4	6	10	14	18
24	4.75	4.75	28000	50	Distant (11)	H	1	1	1	2	2	4	4	6	10	14
30	7.50	7.50	40000	60	Distant (11)	H	½	½	1	1	2	2	4	4	6	10

Mortar Carriage: *Weight:* Weapon Weight times 0.25. *Price:* Weapon Price times 0.10.

MORTAR AMMUNITION

Bore			HE				KEAP			HEAP			Illum		Incend	Chem	Chaff	CBM
(cm)	Vol	Wt	Pen	Dgr	Cr	Dmg	Pen	Cr	Dmg	Pen	Cr	Dmg	Rad	Cr	Cr	Cr	Cr	Cr
6	0.006	0.003	9	10	9	10	16	9/10	8/9	18	15	8	30	20	9	20	20	30
8	0.014	0.007	14	20	21	12	22	20./25	9/10	28	30	9	50	40	21	40	40	60
10	0.030	0.015	16	20	45	14	25	45/50	10/12	34	65	10	65	90	45	90	90	135
12	0.040	0.020	18	25	60	16	27	60/65	12/14	38	90	12	75	120	60	120	120	180
14	0.052	0.026	20	30	78	18	29	75/85	14/16	41	110	14	80	160	78	160	160	230
16	0.070	0.035	22	30	105	20	31	105/115	16/18	43	160	16	90	210	105	210	210	315
18	0.090	0.045	24	35	135	24	33	135/150	18/22	45	200	18	95	270	135	270	270	405
20	0.120	0.060	26	40	180	28	34	180/200	20/25	47	270	20	100	360	180	360	360	540
22	0.156	0.078	28	40	234	30	37	235/200	22/27	49	350	22	105	470	234	470	470	700
24	0.190	0.095	30	45	285	34	39	285/315	24/29	51	430	24	110	570	285	570	570	855
30	0.420	0.240	32	50	720	38	41	720/790	28/33	53	1080	28	115	1440	720	1440	1440	2160

Modifications:

HE Pen TL Mod: +1 for every two Tech Levels over 5 (penetrations shown assume Tech Level 5).

HE Danger Space Mod: +10 meters for every 3 Tech Levels over 5.

KEAP Pen TL Mod: +1 for every 3 Tech Levels over 5; the second price and damage on KEAP is for KEAPER.

HEAP Pen TL Mod: TL 7-8, Pen +5. TL 9-10, Pen+10. TL 11-12, Pen +12. TL 13+, Pen +14.

Illum Radius: +5 meters for each Tech Level over 5 (radii shown assume Tech Level 5).

21 Low Velocity (Howitzer) CPR Rounds

A howitzer is a low velocity explosive thrower. It may be either indirect fire or direct fire, but not both; designate the weapon as direct or indirect when designing it. The weapon may be vehicle mounted or towed (if towed, it needs a carriage). Set-up time increment shown is in seconds; double the time to set up a towed weapon.

HOWITZERS

Bore (cm)	Volume	Weight	Price	Set-up	Ind Fire Range		Sig	ROF by Tech Level 5	6	7	8	10	12	14	16	18	20
2	0.05	0.05	2000	10	—		M	30	30	30	30	30	30	30	30	30	30
4	0.08	0.08	6000	20	V. Long	(2)	M	30	30	30	30	30	30	30	30	30	30
6	0.24	0.24	14000	30	Distant	(6)	M	26	28	30	30	30	30	30	30	30	30
8	0.33	0.33	26000	40	Distant	(10)	M	18	20	22	24	28	30	30	30	30	30
10	0.60	0.60	42000	60	Distant	(13)	M	12	14	16	18	22	26	30	30	30	30
12	1.05	1.05	60000	70	Distant	(13)	M	8	10	12	16	18	22	26	30	30	30
14	1.65	1.65	80000	80	Distant	(15)	M	6	6	6	10	14	18	22	26	30	30
16	2.25	2.25	120000	90	Distant	(17)	H	4	6	6	6	10	14	18	22	26	30
18	3.75	3.75	160000	100	Distant	(18)	H	4	6	6	6	10	14	18	22	26	26
20	5.50	5.50	200000	110	Distant	(19)	H	2	2	2	4	6	6	10	14	18	22
22	7.50	7.50	240000	120	Distant	(20)	H	1	2	2	2	4	4	6	10	14	18
24	9.50	9.50	280000	130	Distant	(21)	H	1	1	1	2	2	4	4	6	10	14
30	15.00	15.00	400000	140	Distant	(22)	H	½	½	1	1	2	2	4	4	6	10

Howitzer Carriage: *Weight:* Weapon weight times 2.5. *Price:* Weapon price times 0.25.

HOWITZER AMMUNITION

Bore			HE				KEAP			HEAP			Flechette			Illum		Incend
(cm)	Vol	Wt	Pen	Dgr	Cr	Dmg	Pen	Cr	Dmg	Pen	Cr	Dmg	Pen	Cr	Dmg	Illum	Cr	Cr
2	0.001	0.001	1	—	—	6	3/4	1/1	4/5	—	—	4	50	5	2	—	—	1
4	0.002	0.002	5	—	—	8	8/4	4/5	6/7	6	6	6	50	20	2	10	10	4
6	0.006	0.006	9	10	12	10	16/4	12/13	8/9	18	18	8	50	60	2	30	25	12
8	0.014	0.014	14	20	28	12	22/4	28/30	9/10	28	42	9	50	140	2	50	60	28
10	0.030	0.030	16	20	60	14	25/4	60/65	10/12	34	90	10	50	300	3	65	120	60
12	0.040	0.040	18	25	80	16	27/4	80/90	12/14	38	120	12	50	400	3	75	160	80
14	0.052	0.052	20	30	100	18	29/4	100/115	14/16	41	150	14	50	500	3	80	200	100
16	0.070	0.070	22	30	140	20	31/3	140/155	16/18	43	210	16	50	700	4	90	280	140
18	0.090	0.090	24	35	180	24	33/3	180/200	18/22	45	270	18	50	900	4	95	360	180
20	0.120	0.120	26	40	240	28	35/3	240/265	20/25	47	360	20	50	1200	4	100	480	240
22	0.156	0.156	28	40	310	30	37/3	310/345	22/27	49	465	22	50	1550	5	105	620	310
24	0.190	0.190	30	45	380	34	39/3	380/420	24/29	51	570	24	50	1900	5	110	760	380
30	0.420	0.420	32	50	840	38	41/3	840/925	28/33	53	1260	28	50	4200	6	115	1680	840

Modifications:

HE Pen TL Mod: +1 for every two Tech Levels over 5.
HE Danger Space Mod: +10 meters for every 3 Tech Levels over 5.
KEAP Pen TL Mod: +1 for every 3 Tech Levels over 5; the second price and damage on KEAP is for KEAPER.
HEAP Pen TL Mod: TL 7-8, Pen +5. TL 9-10, Pen+10. TL 11-12, Pen +12. TL 13+, Pen +14.
Illum Radius: +5 meters for each Tech Level over 5.

Specialized Rounds: The cost of an illumination round is used as the basis for the cost of other specialized rounds. Chemical rounds cost double; chaff rounds cost double; CBM rounds cost triple.

22 High Velocity Gun CPR Rounds

A high velocity CPR gun is a high velocity explosive thrower. It may be either indirect fire or direct fire, but not both; designate the weapon as direct or indirect when designing it. The weapon may be vehicle-mounted or towed (if towed, it needs a carriage). Set-up time increment shown is in seconds; double the time to set up a towed weapon.

HIGH VELOCITY GUNS

Bore (cm)	Volume	Weight	Price	Set-up	Ind Fire Range	Sig	ROF by Tech Level 5	6	7	8	10	12	14	16	18	20
2	0.10	0.10	4000	10	V. Long (2)	M	15	15	15	15	15	15	15	15	15	15
4	0.16	0.16	12000	20	Distant (5)	M	15	15	15	15	15	15	15	15	15	15
6	0.42	0.42	28000	30	Distant (10)	M	13	14	15	15	15	15	15	15	15	15
8	0.66	0.66	52000	60	Distant (16)	M	9	10	11	12	14	15	15	15	15	15
10	1.2	1.2	84000	70	Distant (22)	M	4	5	6	7	9	11	13	15	15	15
12	2.1	2.1	120000	70	Distant (22)	M	4	5	6	7	9	11	13	15	15	15
14	3.3	3.3	160000	80	Distant (24)	M	3	3	3	5	7	9	11	13	15	15
16	4.5	4.5	240000	90	Distant (28)	H	2	3	3	3	5	7	9	11	13	15
18	7.5	7.5	320000	100	Distant (32)	H	1	2	2	3	3	5	7	9	11	13
20	11.0	11.0	400000	110	Distant (36)	H	1	1	1	3	3	3	5	7	9	11
22	15.0	15.0	480000	120	Distant (45)	H	½	1	1	1	2	2	3	5	7	9
24	19.0	19.0	560000	130	Distant (90)	H	½	½	½	1	1	2	2	3	5	7
30	30.0	30.0	800000	140	V Distant (70)	H	¼	¼	½	½	1	1	2	2	3	5

Hi Vel Gun Carriage: *Weight:* Weapon weight times 2.5. *Price:* Weapon price times 0.25.

HIVEL GUN AMMUNITION

Bore			HE				KEAP			HEAP			Flechette			Illum		Incend
(cm)	Vol	Wt	Pen	Dgr	Cr	Dmg	Pen	Cr	Dmg	Pen	Cr	Dmg	Pen	Cr	Dmg	Illum	Cr	Cr
2	0.001	0.001	1	—	2	6	8	2/2	4/5	—	—	4	150	8	2	—	3	2
4	0.002	0.002	5	—	8	8	14	8/9	6/7	—	—	6	150	40	2	10	15	8
6	0.006	0.006	9	10	25	10	22	25/26	8/9	10	35	8	150	120	2	30	50	25
8	0.14	0.14	14	20	55	12	28	55/60	9/10	21	85	9	150	280	2	50	110	55
10	0.030	0.030	16	20	120	14	31	120/130	10/12	28	180	10	150	600	3	65	240	120
12	0.040	0.040	18	25	160	16	33	160/175	12/14	32	240	12	150	800	3	75	320	160
14	0.052	0.052	20	30	210	18	35	210/230	14/16	36	310	14	150	1040	3	80	415	210
16	0.070	0.070	22	30	280	20	37	280/310	16/18	40	420	16	150	1400	4	90	560	280
18	0.090	0.090	24	35	360	24	39	360/395	18/22	42	540	18	150	1800	4	95	720	360
20	0.120	0.120	26	40	480	28	41	480/530	20/25	44	720	20	150	2400	4	100	960	480
22	0.156	0.156	28	40	625	30	43	625/685	22/27	46	935	22	150	3120	5	105	1250	625
24	0.190	0.190	30	45	760	34	45	760/835	24/29	48	1140	24	150	3800	5	110	1520	760
30	0.420	0.420	32	50	1680	38	47	1680/1850	28/33	50	2520	28	150	8400	6	115	3360	1680

Modifications:

HE Pen TL Mod: +1 for every two Tech Levels over 5.
HE Danger Space Mod: +10 meters for every 3 Tech Levels over 5.
KEAP Pen TL Mod: +1 for every 3 Tech Levels over 5; the second price and damage on KEAP is for KEAPER.
HEAP Pen TL Mod: TL 7-8, Pen +5. TL 9-10, Pen+10. TL 11-12, Pen +12. TL 13+, Pen +14.
Illum Radius: +5 meters for each Tech Level over 5.

Specialized Rounds: The cost of an illumination round is used as the basis for the cost of other specialized rounds. Chemical rounds cost double; chaff rounds cost double; CBM rounds cost triple.

23 High Velocity Autocannon

An AutoCannon is a high velocity, high rate of fire slug thrower. It fires direct fire only. The weapon may be vehicle mounted, or towed (if towed, it needs a carriage; use the Hi Vel CPR Gun carriage). Set-up time increment shown is in seconds; double the time to set up a towed weapon. The AutoCannon uses Hi Vel CPR Gun ammunition.

HIGH VELOCITY AUTOCANNON

TL	Bore (cm)	Pwr	Vol	Weight	Price	Set-up	Ind Fire Range	Sig	ROF
5	4	—	0.38	0.38	17500	20	Distant (5)	H	1500
6	6	—	1.0	1.0	40000	30	Distant (10)	H	930
7	8	—	1.6	1.6	75000	40	Distant (16)	H	550
8	10	.001	3.2	3.2	130000	60	Distant (20)	H	540
9	12	.001	5.7	5.7	185000	70	Distant (22)	H	350
10	14	.002	8.9	8.9	250000	80	Distant (24)	H	300
11	16	.002	12.2	12.2	375000	90	Distant (28)	H	185
12	18	.003	20.3	20.3	495000	100	Distant (32)	H	165
13	20	.003	29.7	29.7	620000	110	Distant (36)	H	80
14	22	.004	40.5	40.5	745000	120	Distant (45)	H	80
15	24	.004	51.3	51.3	870000	130	Distant (60)	H	50
18	30	.005	81.0	81.0	1240000	140	V Distant (60)	H	50

24 Mass Driver Guns

A mass driver gun is a high velocity slug thrower. It may fire in both direct and indirect fire. The weapon must be vehicle-mounted. Set-up time increment shown is in seconds.

MASS DRIVER GUNS

TL	Bore Cm	Pwr	Vol	Weight	Price	Set-up	Indirect Fire Range
8	2	0.2	0.12	0.12	112000	10	Distant (5)
8	4	1.0	0.19	0.19	119000	20	Distant (10)
8	6	3.0	0.50	0.50	150000	30	Distant (16)
9	10	15.0	1.40	1.40	240000	60	Distant (22)
9	12	20.0	2.50	2.50	350000	70	Distant (24)
9	14	26.0	4.00	4.00	500000	80	Distant (28)
9	16	35.0	5.40	5.40	640000	90	Distant (32)
10	18	45.0	9.00	9.00	1000000	100	Distant (36)
10	20	60.0	13.20	13.20	1420000	110	Distant (45)
10	22	78.0	18.00	18.00	1900000	120	Distant (60)
10	24	95.0	22.80	22.80	2380000	130	V Distant (70)

Mass drivers use ammunition with the characteristics of Mortar ammunition, but they perform as Hi Vel CPR gun ammo.

Base Rate of Fire for Mass Driver Guns is 1. Rate of Fire may be increased by increasing power output. Doubling power doubles rate of fire. The limit to increased rate of fire is the square of the gun's Tech Level (the limit at TL 8 is 64; the limit at TL 15 is 225).

Signature for all mass driver guns on the table is L.

25 Beam Laser Guns

A beam laser gun is an energy projector. It can fire direct fire only and must be vehicle-mounted. The set-up time increment is Instant.

BEAM LASER GUNS

TL	Pwr	Vol	Weight	Price	Pen	Dmg	Range
8	0.5	0.03	0.03	2000	5/2	4	Distant (2.5)
8	1.0	0.07	0.07	4000	10/2	5	Distant (5.0)
8	5.0	0.33	0.33	20000	28/3	10	V Distant (25)
8	10.0	0.66	0.66	40000	36/3	20	V.Distant (50)
8	25.0	1.70	1.70	100000	47/4	50	Regional (125)
8	50.0	3.30	3.30	200000	55/4	100	Regional (250)
13	0.5	0.03	0.03	2000	6/2	5	Distant (2.5)
13	5.0	0.33	0.33	20000	30/3	12	V Distant (25)
13	25.0	1.70	1.70	100000	49/4	60	Regional (125)

Signature for all TL 8 guns is H; for all TL 13 guns it is L. Rate of Fire for all guns is 40.

26 Pulse Laser Guns

A pulse laser gun is an energy projector. It can fire direct fire only and must be vehicle mounted. The set-up time increment is Instant.

PULSE LASER GUNS

TL	Pwr	Vol	Weight	Price	Pen	Dmg	Range
8	1.0	0.03	0.03	2100	6/2	4	Distant (2.5)
8	2.0	0.07	0.07	4300	12/2	5	Distant (5.0)
8	10.0	0.33	0.33	21000	30/3	10	V. Distant (25)
8	20.0	0.66	0.66	43000	38/3	20	V. Distant (50)
8	50.0	1.70	1.70	107000	49/4	50	Regional (125)
8	100.0	3.30	3.30	213000	57/4	100	Regional (250)
13	1.0	0.30	0.30	2100	7/2	5	Distant (2.5)
13	10.0	0.33	0.33	21000	33/3	12	V Distant (50)
13	50	1.70	1.70	107000	51/4	60	Regional (250)

Signature for all TL 8 guns is H; for all TL 13 guns is L. Rate of Fire for all guns is 80.

