ASTRA IMPERIA

Arkayn Game Designs

ARKAYN GAME DESIGNS

ASTRA IMPERIA

SPACE COMBAT SIMULATIONS

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AGD3-13215

ASTRA IMPERIA

** Art Credits Placeholder **

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CHAPTER 1
INTRODUCTION

"Missiles incoming!" shouted the tactical officer, "Six bogies incoming vector 300. Point defense clusters firing. Four destroyed!"

"All hands! Brace for impact!" the captain announced over the ship's internal comm system.

The cruiser heaved as the multi-megaton antimatter warheads impacted on the shields.

"Shields down to 30%, Captain! ECM and our portside gauss cannon disabled. Damage control on them."

The captain glared at the icon in his display that represented the enemy's ship. Who would have thought that a pirate ship would be able to go toe to toe with a cruiser of the TCN? Captain Delacroix shook himself slightly and formulated a new plan.

"Helm! Come to bearing 120 and open to full power. Tactical, flush the starboard missiles as she bears. Use the MK2 MIRV's."

Delacroix waited tensely as his ship moved through the gyrations he asked of her. The ship rocked slightly as she fired her missiles as she turned. The four missiles were not as heavy a broadside as the pirate was throwing, but while the pirate was limited to what looked to be standard antimatter warheads; the Cutlass was a ship of the Terran Confederation Navy, and her magazines held more than standard antimatter warheads. Ten seconds after leaving the ship, the missiles seemed to break apart. Suddenly there were eight missiles roaring in on the pirate. His point defense crews seemed to be taken by surprise by the MIRV's. Seven of the eight missiles impacted on the shields of the pirate. The shields collapsed, and the pirate ship seemed to glow for a brief second before exploding.

"Looks like her plants went Captain," said the tactical officer.

"Aye, scan for survivors, and stand down from battle stations. Then bring us about and catch up with the convoy. I'm sure the Wolf Trading Company will be glad to hear that there's one less pirate to attack their convoys."

If you enjoy reading stories about battles in space against pirates or invading alien armadas and wish you could partake in the battles or even conduct your own, then Astra Imperia is geared for you. Astra Imperia is a tactical and strategic space simulation. Astra Imperia can be considered two games in one, a tactical space combat, and a strategic stellar empire simulation. Presented here are the rules you need to conduct your own battles, from a single cruiser defending a convoy against pirates, to a clash of mighty fleets fighting for supremacy to rule the stars.

Terms
Some of the terms used throughout this book may not be familiar to you if you have not played role-playing games or war games before.

d10 – This is the nomenclature used to signify that a single 10-sided die is to be rolled. Others you might see include 2d10, or d100 or d%, which mean two 10-sided dice are to be rolled. The last two are synonymous and mean that percentile dice should be rolled. Percentile dice are rolled by using two d10's reading one as the 10's number and the other as the digits.

Hex – The map used to play Astra Imperia is marked in a hexagonal pattern. These markings are referred to as "hexes."

HP – Abbreviation for hardpoint. Hardpoints are required to mount weapons on ships.

IC – Inertial Compensators.

HTK – Hits to Kill. The amount of damage a particular component may sustain.

LM – Abbreviation for a light minute, the distance light travels in one minute.

LS – Abbreviation for a light second, the distance light travels in one second.

LY – Abbreviation for a light year, the distance light travels in one year.

Materials Needed
To play Astra Imperia, you will require at least two d10 dice, a hex map, counters to represent ships, missiles and fighters, paper and pencils, and your imagination.

Rules Organization
The rules are organized into chapters, leading with Tactical Rules. Starting with Chapter 5, each weapon system has its own chapter. Chapters 21-27 cover ship construction and components (outside of weapons). Chapter 28 covers small craft and fighters. Chapter 29 covers ground combat. Chapter 30 starts the campaign rules. Chapter 31 covers creating a race. Chapter 32 details system generation. Chapter 33 contains the rules for research and the complete technology listings. Sample ships and races are in Appendices A-H.

History

The 21st Century

2024 – World War III sparked by a nuclear detonation in NYC by radical terrorists. The United States responds by launching massive invasions into Middle Eastern countries. The conflict overflows into Europe when another terrorist group detonates another nuclear bomb in London. War continues over the next 18 years, reducing most of the Middle East to an uninhabitable wasteland.

2036 – Professor Tadeo Hirugachi of CalTech postulates a theory of Warpspace which states that above normal, or N-Space, is a highly condensed space, which would allow a vessel to travel interstellar distances faster than in N-Space.

2045 – The United States, Canada, Mexico, and most of Latin America merge to form the North American Federation (NAF).

2049 – World War III having been the final death knell to the old European Union, the European countries form the Commonwealth of Greater Europe (CGE).

2054 – China annexes Taiwan over the protests of Japan and the NAF. Over the next ten years, China slowly annexes most of South East Asia. They rename themselves the Middle Kingdom.

2060-2080 – Increased tensions worldwide spur military development. The major powers begin fielding armor and artillery using lasers, rather than projectiles. The drawback to these units is their limited range in the atmosphere. Military satellites and stations around the Earth use lasers exclusively.

2075 – Professor Tadeo Hirugachi, with the aid of the NAF Space Authority (NAFSA), constructs a primitive warp drive, which is installed in a probe. The probe is launched from an orbiting station aimed for the outer system. The probe returns to N-Space after six hours and sends back images of Pluto, before the power plant goes critical and explodes, destroying the probe.

2079 – Russia, with its remaining economic power begins to construct three Sleeper ships in orbit. These massive, slower-than-light ships are constructed as generation ships, to hold a small population that will increase as they voyage between the stars.

2086 – Russia's first generational sleeper ship, the *Novaya Muscovy*, leaves Earth orbit, heading for 61 Ursae Majoris, approximately 30 light years from earth.

2090 – An associate physics professor at the Max Planck Institute, Wilhelm Jacobs, develops a primitive form of magnetic shielding. This shielding can withstand a mega-joule laser for approximately 4 seconds before collapsing. Unfortunately, the shield requires the dedicated output of a small fission plant during that time.

2093 – The countries on the Indian subcontinent are annexed in a brief war by the Middle Kingdom.

2095 – The second of Russia's generational sleeper ships, the *Novaya Petrograd*, leaves orbit, heading for 82 Eridani, approximately 20 light years from Earth.

2099 – The countries of Northern Africa form the Saharan Commonwealth. Four months later, headed by South Africa, the remainder of the African continent coalesces under the flag of the Republic of Africa.

The 22nd Century

2100 – 2108 – Continuing tests by the NAFSA of a viable warp drive continue. A number of warp probes are sent out to Pluto and Alpha Centauri. Continuing issues with the fission plants destroy each probe soon after reemergence into N-Space.

2105 – The South American continent forms the Republica de Bolivar.

2109 – Work by the Max Planck Institute continues on the magnetic shielding developed by Wilhelm Jacobs. The duration of the shielding nears 30 seconds, but the power requirements are still ruinous.

2112 – Japan and Australia, along with the remnants of SE Asia that the Middle Kingdom has not annexed combine into the Pacific Federation (PacFed).

2115 – The final Russian generational sleeper ship, the *Novaya Rostov*, leaves Earth orbit, heading for Alpha Mensae, approximately 28 light years from Earth.

2124 – A PacFed scientific consortium develops a superconducting material that requires minimal cooling. This ushers in an age of quantum computing as computer speed and capacity increases exponentially.

2137 – NAFSA establishes a permanent base on the far side of the moon. Initially, with a population of 20 scientists, the population grows to over 1000 in the next ten years.

2140-2160 – Continuing NAFSA warp experiments and better superconducting materials allows a warp probe to successfully emerge, re-enter 'Warpspace' and return to Earth. Scanners on the NAFSA moon base detect a phenomenon as the probe emerges from Warpspace. This phenomenon becomes known as 'Emergence Waves.' James Van Klaiburn, the lead researcher on the NAFSA team, theorizes that proximity to a planetary body somehow hinders the vessel entering Warpspace. Experiments conducted reveal that a distance of approximately 128,000km is necessary for unimpeded entrance into Warpspace. This limit becomes known as the Van Klaiburn Limit, or the VK Limit.

2157 – The Republic of Africa attacks and takes over a good portion of the Saharan Commonwealth. Small skirmishes continue for the next three years.

2163 – The Saharan Commonwealth, with aid from the Commonwealth of Greater Europe attacks and regains its former territories. Attacks continue deep into the Republic of Africa.

2164 – The Republic of Africa enlists the aid of the Middle Kingdom, which launches an attack against the CGE. The CGE invokes its mutual defense treaties with NAF and PacFed. War continues for the next 20 years.

2179 – The Middle Kingdom launches a limited nuclear strike against PacFed targets. The PacFed retaliates destroying a dozen major Middle Kingdom cities.

2180-2188 – Gradual escalation leads to a decimation of the world's population. Fighting slows to a gradual halt, as economic and industrial infrastructures are unable to sustain hostilities.

2195 – Representatives of the world powers meet in Birmingham, England Province, CGE. The Birmingham Accords lead to the formation of the Terran Confederation.

The 23rd Century

2200-2250 – Outposts are established on a number of solar bodies in the system, including Mars, Galileo, Io, and Ceres.

2240 – The first manned warp-drive ship named *Enterprise* leaves the solar system for Alpha Centauri. The *Enterprise* arrives in the Alpha Centauri system approximately 40 days after leaving Earth. The *Enterprise* spends six months surveying the Alpha Centauri system. The expedition returns to Earth nine months after it left, bringing back scientific knowledge and samples from the first extra-solar system humans have been to.