27 Standard Plasma Guns

A standard plasma gun is an energy weapon. It can fire direct fire only. The weapon must be vehicle-mounted. Set-up time is instant.

STANDARD PLASMA GUNS

TL	Type	Pwr	Vol	Wt	Price	Pen	Dmg	Range
10	PA-10	8.0	0.40	0.40	32000	44/5	20	V. Distant (5.1)
11	PA-11	6.6	0.20	0.20	26400	44/5	20	V. Distant (5.1)
11	PB-11	15.7	0.47	0.47	62800	54/5	20	V. Distant (7.8)
12	PB-12	13.5	0.19	0.19	54000	54/5	20	V. Distant (7.8)
12	PC-12	32.0	0.45	0.45	128000	64/5	20	V. Distant (12)
13	PC-13	32.0	0.19	0.19	128000	64/5	20	V. Distant (12)

Sig for all guns shown is H; ROF is 40.

28 Rapid Pulse Plasma Guns

A rapid pulse plasma gun is an energy projector. It can fire direct fire only and must be vehicle-mounted. The set-up time increment is Instant.

RAPID PULSE PLASMA GUNS

TL	Type	Pwr	Vol	Wt	Price	Pen	Dmg	Range
12	RPA-12	11.3	0.08	0.08	22800	44/5	20	V. Distant (5.1)
13	RPA-13	22.7	0.03	0.03	22800	44/5	20	V. Distant (5.1)
13	RPB-13	26.9	0.08	0.08	54000	54/5	20	V. Distant (7.8)
14	RPA-14	31.7	0.02	0.02	16000	44/5	20	V. Distant (5.1)
14	RPB-14	37.7	0.05	0.05	37700	54/5	20	V. Distant (7.8)
14	RPC-14	44.8	0.11	0.11	89700	64/5	20	V. Distant (12)
15	RPA-15	63.5	0.01	0.01	16000	44/5	20	V. Distant (5.1)
15	RPB-15	75.3	0.03	0.03	37700	54/5	20	V. Distant (7.8)
15	RPC-15	89.7	0.08	0.08	89700	64/5	20	V. Distant (12)

Sig for all guns shown is H. ROF is: RPA-12: 40. RPA-13: 80. RPB-13: 40. RPA-14: 160. RPB-14: 80. RPC-14: 40. RPA-15: 160. RPB-15: 160. RPC-15: 80.

29 Standard Fusion Guns

A standard fusion gun is a very high powered plasma weapon which actually attains fusion of hydrogen in its beam. The weapon must be vehicle mounted. Setup time increment is instant.

STANDARD FUSION GUNS

TL	Type	Pwr	Vol	Wt	Price	Pen	Dmg	Range
12	FX-12	31.0	0.43	0.43	186000	67/5	30	V. Distant (18)
13	FX-13	31.0	0.19	0.19	186000	67/5	30	V. Distant (18)
13	FY-13	44.0	0.26	0.26	264000	71/5	30	V. Distant (21)
14	FY-14	30.9	0.15	0.15	185000	71/5	30	V. Distant (21)
14	FZ-14	61.7	0.31	0.31	370000	79/5	30	V. Distant (30)
15	FZ-15	61.7	0.22	0.22	370000	79/5	30	V. Distant (30)

Sig for all guns is H. ROF for all guns is 40.

29 Rapid Pulse Fusion Guns

The rapid pulse fusion gun is a high rate of fire energy weapon. It must be vehicle mounted. Setup time increment is instant.

RAPID PULSE FUSION GUNS

TL	Type	Pwr	Vol	Wt	Price	Pen	Dmg	Range
14	RFX-14	42.0	0.11	0.11	131000	67/5	30	V. Distant (18)
15	RFX-15	42.0	0.08	0.08	131000	67/5	30	V. Distant (18)
15	RFY-15	61.8	0.11	0.11	185000	71/5	30	V. Distant (21)
16	RFX-16	42.0	0.06	0.06	131000	67/5	30	V. Distant (18)
16	RFY-16	61.8	0.08	0.08	185000	71/5	30	V. Distant (21)
16	RFZ-16	123.4	0.12	0.12	370000	79/5	30	V. Distant (30)

Sig for all guns is H. Rate of fire is: RPX-14: 40. RPX-15: 80. RPY-15: 40. RPX-16: 160. RPY-16: 80. RPZ-16: 40.

31 CPR Laser Guidance

All CPR guns (mortars, low, and high velocity guns) can have laser guidance for direct and indirect fire.

CPR LASER GUIDANCE

TL	Price
8	1000
9	800
10	600
11	400
12+	200

Laser guidance allows the executing of a concentrated attack against as single target in the weapon's danger space. All rounds fired can be specified as hitting a single target.

32 Point Defense Targetting

Point defense targeting allows the weapon to fire at incoming missiles and projectiles. Hardpoint mounted weapons automatically have this capability.

For each direct fire weapon which must also serve in a point defense capacity, install one point defense targeting module.

POINT DEFENSE TARGETTING MODULES

TL	*Power*	*Weight*	*Volume*	*Price*
9	0.010	0.4	0.4	200000
10	0.008	0.5	0.5	300000
11	0.006	0.6	0.6	500000
12	0.004	0.7	0.7	1000000
13	0.003	0.8	0.8	1250000
14	0.002	0.9	0.9	1500000
15	0.001	1.0	1.0	2000000
16	0.001	1.2	1.2	2250000

33 Weapons Mounts

Consider the type of mount used for the weapon. Make sure that there is enough chassi volume for the weapon.

Weapons mounts may be manned or unmanned. Manned mounts require the allocation of space for the crew.

WEAPON MOUNTS

Type	*Location*	*Hul Vol*
Turret	in turret	100%
Cupola	pivot in cupola	100%
Fixed	any	100%
Open	pivot in open	10%

Hull Volume is the percentage of the mount that must be installed within the hull; there must be that amount of hull available for the mount.

If a vehicle is open-topped or smaller than size A, the weapon mount must be Fixed or Open; Turrets or Cupolas are not allowed.

34 Ammunition Storage

Allocate space for the storage of ammunition (if the weapon fires a projectile).

The suggested ammunition load varies, but it should be enough for ten minutes of continuous fire.

35 Stabilization Gear

If the vehicle uses wheels, tracks, legs, or air-cushion for locomotion, consider adding weapon stabilization for weapon accuracy while moving off-road.

STABILIZATION GEAR

TL	*Volume*	*Cr/Kl*	Max Speed
5	None	—	—
6	×0.05	20000	20
7	×0.075	40000	40
8	×0.10	50000	80
9	×0.10	60000	100
10	×0.10	70000	120

Volume: Multiply weapon volume in kl by the listed volume factor to determine the volume of the stabilization gear in kiloliters.
Weight: One ton per kiloliter.

When moving off-road, ignore the Movement DM for the firing vehilce if its speed is less than the maximum speed shown for the equipment on this table.

36 Autofire Targets

Determine the number of targets that can be fired on per combat round by referring to the table below.

AUTOFIRE TARGETS

ROF	*Targets*
40	2
80	3
160	4
320	5
640	6
1280	7

Rate of Fire is expressed in rounds per minute.

37 Compute Weapons Totals

Compute totals for:

- Power
- Volume
- Weight
- Price

7 - SCREENS

1 Select Screens

Select the specific screens for the craft from the following types:

Nuclear Dampers
Meson Screens
Black Globes
Proton Screens
White Globes
Miscellaneous Devices

A variety of screens are available. Optimized packs universally have a screen factor of 1; they are optimized for volume and power rather than for defensive factor.

2 Nuclear Dampers

Nuclear dampers neutralize nuclear warheads, the effects of high radiation, and disintegrator beams.

NUCLEAR DAMPERS

UCP	TL	Power	Volume	Weight	Price
1	12	2500	675	740	50
2	13	5000	540	590	40
3	13	7500	270	300	45
4	14	10000	110	120	30
5	14	12500	135	150	35
6	14	15000	160	180	38
7	15	17500	135	145	30
8	15	20000	200	220	40
9	15	22500	270	300	50
A	16	25000	160	175	45
B	17	27500	190	210	50
C	18	30000	215	230	55
D	19	32500	245	250	60
E	20	35000	270	270	65
F	21	37500	295	290	70

Power is for the installation, regardless of the size of the craft.

OPTIMIZED NUCLEAR DAMPER PACKS

UCP	TL	Volume	Weight	Power	MCr
1	14	28	30	750	40
1	15	16	18	500	35
1	16	13	14	450	25
1	17	11	12	425	15
1	18	9	10	400	10
1	19	8	8	450	5
1	20	7	7	550	4
1	21	6	5	610	3

Power is for the installation, regardless of the size of the craft.

3 Meson Screens

Meson screens lessen the effects of meson weapons.

MESON SCREENS

UCP	TL	Power	Volume	Wt	MCr
1	12	0.15	1220	910	80
2	13	0.30	400	300	50
3	13	0.45	610	460	55
4	14	0.60	215	160	40
5	14	0.75	270	230	45
6	14	0.90	325	290	50
7	15	1.05	270	245	40
8	15	1.20	400	360	50
9	15	1.20	400	360	50
A	16	1.50	325	310	50
B	17	1.65	375	340	60
C	18	1.80	435	390	70
D	19	1.95	485	460	80
E	20	2.10	540	560	90
F	21	2.25	595	640	100

Power is expressed per kiloliter of craft volume.

OPTIMIZED MESON SCREEN PACKS

UCP	TL	Volume	Weight	Power	MCr
1	16	108	85	1.35	55
1	17	90	75	1.00	23
1	18	84	65	0.65	17
1	19	65	55	0.35	9
1	20	40	45	0.15	4
1	21	33	40	0.10	1

Power is expressed per kiloliter of craft volume.

4 Black Globes

Black globes restrict any projectile or energy beam from contacting the vehicle.

UCP	TL	Power	Vol	Wt	MCr
1	15	50	135	130	400
2	15	55	200	190	600
3	15	60	270	250	800
4	15	65	335	320	1000
5	16	65	270	240	500
6	16	70	400	350	700
7	16	75	475	410	900
8	17	75	270	240	500
9	18	75	270	230	500
A	19	75	270	210	500

Power is for the installation, regardless of the size of the craft.

OPTIMIZED BLACK GLOBE PACKS

UCP	TL	Volume	Weight	Power	MCr
1	15	135	130	50	400
1	16	130	128	40	400
1	17	127	126	35	400
1	18	125	124	30	400
1	19	122	122	25	400
1	20	120	120	20	400
1	21	119	118	15	400

Power is for the installation, regardless of the size of the craft.

5 Proton Screen

Proton screens protect a vehicle from missiles with antimatter warheads.

PROTON SCREENS

UCP	TL	Power	Volume	Weight	MCr
1	19	25000	1350	700	75
2	20	50000	410	190	60
3	20	75000	550	240	70
4	21	100000	620	300	45
5	21	125000	270	430	55
6	21	150000	325	165	60

Power is for the installation, regardless of the size of the craft.

OPTIMIZED PROTON SCREEN PACKS

UCP	TL	Volume	Weight	Power	MCr
1	20	12	6	9000	90
1	21	10	5	8000	78

Power is for the installation, regardless of the size of the craft.

6 White Globes

White globes restrict any projectile or beam from contacting the craft while still allowing the occupants to see out and to use sensors without restriction.

WHITE GLOBES

UCP	TL	Power	Volume	Weight	Price
1	20	100	30	25	900
2	20	200	40	30	910
3	20	300	55	35	750
4	21	400	30	20	800
5	21	500	40	30	850
6	21	600	55	35	900

Power is for the installation, regardless of the size of the craft.

OPTIMIZED WHITE GLOBE PACKS

UCP	TL	Volume	Weight	Power	MCr
1	21	60	55	50	850

7 Basic Obscuration Devices

The following are basic devices to obscure line of sight.

OBSCURATION DEVICES

Smoke Discharger: TL 5. 0.005 kl. 0.005 tons. 0.001 Mw. Cr150.

Anti-Laser Aerosol: TL 8. 0.001 kl. 0.001 tons. 0.002 Mw. Cr20.

Prismatic Aerosol: TL 10. 0.001 kl. 0.002 tons. 0.003 Mw. Cr20.

Sandcaster: TL 12. 0.010 kl. 0.014 tons. 0.005 Mw. Cr1250.

8 Compute Screen Totals

Note totals for:

Power Consumption
Volume
Weight
Price

8 - BRIDGE

1 Environmental Controls

Determine the type of environmental control measures to provide for the craft.

TL	Description	Power	Volume	Weight	Price	Units
5	Intake Compressor (for power plants in very thin atmosphere)	0.005	0.100	0.100	200	—
5	Basic Environment (heat, lights)	0.001	0.005	0.005	10	per kiloliter of hull
5	Basic Life-Support (sealed environment, atmos, water)	0.001	0.050	0.050	300	per kiloliter of hull
6	Extended Life Support (food, waste recycle)	0.002	0.003	0.003	200	per kiloliter of hull
5	Air Lock	0.002	3.000	0.200	5000	—
10	Artificial Grav Plates	0.050	0.010	0.020	500	per kiloliter of hull
10	Inertial Compensators	0.020	0.010	0.020	250	per kiloliter of hull

Basic Life Support and Extended Life Support are only possible if the vehicle is enclosed. Extended Life Support must be provided if occupants are routinely expected to spend 8+ hours aboard the vehicle per day.

Only the occupied hull volume need be considered for units; in small craft and starships, the entire hull volume is usually included in order to make the entire craft accessible for maintenance.

2 Control Points

Determine the number of control points required using the following formula:

CP = (Pr/100000) × TL

CP = Control Points. Pr = Price. TL = Tech level of the craft.

Section Control Points: Determine the control points required by each of the 8 following sections:

Hull. Power Supply. Locomotion. Communications. Sensors. Weapons. Screens. Environment Control.

3 Computers

If a computer is desired, select one from the list below. A computer multiplies the number of CP input into it by the CP multiple shown; it reduces the number of control panel units needed to control the craft.

COMPUTERS

TL	Model	Power	Volume	Weight	Price	Maximum CP Input	CP Multiplier
5	0	0.001	0.5	0.1	0.06	500	5
5	0/fib	0.002	1.0	0.2	0.10	500	5
5	0/bis	0.001	0.5	0.1	0.13	1000	10
5	1	0.002	2.0	0.5	0.40	5000	10
5	1/fib	0.004	4.0	0.9	0.65	5000	10
6	1/bis	0.003	2.0	0.5	0.90	7500	15
7	2	0.003	3.5	0.9	1.90	10000	15
7	2/fib	0.006	7.0	1.6	3.00	10000	15
8	2/bis	0.004	3.5	0.9	3.80	15000	20
9	3	0.004	4.0	1.0	3.80	20000	25
9	3/fib	0.004	8.0	1.9	5.80	20000	25
10	4	0.005	5.5	1.4	6.40	50000	30
10	4/fib	0.010	11.0	2.8	9.70	50000	30
11	5	0.006	6.5	1.6	9.70	100000	35
11	5/fib	0.012	13.0	3.2	14.80	100000	35
12	6	0.007	9.0	2.4	11.80	500000	45
12	6/fib	0.014	19.0	4.8	18.00	500000	45
13	7	0.008	12.0	3.0	17.40	5 million	65
13	7/fib	0.016	24.0	6.0	21.70	5 million	65
14	8	0.009	14.0	3.5	23.90	50 million	95
14	8/fib	0.018	28.0	7.0	30.50	50 million	95
15	9	0.010	17.5	4.4	30.50	100 million	120
15	9/bis	0.020	35.0	8.8	43.00	500 million	120
16	10	0.011	20.0	5.0	43.00	500 million	200
16	10/fib	0.022	40.0	10.0	65.50	500 million	200
17	11	0.012	13.0	3.3	65.50	20 billion	1000
17	11/fib	0.024	36.0	6.6	87.00	20 billion	1000
18	12	0.013	15.5	3.9	87.00	100 billion	10000
18	12/fib	0.026	31.0	7.8	108.50	100 billion	10000
19	13	0.014	18.0	4.5	108.50	500 billion	25000
19	13/fib	0.028	26.0	9.0	130.00	500 billion	25000
20	14	0.015	21.0	5.3	130.00	2 trillion	50000
20	14/fib	0.030	42.0	10.6	150.50	2 trillion	50000
21	15	0.016	24.0	6.0	150.50	50 trillion	100000
21	15/fib	0.032	48.0	12.0	170.00	50 trillion	100000

Power, Volume, Weight, and Price Modifications: If TL 5, ×100. If TL 6, ×10, if TL 7, ×2. Flying craft should have two computers; one is a safety backup. Space craft should have three computers; two are safety backups. If all computers malfunction, a craft which uses controls that require a computer will be out of control.