2245 – Plans are made for the colonization of the Alpha Centauri system.

2257 – Wonder about the generational ships launched over 100 years ago leads to the formation of the Terran Confederation Survey Corps. Three *Enterprise*-class ships are constructed, the *Consortium, Endeavor,* and *Venture*. The ships leave for the stars that were the generational ships' destinations.

2258 – The *Consortium* arrives at 82 Eridani and encounters the Novaya Ruskaya Commonwealth (NRC). The Novaya Ruskayans have a number of outposts and populations on most of the larger bodies in the system. The Novaya Ruskayan scientists have improved upon the early work of Wilhelm Jacobs and have developed a viable shield system which all of their ships mount. Negotiations begin to trade shields for warp drive.

2258 – The *Endeavor* arrives at Alpha Mensae. Entering the system, they find a derelict *Novaya Rostov*. Closer examination of the derelict shows that the ship was attacked by multi-mega joule lasers. The *Endeavor* returns home, and plans are quietly made to begin arming and shielding ships.

2259 – The *Venture* arrives in the 61 Ursae Majoris system. Entering the system, the *Venture* is hailed by ships of the Ursae Republic (UR). The *Venture* is not allowed into the inner system and after two months of fruitless negotiations; returns to Earth.

2260-2300 – Continuing expansion of colonies and outposts in both Sol and Alpha Centauri continues.

2267 – In an effort to improve warp drives, the scientists at the University of Sol, Mars, develop a "Warp Anchor." This device seems to be capable of latching onto a nearby ship and dragging it out of Warpspace. The Terran Confederation Navy (TCN) starts quietly outfitting some of its ships with the device.

2275 – Ships from the NRC colonize P Eridani.

2294 – Ships from the UR colonize DM+36 1979, which they rename Ursae Minoris.

The 24th Century

2310 – Increased commercial traffic between Sol, Alpha Centauri, and 82 Eridani leads to increased incidents of piracy and lost ships. The Terran Confederation begins to patrol the trade lanes between the three systems. Commercial ships begin to travel in convoys, which leads to a number of the more successful pirates to merge operations. The biggest pirate group begins to call itself the Obsidian Blade.

2312 – Pirates from the Obsidian Blade establish a base in the Delta Trianguli system, renaming it Bolthole.

2315 – Increased patrolling leads to a number of clashes between the Obsidian Blade and the Terran Confederation Navy. Most clashes are inconclusive as the Obsidian Blade ships retreat when greatly outnumbered. The TCN has no idea where the Obsidian Blade calls home.

2320 – Continued exploration of nearby systems reveals a small number of habitable bodies orbiting Wolf 359, Barnard's Star and Tau Ceti. Plans are made to seed the planets with colonies

2300-2350 – Continued research on Terra provides breakthroughs in weaponry. TC scientists develop a beam weapon that provides a kinetic strike, similar to a projectile weapon. TCN ships begin to get refit to include the new weapon.

2300-2350 – Limiting their expansion, and increasing their naval expenditures and research, the Ursae Republic develops a weapon they call the particle bomb, along with enhanced fission plants.

2300-2350 – Trading with the TC, the Novaya Ruskayans develop improved sensors and ECM.

2340 – Since the return of the *Endeavor* from the Alpha Mensae system, the TCN has kept a quiet eye on the system to see what may have attacked and destroyed the sleeper ship. After 81 years of surveillance the ship on picket, the *Katana,* detects emergence waves. Slowly and stealthily moving closer in-system, the *Katana* is able to detect a ship of a type not previously seen. The ship moves into proximity to the derelict and remains there for nearly a week before warping out of the system.

2341 – The TCN reinforces the Alpha Mensae picket with an additional four cruisers.

2360 – The Third Reconnaissance Squadron, tasked to survey stars near the Ursae Republic's territory, encounters a small force of ships of an unidentified type. The URN attacks the ships and destroys most of them.

2360-2400 – The Ursae Republic continues to build and maintain their isolation. Increased skirmishes occur between the URN and the aliens, now known to be the Trit'ikk'it, an insect-like race.

2375 – The TCN Alpha Mensae picket is surprised by a squadron of ships similar to the lone alien ship from 35 years earlier. The alien squadron opens fire when the picket attempts to hail them. The TCN picket attempts to withdraw, sustaining 80% casualties. The aliens are identified as Kal'Shak.

2377 – The TCN reinforces the Alpha Mensae picket and upgrades it to a full fleet under Vice Admiral James Horner. Admiral Horner also receives material to construct outposts on Alpha Mensae IV.

2385-2390 – A number of clashes between the TCN and the Kal'Shak are inconclusive. The population of Alpha Mensae continues to grow.

2398 – Tau Ceti reaches a population level similar to Earth's in the late 22nd Century. Increased Tensions between the Tau Cetans and Earth lead to a separatist movement on Tau Ceti.

The 25th Century

2402 – Tau Ceti formally secedes from the Terran Confederation. Increased pressure from the Kal'Shak has a large portion of the TCN pinned down in defensive positions. The Tau Cetans forms the Taurus Republic. Ships from the TRN engage in limited skirmishes with the TCN.

2408 – The Terran Confederation reluctantly agrees to a cease-fire with the Taurus Republic.

2410 – The present.

CHAPTER 2 TACTICAL RULES

The simplest simulation to take place in Astra Imperia would be an encounter between two ships. The tactical game is played on a hex map. Each hex on the map represents 10,000 km. Most encounters take place in the 15 to 25 hex or 150,000km to the 250,000km range.

Turn Order
Each turn takes place in a specific order. Each turn is 30 seconds in duration. The turn order is as follows:
1. Pre-Turn
2. Initiative
3. Phase 1 – Electronic Warfare
4. Phase 2 – Movement
5. Phase 3 – Offensive Fire
6. Phase 4 - Missile/Small Craft Movement
7. Phase 5 – Defensive Fire
8. End Turn Bookkeeping

Pre-Turn
The following actions occur in the Pre-Turn in this order.
1. Fighters/Small Craft are recovered.
2. Organic Armor regenerates.
3. Damage Control is attempted.
4. Critical Effects wear off.

Fighter/Small Craft Recovery
The fighter or small craft to be recovered must end its movement with a speed of zero in the hex of the ship it wishes to land on.

Organic Armor Regeneration
Organic Armor regenerates its Collapse Value based on the generation of the armor.

Damage Control
Damage Control Crews (DCC) may attempt to make repairs at this time.

Critical Effects
Critical effects due to expire do so at this time.

Initiative
The initiative is determined by a d10 roll. Crew grade and admiral grade affects this roll. Crew grade also affects combat rolls. The lower the number for the initiative, the faster your crew reacts. Each ship usually rolls for its own initiative. Exceptions to this are ships connected by Command Nets (on page 46), and large battles, where groups of ships in fleets or squadrons move at the same time. The modifiers are shown in the table below.

Crew/Admiral Grade	Initiative Modifier	To Hit Modifier
Green	+3	-15
Poor	+1	-5
Average	±0	±0
Veteran	-1	+5
Crack	-2	+10
Elite	-4	+20

Table 1 Crew/Admiral Grade

Phase 1 Electronic Warfare
Ships engage any electronic defenses in this phase.
1. ECM engaged.
2. ECCM engaged.

Phase 2 Movement
This is the opportunity for ships to maneuver. Ships move in order of reverse initiative. Each ship applies thrust in any vector chosen and moves up to the maximum thrust of the ship. After all ships have moved, the phase ends.
1. Ships tumble.
2. Vector/Thrust changes applied.
3. Ships move (reverse initiative order).
4. Small Craft movement.
5. Check for mine detonation (may interrupt movement).
6. Heat Accumulation

Ships Tumble
Tumbling ships change facing at this point.

Vector/Thrust Changes
Any changes to vectors or thrust are applied to ships at this time.

Ship Movement
Ships move as detailed in Chapter 3.

Small Craft Movement
Small craft and fighters move at this point.

Mine Detonation
Any ship entering or exiting a hex with mines must roll to see if the mines detonate. Mines must roll to lock on to the ship. If the lock on is successful, the mines detonate. Mines with ranged offenses (missiles or beam weapons) have an engagement range set. Ships entering the engagement range are subject to mine detonation. Detonation of mines supersedes movement.

Heat Accumulation
Each point of thrust spent generates one point of heat. Ships have radiators to disperse this heat. Dispersion takes place at the end of the turn.

Phase 3 Offensive Fire

This is the opportunity for ships to fire. Combat is detailed in the Combat section (on page 19).

1. Target locks rolled.
2. Direct Fire weapons fire.
3. Indirect Fire weapons fire.
4. Heat Accumulation

Target Lock

Ships roll for target locks at this point. Target locks are maintained from turn to turn.

Direct Fire

Direct Fire weapons fire and damage is applied.

Indirect Fire

Indirect fire weapons are launched.

Heat Accumulation

For every ten points of power used in offensive fire, one point of heat accumulates.

Phase 4 Missile Movement

This is the opportunity for missiles to move. Missiles do not use the vectored thrust system. Each hex moved requires one thrust. Each change of hex facing requires two thrust.

1. Missiles move.
2. Other Indirect Fire weapons move.

Missile Movement

Missiles move at this point. A missile entering the hex of its target explodes. Point defense weapons on the targets get a last-ditch chance to intercept.

Indirect Weapon Movement

Indirect fire weapons move at this point. The weapon entering the hex of its target detonates. Point defense weapons on the target get a last-ditch chance to intercept.