4 Control Panel Units

Select and install enough control panel units so that the total CPs from the control units multiplied by the computer's CP multiplier (if a computer is installed) equals or exceeds the number of CPs required to control the craft.

CONTROL PANEL UNITS

TL	Type	Power	Vol	Wt	Cr	CP
5	Basic Mechanical	—	0.4	0.1	5	0.2
6	Enhanced Mechanical	0.0005	0.4	0.5	30	0.4
7	Electronic	0.0005	0.1	0.005	70	0.5
8	Electronic Linked	0.0005	0.01	0.005	200	0.7
9	Computer Linked	0.0005	0.01	0.001	350	0.8
10	Dynamic Linked	0.001	0.02	0.01	500	1.0
13	Holographic Linked	0.002	0.03	0.02	1000	1.5

Linked panels require a computer; other panels cannot use a computer.

5 Special Control Panel Add-Ons

Special add-ons all require a computer.

CONTROL PANEL ADD-ONS

TL	Type	Power	Vol	Wt	MCr	CP
9	Heads-up Display	0.005	0.5	0.2	0.02	50
12	Large Holodisplay	0.050	2.0	1.0	0.5	1500
13	Heads-up HoloDisplay	0.020	1.0	0.5	0.10	200

6 Electronic Circuit Protection

If electronic circuit protection is desired, multiply weight and price of computer and controls by 1.5.

7 Compute Controls Totals

Note totals for:

Power Consumption

Volume

Weight

Price

9 - ACCOMMODATIONS

1 Basic Crew Complement

Determine the type of craft.
If **vehicle** or **small craft**, go to step 2.
If **starship** or **spacecraft**, go to step 7.

2 Vehicle and Small Craft Crew

Vehicles and small craft require:
Operator/Driver: Always required.
Gunner: One per gun.
Commander: Required if the craft carries offensive weapons; recommended for flying craft over 100 kiloliters.

3 Reduced Vehicle Gunners

Determine if computers and sensors reduce the number of gunners required.
X = C/(S/W)
X = Reduction in gunners allowed.
C = Computer CP Multiple.
S = Sensors CP.
W = Weapons CP.
X is the number of gunners that can be eliminated because sensors and computer provide substantial assistance.

4 Supplanted Vehicle Commander

Determine if sensors and computer supplant the need for a vehicle commander.
X = (T-S)/C
X = Commander Supplantation Value.
C = Computer CP Multiple.
S = Sensors CP.
T = Total Craft CP Multiple.
If X is between 0 and 1, the commander position is not needed because the operator/driver has enough assistance from the sensors and computer to make a tactical decision while operating the craft.

5 Special Vehicle Considerations

If space is at a premium the commander position may be eliminated; 2 or more gunner positions may be combined into 1.
If space is critical (and the craft only needs 1 gunner) the gunner may be eliminated and the operator/driver be required to fire the gun.

6 Vehicle Crew Accommodations

Allocate vehicle crew positions.

CREW POSITIONS

Access	*Pwr*	*Vol*	*Wt*	*Price*
None	—	1.0	0.02	100
Cramped	—	2.0	0.02	100
Adequate	—	3.0	0.02	100
Roomy	—	4.0	0.02	100

One position required for each occupant. If occupants are expected to spend more than 8 hours in the vehicle, double the above. If they spend more than 24 hours in the vehicle, provide extended accommodations (step 9); otherwise, go to step 10.

7 Starship and Spacecraft Crews

Starships and spacecraft (larger than vehicles and small craft) require an extensive crew to handle the responsibilities of the ship's operations. Use the following formulae to compute the requirements.

Bridge Crew (Cb):
Cb = (T/C)/750 (round fractions up).
T = Total Craft CP.
C = Computer CP Multiple.
The minimum bridge crew is 2. If Cb computed above exceeds 10, recompute Cb instead as:
Cb = 10 + (Cb/10) (round fractions up).

Engineering Crew (Ce):
Ce = ((P + L))/C)/400 (round fractions up).
P = Power Supply CP.
C = Computer CP Multiple.

Maintenance Crew (Cm):
Cm = ((H + A)/C/400 (drop fractions)
H = Hull displacement divided by 100.
C = Computer CP Multiple.

Gunners (Cg):
Cg = (W + F)/C/10 (drop fractions)
W = Weapons CP.
F = Screens CP.
C = Computer CP Multiple.

Flight Crew (Cf):
Cf = Q + R.
Q = Total Subordinate Craft Crew.
R = Number of Subordinate Craft.

Ship's Troops (Ct):
Ct = (H/1000) × M) (drop fractions)
H = Hull Displacement.
M = Troop Multiple (referee's or designer's selection from 1 to 30).
Reduce maintenance crew (Cm) by 1 for every 6 ship's troops carried.

Command (Cc):
Cc = Z/6 (drop fractions)
Z = Total crew to this point (does not include Stewards or Medical Crew).

Stewards (Cs):
Cs = ((Cc + Ch)/8) + (((Z-Cc) + Cj))/50) (drop fractions)
Ch = High Passage Passengers.
Cc = Command Crew.
Cj = Middle Passengers.
Z-Cc = Non-Command Crew.
At least one steward is required if there are any High Passengers.

Frozen Watch (Cf):
Cf = Z/H
Z = Total Crew Count (not including Medical Crew).
H = Hull Displacement Tonnage divided by 1000 (if less than 1, treat as 1).
If Cf low (not emergency low) berths are present, the ship can carry a frozen watch.

Medical Crew (Cd):
Cd = (Z/120) + (Cl/20) (drop fractions)
Z = Current crew and passenger count to this point.
Cl = Low Passengers.

8 Crew Segments

Determine the number of crew segments for the ship. The crew is divided into even segments: one per 1350 kiloliters of hull (round fractions up). For example, the 43-person crew of a 16,200 kiloliter ship divides into two 23-person segments.

9 Extended Accommodations

Starships and spacecraft require extended accommodations rather than crew accommodations. Vehicles and small craft require extended accommodations if the crew is present for 24 hours or more.

EXTENDED ACCOMMODATIONS

Type	*Pwr*	*Vol*	*Wt*	*Cr*
Bunk	—	13.5	0.5	5000
Low Berth	.001	13.5	1.0	50000
Emergency Low	.002	27.0	2.0	100000
Small Stateroom	.002	27.0	2.0	40000
Stateroom	.003	54.0	4.0	400000

Volume includes an allowance for access space; volume of the accommodation itself is half that shown.
Only crew members may have bunks; passengers must have staterooms or low berths. Double occupancy of a small stateroom is possible if each occupant uses the room for 12 out of 24 hours. Double occupancy of a standard stateroom is possible on a constant basis.

10 Subordinate Craft

Subordinate craft may be carried on a larger craft.
Vehicles (270 kiloliters or less) require 150 percent of their volume.
Small craft (270 to 1350 kiloliters) require 130 percent of their volume.
Starships and spacecraft (1350 kiloliters or more) require 110 percent of their volume.
Irregular configuration craft (UCP configuration 7) are an exception to volume requirements: they can carry subordinate craft on their exterior with no extra volume requirement.
Fittings to hold subordinate craft cost Cr150 per kiloliter of carried craft.

11 Rapid Launch Facilities

If rapid launch facilities (launch tubes) are desired, they may be fitted. Launch tubes require a volume equal to 25 times the volume of the largest craft which they will launch. Launch tubes costs Cr150 per kiloliter.

12 Accommodations Totals

Note totals for:
Power Consumption
Volume
Weight
Price

10 - FUEL

1 Required Fuel Tankage

Total required fuel (in kiloliters) from all parts of the craft. Note endurance of the craft (in hours, days, or weeks).

2 Cost and Weight of Fuel

Determine cost and weight of the fuel required. Cost and weight shown are per kiloliter of fuel.

The result of this calculation is the cost of one refill of the tanks with fuel.

FUEL PRICES

Type	*Weight*	*Price (Cr)*
Hydrocarbons	1.0	250
Radioactives	12.5	75000
Hydrogen	0.07	35
Antimatter	1.0	625000

3 Fuel Purification Plant

If the ship is jump-capable and uses hydrogen fuel and if a fuel purification plant is desired, select one from the table.

FUEL PURIFICATION PLANTS

TL	*Power*	*Volume*	*Weight*	*Price*	*Minimum Volume*
8	0.010	0.70	1.5	200	135
9	0.009	0.60	1.2	190	120
10	0.008	0.55	1.1	180	105
11	0.007	0.45	0.9	170	95
12	0.006	0.40	0.8	160	80
13	0.005	0.35	0.7	150	65
14	0.005	0.25	0.5	140	55
15	0.005	0.20	0.4	150	40
16	0.005	0.15	0.3	160	25
17	0.005	0.05	0.1	170	15

Values shown are per kiloliter of fuel per 6 hours. One complete fuel purification plant, installed on the basis of the total ship's fuel capacity, will purify in the tanks in 6 hours; a plant installed in the basis of half the ship's fuel capacity will purify all of the fuel in the tanks in 12 hours. No fuel purification plant may be made smaller than the minimum volume.

Fuel Scoops: A craft may be fitted with fuel scoops in order to acquire hydrogen gas from a gas giant.

The craft must be streamlined or airframe. Fuel scoops cost Cr75 per kiloliter of hull. They consume no power, volume, or weight.

Fuel scoops allow scooping of hydrogen gas (unrefined fuel) at the rate of 20 percent of the tonnage of the hull per hour, until the ship's fuel tanks are filled.

4 Special Fuel Tankage

If desired, additional fuel tankage can be allocated.

Collapsible Tanks: Large fuel bladders that are installed in the ship's internal cargo hold. Fuel must be pumped from the collapsible tanks into the regular fuel tanks before it can be used. Collapsible tanks costs Cr35 per kiloliter. They take no space when empty.

Dismountable Tanks: Fixed, semi-permanent, interior fuel tanks that can be installed in the cargo hold. They operate as permanent fuel tanks; the fuel can be used directly from these tanks. Dismountable tanks cost Cr75 per kiloliter. They take up their full space even when empty. They can be dismounted and stored when not needed.

Exterior Dismountable Tanks: Fixed, semi-permanent, exterior fuel tanks that can be installed by bolting to the outside of the hull. They operate as permanent fuel tanks; the fuel can be used directly from these tanks. The ship is considered unstreamlined while the tanks are mounted. Ship volume is increased by the volume of the tanks; ship's weight is increased by the tank weight plus the fuel weight. The ship performance must be reevaluated when the tanks are installed.

Exterior dismountable tanks cost Cr35 per kiloliter plus the cost of equivalent starship hull volume. They can be dismounted by the starship crew in two weeks at no cost or by professional laborers at a starport in two weeks for Cr10 per kiloliter.

Drop Tanks: Disposable tanks which provide fuel while reducing ship tonnage. Tanks are mounted only when needed and dropped away prior to jump. They do not affect the routine performance of the ship. Cost is Cr10,000 plus Cr75 per kiloliter of drop tank.

5 Cargo Hull

If space is required for cargo or freight transport, allow the desired volume in kiloliters. Cargo space has no extra cost.

6 Compute Fuel and Miscellaneous Totals

Note totals for:

Power Consumption
Volume
Weight
Price

Design Evaluation

Finally, the figures are analyzed to insure that the design has not exceeded hull capacity and that it has not gone over budget or violated Tech Level requirements.

The design is finalized, and a Universal Craft Profile (UCP) is created. A sample UCP is displayed below. (This particular sample is contrived to show examples of the various UCP elements.) The text that follows describes how to create a UCP for any craft.

UNIVERSAL CRAFT PROFILE FORMAT SAMPLE

CraftID: Slow Tug, Type TW, TL 15, MCr688.123
Hull: 90/225, Disp=2,000, Config=1SL, Armor=40G,
Unloaded=1270 tons, Loaded=2595 tons
Power: 32/64, Fusion=5420Mw, Duration=30/90
Loco: 30/60, Maneuver=2, 26/52, Jump=2,
NOE=190kph, Cruise=750kph, Top=1000kph,
Agility=0
Commo: Radio=System
Sensors: PassiveEMS=System, ActiveEMS=FarOrbit,
Densitometer=LowPen/250m, Neutrino=1kw
ActObjScan=Rout, ActObjPin=Rout,
PasObjScan=Rout, PasObjPin=Rout,
PasEngScan=Simp, PasEngPin=Rout
Off: ParticleAccel=000, MesonGun=000
Batt 111 111
Bear 111 111
Disintegrator=000, JumpProj=000
Batt 111 111
Bear 111 111
Missiles=x00
Batt 111
Bear 111
PlasmaGun=x00, FusionGun=x00
Batt 111 111
Bear 111 111
BeamLaser=x00, PulseLaser=x00
Batt 111 111
Bear 111 111
Def: DefDM=+1, MesonScrn=0, BlackGlobe=0
Repulsors=x00, Sandcaster=x00
Batt 111 111
Bear 111 111
Tractors=x00, JumpDamper=x00
Batt 111 111
Bear 111 111
Control: Computer=1bis×3, Panel=holodynamic
link×216, Special=large holodisplay,
Environ=basic env, basic ls, extend ls, grav
plates, inertial comp
Accomm: Crew=10×2 (Bridge=2, Engineer=4, Maint=1,
Gunnery=1, Flight=4, ShipTroops=1,
Command=2, Steward=1, Medical=1,
FrozenW=1), Staterooms=10, LowBerths=5,
Bunks=2, HighPsg=2, MidPsg=18, LowPsg=5,
SubCraft=pinnace×2, air/raft
Other: Cargo=7695kliters, Fuel=4050kliters
ObjSize=Average, EmLevel=Moderate

CraftID

List craft name, type, Tech Level, and total price. Space-faring craft have some special type IDs that are used across the Imperium. These are shown in the table below.

SPACE-FARING CRAFT TYPE CODES

Primary	*Qualifier (Optional)*
A Merchant	A Armored
B Battle	B Battle; Boat
C Cruiser; Carrier	C Cruiser; Close
D Destroyer	D Destroyer
E Escort	E Escort
F Frigate; Fighter	F Fast; Fleet
G Gig	G Gunned
H Hunter	H Heavy
I,J Intruder	I,J Imperial
K Pinnace	K Courier
L Lab; Corvette	L Leader; Light
M Merchant	M Missile
N Ferry	N Nonstandard
P Planetoid	P Provincial
Q Auxiliary	Q Decoy
R Liner	R Raider
S Scout; Station	S Strike
T Tanker; Tender	T Troop; Transport
U Tug	U Unpowered
V Carrier	V Vehicle
W Barge	W Slow
X Express	X Alternate
Y Yacht	Y Shuttle; Cutter
Z Special	Z Experimental

Hull

List the hull damage points, craft displacement (in displacement tons), configuration, armor rating and type, unloaded weight, and loaded weight.

Hull Damage Points: Hull damage points are listed as two values separated by a slash: inoperative damage level, then destroyed damage level. Compute hull damage points as follows. (Round fractions up; a result can never be less than 1.)

Inoperative: Volume of craft hull ÷ 15

Destroyed: Volume of craft hull ÷ 6.

Unloaded Weight: Compute the unloaded weight of the vehicle as the weight of all components without any fuel or cargo.

Loaded Weight: Compute the loaded weight of the vehicle by including the weight of the fuel, plus the weight of a full cargo hold. Compute the weight of fuel from the following table:

FUEL TABLE

Type	*Weight*	*Cr per kiloliter*
Hydrocarbons	1.00	250
Radioactives	25.00	75000
Hydrogen	0.07	35
Antimatter	1.00	625000

To compute the average weight of a full cargo hold, multiply the volume of the cargo hold in kiloliters by 1000 kg (one metric ton).

Power

List the power plant damage points, power plant output in megawatts, and duration of operation.

Power Plant Damage Points: Power plant damage points are listed as two values seperated by a slash: inoperative damage level, then destroyed damage level. Compute power plant damage points as follows. (Round fractions up; a result can never be less than 1.)

Inoperative: (Volume of power plant ÷ hull volume) × hull inoperative damage points.

Destroyed: Inoperative value × 2.

If the craft uses electronic circuit protection, multiply the inoperative value by 1.5.

For example, if a craft with hull damage points of 45/113 has a power plant that takes 50 kiloliters, and the hull volume is 675 kiloliters, then the power plant's inoperative value is (50/675) × 45, or 3.33, which rounds to 4. The destroyed value becomes 4 × 2, or 8. The final power plant damage point value is 4/8. If the craft had electronic circuit protection, the damage points value would become 6/8.

Duration of Operation: Divide the power plant fuel tank volume in liters (do not include starship jump drive fuel) by the power plant fuel usage per hour to determine the number of hours of continous operation. Divide the number of hours by 24 to arrive at the number of full days of continous operation.

Divide the number of hours by 8 to determine the number of eight-hour work days of operation.

The two numbers, 24-hour continous days and 8-hour work days, are separated by a slash.

Locomotion

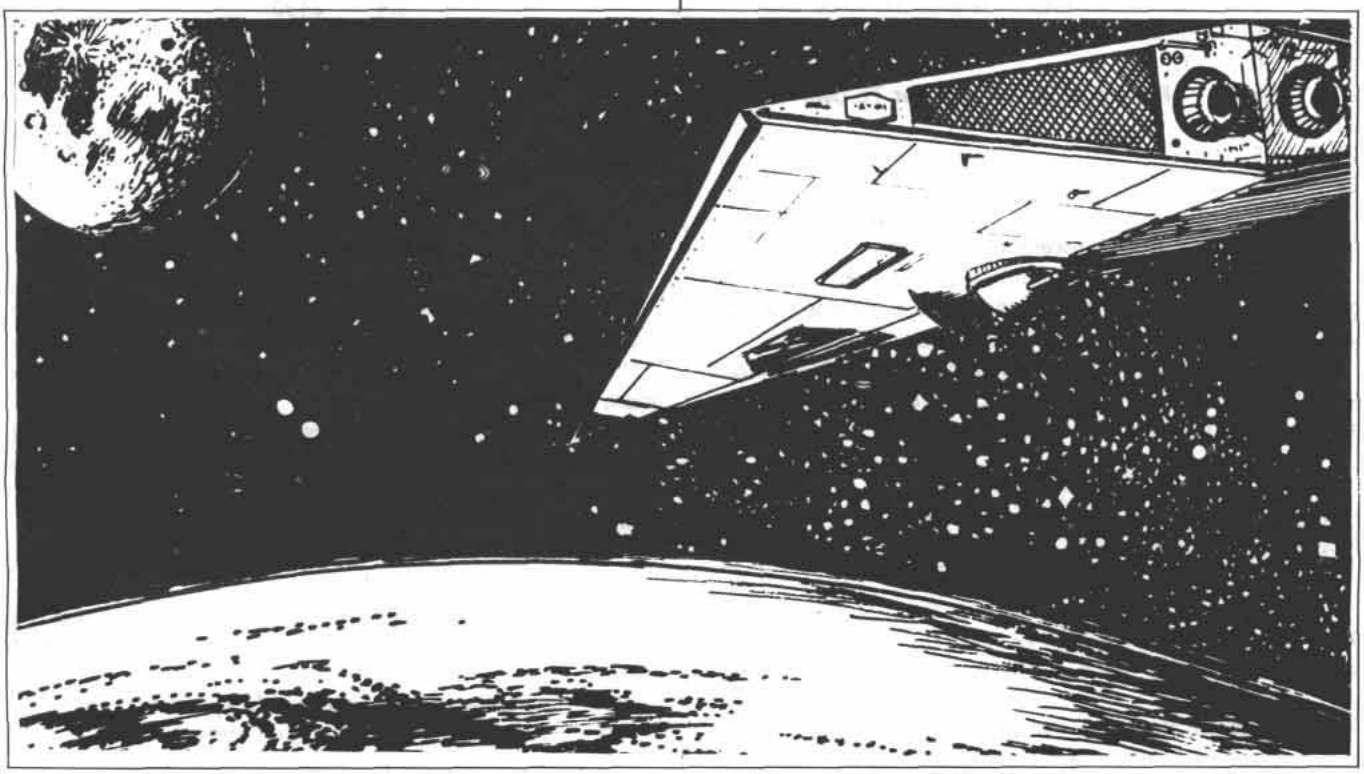
List the locomotion damage points for each of the types of locomotion (some craft have more than one locomotion type: starships, for example, have both maneuver drive and jump drive).

For contact-based vehicles, list the power-to-weight ratio, the on-road speed, and the off-road speed. For a thrust-based vehicle, list the thrust in tons, the Nap-of-Earth (NOE, that is "terrain following") speed, the cruising speed, and the top speed.

For space-faring craft, list the maneuver Gs, the jump drive number, the NOE speed, the cruising speed, the top speed, and the craft's agility.

Locomotion Damage Points: Locomotion damage points are listed just like power plant and hull damage points. Compute locomotion damage points as follows. (Round fractions up; a result can never be less than 1.)

Inoperative: (Volume of locomotion suspension ÷ hull



volume) × hull inoperative damage points. *Note:* For wheels, divide the inoperative result by 2. For legs, divide the inoperative result by 5 and multiply it by the number of legs.

Destroyed: Inoperative value × 2.

After computing the destroyed damage point value, if the craft uses electronic circuit protection, multiply the inoperative value by 1.5.

For example, if a craft with hull damage points of 45/113 has a locomotion that takes 70 kiloliters, and the hull volume is 675 kiloliters, then the locomotion's inoperative value is (60/675) × 45, 4.67 or 5. The destroyed value becomes 5 × 2, or 10. The final locomotion damage point value is 5/10. Were electronic circuit protection present in the craft, the damage points value would become 8/10.

For space-faring craft, list both the damage points for the maneuver drive, and the jump drive. Use the volume of the maneuver drive or the volume of jump drive as the suspension volume when performing the calculation.

Contact-Based Vehicles: List the vehicle's power-to-weight ratio, its road speed, and its off-road speed. To determine the vehicle's power to weight ratio:

(Power plant output in megawatts ÷ vehicle's loaded weight in tons) × 1000.

To determine road speed, consult the following table:

SPEED TABLE

P/W	*KPH*
4	15
6	20
8	25
10	30
12	35
14	40
16	45
18	50
20	55
22	60
24	65
26+	70

For Tracked and Wheeled Vehicles: Add 10 kph per TL over 5, add 10 kph for wheeled vehicles, add 15 kph if vehicle is light.

Light Vehicles: A vehicle is light if it is 5 tons or less at TL5, 10 tons or less at TL6, 15 tons or less at TL 7, 20 tons or less at TL 8, and 25 tons or less at TL 9.

For Legs: Add 5 kph per TL over 10.

Add 1 kph per power-to-weight ratio number over 26.

To determine the vehicle's off-road speed, first compute its ground pressure using the following formula: Vehicle's weight in tons ÷ volume of vehicle's suspension in kiloliters

Consult the following table to determine the vehicle's off-road speed factor. Multiply the vehicle's road speed by the factor shown to get the vehicle's off-road speed:

OFF-ROAD SPEED

Ground Pressure of 6 or less				*Ground Pressure of 7 or more*			
P/W	*Wheels*	*Tracks*	*Legs*	*P/W*	*Wheels*	*Tracks*	*Legs*
4	×0.15	×0.3	×0.5	4	×0.05	×0.1	×0.3
8	×0.2	×0.4	×0.6	8	×0.1	×0.2	×0.4
12	×0.25	×0.5	×0.7	12	×0.15	×0.3	×0.5
16+	×0.3	×0.6	×0.8	16+	×0.2	×0.4	×0.6

Thrust-Based Vehicles: For grav vehicles, list the terrain following speed (NOE), crusing speed, and top speed. For air cushion vehicles list only the top speed and the cruising speed (they always travel at NOE altitude). All speeds listed for vehicles are for a standard atmosphere unless otherwise noted.

For grav vehicles, begin by computing the vehicle's maneuver thrust:

(Total thrust ÷ vehicle's loaded weight)-1.

The result must be greater than zero. If it is not, the design is flawed and more thrust must be provided.

Once the maneuver thrust is known, consult the following table to find the craft's top speed in a vacuum:

TOP VACUUM SPEED

Maneuver Thrust	*Vacuum Speed (kph)*
0.1	120
0.15	180
0.2	240
0.25	300
0.3	360
0.35	420
0.4	480
0.45	540
0.5	600
0.6	720
0.7	840
0.8	960
0.9	1080
1.0	1200
1.2	1400
1.4	1590
1.6	1770
1.8	1950
2.0	2120
2.2	2280
2.4	2430
2.6	2580
2.8	2720
3.0	2850
3.5	3150
4.0	3400
4.5	3640
5.0	3840
6.0	4200

From the top speed, determine the vehicle's other speeds as:

Cruising Speed = Top Speed × 0.75.

NOE Speed = Top Speed × 0.25 (not to exceed the maximum allowed by avionics).

A craft's streamlining affects its speed when operating in a standard atmosphere. Based on the craft's streamlining, modify the speed values as follows:

Airframe: Use 90% of vacuum speed.

Streamlined: 1000 kph is top speed. Compute all other speeds from this top speed.

Unstreamlined: 300 kph is top speed. Compute all other speeds from this 300-kph top speed level. List vacuum speed only.

Other atmospheres affect the craft's speed figures:

Very Thin or Less: Use full vacuum speed.

Thin Atmosphere: Use standard atmosphere speed × 1.5.

Dense Atmosphere: Use standard atmosphere speed × 0.75.

Very Dense Atmosphere: Use standard atmosphere speed × 0.25.

For air cushion vehicles, compute the top speed as shown above for grav vehicles, but then multiply it by 0.25 (in effect, an air cushion vehicle's top speed is its NOE speed, and no NOE speed is listed). Compute the cruising speed as × 0.75 of the new top speed.

Modify the new top speed by the streamlining effects, but completely ignore all of the effects of atmosphere. All air cushion vehicles operate at the same speeds in all of the atmospheres listed as follows: thin, standard, and dense. Keep in mind that air cushion vehicles cannot operate in a very dense atmosphere or in an atmosphere that is categorized as very thin or less.

Space-Faring Craft: For space-faring craft, list the maneuver drive thrust in Gs, the jump drive number, along with the standard atmosphere terrain following speed (NOE), cruising speed, and top speed for streamlined and airframe designs. If a spacecraft is unsteamlined, it is incapable of travelling in an atmosphere; therefore, list only its vacuum cruise speed and top speed. Compute the speed values exactly as shown for grav vehicles. Use the spacecraft's maneuver drive thrust in Gs directly as the maneuver thrust—skip the maneuver thrust computation.

Space-faring craft also list the craft's agility, which is used in starship combat. To compute the craft's agility (drop fractions):

Agility = (Excess power output in megawatts ÷ unloaded weight of craft in tons) × 5.4. Agility can never exceed 6.

Excess power output is the power left over from the power plant after all of the craft's other components have been powered.

Commo

List each installed communication device and its range.

Sensors

List each installed sensor and its range. Also compute and list the craft's sensor profile for locating objects and energy emissions.

Active Object Scan: Active EMS and Radar send out wide-beam electromagnetic emissions in an attempt to locate and classify objects from the reflected signal. Based on the range of the craft's active sensors (do not include LADAR), determine the basic difficulty level for doing active object scans:

DIFFICULTY TABLE

Range of Sensor	*Difficulty*
Distant or less	Formidable
Very Distant	Difficult
Regional	Difficult
Continental	Difficult
Planetary	Difficult
Far Orbit	Routine
Extreme Orbit	Routine
Interplanetary	Routine
Substellar	Simple
Stellar	Simple
Interstellar	Simple

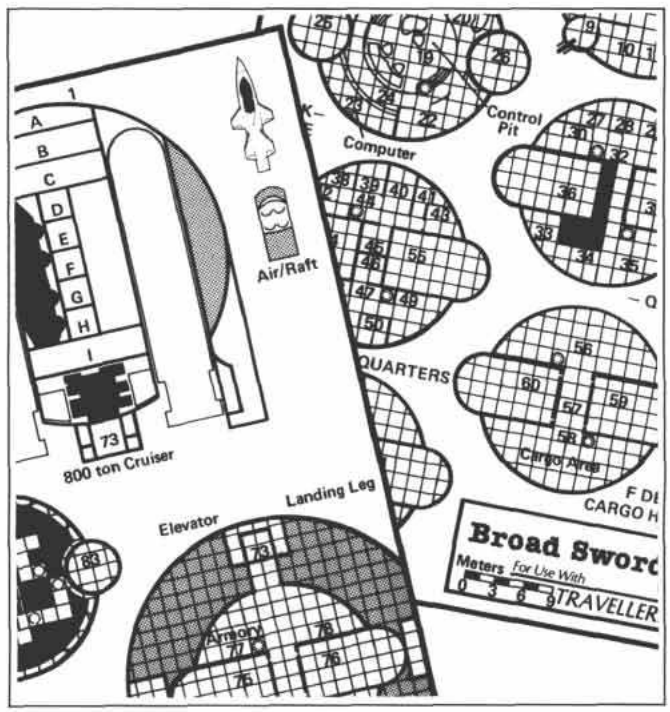
Active Object Pinpoint: Active EMS and radar send out a tight-beam electromagnetic emission in order to get a precise image of an object from the reflected signal. In this way, active EMS and radar can provide a highly detailed view of the object under consideration. Tight-beam active sensors have the advantage of only giving away your position to the one enemy target you have scanned. However, the disadvantage is that you must use other sensors to first locate the object you wish to pinpoint scan. Based on the range of the craft's active EMS or RADAR, determine the basic difficulty level for active object pinpoint scans by consulting the Difficulty Table above.

Passive Object Scan: A densitometer detects an object's natural gravity and by doing so can locate and classify the object according that particular object's density type. The densitometer is a passive sensor: because it is a passive sensor, it has the advantage of not emitting any signals that can be detected. Consult the following table to determine the densitometer's passive object scan ability:

SCAN ABILITY

TL	*Difficulty*
10	Formidable
11	Formidable
12	Difficult
13	Difficult
14	Routine
15	Routine
16	Routine
17	Simple
18	Simple
19	Simple
20	Simple

Passive Object Pinpoint: A densitometer can also provide a detailed density map of an object's outline and interior.



However, the object from which the densitometer is making this map must first have been located through the use of an object scan. Such a scan often results in the enemy craft's precise ID. Consult the following table to determine the densitometer's passive object pinpoint ability based on its penetration:

PASSIVE OBJECT PINPOINT

Penetration of Sensor	*Difficulty*
Surface	Impossible
1 m	Formidable
50 m	Difficult
100 m	Difficult
250 m	Routine
1 km	Routine
25 km	Routine
2500 km	Simple
250,000 km	Simple

Passive Energy Scan: Passive EMS, laser sensors, radar direction finders, radio direction finders, and neutrino sensors can locate and classify energy emissions, indicating size and power level status. Determining a craft's passive energy scan ability is a three-step process. First, consult the following table to determine the sensors' passive energy scan ability:

PASSIVE EMS SENSORS

Distant or less	+1
Very Distant	+2
Regional	+3
Continental	+4
Planetary	+5
Far Orbit	+6
Extreme Orbit	+8
Interplanetary	+12
Substellar	+14
Stellar	+16
Interstellar	+18

NEUTRINO SENSORS

1 Gw	+1
1 Mw	+2
100 kw	+4
10 kw	+6
1 kw	+8
1kw	+10

Second, compute the following:

(Passive EMS or laser sensor, or Radar direction finder + Neutrino)/2.

Finally, consult the following table to determine the craft's passive energy scan ability:

PASSIVE ENERGY SCAN ABILITY

Value	*Difficulty*
+0	Impossible
+1	Formidable
+3	Difficult
+6	Routine
+12	Simple

Passive Energy Pinpoint: Neutrino sensors can classify nuclear-based energy emissions with great precision. A passive pinpoint scan by a neutrino sensor can provide the precise energy level of the enemy craft. To determine a craft's passive energy pinpoint ability, consult the following table:

PASSIVE ENERGY SCAN ABILITY

Sensitivity	*Difficulty*
1 Gw	Formidable
1 Mw	Formidable
100 kw	Difficult
10 kw	Routine
1 kw	Routine

Off

For craft mounting hardpoint weapons, list the weapons using the hardpoint format:

ParticleAccel = 000, MesonGun = 000
Batt 111 111
Bear 111 111

For a specific weapon type, the first digit indicates the UCP value for a spinal mount, the second digit indicates the UCP value for bays, and the final digit indicates the UCP value for turrets. For weapons that cannot be installed in a spinal mount, list the UCP values as "x00," with the lower-case "x" in the spinal mount position.