Phase 5 Defensive Fire

Only Point-Defense class weapons may fire in Phase 5. Combat is conducted as in Phase 3. Fighters/Small Craft are launched in this phase also.

1. Fighter/Small Craft Launch.
2. Defensive Fire
3. Heat Accumulation

Fighter/Small Craft Launch

Fighters and small craft launch at this point.

Defensive Fire

Point Defense weapons fire now.

Heat Accumulation

For every ten points of power used in defensive fire, one point of heat is accumulated.

End Turn Bookkeeping

The end turn bookkeeping is when Shields rebalance and regenerate.

The order these events occur is specific.

1. Surrender Check
2. Radiation Zone effects.
3. Shields Regenerate.
4. Shields may rebalance.
5. Nebular Movement
6. Recover Control
7. Crystal Armor Effects
8. Heat Effects

Surrender Checks

A ship may surrender if it meets one or more of the following requirements:

1. No remaining weapons.
2. No remaining engines.
3. No FTL capability (if present previously).
4. All command facilities destroyed.
5. No remaining passive defenses.
6. Less than one-half original structure left.

If the conditions are met, the ship rolls against the average of the race's Aggressiveness and Willpower. If the roll is over the value, the ship surrenders. Surrendered ships immediately reduce speed to zero (if capable). The crew's grade applies to this roll. If the racial Aggressiveness is higher than Willpower, add the crew to hit modifier to the roll. If Willpower is higher, subtract it from the roll. Each condition met after the first add +5 to the roll.

Radiation Zone Effects

Ships with collapsed shields suffer crew losses. Roll on the Damage Allocation Table, except roll a third d10. This third die shows which column to select. In the case of a 10, reroll the third die. Crew losses are 1d10 crew at the location. Treat crew losses as combat losses.

Shield Regeneration

Shields regenerate an amount to their Collapse value based on their generation.

Shield Rebalance

Shields that are out-of-balance, or not equal in all facings rebalance so that they are equal in all facings.

Nebular Movement

Each ship in a nebula is subject to some random movement. All units (including seeking weapons) are

moved one hex in a random direction. This movement does not count against turn modes.

2d10	Hex Change
2-3	Forward
4-5	60° Right
6	120° Right
7	Rear
8	120° Left
9-10	60° Left
11-12	Up
13-14	60° Up
15	120° Up
16	120° Down
17-18	60° Down
19-20	Down

Table 2 Nebular movement

Also, the unit makes a facing change as shown below.

d10	Facing
1-2	60° Right
3-4	None
5-6	60° Left
7-8	60° Up
9-10	60° Down

Table 3 Nebular facing change

Recover Control

If a ship is tumbling, the crew may attempt to recover control of the ship. The chance is 25%, modified by the crew grade. If the roll is successful, the ship is immediately under control and no longer tumbling.

Crystal Armor Effects

Crystal armor dissipates 5 points of stored energy at this point. This dissipation increases the signature of the ship by 5 for the next tactical turn.

Heat Effects

If a ship does not have enough radiators to account for all of the heat generated, they accumulate excess heat. When excess heat reaches ten points, the ship has one randomly selected system disabled. Heat from that system is still accounted for. Ships may vent heat at this point also. To vent heat, a ship may not have allocated any thrust in the turn just completed. If this case is true, the ship reduces the amount of accumulated heat by twice the Radiator Rating of the ship.

CHAPTER 3 MOVEMENT

General Movement

The movement phases occur in reverse initiative order, i.e., the higher initiative numbers move first. This is to simulate the experience and ability for faster reacting crews/ships to react to the movements of their opponents.

Each ship has two important characteristics that are relevant to movement. These are Thrust and Compensation. Movement is a function of the engines of the ship. Compensation is a factor of the inertial compensators. Ships can move faster than their Comp rating, but each step past it incurs a -5% to hit and a +1 to Initiative. Ships cannot move more than three steps past their Comp rating. After this, the crew loses consciousness or otherwise is rendered incapable of effectively running the ship. Compensation may not necessarily equal Thrust but should be at least equal. Engines provide an innate compensation equal to their Thrust. Inertial Compensators increase the maximum speed a ship may travel. Compensation is capped at the level specified by Hull technologies.

Movement Basics

Astra Imperia uses a vectored thrust movement system. This means that the direction the ship faces is not necessarily the direction it is moving. Each ship has a Bearing and a Thrust. These are recorded by the following designations 000, 060, 120, 180, 240, & 300. Each ship records the amount of net thrust in a given vector and the heading. Each ship has a limited number of thrust points to allocate per turn.

Example: The Katana has a current heading of 060 and a vector of 120 with a thrust of 3. Thus, the Katana's bow is facing 060, and she is moving direction 120.

Pitch/Yaw/Roll

A ship moves in a three-dimensional space. Each ship has a Pitch, Yaw, and Roll facing. The bearing is the cumulative values for Pitch, Yaw, and Roll. Pitch is defined as the offset from the flat plane, in other words, how much up and down facing the ship has. A ship with a 90 degree Pitch looks as if it is standing on its tail. A -90 degree Pitch would look like the ship is standing on its nose. Yaw is which hex facing the ship is currently pointed towards. Roll is how far the ship has rolled from its normal position.

Altitude

While there is no ground level in space, Altitude is used to define how far above or below the base plane the ship is. A ship with a Pitch of 60 will climb 1 level per Thrust, all other values being zero. A ship with a Pitch of -60 will descend 1 level per Thrust with all other values being zero.

Net thrust is determined by subtracting opposite vectors. It is recommended that the 'forward' bearings (300, 000, and 060) be used as base headings. When the total movement is determined for each heading, the ship will move one hex per movement in those vectors. A negative movement would designate movement in the opposite heading.

Example: The Katana has the following movements, 000:1, 060:0, 120:2, 180:1, 240:0, 300:1. These results in vectors of 300: -1, 000:0, 060:0. The Katana will move one hex in the direction of 120.

Movement vectors are recalculated each turn. From the above example, the *Katana* will start its next turn with a vector of 120:1.

Example: A ship has the following vectors, 000:4, 060:1, 120:3, 180:0, 240:0, 300:0. These cannot simply be subtracted from each other. Subtract the lower of the outer vectors, in this case, 120:3 from both outer vectors. This results in 000:1 and 120:0. Add the vector to the middle vector (060:4). This shows the final vectors to be 000:1, 060:4, 120:0, 180:0, 240:0, 300:0. The ship starts in Position 1 with the black lines showing current vectors. Position 2 is the ending location, and the red lines show new vectors.
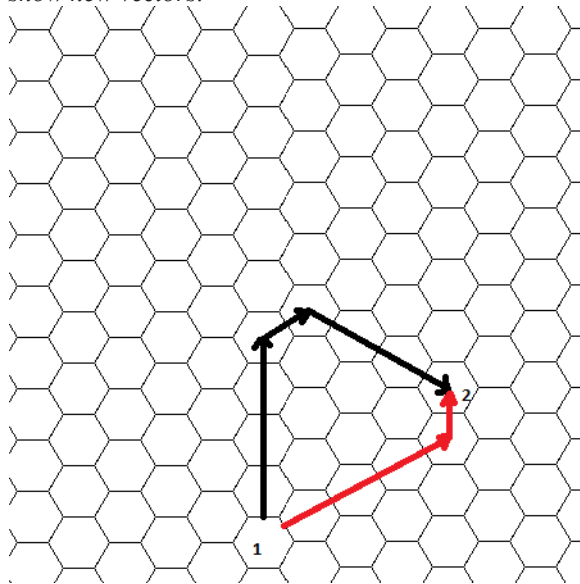
Figure 1 Movement Example

Miscellaneous Maneuvers

Defensive Maneuvers

Movement in the hex itself sometimes referred to as Defensive Maneuvers, requires 1 Thrust point.

Defensive Maneuvers provides a reduction of 5m to the Signature of the ship. This will also force opponents to reroll for lock-on. Defensive Maneuvers also impose a -10 to the chance to hit the ship.

Combat Rolling

A Combat Roll is a rapid 180-degree roll to bring the opposite broadside to bear on a target. Rolling 180 degrees would normally cost 3 Thrust, but the rapid nature of the Combat Roll only costs 2 Thrust. As the name indicates, this is the only maneuvering that may be made during combat.

High-Speed Turns

High-speed turns are similar to Combat rolls, except they flip the ship end for end, rather than rolling. This maneuver costs 2 Thrust and may be combined with a Combat Roll. Ships have a 50% chance, modified by the crew grade To Hit chance to lose control. Ships losing control are tumbling. If the ship was attempting a Combat Roll in conjunction with the HST, then the chance to lose control is 65%, modified by crew grade.

Turning

Each 60-degree change in Pitch, Yaw, or Roll requires Thrust. A ship pays Thrust equal to its tonnage divided by 2500 to turn. This is rounded up. This simulates a smaller ship being more nimble or agile than a larger ship. Some cases might reduce or increase the turn mode of a ship. A ship larger than 2,500 tons with only 1 Thrust is still able to turn 60 degrees. *Note: 60 degrees is one hex side change.*

Landing/Docking

Ships may land or dock with a planet or orbital habitat. To accomplish this, a ship must enter the hex of the target and reduce movement to zero. The ship will be considered docked or landed at the end of the Movement phase. Only streamlined ships may land on planets with an atmosphere. If a ship does not reduce speed to zero after entering the planet hex, the ship suffers 500K damage per point of Thrust.