Also listed are the batteries and the batteries bearing.

Determining Batteries: Space-faring craft with more than one weapon of a type may group them into batteries. Space-faring craft with more than ten weapons of the same type must group them into batteries. A battery may be only a single turret, or may be as many as as ten turrets, but all batteries of the same type of weapon must have the same UCP factor.

Each bay weapon is automatically a battery. The spinal mount of a ship (if it has one) is a single battery.

For example, a ship has 80 triple-beam laser turrets. The ship may have 80 batteries of one turret (UCP factor 3), 40 batteries of two turrets (UCP factor of 4), 16 batteries of five turrets (UCP factor of 6), or 8 batteries of 10 turrets (UCP factor of 8). Other configurations are possible, but these selections constitute the optimal battery configurations from the turret weapon tables on the design flowchart.

When the craft design is used in starship combat, each

BEARING TABLE

Ship Displacement	*Percent Bearing*
Under 20,000	100%
20,000	95%
30,000	90%
40,000	85%
50,000	80%
75,000	75%
100,000	70%
200,000	65%
300,000	60%
400,000	55%
Over 400,000	50%

battery can fire once each turn; each battery may also select a different target. Battery configurations are determined when the ship is built, not on the spur of the moment. The actual number of batteries which may bear on the target may be less than the total number of batteries on larger ships, and is determined from the Bearing Table, on the previous page.

For example, if a 50,000 displacement ship has 15 particle accelerators in bays, 100 laser turrets in eight batteries, 50 missile turrets in five batteries, and 80 sandcaster turrets in eight batteries, it could bring to bear 12 particle accelerator batteries, 6 laser batteries, 6 sandcaster batteries, and 4 missile batteries. The figures are based on the table reading that a 50,000 displacement craft can bring 80% of its batteries to bear on a single target. Round fractions up.

The spinal mount always bears. One battery of each weapon always bears.

Guns: For nonhardpoint weapons, list the weapon stats using the standard format as shown at the bottom of this page.

Def

For space-faring craft, list the defensive DM first. Next, list any screens or defensive weapons installed on the craft. For screens, list their UCP value. Even though repulsors, sandcasters, tractors, and jump dampers can be mounted in bays or turrets, they are considered defensive weapons, and are listed under the defenses section using the bays and turrets UCP format.

Defensive DM: To compute the defensive DM, use the following formula:

Computer Model Number + Agility + Target Size DM (below).

TARGET SIZE DMS

Displacement	*DM*
Under 100	+2
Under 1000	+1
Under 10,000	0
10,000 or more	−1
100,000 or more	−2

Control

List the installed computer, panel units, special control units, and environmental control units.

Accomm

List the number of crew sections, followed by a detailed breakdown of each functional crew area (bridge, engineering, and so on); list the number of high, middle, and low passage passengers; list any subordinate craft carried by the craft.

Other

List the cargo capacity of the craft in kiloliters, the fuel capacity of the craft in kiloliters, the object size, the emmission level, and any other pertinent design notes.

Object Size: Determine the craft's object size (used when the craft is the subject of an object sensor scan) from the table below:

OBJECT SIZE

*Loaded Weight**	*Size*
Over 10,000 tons	Large
100 to 10,000 tons	Average
Under 100 tons	Small

*Note: Craft loaded weight is used, not displacement tonnage.

Emission Level: Determine the craft's emission level (used when the craft is the subject of an energy sensor scan):

EMISSION LEVEL

Power Plant Output	*EmLevel*	*-1 Lvl if*	*+1 Level if Displacement*
Over 100,000 Mw	Strong	EMM	Under 1000
1000 to 100,000 Mw	Moderate	EMM	Under 100
Under 1000 Mw	Faint	EMM*	Under 20

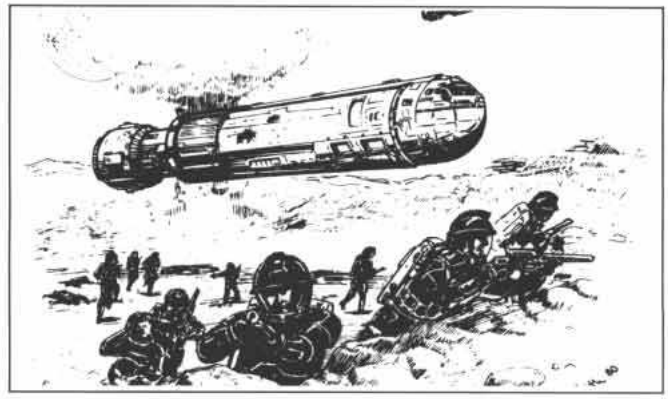
EMM means the craft mounts electromagnetic masking.
*means no emission.

DRAWING CRAFT PLANS

Craft plans may have a scale of 1.5 meters per square. Optimum space between decks is 3 meters: one floor square (1.5 meters by 1.5 meters by 3.0 meters) equals 6.75 cubic meters or 6.75 kiloliters. Two floor squares equal 13.5 kiloliters or one displacement ton.

When allocating space within the craft, assume only a portion of the specified volume for extended accommodation (staterooms, bunks, low berths, and so on) is used; the remainder should be used in common areas and other accomodations for the crew.

A leeway of 10% to 20% should be allowed. If the final craft plan comes within 20% of the craft's UCP volume, the plan is acceptable.



WEAPON STAT FORMATS

	Ammo Notes	*Rounds*	*Pen/ Atten*	*Dmg*	*Max Rng*	*Auto Tgts*	*Danger Space*	*Sig*	*Recoil*	*Diff as*
Plasma A-10	0	0	44/5	20	VDist(5.1)	2	15	Hi	—	FCTL
HiV 2cm CPR	HE	50	1	6	VLong(2.0)	—	—	Med	—	FCTL
	KEAP	50	2	4	VLong(2.0)	—	—	Med	—	FCTL

Starship Combat

In the uncertain environment of the divided Imperium, interstellar conflicts are certain to happen. Starship combat addresses handling such conflicts between space-faring craft.

A starship combat situation occurs when a side of adventurers (in a spacecraft) encounters another space-faring craft—and violence is offered by either side.

Starship combat is task-based. As with personal combat, the players are familiar with the concepts of tasks, so they can immediately make reasonable decisions about when to fight and when to prudently make a run for it.

These rules are intended for a situation in which the referee must run fewer than 20 spacecraft. The combat rules are presented in two parts: the first part covers the Basic Rules and the second part covers Special Rules. The Basic Rules cover all that is needed to resolve ordinary space combat encounters, and the Special Rules section discusses special combat situations that can occur.

THE BASIC RULES

At the beginning of a combat encounter, a marker representing each individual ship is placed on the playing surface.

Combat involves locating targets by using sensors and performing successive attacks (such as missile fire, laser shots, or spinal meson fire) on the located targets.

A basic "to hit" task is used in every case to obtain a hit; the basic task is modified by such considerations as range between the attacker and the target, the type of weapon used, the defensive abilities of the target spacecraft, and other such factors. If a hit is obtained, the weapon must penetrate the target's screens and active defenses (such as laser fire destroying incoming missiles). The damage inflicted depends on the type of weapon.

Combat continues until one side is vanquished, flees, surrenders, or is destroyed.

DEFINITIONS

Combat Round: Combat is resolved in rounds. Each combat round represents 20 minutes of elapsed time. Thus, three combat rounds equal one hour.

Within a single round, each individual spacecraft is allowed an opportunity to move and to attack. Each may be attacked by one or more enemy spacecraft.

Once all spacecraft in the battle have been provided with the opportunity to act, the combat round is over, and the next combat round begins.

Distance Scale: Combat is conducted on graph paper or hex-grid paper. The distance scale is 25,000 kilometers per square (or hex).

Unit: Refers to a single spacecraft. Markers, crude models, or finely detailed miniatures are all suitable to represent units. However, because of the need to create uncertainty when trying to get positive sensor contact on a target, the combat session should start out with generic markers indicating the location of each starship on the playing surface.

Range Bands: For convenience, space combat divides distance into a series of special ranges. These ranges are:

Visual: Very distant or less (under 50 km).
Near: Very distant to planetary (50 km to 50,000 km).
Far: Planetary to Far Orbit (50,000 km to 500,000 km).
Extreme: Beyond Far Orbit (Beyond 500,000 km)

In terms of distance on the playing surface, the ranges are:

Visual: 1 square (adjacent)
Near: 2 squares
Far: 3 to 10 squares
Extreme: 11+ squares

The starting range of a combat situation depends on the referee's specific statement about the encounter.

Tasks: All combat activities use tasks. Most combat tasks have an absolute time increment of one combat round. Also, in starship combat, unless specifically stated otherwise, all tasks are "nonrepeatable" tasks. In other words, try the task once and if it fails, you are done.

ROLE OF THE TACTICS SKILLS: THE TACTICAL POOLS

Before a combat session begins, total up all the Fleet Tactics skill levels of the participants on each side. This total is known as the "fleet tactics pool." Fleet tactical points can be used as a special "roving DM" on any combat task roll. The number of tactical points to be used as a DM must be specified before the roll is made.

Total up the Ship Tactics skill levels of all the crewmembers of a given spaceship. This total becomes the "ship tactics pool" for that ship. Ship Tactics skill can be used as a DM on any task related to the activities of that given ship.

Once a tactical point is expended, it is used up for the combat round. Any number of tactical points may be used on a given roll as long as they are available. The tactical point pool is received anew each combat round. Any unused tactical points at the end of the combat round are lost and may not be carried over to the next combat round.

Obviously, tactical points are quite valuable because they can be used to favorably influence the outcome of any tasks that are viewed as vital to the success of the attack.

Tactical points may never be used to create a task DM that exceeds the ±8 task DM limit.

SETTING UP THE COMBAT SESSION

Once an starship encounter appears to require force, the playing surface must be set up.

Generic markers must be used because sensor scans are required to identify enemy units and make them available as targets.

Each unit's initial speed must be determined. The initial speed can be any value up to ten times the unit's maneuver drive G-number. Of course, high speeds can make it difficult for a unit to stay on the playing surface, so the initial speed needs to be carefully considered. The referee may want to dictate the initial speed as a part of the encounter set up.

THE COMBAT PROCEDURE

Once the playing surface is set up, combat can begin. Each step is described in detail below.

Step 1: Determine Surprise

Surprise is determined only once per combat encounter. Surprise is possible for either side, and the element of surprise gives an advantage both in attacking and in avoiding the enemy.

Surprise is a task, rolled by the side which makes the first hostile move.

To determine if an attacking side has surprise:
Difficult, Leader, Sensor Ops (confrontation).

Referee: Success at this task provides the attacking side with the benefits of surprise. Use the best Leader skill level and Sensor Ops skill level from among the crewmembers of each side. Since this is a confrontation task, both parties contribute DMs as described in the Referee's Guide to Tasks chapter.

If this task fails, both parties are considered to be aware of each other. If any mishap occurs, the defending side has surprise instead.

While in most attack situations the chance of surprise is Difficult, the referee must weigh each situation and set the difficulty accordingly. For example, if the defending side has no reason to expect an attack, the surprise may become Routine. On the other hand, if the attacking side consists of a pirate vessel known to be in the system attacking some local system defense boats with high-quality sensors, achieving surprise may be a Formidable task.

Benefits of Surprise: A side with the element of surprise may elect to end the combat situation before it even starts by so stating. NPC-piloted spacecraft which have surprise and are outnumbered can avoid the combat encounter if the referee so chooses.

A side with the element of surprise may freely attack until surprise is lost. The surprised side must continue with the action they were performing before the combat occurred, and it cannot attack in return. All craft of the attacking side may each make one surprise attack. If surprise is not lost, each member of the side may make another surprise attack. This continues until surprise is lost.

Surprise is lost when any unit in the other side gives the alarm in some manner. All spinal mount shots will alert the enemy to an attack; turret and bay fire may not. Any unit that is hit but not rendered inoperative will raise the alarm.

If the alarm is not raised in this manner, there is a chance that an unattacked unit in the defending side will see the attack and give the alarm, as per the following task:

To raise an alarm in a surprise attack:
Difficult, Leader, Sensor Ops.

Surprise continues until it is lost, and so it may continue indefinitely. Once surprise is lost, normal combat begins. At the moment surprise is lost, the combat round ends; the attacker may no longer make any further surprise attacks.

Step 2: Fight a Round of Combat

At the beginning of each combat round, the side with the largest tactical point pool gets to select which side goes first.

Once a side has been selected, one unit from that side may take its turn. The unit may move, make sensor scans, and make attacks (limit of one attack per battery per combat round). Any attacks made take effect immediately. Once the unit's turn is finished, one unit from the other side may take a turn. Turns continue to alternate back and forth from side to side in this manner until all units on both sides have had an opportunity to take a turn. Once all have had a chance to take their turn, the combat round is over, and a new combat round begins.

Interrupts: A unit from the opposing side that has not yet taken a turn can choose to interrupt another unit's turn and take their turn in the middle of that unit's turn.

To interrupt another unit's turn:
Routine, Agility (safe).

Referee: If this task is successful, it becomes the interrupting

unit's turn: the unit's turn is considered spent for the combat round. A failed interrupt roll doesn't count as a spent turn. Ignore mishaps. Pilot skill may be used in place of agility on this task.

Interrupts are subject to these restrictions:

- A unit cannot interrupt the turns of others on his own side.
- Only one active interrupt is permitted per side.
- Only one interrupt is permitted per enemy attack, sensor scan, or square of enemy movement.

Combat Actions: During their turn, all units may move, perform sensor scans, and fire.

Movement: Movement speed is specified based on the unit's maneuver drive value. For example, a unit with a maneuver drive of 1 can start out from a standing start with a movement speed of 1 for the turn. The unit can move a maximum of one square at movement speed 1.

Each unit must specify a movement speed to be used for the turn. The movement speed represents the maximum number of squares the unit can move that turn; however, the unit may move any number of squares less than the maximum, or it may even remain stationary (25,000 km per square is a lot of space—in effect, the unit is circling in the square).

A unit may change speed each combat round by up to its maneuver drive value. Thus if a unit with a maneuver drive-6 is moving at speed 10, the next time it takes a turn, it may reduce its speed to as low as speed 4, or it may increase its speed to as high as speed 16 or any value in between. Or it may leave its speed unchanged at 10.

Sensor Tasks: Sensors must locate a unit and lock on to it before it can become a target. The unit's UCP lists the various sensor difficulty levels for the different types of sensors carried by the unit.

At any point in its movement, a unit may declare it is performing a sensor task on an enemy unit. Multiple sensor tasks take time; to reflect this, the sensing unit must forego the firing of one weapon battery for every sensor task performed (one sensor task costs nothing). If the craft has no weapon batteries, only two one-sensor tasks may be performed per turn.

Getting a good sensor lock on a target requires two sensor tasks: the target must first be located using a sensor scan task; upon a getting a successful scan, the sensors must be locked onto the target using a sensor pinpoint task.

1. Locating the Target: Locate the desired target with the following task:

To locate an enemy unit with sensors:

Difficult, Off = Computer Model Number; Def = Range (confrontation).

Referee: Use the most favorable sensor scan difficulty level from among the unit's UCP. Use the number of squares from the sensing unit to the target unit as a negative DM. Optionally, a character may use Sensor Op skill in place of the computer number.

Evaluate the results of this task as:

Extreme Failure: Scan failed.

Failure: Target located if Strong/Large

Success: Target located if it is Moderate/Medium or Strong/Large

Extreme Success: Target located.

2. Locking Sensors on the Target: Lock on the desired target with the following task:

To lock on to an enemy unit with sensors:

Difficulty, Off = computer model number; Def = range (confrontation, uncertain).

Referee: Use the most favorable sensor pinpoint difficulty level from among the unit's UCP. Use the number of squares from the sensing unit to the target unit as a negative DM. Optionally, a character may use Sensor Op skill in place of the computer number.

If the player's task fails, the sensor lock-on failed, but some benefit may still be gained, as follows:

Some truth: Give unit displacement, power, but incorrect type.

Total truth: Give unit displacement, power, and correct type.

Note: Some examples of type include: Express boat, Regal class battlecruiser, and so on.

Once a unit has been the subject of a successful sensor lock on, replace the generic marker (or flip it over, if the reverse side is different) to indicate that a successful sensor lock on exists. Any friendly unit may fire on a target located by a sensor lock on, even though the friendly unit itself did not actually perform the lock on task.

Each new combat round, as long as the unit does not move out of its square, the sensor lock on stays in effect. If the unit moves one or more squares, a new sensor scan and lock on task must be performed.

If the sensing unit uses active sensors for the scan and the enemy has any functioning sensors, the sensing unit must automatically reveal the sensing unit to the enemy as if the enemy had performed an exceptional success sensor scan on the unit using active sensors.

Fire Combat: The defender may fire at any enemy target unit (which has a sensor lock on) using any of the batteries on his unit. He may fire as many or as few batteries as he wants, at any combination of target units. He may even decline to fire at all.

1. Sequence of Fire: Fire against each target occurs in the following sequence:

- All batteries which will fire against that ship must be stated.
- A task is performed for each battery to determine if it scored a hit.
- For each battery that achieved a hit, a task is performed to determine if the hit penetrated the defensive fire of the target. Each battery fired by the target ship as defense may not be fired again when he takes his turn.
- A task is performed to determine for each passive defenses of the target ship that must be penetrated.
- If the battery has hit and then penetrated all defenses, then the damage inflicted is determined and applied.

2. Defensive Weapons: Defensive weapons (sandcasters, repulsors, and beam weapons used as missile defense, or proton beams against antimatter missiles) must be allocated against the hits of specific batteries.

If a unit has eight laser batteries and has been "hit" four

times by enemy missiles, the player may allocate two laser batteries against each missile battery hit, all eight lasers against one of the missile battery hits, or any other combination.

Passive defenses (nuclear dampers, meson screens, and configuration) resist each battery that hits.

3. Determining Range: Range is determined by tracing the shortest path of squares between the firing unit and the target. Count the number of squares and compare the result to the range table to determine the range used to resolve the fire.

4. Weapon Fire Tasks: When firing, a unit must do these tasks:

To hit a target in starship combat:

Difficult, Off = computer model size, Weapon Table DM, range DM; Def = def DM (confrontation).

Referee: The Weapon Table DM is from a weapon table.

The range DM is as follows:

Laser Weapons: -1 if target beyond planetary range (worse attack)

Missiles: +1 if target beyond planetary range (better attack)

Meson Weapons: -2 if target beyond planetary range (worse attack)

Fusion Weapons: Cannot fire at targets beyond planetary range

Plasma Weapons: Cannot fire at targets beyond planetary range

Tractors: Cannot be directed at targets beyond planetary range.

The def DM comes from the Def: section of the target's UCP.

To penetrate a defense in starship combat:

Difficult, Off = computer model size; Def = computer model size, Defense table DM (confrontation).

Referee: The defense table DM comes from a weapon defense table. Energy weapons provide an Off DM of +2.

5. Additional Direct Fire Notes:

● *Line of Sight:* Attacks on targets require a clear line of sight. Such a line of sight is a straight line from the center of the attacker's square to the center of the target's square. The line of sight may not pass through any obstruction.

Line of sight is usually not even a consideration in open space; however, the presence of a star, planet, moon, or even a large asteroid on the playing surface can block a line of sight.

● *Pinpoint Location:* When at visual range, a unit can specify that a pinpoint location on a target in an effort to hit a location. If an exceptional success hit is achieved, allow the attacker to select the hit location: reroll on the hit location table until the desired location comes up. If exceptional success +2 is achieved, the location is hit with a critical hit. Otherwise, the shot failed to hit the location, and is resolved as normal.

DAMAGE

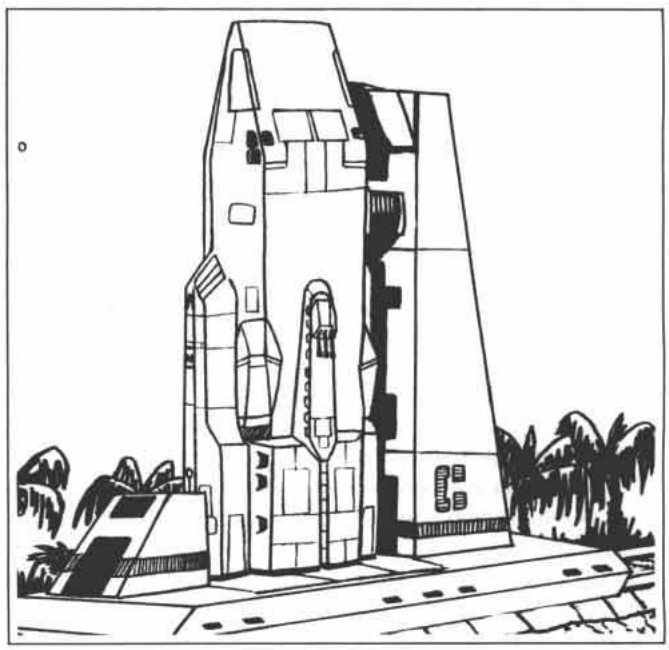
Weapons which penetrate inflict damage. Each battery is allowed one roll on one or more damage tables, depending on weapon type. This roll may be modified by various factors.

Spinal Mounts: Spinal mounts weapons that penetrate inflict one extra damage roll (on each appropriate table) for each letter by which their UCP code exceeds 9. A particle accelerator with a code of A gets 2 rolls on both the surface explosion and radiation tables; a factor of B receives 3 rolls, etc. The number of extra rolls is reduced by one for every 3 levels of armor the target ship has beyond factor 40 (but a weapon always gets one roll). Meson guns are not reduced by armor.

Critical Hits: Find the unit's displacement in the following table. All batteries whose weapon UCP code exceeds the UCP code shown in the second column will inflict (if they hit and penetrate the defenses) one automatic critical hit per weapon UCP code value over the value shown. If a missile battery of factor 9 hits a displacement 400 ship, it will (in addition to any other damage) inflict 5 critical hits. These critical hits are reduced in number by one for every 3 levels of armor the target ship has over 40. Meson gun hits are not reduced by armor.

CRITICAL HIT DISTRIBUTION

Unit Displacement	*1 Critical Hit per Wpn UCP over*	*Unit Disp*	*1 Critical Hit per Wpn UCP over*
below 99	0+	7000	G+
100	1+	8000	H+
200	2+	9000	J+
300	3+	10,000	K+
400	4+	20,000	L+
500	5+	30,000	M+
600	6+	40,000	N+
700	7+	50,000	P+
800	8+	75,000	Q+
900	9+	100,000	R+
1000	A+	200,000	S+
2000	B+	300,000	T+
3000	C+	400,000	U+
4000	D+	500,000	V+
5000	E+	700,000	W+
6000	F+	900,000	X+



In addition to rolled damage, each critical hit reduces a target's armor factor by one. A ship's armor factor may not be reduced to less than zero.

CRITICAL HIT TABLE

(2D)	*Critical Hit Result*
2	Ship vaporized.
3	Bridge destroyed.
4	Computer destroyed.
5	Maneuver drive disabled.
6	One screen disabled.
7	Jump drive disabled.
8	Sensors destroyed.
9	Power plant disabled.
10	Crew-1.
11	Spinal Mount/Fire control out.
12	Frozen Watch/Ship's troops dead.

DMS FOR SHIP DAMAGE TABLES

- For every 3 armor levels over 40 (defending ship) apply a -1 DM against all weapons on the surface explosions table and all but meson guns on the radiation damage tables.
- If the weapon inflicting the hit has a UCP factor of 9 or less, apply a DM of -6.
- If the weapon inflicting the hit was a nuclear missile, apply a DM of +6 on surface explosion damage.
- If the weapon inflicting the hit was a pulse laser, apply a DM of +2.
- Rolls resulting from other rolls (for example, interior explosion caused by surface explosion) are unmodified.

EXPLANATION OF DAMAGE RESULTS

If an indicated damage location on a ship does not exist, the damage is ignored.

Bridge Destroyed: The ship may not maneuver or jump. It fires and is fired upon as if its computer were half its actual factor (rounding down). If the ship has an auxiliary bridge then command may be transferred to it, negating all penalties.

Computer-n: The UCP computer factor is reduced by n. If this result is rolled on the radiation damage table and the computer has a fibre-optic backup, it is ignored.

Computer Destroyed: The UCP computer factor is reduced to zero; the ship may not jump, or launch subordinate craft through launch tubes, although it may continue to fire weapons and maneuver.

Crew-n: One crew section is destroyed. Upon reduction of the crew to below 50% of its initial level, the ship may no longer fire its weapons or attempt repair, although it may use its passive defenses, maneuver, or jump. This result does not affect the frozen watch or ship's troops.

Critical: Roll again on the critical hit table. Reduce the ship's UCP armor factor by one for each critical hit received.

Frozen Watch/Ship's Troops Dead: On a die roll of 1-3, all personnel in low berths or the frozen watch are dead; on a roll of 4-6, all ship's troops (including marines and security troops) are dead.

Fuel-n: Current fuel is reduced by n% of total fuel capacity (at least 10 tons).

Fuel Tanks Shattered: all fuel on the ship is lost and the ship may not be refuelled. No ship systems requiring energy points may operate.

Interior Explosion: Roll again on the interior explosion table.

Jump-n: The UCP jump factor is reduced by the indicated amount.

Jump Drive Disabled: The UCP jump factor is reduced to zero.

Maneuver-n: The UCP maneuver factor is reduced by the indicated amount.

Maneuver Drive Disabled: The UCP maneuver factor is reduced to zero. The unit must continue moving with its last course and heading unchanged.

One Screen Disabled: One screen (nuclear damper, meson screen, or black globe) of the firing player's choice has its UCP factor reduced to zero.

Power-n: The UCP power plant factor is reduced by the indicated amount.

Power Plant Disabled: The UCP power plant factor is reduced to zero.

Screen-n: The UCP factor for one screen (nuclear damper, meson screen, or black globe) selected by the firing player is reduced by the indicated amount. Damage must be divided as evenly as possible: no screen may receive two hits until all other screens have at least one, or three hits until all others have at least two.

Sensors-n: The indicated n number of sensors have been destroyed, selected by the firing player.

Sensors Destroyed: All ship sensors have been destroyed. The ship may no longer fire any weapons.

Ship Vaporized: The ship is utterly destroyed.

Spinal Mount/Fire Control Out: On a die roll of 1-3, the UCP spinal mount factor is reduced to zero; on a roll of 4-6, fire control is out, and no weapons except the spinal mount may fire.

Weapon-n: Each hit destroys one battery of weapons, either offensive (laser, energy weapon, meson gun, particle accelerator, or missile) or defensive (sandcasters, or repulsors). If the ship has only one battery of a type (including spinal mounts), a hit reduces its UCP factor by the indicated amount. As with screens, the firing player chooses which weapons are affected, but damage must be divided as evenly as possible.

SPECIAL RULES

Emergency Agility: Because of the importance of agility, it is possible for a ship to elect not to use energy-consuming weapons in a combat round and instead divert energy to its maneuver drives. In such a case, an emergency agility rating equal to the ship's maneuver drive may be used. As always, Pilot skill may be substituted for emergency agility if desired.

Visible Range: At visible range, several special considerations come into play. Because minimal sensor aid is needed at this range, a unit is automatically considered to have a sensor lock on if any friendly unit is at visual range to it.

Spinal mount weapons cannot be used at this range. Spinal mount weapons require moving the entire mass of the ship in order to aim—which is virtually impossible when the target is this close.

If a target at this range is hit with nuclear or antimatter missiles, the firing unit also takes radiation hits.

Aiming Spinal Mounts: Because a spinal mount must be

aimed by moving the entire ship's mass, agility is a good measure of the unit's ability to aim its spinal mount. Optionally, roll the following task to aim a spinal mount before attempting to fire it:

To aim a spinal mount weapon:
Routine, Agility.
Referee: Pilot skill may be used in place of Agility on this task.

Gunnery Skill: Gunnery skill (turret/bay, spinal, or screens) may be used in place of the computer DM or weapon table DM on the to hit and defensive tasks.

Powering Down: A ship may be deliberately powered down to reduce its apparent power plant size to sensors. This dangerous tactic (called the Diskhili maneuver in honor of the Solomani commander Diskhili who used it with great success during the Solomani/Vilani interstellar wars) runs the risk that the power plant may not be restarted as fast as it needs to be. See the chapter on *Travelling* for detailed tasks on starting a starship power plant.

Fighter Squadrons: Shipboard fighters are almost always organized into squadrons of 8 to 10 fighters. Because of this, a squadron may be organized into a single "unit" with multiple batteries. Not all of the craft need to be of the same design, but they all must have the same agility.

Tractors: Tech Level 16 tractors only work at near range; Tech Level 17 and beyond tractors also function at far range. Each UCP unit of tractor can seize up to 10,000 tons of weight (not displacement), and it can affect a target's agility according to the following formula:

Tractor Pull ÷ Target Weight = Agility Loss

Multiple tractors can be used in conjunction to increase the tractor pull. Tractors can also be used as an equivalent UCP factor of repulsor. Reversed Tractors or repulsors can also be used to cut tractor pull.

The Black Globe: Since a black globe absorbs all energy, a ship with its field on is protected from all fire. Unfortunately, the force field works in both directions; the ship may not fire, maneuver, or even see out. These limitations would make the black globe of little value in battle if not for the ability of the field generator to flicker—switch the field on and off many times per second—giving the ship part-time protection while still allowing it to fire, maneuver, and track enemy ships during the "off" intervals.

A black globe screen's factor is its maximum rate of flicker; a screen may be on up to 10 percent of the time times its factor. For instance, a screen with a factor of 2 may flicker at a maximum rate of 20 percent; it is on 20 percent of the time in every second. A the beginning of his turn, a player decides the flicker rate of each unit's black globe (if any), which may range from its maximum rate down to zero (off).

Each 10 percent of flicker acts as 6 levels of armor over the base of 40, which protects the owning ship and any enemy ship it fires at. For instance, if a ship has a black globe with a factor of 4 operating at the maximum of 40 percent flicker rate, all damage rolls against the ship will receive a DM of +8, and all damage rolls it inflicts on enemy ships will also have a +8 DM. Unlike normal armor, a black globe also affects meson guns.

Energy striking a black globe screen is diverted to the ship's energy sink. Each kiloliter of energy sink will hold 650 "megawatts" of raw, low level energy. When the screen is flickering, a percentage of the incoming energy equal to the flicker rate is absorbed. In order to strike the black globe, the weapon must first hit and penetrate all defenses.

The amount of energy a weapon transfers depends on its type and factor. Turret and bay weapons inflict 250 megawatts times their UCP factor. Non-nuclear missiles inflict 500 megawatts times their factor; nuclear missiles inflict 25,000 megawatts times their factor; meson guns inflict 5000 megawatts times their factor.

Spinal mount weapons inflict their full megawatt requirements. For example, a particle accelerator with a factor of 8 would inflict 10,000 megawatts each time it hits and penetrates. If the target ship's black globe is operating at a flicker rate of 10 percent, the ship's capacitors would absorb 1000 megawatts.

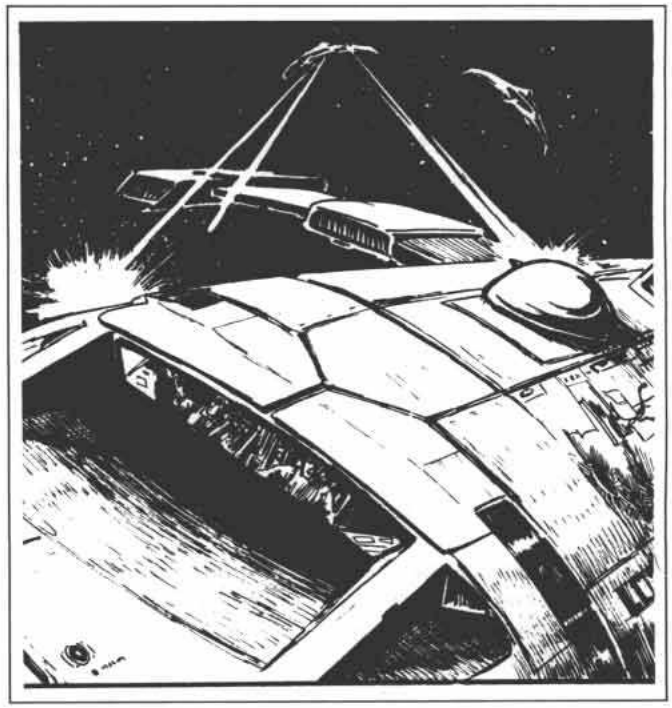
If a black globe absorbs energy and the ship's energy sinks are already full, the ship is destroyed. A ship without additional energy sinks installed has energy sinks (for the jump drive) equal to:

Volume of the Ship in Kiloliters x Jump Number x 0.005.