Ship Docking

To dock with another ship, the ships must match speeds and vectors and be in the same hex. At the end of the Movement phase, the ships will be docked. If the ships are hostile to each other, boarding actions may commence.

Collisions/Ramming

If two ships end the turn in the same hex, there is a chance they may collide. The chance for this to happen is equal to the combined tonnage of the ships divided by 500,000. If the ships collide, they suffer damage equal to 1/10th the other ship's structure in Kinetic damage.

Ramming

If two ships end the turn in the same hex, and one or both ships want to ram the other, the ramming ship must successfully roll twice, once under Aggression and once under Willpower. If these rolls are successful, the ship is on a collision course with the other ship. The chance of colliding is equal to the tonnage of the target ship divided by 250,000. If the target is performing EM, this chance is halved. If the ram is successful, both ships suffer damage equal to 1/10th of the other ship's structure multiplied by the speed of the ramming ship.

Non-Ship Movement

Small craft, missiles, and indirect fire weapons all move during Phase 3 of the turn. These items will generally move faster than ships. They also do not use the vectored thrust system. They all use a simplified movement system. Each hex moved forward requires one Thrust. Each hex facing changed requires two Thrust. Missiles, small craft, and indirect fire weapons do not have a turn mode.

Loss of Control

If all control systems (Bridge, Aux Bridge, Flag Bridge, and CIC) are disabled/destroyed, the ship is considered out of control. Ships in this situation function at a crew grade one less than normal. The ship may only make one facing change or turn per round. ECM/ECCM/Stealth may not be employed, though natural sources of ECM still apply. Advanced maneuvers such as Combat Rolls, High-Speed Turns, Defensive Maneuvers, Landing, and Ramming may not be attempted. If one of the control systems is recovered, the ship regains control.

Tumbling

A ship that is tumbling is out of control as above. In addition, each hex moved changes the facing of the ship by one. This will randomly be left or right. Tumbling ships may not make a vector or facing changes until control is recovered. Each turn, the ship may attempt to recover control. This occurs in End Turn Bookkeeping.

Astrographic Terrain

Space is not empty. There are a number of terrain features that can impede movement. Some of these features also inhibit detection of ships.

Natural Features

Nebula

A nebula will reduce the maximum speed of ships and missiles to 1/3 their normal maximum. Any speed in excess of this results in 10K/10Th/10EM damage applied per thrust. Additionally, each ship in the nebula increases their effective ECM generation by 2. If this takes the generation over 9, each step provides an additional -10m Signature reduction and -5% chance for seeking weapons to hit. Nebulae do not affect ECCM or Stealth. Small craft may not be launched in a nebula. 10% of nebulae include a radiation zone.

Asteroids

Asteroid belts are classed as sparse or dense.

Sparse Asteroid Belts

Sparse asteroid belts reduce the maximum speed of ships and missiles to 75% of their normal maximum. Each point of thrust above that imposes a 5% chance of impacting on an asteroid. Impact results in a 150K strike on the ship.

Dense Asteroid Belts

Traveling through dense asteroid belts reduces the maximum speed of ships and missiles to ½ their normal maximum. Each point of thrust above that imposes a 10% chance of impacting on an asteroid. Impact results in a 150K strike on the ship.

Planets/Moons

Planets and moons cannot be traveled through. Moons usually fit in one hex, as do smaller planets. Larger planets will occupy multiple hexes. Planets and moons may be orbited by reducing speed to 1 while in a hex adjacent to the body. Each turn after, the ship moves one hex around the body. Ships may land on a body by moving into an adjacent hex and reducing speed to zero. The ship is then considered to be landed on the planet. Note – planets with atmosphere require a ship to be Streamlined. Ships without streamlining may land on a planet but suffer a 50TH hit from reentry.

Black Holes

Black holes occupy a hex radius equal to their rating. Each turn, ships in the system with a black hole move towards the black hole a number of hexes equal to twice the rating. This movement is considered Thrust.

Radiation Zones

Radiation zones are areas of high radiation. Ships with intact shields are unaffected by the radiation zone. When a shield is collapsed, the ship suffers crew losses as detailed in Chapter 2.

Planetary Rings

Planets with rings, usually gas giants offer additional hazards to navigation. Rings are 1d10 hexes from the planetary surface and are 1 or 2 hexes thick. Planetary Ring hexes are treated as dense asteroid hexes.

Created Features

EMP Bursts

EMP Bursts are generated by ships exploding. Anything drawing a line of sight through the hex is blocked. The burst lasts for 1 turn per 250 pts of power generated by the ship. Any ships in the hex are blinded. Sensors blocked by an EMP Burst lose lock-on and must reroll once valid line of sight is reestablished. Any indirect fire weapons passing through the hex are rendered inert.

Missile Explosions

Missile explosions impose a -1% to hit per 10 points of cumulative damage. This negative to hit applies to the target and any ship targeting the ship. Sensors on the target will need to reroll for any lock-on.

Special Movements

Tractoring

If a ship is being towed by another, the tonnages of both ships are added together. This is divided by 1,000 to arrive at the power per Thrust needed by the towing ship. This is modified by the engines on the towing ship. If the ship being towed has functional engines, they may be used to offset some of the power cost by the tug.

A 2,000-ton tug is towing a 10,000-ton cruiser with disabled engines. The tug has Improved Grav Pulse engines which require 21 power per thrust per 1,000 tons. The tug has 420 power dedicated to thrust, which gives the tug a normal Thrust of 10. While towing the cruiser, the combined mass is 12,000 tons. This slows the tug to 1.67 Thrust, rounded up to 2. If the cruiser's engines were intact, it could help the tug move faster.

If a tractored ship enters an atmosphere and is not streamlined, it suffers a 50TH hit from the atmosphere. If the towing ship is not streamlined, it also suffers the hit. A ship may not be tractored into or out of FTL.

CHAPTER 4 COMBAT

Combat occurs in Phases 3 and 5, with some specific exceptions occurring in Phases 2 and 4.

Altitude

Ships at different altitudes have increased ranges to their targets. A general rule is for every 3 levels of altitude and 4 hexes of range, increase the range by 1. For those desiring a more accurate calculation, the Pythagorean Theorem will give the proper range. Fractions should be rounded normally.

Weapon Mounts

Weapons are mounted on hardpoints on each ship. Each hardpoint is mounted in firing aspects. These aspects are Spinal (Forward or Rear), Broadside (Port or Starboard), Turreted, Forward Arc, Rear Arc. Spinal weapons do twice as much damage as regular weapons.

- Spinal (Forward) – The hex row on bearing 000. Spinal mounts may not be angled to fire at targets at different altitudes.
- Spinal (Rear) – The hex row on bearing 180. Spinal mounts may not be angled to fire at targets at different altitudes.
- Broadside (Port) – The arc defined by bearings 240 and 300. Broadside weapons may fire at targets that are within 120 degrees in altitude.
- Broadside (Starboard) – The arc defined by bearings 060 and 120. Broadside weapons may fire at targets that are within 120 degrees in altitude.
- Forward Arc – The arc defined by bearing 000. Forward weapons may fire at targets that are within 60 degrees in altitude.
- Rear Arc – The arc defined by bearing 180. Rear weapons may fire at targets that are within 60 degrees in altitude.
- Turreted – May fire into any arc. Turreted weapons must be declared dorsal (top) or ventral (bottom). Dorsal turrets may not fire at targets at a lower altitude. Likewise, ventral turrets may not fire at targets at a higher altitude.
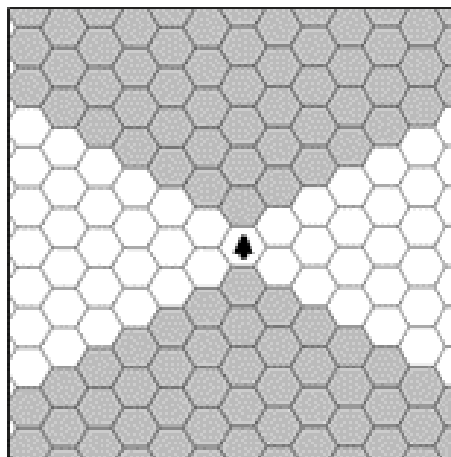
Figure 2 Forward/Rear Arcs
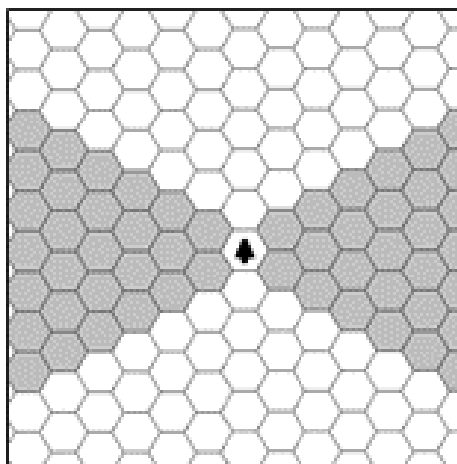
Figure 3 Broadside Arcs
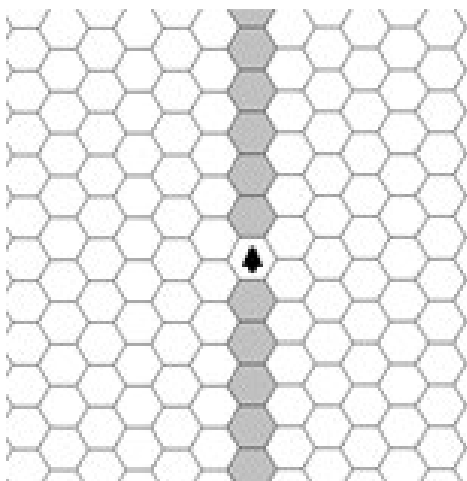
Figure 4 Spinal Arcs

Hardpoints

Hardpoints are required to mount weapons. Each size hull has a limited amount of hardpoints. There are three different types of hardpoints, Point Defense, or PD hardpoints, Standard hardpoints, and Capital

hardpoints.