Stored energy may be removed from the energy sink by using it to power the ship. Energy may only leave the ship, however, when the black globe is off (or during the off intervals of its flicker).

During a turn, a ship may dispose of its energy from its energy sinks equal to the number of megawatts generated by its power plant, minus 10 percent for every 10 percent of flicker rate of the black globe screen. For example, if a ship's black globe screen is operating at 60 percent and its power plant has an output of 250,000 Mw, then 100,000 Mw may be removed from the ship's energy sinks on that turn.

The screen also affects a ship's ability to maneuver. A ship's



agility is reduced by 10 percent (round fractions to the nearest whole number) for each 10 percent of flicker rate of its black globe.

Instead of flickering, any black globe may be turned completely on. No enemy fire will affect it, but the ship may not fire or change direction—the ship continues to move with the same heading and speed it had at the time the black globe was turned completely on.

While the black globe is on, all enemy fire automatically hits the screen, and 100 percent of its energy is absorbed. No energy may be removed from the ship's energy sink while the screen is on. All fire also automatically hits (although it may not penetrate the ship's defenses) in the first turn after the black globe is turned off.

If a ship absorbs enough energy to make a jump and is supplied with sufficient fuel, it may jump at the end of the turn.

Invisibility: Since a black globe field absorbs all energy, a ship with its field completely on is, at any range over a few kilometers, effectively invisible. In battle this will have no effect since a ship that suddenly disappears from enemy sensors in this way will have its course predicted on the basis of its last known position; since the ship cannot maneuver while in the field, the prediction will always be correct.

However, the advantages to a fleet which has not yet been detected by the enemy are immense. Suppose, for instance, that a fleet were to jump into a system with its black globes on and its velocity set upon a predetermined course. It could drift unseen past any defending fleet and drop its screens at a preplanned moment to bombard a planet or to engage enemy fleets by surprise.

Further tactical possibilities are left to the imaginations of the referee and players.

Boarding: Disabled enemy ships may be captured by boarding. In order for boarding to take place, two conditions must be satisfied.

First, the ship to be boarded must be disabled; it must be incapable of maneuvering, all of its offensive weapons must be disabled, and it must not have a working black globe generator.

Second, the ship which has been disabled must be separated by at least one square from any friendly ships which are engaged in protecting the disabled ship from any possible boarding or harm.

At any time thereafter, the disabled ship may be boarded by a boarding party from another ship. Any ship which is capable of maneuver may attempt to board the disabled ship. A ship wishing to engage in an attempt at boarding may initiate the boarding procedure by moving adjacent to the ship to be boarded. A boarding party consists of the ship's troops. If the boarding ship has no marines, it will have security troops (consisting of one-third of the ship's service crew station); only marines and troops may board a disabled ship. The entire remaining crew of the disabled ship may fight to defend that vessel.

Boarding actions may be resolved by the boarding party through the use of the deck plans, as well as through the use of the personal combat rules.

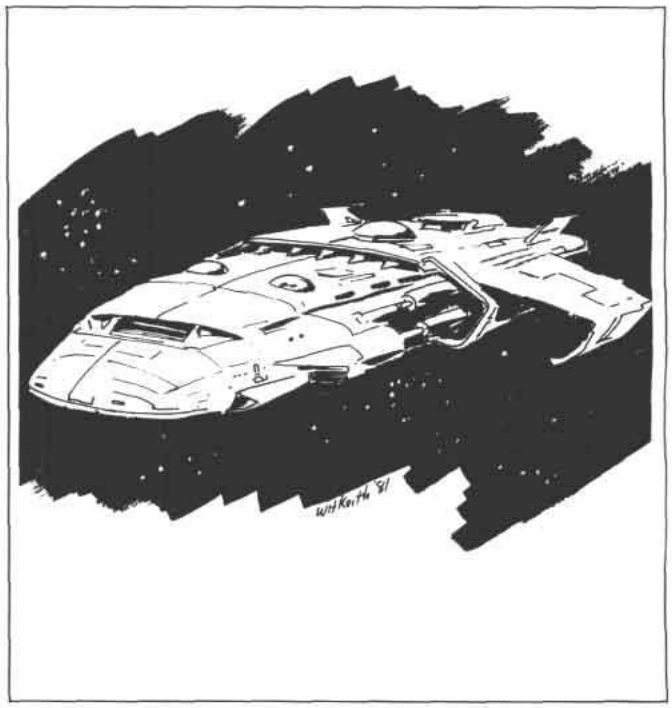
Frozen Watch: A ship's frozen watch is a reserve pool which can be used to replace any crew casualties resulting from ship combat. If a ship has a frozen watch, it may be revived and then used to replace one or more crew sections which were lost in combat.

Damage Control and Repair: It is possible for a ship to undertake emergency repairs, if necessary, during a battle. The damaged ship must be out of range of all enemy ships before the emergency repairs can begin. In addition, its crew must be intact (which means its crew factor is at full value). The crew may attempt to repair one ship system for each 10,000 tons of ship or fraction thereof. Attempts may be made to repair weapons (both offensive and defensive weapons which may have been damaged), screens, drives and power plants, and computers.

A repair attempt takes one combat round and is generally considered to be a difficult task. A successful repair attempt negates the effect of one hit; in most cases, this negation means that the repaired system regains one lost factor; weapons batteries that were knocked out with one hit are restored to full function. The crew may not attempt to repair the same system more than once in a turn (although different batteries of the same weapon type may be repaired). The effects of critical hits may not be repaired. The referee should keep in mind that these emergency repairs made by the crew of a ship are jury-rigged and may not survive long under hard usage.

After the battle has reached a resolution, any ships which have been damaged in the battle may be repaired at shipyards. Jump drives may be repaired at class A starports; any other ship systems may be repaired at class A or B starports. In any situation, repairs to a damaged ship following a battle must be conducted at shipyards of the required Tech Level (although it is an option of the referee to make exceptions to this rule).

Systems which have been repaired during the battle must still be repaired in a shipyard to function properly in the long run.



Starship Combat Tasks

To hit a target in starship combat:
Difficult, Off = computer size, weapon table DM, range DM; Def = def DM (confrontation)
Referee: The range DM is

Laser Weapons:	−1 if target is beyond planetary range (worse attack).
Missiles:	+1 if target is beyond planetary range (better attack).
Meson Weapons:	−1 if target is beyond planetary range (worse attack).
Fusion Weapons:	Cannot fire at targets beyond planetary range.
Plasma Weapons:	Cannot fire at targets beyond planetary range.
Tractors:	Cannot be directed at targets beyond planetary range.

Weapon Table DM is found in the appropriate weapon table.
Def DM (computed as part of UCP) equals Computer Size + Agility + Target Size DM.

To penetrate a defense in starship combat:
Difficult, Off = computer size; Def = computer size, defense table DM (confrontation)
Referee: Energy weapons provide an additional Off DM +2.

TARGET SIZE DMS

Tonnage	*DM*
under 100	+2
under 1000	+1
under 10,000	+0
10,000 or more	−1
100,000 or more	−2

RANGE BANDS

Visual:	50 km or less (very distant and less).
Near:	50 to 50,000 km (regional, continental, and planetary).
Far:	50,000 to 500,000 km (far orbit).
Extreme:	500,000 km to 5,000,000 km (extreme orbit).

1 Disintegrators

Attacking Disintegrator Factor

	1	2	3	4	5	6	7	8	9	A	C	D	E	F
To Hit:	3	3	3	4	4	4	5	5	6	6	6	7	7	8

To Pen: Nuclear Damper

1	-5	-4	-4	-3	-3	-2	-2	-1	-1	2	2	3	3	4
2	-5	-5	-4	-4	-3	-3	-2	-2	-1	1	2	2	3	3
3	-6	-5	-5	-4	-4	-3	-3	-2	-2	1	1	2	2	3
4	-6	-6	-5	-5	-4	-4	-3	-3	-2	0	1	1	2	2
5	-7	-6	-6	-5	-5	-4	-4	-3	-3	0	0	1	1	2
6	-7	-7	-6	-6	-5	-5	-4	-4	-3	-1	0	0	1	1
7	-8	-7	-7	-6	-6	-5	-5	-4	-4	-1	-1	0	0	1
8	-8	-8	-7	-7	-6	-6	-5	-5	-4	-2	-1	-1	0	0
9	-9	-8	-8	-7	-7	-6	-6	-5	-5	-2	-2	-1	-1	0
A	-9	-9	-8	-8	-7	-7	-6	-6	-5	-3	-2	-2	-1	-1
B	-10	-9	-9	-8	-8	-7	-7	-6	-6	-3	-3	-2	-2	-1
C	-10	-10	-9	-9	-8	-8	-7	-7	-6	-4	-3	-3	-2	-2
D	-11	-10	-10	-9	-9	-8	-8	-7	-7	-4	-4	-3	-3	-2
E	-11	-11	-10	-10	-9	-9	-8	-8	-7	-5	-4	-4	-3	-3
F	-12	-11	-11	-10	-10	-9	-9	-8	-8	-5	-5	-4	-4	-3

2 Jump Projectors

Attacking Jump Projector

	A	B
To Hit:	7	7

To Pen: Jump Damper

1	2	2
2	1	2

3 Tractors

Attacking Tractor Factor

	1	2	3	4	5	6	7	8	9
To Hit:	5	5	6	6	7	7	8	8	9

To Pen: Repulsor

1	3	2	1	0	-1	-2	-3	-4	-5
2	4	3	2	1	0	-1	-2	-3	-4
3	5	4	3	2	1	0	-1	-2	-3
4	6	5	4	3	2	1	0	-1	-2
5	7	6	5	4	3	2	1	0	-1
6	8	7	6	5	4	3	2	1	0
7	9	8	7	6	5	4	3	2	1
8	10	9	8	7	6	5	4	3	2
9	11	10	9	8	7	6	5	4	3
A	11	11	10	9	8	7	6	5	4
B	11	11	11	10	9	8	7	6	5
C	11	11	11	11	10	9	8	7	6
D	11	11	11	11	11	10	9	8	7
E	11	11	11	11	11	11	10	9	8
F	11	11	11	11	11	11	11	10	9

4 Beams

Attacking Beam Factor

	1	2	3	4	5	6	7	8	9	A	B	C
To Hit:	10	9	8	7	6	5	4	3	2	11	11	11

To Pen: Sand

1	5	6	7	8	9	10	11	11	11	11	11	11
2	4	5	6	7	8	9	10	11	11	11	11	11
3	3	4	5	6	7	8	9	10	11	11	11	11
4	2	3	4	5	6	7	8	9	10	11	11	11
5	1	2	3	4	5	6	7	8	9	10	11	11
6	0	1	2	3	4	5	6	7	8	9	10	11
7	-1	0	1	2	3	4	5	6	7	8	9	10
8	-2	-1	0	1	2	3	4	5	6	7	8	9
9	-3	-2	-1	0	1	2	3	4	5	6	7	8
A	-4	-3	-2	-1	0	1	2	3	4	5	6	7

5 Meson Guns

Attacking Meson Gun Factor

	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S	T	U	V	W	X	Y	Z
To Hit:	4	4	5	6	6	6	7	7	7	8	8	8	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9	10	10	10	10	10	10

To Pen: Meson Screen

1	-5	-4	-4	-3	-3	-2	-2	-1	-1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	13
2	-5	-5	-4	-4	-3	-3	-2	-2	-1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	13	
3	-6	-5	-5	-4	-4	-3	-3	-2	-2	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	12	
4	-6	-6	-5	-5	-4	-4	-3	-3	-2	0	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	12	
5	-7	-6	-6	-5	-5	-4	-4	-3	-3	0	0	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	11	
6	-7	-7	-6	-6	-5	-5	-4	-4	-3	-1	0	0	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	11	
7	-8	-7	-7	-6	-6	-5	-5	-4	-4	-1	-1	0	0	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10	
8	-8	-8	-7	-7	-6	-6	-5	-5	-4	-2	-1	-1	0	0	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	
9	-9	-8	-8	-7	-7	-6	-6	-5	-5	-2	-2	-1	-1	0	0	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	
A	-9	-9	-8	-8	-7	-7	-6	-6	-5	-3	-2	-2	-1	-1	0	0	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	
B	-10	-9	-9	-8	-8	-7	-7	-6	-6	-3	-3	-2	-2	-1	-1	0	0	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	
C	-10	-10	-9	-9	-8	-8	-7	-7	-6	-4	-3	-3	-2	-2	-1	-1	0	0	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	
D	-11	-10	-10	-9	-9	-8	-8	-7	-7	-4	-4	-3	-3	-2	-2	-1	-1	0	0	1	1	2	2	3	3	4	4	5	5	6	6	7	7	
E	-11	-11	-10	-10	-9	-9	-8	-8	-7	-5	-4	-4	-3	-3	-2	-2	-1	-1	0	0	1	1	2	2	3	3	4	4	5	5	6	6	7	
F	-12	-11	-11	-10	-10	-9	-9	-8	-8	-5	-5	-4	-4	-3	-3	-2	-2	-1	-1	0	0	1	1	2	2	3	3	4	4	5	5	6	6	

To Pen: Configuration

0	-3	-3	-2	-2	-2	-1	-1	-1	0	1	1	2	2	2	3	3	3	4	4	4	5	5	5	6	6	6	7	7	7	8	8	8	9
1	-1	-1	-1	0	0	0	1	1	1	3	3	3	4	4	4	5	5	5	6	6	6	7	7	7	8	8	8	9	9	9	10	10	10	
2	0	0	1	1	1	2	2	2	3	4	4	5	5	5	6	6	6	7	7	7	8	8	8	9	9	9	10	10	10	11	11	11	11	
3	1	2	2	2	3	3	3	4	4	5	6	6	6	7	7	7	8	8	8	9	9	9	10	10	10	11	11	11	11	11	11	11	11	
4	4	4	5	5	5	6	6	6	7	8	8	9	9	9	10	10	10	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	
5	5	6	6	6	7	7	7	8	8	9	10	10	10	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	
6	3	3	3	4	4	4	5	5	5	6	6	6	7	7	7	8	8	9	10	10	10	11	11	11	11	11	11	11	11	11	11	11	11	
7	-4	-4	-3	-3	-3	-2	-2	-2	-1	0	0	1	1	1	2	2	2	3	3	3	4	4	4	5	5	5	6	6	6	7	7	7	8	
8	7	7	7	8	8	8	9	9	9	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11	
9	-3	-2	-2	-2	-1	-1	-1	0	0	1	2	2	2	3	3	3	4	4	4	5	5	5	6	6	6	7	7	7	8	8	8	9	9	

6 Missiles

Attacking Missile Factor

	1	2	3	4	5	6	7	8	9	A	B	C
To Hit:	4	4	5	5	6	6	7	7	8	8	9	9

To Pen: Disintegrator, Sand, or Beam

1	6	7	8	9	10	11	11	11	11	11	11	11
2	5	6	7	8	9	10	11	11	11	11	11	11
3	4	5	6	7	8	9	10	11	11	11	11	11
4	3	4	5	6	7	8	9	10	11	11	11	11
5	2	3	4	5	6	7	8	9	10	11	11	11
6	1	2	3	4	5	6	7	8	9	10	11	11
7	0	1	2	3	4	5	6	7	8	9	10	11
8	-1	0	1	2	3	4	5	6	7	8	9	10
9	-2	-1	0	1	2	3	4	5	6	7	8	9
A	-3	-2	-1	0	1	2	3	4	5	6	7	8