Point Defense Hardpoints

Point defense hardpoints are automatically turreted. Weapons on PD Hardpoints have a maximum range of 8 hexes (or the weapon range, whichever is less).

Standard Hardpoints

Standard hardpoints are what most weapons are mounted on. If a weapon on a standard hardpoint is turreted, it takes one additional hardpoint.

Capital Hardpoints

Capital hardpoints are required to mount the largest weapons. They are restricted to Spinal mounts and Broadsides. Capital hardpoints may not be turreted.

Firing

Firing weapons is a percentile roll. Each weapon has a 'to hit' number based on the range to the target, and crew ability. If the percentile roll is less than or equal to the calculated to hit number, the weapon has struck the target and damage is done. Weapons may normally only fire once per turn.

To Hit Values

To Hit values are based on the Class of the weapon.

Critical Hits

Critical hits occur on a roll of "01". Each crew grade above Average increases this percentage by 2 points. A critical hit does extra, special damage in addition to the damage from the weapon. Roll on Table 5 Critical Hits to determine the effects of the critical hit.

Weapon Class	Range							
	0	1-2	3-5	6-10	11-15	16-25	26-35	35+
Class I	95	95	95	90	85	0	0	0
Class II	95	95	94	88	82	0	0	0
Class III	95	95	92	84	76	0	0	0
Class IV	95	90	80	70	60	50	0	0
Class V	95	88	76	64	52	40	28	0
Class VI	95	86	72	58	44	30	16	2

Table 4 To-Hit Values

Roll	Effect
1	IFF Transponder out of commission for 3 turns. Friendly indirect fire weapons may target the ship (50% chance).
2	Sensors erratic. Lose 1d10 channels for 3 turns.
3	Life Support erratic. Roll 1d10 for the next 3 turns. 6+ Life support is out.
4	Compensators erratic. Roll 1d10 for the next 3 turns. 6+ decrease Comp rating by 1.
5	Shield Flare. Increase signature by 1d10m for the next 3 turns.
6	Drive erratic. Lose 1d10/2 Thrust for 3 turns. Minimum 1 Thrust.
7	Power Surge. Firing computers running locally. Reduce effective grade by 1 for 3 turns.
8	EM Flare. Take 5 pts additional EM damage.
9	Thermal Flare. Take 5 pts additional Thermal damage.
10	Kinetic Flare. Take 5 pts additional Kinetic damage.

Table 5 Critical Hits

Specific Targeting

Specific areas of a ship may be targeted by Direct Fire weapons. Areas that may be targeted are Engines, Sensors, Weapons, and Hangar/Shuttlebays. Each of these items may be targeted at -50 to hit. If shields and armor have been penetrated, the damage is done directly to the component rather than randomly rolling.

ECM Suites

ECM Suites, or Electronic Countermeasures Suites, are used to degrade the chances for weapons to lock onto the ship the ECM is on. ECM can act in one of three different modes. The modes are ECM, ECCM, and Stealth.

ECM Mode

ECM works against the enemy ship to prevent target acquisition. This is the standard mode. ECM mode decreases the Signature of the ship. ECM also decreases the chances of seeking weapons to hit.

Jamming

ECM may be used to jam sensors. ECM used in this manner provides no protection. Jammed sensors suffer a negative modifier equal to the "To-Hit reduction" on their chances to lock on and to hit. This is shown in Table 52 on page 45. Jammed sensors also have half of the channel capacity. The ship wishing to jam a sensor must roll a to-hit as a Class II weapon. If the roll succeeds, the target's sensors are jammed for 1d5 turns. Multiple "hits" from jamming are not cumulative.

ECCM Mode

ECCM, or Electronic Counter-Countermeasures, is used to counter ECM. ECCM aids the acquisition of target lock, by decreasing the signature resolution of your sensors.

Stealth Mode

Stealth mode is an advanced form of ECM. It cloaks the ship from sensors and provides a defense against target acquisition. It also reduces the chances of the

stealthed ship acquiring targets. A ship in Stealth mode may not radiate heat normally. All heat generated is accumulated.

IFF

IFF systems are assumed to be built into each ship. IFF is set to the empire to which the ship belongs. Diplomatic states usually control what the IFF is set to recognize other imperial ships as.

Sensors

Sensors are required for both navigation and sensing ships to fire on. Sensors have ranges based on their generation. Sensor use adds to the signature of the ship.

Ships must roll for Acquisition before weapons can be fired at the target. Once the lock is attained, it is maintained until ECM status changes, the target moves out of the range of the sensors, the Signature of the target changes, or the target is destroyed. Channels indicate the number of targets able to be tracked, and the number of incoming missiles/seeking weapons that may be targeted. Point defense may fire under local control, but to hit numbers are halved in this case. Each seeking weapon fired by the ship requires a dedicated sensor channel. The formula for determining lock on is **(Signature – Resolution +/- ECM + Acquisition + Crew Grade)**, where Signature is the Signature of the target ship and Resolution is the Resolution of your scanners. Sensors have four areas of classification; Base Class, which determines ranges and base acquisition values; Channel Class, which determines the number of channels available to a ship; Signature Class, which determines the Active/Passive signature of the sensor; and Resolution Class, which determines the Resolution of the sensor in Standard and Stealth modes.

Class	Range	Acquisition	Detect Range
1	12 hexes	30%	20 hexes
2	19 hexes	35%	30 hexes
3	28 hexes	40%	40 hexes
4	39 hexes	45%	50 hexes
5	52 hexes	50%	70 hexes
6	67 hexes	60%	90 hexes
7	84 hexes	70%	110 hexes
8	99 hexes	80%	130 hexes

Table 6 Base Sensor Class

Sensor Class	Channels
1	10
2	20
3	30
4	40
5	50
6	60
7	70
8	80

Table 7 Sensor Channels Class

Class	Active Sig	Passive Sig
1	20m	5m
2	40m	10m
3	60m	15m
4	80m	20m
5	100m	25m
6	120m	30m
7	140m	35m
8	160m	40m

Table 8 Sensor Signature Class

Class	Standard Resolution	Stealth Resolution
1	60m	120m
2	50m	100m
3	40m	80m
4	30m	60m
5	20m	40m
6	15m	30m
7	10m	20m
8	5m	10m

Table 9 Sensor Resolution Class

Sensors may be activated in Active or Passive mode.

System Bodies

System bodies will interfere with Lock-On by reducing signatures of ships behind them. In the diagram below, a ship in Zone A has its Signature reduced by 50% for the scanning ship. If the ship were in Zone B, the Signature would be reduced to 10%. If there are multiple scanning ships, the reduced Signature only applies when the ship is in Zone A or Zone B for the scanning ship. If the scanning ships are in a Command Net and spread out enough to remove the Zones completely, then there is no

Signature reduction.
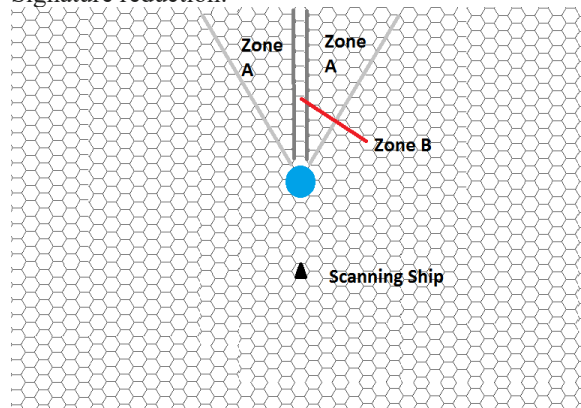
Active Sensors
Active sensors increase the signature of the ship based on the Signature Class of the sensor. Active sensors may be detected at a range equal to 2x their range. Active mode is required for target acquisition.

Passive Sensors
Passive mode sensors have half the range and channel capacity of active mode. Target acquisition may be made at -25%. ECCM may not be used with passive targeting, as it is tied to the active fire control suites.

Weapon Fire
All weapon fire follows the basic formula of a to-hit roll made followed by damage applied. Certain weapons (Missiles and Indirect Fire) have other steps involved also. Each weapon fired in a turn increases the Signature of the firing ship for the following turn.

Direct Fire
Direct fire weapons are beam weapons and projectile weapons. These weapons do damage when the to-hit roll is successful. Direct Fire weapons may not fire at a target if there is a planetary body in any hex between the target and the firing ship.

Missiles
Missile weapons are fired like other weapons, but they must travel the distance to the target. Missile weapons move in Phase 3. They are susceptible to point defense. Missiles which enter the hex of their target explode, doing damage.

Guidance Variations
Normally missiles require a dedicated sensor channel on the firing ship for guidance. Missiles with onboard sensors do not require a sensor channel on the firing ship. Additional variations may be used. Missile guidance may also be shunted to a missile control

ship (a ship with a lot of sensor channels). Missiles transferring control in this manner must be launched within 5 hexes of the control ship. Missiles outside that range must be controlled by the firing ship or contain self-guidance.

Self-Guided
Missiles with the sensor package are capable of self-guidance. These missiles will home in on the nearest enemy target (defined by IFF).

Thermal Guidance
Thermal Guidance missiles replace the standard sensor package with a thermal guidance package. Missiles with this package will target the closest unfriendly target (defined by IFF) with the highest Thrust. This package is usually used for anti-missile/anti-fighter purposes.

HARM
HARM missiles target the nearest unfriendly (defined by IFF) target with the highest Signature.

Indirect Weapons
Indirect fire weapons are similar to missiles but are generally energy based. Each projectile has an HTK value. If sufficient damage is done to the projectile during its flight to the target, the projectile is destroyed. Indirect fire weapon projectiles entering the hex of their target do damage.

Point Defense
Point Defense weapons have a maximum range of 8 hexes. Point defense may react as soon as weapons are launched within the interception range. Point defense fires in Phase 4. Point defense is also granted a "last ditch" intercept at -10 to hit when missiles and indirect fire weapons enter the ship's hex. A sensor channel is required per missile for tracking purposes. Each missile must be individually rolled for target lock.

Applying Damage
When a weapon hits, it does damage. Each weapon does damage of up to three types. These types are Thermal, Kinetic, and EM. Each defense protects against these damage types to a differing degree. Once shields and armor have been penetrated, one-half of the damage is applied to internal systems; the other half is applied to the structural integrity of the hull. Damage is allocated to internal systems according to Table 10 (below). Each type of weapon (direct fire or indirect fire) fired at a target from one source is considered a volley. Direct fire volleys are additionally broken down into PD, Standard, and Capital class volleys. Weapons fired from ships in a

Command Net count as a single volley with the above categories.

Internal damage is generic damage. Internal components do not care whether damage is Thermal, Kinetic or EM. For each volley that hits, and does internal damage, a roll is made for each point. Progress to the right is made along the table each time that particular result comes up. If a component does not exist on the ship, move right along the track until the first component to exist on the ship is hit.

hull. If this roll is equal to or less than that percentage, the ship is considered to be destroyed.

Crew Losses

When components are damaged, the crew working in those locations suffer losses. A disabled component will lose 1d5 crew. A damaged component loses 1d10 crew. A destroyed component loses 1d10 + 10 crew. If all of the crew in a location are lost, the component is treated as disabled until additional crew

2d10	1st Result	2nd Result	3rd Result	4th Result	5th Result	6th Result	7th Result	8th Result	9th Result
2	Command Net	Long-range Scanners	Sensors	ECM	EWD	Commo.	Science Instruments	HEC	Structure
3	N-Space Engines	N-Space Engines	FTL Engines	FTL Engines	Magazine	Magazine	Magazine	Magazine	Structure
4-5	Capital HP	Capital HP	Standard HP	Standard HP	PD HP	Magazine	Magazine	Magazine	Structure
6-8	Radiators	Structure	Structure	Shield Generator	Shield Generator	DCC	DCC	DCC	Structure
9-13	Structure	Structure	Power	Power	Capital HP	Capital HP	Standard HP	PD HP	Structure
14-16	Radiators	Structure	Structure	Shield Generator	Shield Generator	DCC	DCC	DCC	Structure
17-8	Capital HP	Capital HP	Standard HP	Standard HP	PD HP	Magazine	Magazine	Magazine	Structure
19	N-Space Engines	N-Space Engines	FTL Engines	FTL Engines	Magazine	Magazine	Magazine	Magazine	Structure
20	Bridge	Aux Bridge	CIC	Flag Bridge	Life Support	Shuttlebay	Hangar	Inertial Comps	Structure

Table 10 Damage Allocation Each component on the ship has a number of HTK. Damage applied to a component is applied whole. If a disabled component is hit again, it is damaged. If a damaged component is hit again, it is destroyed. Components reduce internal damage by their HTK. Partially hit components, from not enough internal damage to overcome the HTK have their HTK reduced and are disabled.

For each system hit, roll on the following table.

Roll	Result
1-4	Disabled
5-8	Damaged
9-0	Destroyed

Table 11 Internal Damage

If a system is disabled, Damage Control can restore the system the next turn if the crew makes its roll. A damaged system requires more time to repair. Destroyed systems can only be repaired at a shipyard or similar facility.

Massive Damage (Optional)

If a ship sustains more than 50% of its structure in one volley, in internal damage, a simple percentage roll against the damage done as a percentage of the

may be assigned.

Damage Control

Damage Control crews are vital for repairing combat damage in combat. Crews make a d10 roll, modified by grade and system damage level. If the result is a 7 or higher, the system is considered online and usable again. If no damage control crews are available, the roll for repairs may be made but require a result of 11 or higher.

Modifier	Level
Disabled	-1
Damaged	-3
Green	-3
Poor	-2
Average	0
Crack	+2
Elite	+4

Table 12 Damage Control Modifiers

The time it takes to restore a system to functionality is based on the level of damage. Disabled systems take one turn. Damaged systems take 2d10 turns.

Special Situations

Power Plants

Power plants have a chance to go into a critical meltdown when damaged. This is based on their generation. To prevent the meltdown, a damage control crew must be allocated and make a successful roll at a -2 to their Damage Control roll. Alternatively, the captain may choose to jettison the power plant. Plants are jettisoned into space and explode outside the shielding.

Plant Generation	Meltdown Chance
Primitive	85%
Basic	60%
Standard	50%
Improved	40%
Enhanced	25%
Advanced	10%

Table 13 Power Plant Meltdown

If a power plant melts down, it explodes, doing damage equivalent to 25% its power rating. This damage is applied to internal systems. For each system on the ship, roll against Table 11 with a +5 on the roll.

Sensors

If Sensors are non-functional, the ship may not acquire targets. It may fire at ships that are no more than 2 hexes away. Only direct fire and missile weapons may be fired this way. Direct Fire weapons are considered Class I weapons under this situation. Seeking weapons may not be fired, as they require active sensors for targeting.

Life Support

If all life support systems are disabled/destroyed, the ship functions at one grade lower. Green crews get an additional +2 initiative and -20% to hit in this situation. This is cumulative with command system penalties.

Command Systems

If all command systems aboard the ship are disabled/destroyed, the ship functions at one grade lower than its grade. Green crews suffer an additional +2 initiative and -20% to hit. This is cumulative with the loss of life support. Ships in this situation are also considered to be uncontrolled (see page 17).

Engines

If the engines are disabled/destroyed, the ship cannot change speed or heading. A ship with no engines loses 1 speed every 5 turns.

Compensators

If the compensators are disabled/destroyed, the ship cannot exceed a speed equal to the Thrust of the engines. If the engines are run at the maximum rating for more than 10 turns, then every other turn for the next 10, they have a cumulative 5% chance of suffering a failure and having their maximum thrust reduced by 1. After 20 turns at maximum, the chance of failure is checked each turn and increases by 10% each turn. If the ship suffers a compensator failure, it immediately is considered at +1 Speed on Table 14. Ships must reduce speed immediately or continue to suffer the excessive speed effects. After suffering compensator failure, the chances for failure are reset to 0. Compensator failure may be repaired by DCC as if the component had been disabled by enemy fire.

Overloading Compensators

Any extra power may be diverted to engines and inertial compensators to increase Thrust. Ships using this run the risk of compensator failure at a rate of 10% per turn. In addition, engines may burn out, with a chance of 10% of turn. Burnt out engines are considered disabled for damage control purposes.

Speed	Initiative Mod	To Hit Mod	Structural Failure Chance
+3	+3	-15%	15%
+2	+2	-10%	10%
+1	+1	-5%	5%

Table 14 Compensator Failure

Incoming Fire

Incoming fire that is able to be interdicted is subject to point defense of any ships that are linked via Command Net.

Heat

Ships generate heat. For each point of Thrust generated, one point of heat is generated. For every ten points of power used for weapons, one point of heat is generated. Ships utilize radiators to disperse the heat. If the ship has more heat built up than radiators to disperse it, the excess heat remains and is carried over to the next turn. Every ten points of excess heat disable a system. Roll on the Damage Allocation table as normal. Roll a third d10, rerolling results of 9 or 10. Use the third d10 result to determine which column is used. In the case of a Structure result, reroll all three dice.

CHAPTER 5 LASERS

Lasers are designed using one entry from each table. Lasers are Class VI weapons. Lasers do full damage up to the Full Damage Range, half damage between the Full Damage and Half Damage ranges, and one (1) point of Thermal damage out to the 1-Point Range. When dividing the damage in half, each type is halved, rounding down. The added signature to the ship when firing is based on the power used to fire. When calculating the added Signature, always round up to the nearest whole number.

the following weapon Modifications; Autofire, Miniaturization, Overloaded, Shield Penetrating, Extended Range, High-Energy Focus, and Pulse.

Crew

Lasers require 5 per laser and 1 engineering crew per 50 tons.

Table 15 Laser Aperture

Aperture (cm)	Full Dmg Range	½ Damage Range	1-point Damage Range	Power Use	HTK	Hardpoints	Cost	Tons	Logistic Point Cost
5	6	9	12	3	1	1	30	15	3
10	8	12	16	4	1	1	60	15	4
15	10	15	20	5	1	1	90	15	5
20	12	18	24	6	1	1	120	15	6
25	14	21	28	7	1	1	150	15	7
30	16	24	32	8	2	1	180	15	8
35	18	27	36	9	2	2	210	30	9
40	20	30	40	10	2	2	240	30	10
45	22	33	44	11	2	2	270	30	11
50	24	36	48	12	2	2	300	30	12
55	26	39	52	13	3	2	330	30	13
60	28	42	56	14	3	2	360	30	14
65	30	45	60	15	3	2	390	30	15
70	32	48	64	16	3	3	420	45	16
75	34	51	68	17	3	3	450	45	17
80	36	54	72	19	4	3	480	45	18
85	38	57	76	20	4	3	510	45	19
90	40	60	80	21	4	3	540	45	20
95	42	63	84	22	4	3	570	45	21
100	44	66	88	23	4	4	600	60	22

Class III RoF fires 2 shots the first turn, and 1 shot the second turn.