To Pen: Repulsor

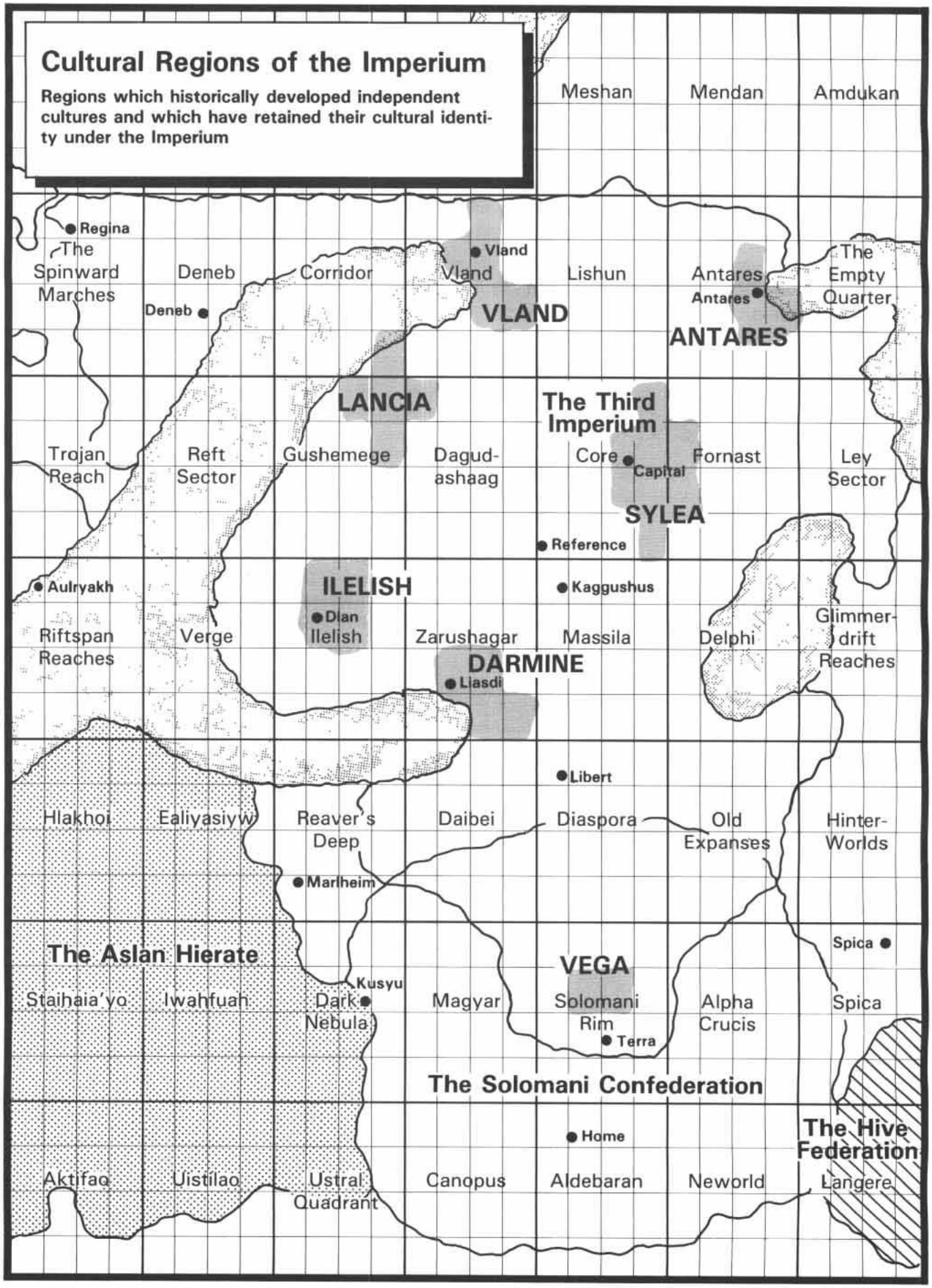
1	-4	-3	-2	-1	0	1	2	3	4	5	6	7
2	-5	-4	-3	-2	-1	0	1	2	3	4	5	6
3	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5
4	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4
5	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3
6	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2
7	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1
8	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0
9	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1
A	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2
B	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3
C	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4
D	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6	-5
E	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7	-6
F	-18	-17	-16	-15	-14	-13	-12	-11	-10	-9	-8	-7

To Pen: Nuclear Damper or Proton Screen

1	1	2	3	4	5	6	7	8	9	10	11	11
2	0	1	2	3	4	5	6	7	8	9	10	11
3	-1	0	1	2	3	4	5	6	7	8	9	10
4	-2	-1	0	1	2	3	4	5	6	7	8	9
5	-3	-2	-1	0	1	2	3	4	5	6	7	8
6	-4	-3	-2	-1	0	1	2	3	4	5	6	7
7	-5	-4	-3	-2	-1	0	1	2	3	4	5	6
8	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5
9	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4
A	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3
B	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2
C	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1
D	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	0
E	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1
F	-13	-12	-11	-10	-9	-8	-7	-6	-5	-4	-3	-2

STARSHIP DAMAGE TABLES

Die	*Surface Explosion Damage Table*	*Radiation Damage Table*	*Interior Explosion Damage Table*
2	No Effect	No Effect	No Effect
3	Weapon -1	Weapon -1	Power Plant -1
4	Weapon -1	Weapon -1	Jump -1
5	Fuel -1	Weapon -1	Screens -1
6	Weapon -1	Weapon -1	Sensor -1
7	Weapon -1	Weapon -2	Power Plant -1
8	Fuel -1	Sensor -1	Jump -1
9	Weapon -1	Computer -1	Screens -1
10	Weapon -1	Weapon -2	Computer -1
11	Fuel -1	Sensor -2	Power Plant -1
12	Maneuver -1	Computer -2	Sensors -2
13	Weapon -2	Weapon -4	Computer -1
14	Fuel -2	Sensor -2	Crew -1
15	Maneuver -1	Computer -1	Power Plant -2
16	Weapon -3	Computer -2	Jump -2
17	Fuel -3	Crew -1	Screens -3
18	Maneuver -2	Computer -3	Sensors -3
19	Interior Explosion	Crew -1	Fuel Tanks Shattered
20	Interior Explosion	Computer -4	Critical
21	Interior Explosion	Crew -2	Critical
22	Critical	Critical	Critical
	Use this column for:	*Use this column for:*	*Use this column for:*
	Fusion, Plasma, Laser, Missiles, Particle Accelerator, and Disintegrator.	Particle Accelerator, Nuclear and Antimatter Missiles, and Meson Guns.	Meson Guns and Disintegrators.


Cultural Regions of the Imperium
Regions which historically developed independent cultures and which have retained their cultural identity under the Imperium
Meshan
Mendan
Amdukan
Regina
The Spinward Marches
Deneb
Corridor
Vland
Vland
Lishun
Antares
Antares
The Empty Quarter
VLAND
ANTARES
LANCIA
The Third Imperium
Trojan Reach
Reft Sector
Gushemege
Dagud-ashaag
Core
Capital
Fornast
Ley Sector
SYLEA
Reference
Aulryakh
ILELISH
Kaggushus
Dlan Ilelish
Riftspan Reaches
Verge
Zarushagar
Massila
Delphi
Glimmer-drift Reaches
DARMINE
Liasdi
Libert
Hlakhoi
Ealiyasiyw
Reaver's Deep
Daibei
Diaspora
Old Expanses
Hinter-Worlds
Marlheim
The Aslan Hierate
Spica
VEGA
Kusyu
Staihaia'yo
Iwahfuah
Dark Nebula
Magyar
Solomani Rim
Alpha Crucis
Spica
Terra
The Solomani Confederation
Home
The Hive Federation
Aktifao
Uistilao
Ustral Quadrant
Canopus
Aldebaran
Neworld
Langere

DEMOLITION TABLES

CONVENTIONAL EXPLOSIVES PENETRATION AND DAMAGE

Armor	Penetration					Breach				
Value	TL 5	TL 7	TL 9	TL 11	TL 13	TL 5	TL 7	TL 9	TL 11	TL 13
1	1	1	1	1	1	250	167	125	100	83
2	1	1	1	1	1	255	170	128	102	85
3	1	1	1	1	1	260	173	130	104	87
4	1	1	1	1	1	265	177	133	106	88
5	1	1	1	1	1	270	180	135	108	90
6	1	1	1	1	1	276	184	138	110	92
7	1	1	1	1	1	282	188	141	113	94
8	1	1	1	1	1	288	192	144	115	96
9	1	1	1	1	1	294	196	147	118	98
10	1	1	1	1	1	300	200	150	120	100
15	1	1	1	1	1	330	220	165	132	110
20	1	1	1	1	1	365	243	183	146	122
25	1	1	1	1	1	401	267	201	160	134
30	1	1	1	1	1	454	303	227	182	151
40	12	8	6	5	4	730	487	365	292	243
50	150	100	75	60	50	1.8 tn	1.2 tn	888	710	592
60	2.0 tn	1.3 tn	1.0 tn	800	667	16.4 tn	10.9 tn	8.2 tn	6.6 t	5.5 tn
70	27.5 tn	18.3 tn	13.8 tn	11.0 tn	9.2 tn	81.9 tn	54.5 tn	40.9 tn	32.8 tn	27.3 tn
80	375 tn	250 tn	190 tn	150 tn	125 tn	625 tn	415 tn	310 tn	250 tn	210 tn
90	5.0 ktn	3.3 ktn	2.5 ktn	2.0 ktn	1.7 ktn	7.5 ktn	5.0 ktn	3.8 ktn	3.0 ktn	2.5 ktn
100	82 ktn	55 ktn	41 ktn	33 ktn	27 ktn	1 Mtn	67 ktn	50 ktn	40 ktn	33 ktn

SHAPED EXPLOSIVES PENETRATION AND DAMAGE

Armor	Penetration				Breach			
Value	TL 7	TL 9	TL 11	TL 13	TL 7	TL 9	TL 11	TL 13
1	1	1	1	1	18	14	11	9
2	1	1	1	1	18	14	11	9
3	1	1	1	1	18	14	11	9
4	1	1	1	1	19	14	11	9
5	1	1	1	1	19	14	11	9
6	1	1	1	1	19	14	11	9
7	1	1	1	1	19	14	11	10
8	1	1	1	1	19	14	11	10
9	1	1	1	1	19	15	12	10
10	1	1	1	1	19	15	12	10
15	1	1	1	1	20	15	12	10
20	1	1	1	1	21	16	13	11
30	1	1	1	1	24	18	14	12
40	2	2	1	1	30	23	18	15
50	10	8	6	5	54	41	32	27
60	58	44	35	29	143	108	86	72
70	317	238	190	158	517	388	310	258
80	4.1 tn	3.1 tn	2.4 tn	2.0 tn	4.9 tn	3.7 tn	3.0 tn	2.5 tn
90	12.2 tn	9.1 tn	7.3 tn	6.1 tn	15.2 tn	11.4 tn	9.1 tn	7.6 tn
100	72.6 tn	54.5 tn	43.6 tn	36.3 tn	85.7 tn	64.3 tn	51.4 tn	42.9 tn
110	330 tn	250 tn	200 tn	165 tn	480 tn	360 tn	290 tn	240 tn

TDX PENETRATION AND DAMAGE

Armor	Penetration			Breach		
Value	TL 9	TL 11	TL 13	TL 9	TL 11	TL 13
1	1	1	1	55	37	22
2	1	1	1	55	37	22
3	1	1	1	55	37	22
4	1	1	1	56	37	22
5	1	1	1	56	37	22
6	1	1	1	56	37	22
7	1	1	1	57	38	23
8	1	1	1	57	38	23
9	1	1	1	58	39	23
10	1	1	1	58	39	23
15	1	1	1	61	41	24
20	1	1	1	63	42	25
30	1	1	1	71	47	28
40	6	4	2	90	60	36
50	30	20	12	162	108	65
60	175	117	70	430	287	172
70	950	633	380	1.6 tn	1.0 tn	620
80	12.2 tn	8.1 tn	4.9 tn	14.8 tn	9.9 tn	5.9 tn
90	36.6 tn	24.3 tn	14.6 tn	45.6 tn	30.4 tn	18.2 tn
100	215 tn	145 tn	87.2 tn	260 tn	170 tn	100 tn
110	1.0 ktn	670 tn	400 tn	1.4 ktn	960 tn	575 tn

The listed number indicates how many kilograms of explosive is required to do the indicated task.

Penetration: Does 15 points of damage (for TDX, this is perpendicular to the plane of gravity), and penetrates the indicated armor value enough to break its sealed environment integrity.

Breach: Does 250 points of damage (for TDX, this is perpendicular to the plane of gravity), penetrates the indicated armor value, and leaves a hole one meter in diameter in the armor.

Abbreviations: The following abbreviations are used for explosive quantity.

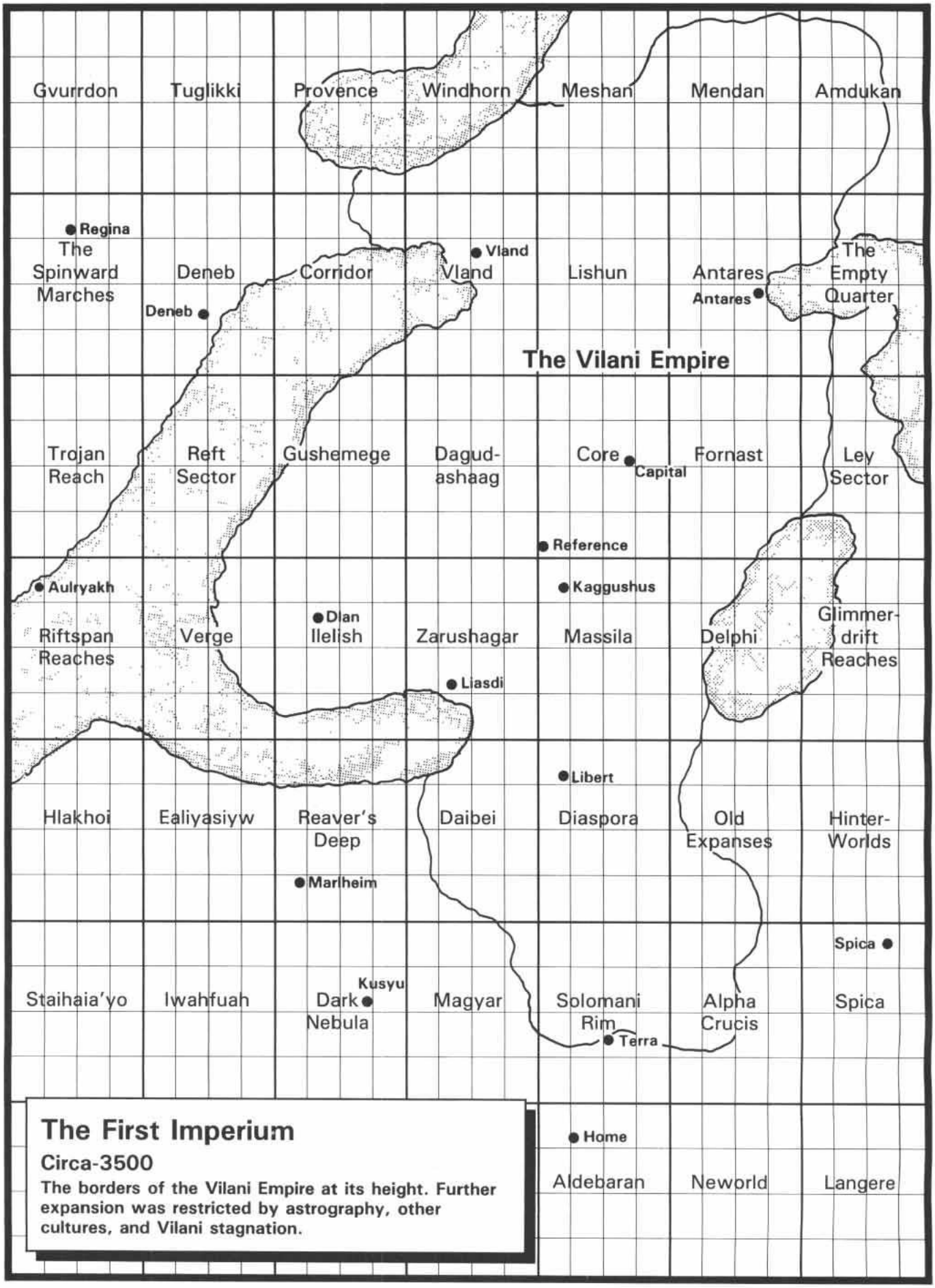
tn = ton (1000 kg).
ktn = kiloton (1000 tons).
Mtn = Megaton (1,000,000 tons).

Prices: Established base prices for explosives are:

Conventional: Cr5 per kilogram. Conventional explosives are available beginning at Tech Level 5.

Shaped Charge: Cr10 per kilogram. Shaped charge explosives are available beginning at Tech Level 7.

TDX: Cr150 per kilogram. TDX gravity polarized explosives are available beginning at Tech Level 9.



The First Imperium

Circa-3500

The borders of the Vilani Empire at its height. Further expansion was restricted by astrography, other cultures, and Vilani stagnation.