Table 16 Laser Frequency

Frequency	EM Damage	Thermal Damage	Kinetic Damage	Cost	Logistic Pt. Cost
Far-Infrared	2	4	0	50	6
Mid-Infrared	2	6	0	150	8
Near Infrared	4	6	0	250	10
Visible Light	4	8	0	350	12
Near Ultraviolet	4	8	2	450	14
Extreme Ultraviolet	4	10	2	550	16
Soft X-Ray	6	10	2	650	18
Hard X-Ray	6	12	2	750	20
Gamma Ray	6	12	4	850	22

RoF Class	Rate of Fire	Cost	Logistic Pt. Cost
Class I	1 per 2 turns	0	-5
Class II	1 per turn	100	0
Class III	3 per 2 turns	200	5
Class IV	2 per turn	300	10
Class V	3 per turn	400	15
Class VI	4 per turn	500	20

Modifications

Lasers may use PD Hardpoints, Standard Hardpoints, Capital Hardpoints, Heavy Mounts, Dual Mounts, Turreted Mounts, and Spinal Mounts. Lasers may use

CHAPTER 6 MASS CANNONS

Mass cannons are built selecting one entry from each table. Mass cannons do their full damage across the entire range. Mass Cannons are Class V weapons. Mass Cannons increase Signature by the power used.

Modifications

Mass Cannons may be mounted on PD Hardpoints, Standard Hardpoints, Capital Hardpoints, Heavy Mounts, Dual Mounts, and Turreted Mounts. Mass Cannons may use the following weapon modifications; Armor Piercing, Autofire, Miniaturization, and Stealth.

Caliber (cm)	EM Dmg	Thermal Dmg	Kinetic Dmg	Power Use	HTK	Hardpoints	Cost	Tons	Logistic Pt. Cost
1	0	0	3	3	1	1	50	25	3
2	0	1	3	4	1	1	100	25	4
3	0	1	4	5	1	1	150	25	5
4	1	1	4	6	1	2	200	50	6
5	1	2	4	7	2	2	250	50	7
6	1	2	5	8	2	2	300	50	8
7	2	2	6	10	2	2	350	50	10
8	2	3	6	11	2	3	400	75	11
9	2	3	7	12	3	3	450	75	12
10	3	3	7	13	3	3	500	75	13
11	3	3	8	14	3	3	550	75	14
12	3	4	8	15	3	4	600	100	15
13	4	4	9	17	4	4	650	100	17
14	4	5	9	18	4	4	700	100	18
15	4	5	10	19	4	4	750	100	19
16	5	5	10	20	4	5	800	125	20
17	5	5	11	21	5	5	850	125	21
18	5	6	11	22	5	5	900	125	22
19	6	6	12	24	5	5	950	125	24
20	6	7	12	25	5	6	1000	150	25

Table 17 Mass Cannon Caliber

Crew

Mass Cannons require 8 crew per cannon and 1 engineering crew per 50 tons.

Launch Velocity (km/s)	Range	Power	Cost	Logistic Point Cost
3000	9	0	50	3
3500	11	2	250	3
4000	12	4	450	4
4500	14	6	650	4
5000	15	8	850	5
5500	17	10	1050	5
6000	18	15	1550	6
6500	20	20	2050	8

Table 18 Mass Cannon Launch Velocity

CHAPTER 7 KINETIC BEAM

Kinetic beams are created by selecting one entry from each table below. Kinetic beams are Class IV weapons.

Fire Delay is a special attribute of Kinetic Beams. The longer the delay in firing, the greater the range of the beam. A weapon that can delay more than one turn may fire earlier at a reduced range, based on the turns delayed.

Miniaturization, Overloaded, Shield Penetrating, Extended Range, High-Energy Focus, and Pulse.

Crew

Kinetic Beams require 12 crew per beam and 1 engineering crew per 50 tons.

Aperture (cm)	EM Dmg	Thermal Dmg	Kinetic Dmg	Power Use	HTK	Hardpoints	Cost	Tons	Logistic Pt. Cost
5	1	0	3	4	1	1	50	25	4
10	1	0	4	5	1	1	100	25	5
15	2	0	4	6	1	1	150	25	6
20	2	0	5	7	1	2	200	75	7
25	2	1	5	8	2	2	250	75	8
30	2	1	6	9	2	2	300	75	9
35	3	1	6	10	2	2	350	75	10
40	3	1	7	11	2	3	400	100	11
45	4	2	7	13	3	3	450	100	13
50	4	2	8	14	3	3	500	100	14
55	5	2	8	15	3	3	550	100	15
60	5	2	9	16	3	4	600	125	16
65	5	3	9	17	4	4	650	125	17
70	5	3	10	18	4	4	700	125	18
75	6	3	10	19	4	4	750	125	19
80	6	3	11	20	4	5	800	150	20
85	6	4	11	21	5	5	850	150	21
90	6	4	12	22	5	5	900	150	22
95	7	4	12	23	5	5	950	150	23
100	7	4	13	24	5	6	1000	175	24

Table 19 Kinetic Beams

Fire Delay (turns)	Range (hexes)	Signature	Logistic Pt. Cost
0	5	10m	1
1	8	16m	2
2	11	22m	3
3	14	28m	4
4	17	34m	4
5	20	40m	5

Table 20 Fire Delay/Signature

Modifications

Kinetic Beams may be mounted on PD Hardpoints, Standard Hardpoints, Capital Hardpoints, Heavy Mounts, Turreted Mounts, Dual Mounts, and Spinal Mounts. Kinetic Beams may use the following weapon modifications; Armor Piercing, Autofire,

CHAPTER 8 PARTICLE BEAM

Particle beams fire charged particles. Particle beams are created by selecting one entry from each table below. Particle Beams are Class IV weapons. Particle Beams increase Signature based on the amount of power required.

Aperture (cm)	EM Dmg	Thermal Dmg	Kinetic Dmg	Power Use	HTK	Hardpoints	Cost	Tons	Logistic Pt. Cost
5	4	0	2	6	1	1	50	25	6
10	5	0	2	7	1	1	100	25	7
15	5	0	3	8	2	1	150	25	8
20	6	0	3	9	2	2	200	50	9
25	6	1	3	10	3	2	250	50	10
30	7	1	3	11	3	2	300	50	11
35	7	1	4	12	4	2	350	50	12
40	8	1	4	13	4	3	400	75	13
45	8	2	5	15	5	3	450	75	15
50	9	2	5	16	5	3	500	75	16

Table 21 Particle Beam Aperture

Particle	Range (hexes)	Logistic Pt. Cost
Electron	5	1
Neutrino	7	2
Muon	9	2
Tau	11	3
Boson	13	3
Gluon	15	4
Graviton	17	4
Baryon	19	5
Meson	21	5
Tachyon	23	6

Table 22 Particle Beam Composition

Modifications

Particle Beams may be mounted on PD Hardpoints, Standard Hardpoints, Capital Hardpoints, Heavy Mounts, Dual Mounts, and Turreted Mounts. Particle Beams may accept the following modifications; Autofire, Miniaturization, Overloaded, Extended Range, High Energy Focus, and Pulse.

Crew

Particle Beams require 12 crew and 1 engineering crew per 50 tons.

CHAPTER 9 PLASMA CANNON

Plasma cannons are created by selecting one entry from each table below. Plasma cannons are Class III weapons. Plasma cannons increase Signature by the amount of power used to fire.

Crew

Plasma Cannon require 15 crew per cannon and 2 engineering crew per 50 tons.

Aperture (cm)	EM Dmg	Thermal Dmg	Kinetic Dmg	Power Use	HTK	Hardpoints	Cost	Tons	Logistic Pt. Cost
10	2	8	0	10	1	1	50	50	10
20	2	9	0	11	1	1	100	50	11
30	3	9	0	12	2	1	150	50	12
40	3	10	0	13	2	2	200	100	13
50	3	10	1	14	3	2	250	100	14
60	4	10	1	15	3	2	300	100	15
70	4	11	1	16	4	2	350	100	16
80	4	12	1	17	4	3	400	150	17
90	5	12	2	19	5	3	450	150	19
100	5	13	2	20	5	3	500	150	20
110	6	13	2	21	6	3	550	150	21
120	6	14	2	22	6	4	600	200	22
130	6	14	3	23	7	4	650	200	23
140	6	15	3	24	7	4	700	200	24
150	7	15	3	25	8	4	750	200	25
160	7	16	3	26	8	5	800	250	26
170	7	16	4	27	9	5	850	250	27
180	7	17	4	28	9	5	900	250	28
190	8	17	4	29	10	5	950	250	29
200	8	18	4	30	10	6	1000	300	30

Table 23 Plasma Cannon Aperture

Containment Strength	Range (hexes)	Logistic Point Cost
1	7	2
2	9	2
3	10	3
4	12	3
5	13	3
6	15	4
7	16	4
8	18	5
9	19	5
10	21	5

Table 24 Plasma Cannon Containment Strength

Modifications

Plasma Cannon may be mounted on Standard Hardpoints, Capital Hardpoints, Heavy Mounts, Dual Mounts, and Spinal Mounts. Plasma Cannon may use the following weapon modifications; Armor Piercing, Miniaturization, Overloaded, Shield Penetrating, Enveloping, and High Energy Focus.

CHAPTER 10 GAUSS CANNON

Gauss Cannons are similar to Mass Cannons, with an accelerated rate of fire. Gauss Cannons are Class IV weapons. Damage does not vary due to range. Each shot of the Gauss Cannon requires a separate to hit roll. Gauss cannons increase Signature by the power used to fire.

Rate	Shots
1	1
2	2
3	4
4	6
5	8

Table 25 Gauss Cannon Cycle Rate

Caliber (cm)	EM Dmg	Thermal Dmg	Kinetic Dmg	Power Use	HTK	Hardpoints	Cost	Tons	Logistic Pt. Cost
1	0	1	5	6	1	1	50	30	6
2	0	1	6	7	1	1	100	30	7
3	0	2	6	8	1	1	150	30	8
4	0	2	7	9	2	2	200	60	9
5	1	2	7	10	2	2	250	60	10
6	1	2	8	11	2	2	300	60	11
7	1	3	8	12	3	2	350	60	12
8	1	3	9	13	3	3	400	90	13
9	2	4	9	15	3	3	450	90	15
10	2	4	10	16	4	3	500	90	16
11	2	5	10	17	4	3	550	90	17
12	2	5	11	18	4	4	600	120	18
13	3	5	11	19	5	4	650	120	19
14	3	5	12	20	5	4	700	120	20
15	3	6	12	21	5	4	750	120	21
16	3	6	13	22	6	5	800	150	22
17	4	6	13	23	6	5	850	150	23
18	4	6	14	24	6	5	900	150	24
19	4	7	14	25	7	5	950	150	25
20	4	7	15	26	7	6	1000	180	26

Table 26 Gauss Cannon Caliber

Table 27 Gauss Cannon Launch

Launch Velocity (km/s)	Range (hexes)	Power	Logistic Pt. Cost
3,500	11	0	3
4,000	12	2	3
4,500	14	4	4
5,500	17	6	4
6,000	18	8	5
6,500	20	10	5
8,000	24	15	6
10,000	30	20	7
12,000	36	25	9

Velocity

Modifications

Gauss Cannons may be mounted on Standard Hardpoint, Capital Hardpoint, Dual Mounts, and Heavy Mounts. Gauss Cannons may use the following modifications; Autofire, Miniaturization, and Stealth

Crew

Gauss Cannons require 8 crew per cannon and 1 engineering crew per 50 tons.

CHAPTER 11 HYPER-VELOCITY CANNON

Hyper-Velocity Cannons are a variation on Mass Cannons/Gauss Cannons. They fire packets of flechettes. Hyper-Velocity Cannons are Class II weapons. Damage is constant across the range. Hyper-Velocity cannons increase Signature by the power used to fire.

Modifications

Hyper-Velocity Cannons may be mounted on Standard Hardpoints, Dual Mounts, and Heavy mounts. Hyper-Velocity Cannons may use the following weapon modifications; Autofire, Miniaturization, Extended Range, and Stealth.

Caliber (cm)	EM Dmg	Thermal Dmg	Kinetic Dmg	Power Use	HTK	Hardpoints	Cost	Tons	Logistic Pt. Cost
1	0	0	5	5	1	2	60	40	5
2	0	0	6	6	1	2	120	40	6
3	1	0	6	7	1	2	180	40	7
4	1	0	7	8	2	3	240	60	8
5	1	1	7	9	2	3	300	60	9
6	1	1	8	10	2	3	360	60	10
7	2	1	8	11	3	4	420	80	11
8	2	1	9	12	3	4	480	80	12
9	3	2	9	14	3	4	540	80	14
10	3	2	10	15	4	5	600	100	15
11	4	2	10	16	4	5	660	100	16
12	4	2	11	17	4	5	720	100	17
13	4	3	11	18	4	6	780	120	18
14	4	3	12	19	5	6	840	120	19
15	5	3	12	20	5	6	900	120	20
16	5	3	13	21	5	7	960	140	21
17	5	4	13	22	6	7	1020	140	22
18	5	4	14	23	6	7	1080	140	23
19	6	4	14	24	6	8	1140	160	24
20	6	4	15	25	7	8	1200	160	25

Table 28 Hyper-Velocity Cannon Caliber

Packet Size	Range (hexes)	Shots	Logistic Pt. Cost
1	4	2	1
2	6	2	2
3	7	2	2
4	9	3	2
5	10	3	3
6	12	3	3
7	13	4	3
8	10	4	4
9	16	4	4
10	18	5	5

Table 29 Hyper-Velocity Cannon Packet Size

Each shot in the packet is rolled for separately

Crew

Hyper-Velocity Cannons require 5 crew per cannon and 1 engineering crew per 50 tons.

CHAPTER 12 PLASMA MISSILES

Plasma Missiles are created by selecting one component from each table below. Plasma Missiles have a range equal to the sensor range of the firing ship. Plasma Missiles have a speed of 6. Every full five points of damage done to a Plasma Missile projectile reduces the damage of the projectile by five points in each type. Plasma Missiles may be intercepted by PD Fire. If the projectile survives to reach the target hex, it will intercept the target and do damage.

Aperture (cm)	EM Dmg	Thermal Dmg	Kinetic Dmg	Power Use	HTK	Hardpoints	Cost	Tons	Logistic Pt. Cost
25	5	15	0	20	2	3	200	300	20
50	5	17	0	22	3	3	400	300	22
75	6	17	0	23	4	3	600	300	23
100	6	19	0	25	5	4	800	400	25
125	6	19	1	26	6	4	1,000	400	26
150	6	21	1	28	7	4	1,200	400	28
175	7	21	1	29	8	5	1,400	500	29
200	7	23	1	31	9	5	1,600	500	31
225	8	23	2	33	10	5	1,800	500	33
250	8	25	2	35	11	6	2,000	600	35
275	9	25	2	36	12	6	2,200	600	36
300	9	27	2	38	13	6	2,400	600	38

Table 30 Plasma Missile Aperture

Containment Strength	Signature	HTK	Logistic Pt. Cost
1	10	10	2
2	15	15	3
3	20	20	4
4	25	25	5
5	30	30	6

Table 31 Plasma Missile Containment Strength

Modifications

Plasma Missiles may be mounted on Standard Hardpoints, Capital Hardpoints, Dual Mounts, and Heavy Mounts. Plasma Missiles may use the following weapon modifications; Miniaturization, Overloaded, and Enveloping.

Crew

Plasma Missiles require 18 crew per missile and 1 engineering crew per 50 tons.

CHAPTER 13 PARTICLE BOMB

Particle Bombs are created by selecting one entry from each table below. Particle Bombs have a speed of 4. Particle Bombs have a range equal to one half the sensor range of the firing ship. Particle Bomb damage does not reduce due to Containment damage. Particle Bombs may be intercepted by PD fire. If the projectile survives to reach the target hex, it intercepts the target ship and does damage.

Aperture (cm)	EM Dmg	Thermal Dmg	Kinetic Dmg	Power Use	HTK	Hardpoints	Cost	Tons	Logistic Pt. Cost
10	15	5	5	25	1	2	50	25	25
20	17	5	5	27	1	2	100	50	27
30	17	6	5	28	1	3	150	75	28
40	19	6	5	30	2	3	200	100	30
50	19	6	6	31	2	4	250	125	31
60	21	7	6	34	2	4	300	150	34
70	21	7	7	35	2	5	350	175	35
80	23	7	7	37	3	5	400	200	37
90	23	8	7	38	3	6	450	225	38
100	25	8	8	41	3	6	500	250	41

Table 32 Particle Bomb Aperture

Containment Strength	Signature	HTK	Logistic Pt. Cost
1	6	6	2
2	8	8	2
3	10	10	3
4	12	12	3
5	14	14	4

Table 33 Particle Bomb Containment Strength

Modifications

Particle Bombs may be mounted on Standard Hardpoints, Capital Hardpoints, Dual Mounts, and Heavy Mounts. Particle Bombs may use the following weapon modifications; Miniaturization, Enveloping, and Overloaded.

Crew

Particle Bombs require 15 crew per bomb and 1 engineering crew per 50 tons.

CHAPTER 14 ELECTRON TORPEDO

Electron Torpedoes are created by selecting one entry from each table below. Electron Torpedoes have a range equal to the sensor range of the firing ship. Electron torpedoes have a speed of 8. Electron torpedo damage does not reduce due to range. Electron torpedoes may be intercepted by PD Fire. If the projectile survives to reach the target hex, it intercepts the target, doing damage.

Aperture (cm)	EM Dmg	Thermal Dmg	Kinetic Dmg	Power Use	HTK	Hardpoints	Cost	Tons	Logistic Pt. Cost
10	20	5	5	30	1	3	120	60	30
20	22	5	5	32	2	3	240	120	32
30	22	6	5	33	2	4	360	180	33
40	24	6	5	35	3	4	480	240	35
50	24	6	6	36	4	5	600	300	36
60	26	7	6	39	4	5	720	360	39
70	26	7	7	40	5	6	840	420	40
80	28	7	7	42	5	6	960	480	42
90	28	8	8	44	6	7	1080	540	44
100	30	8	8	46	7	7	1200	600	46

Table 34 Electron Torpedo Aperture

Containment Strength	Signature	HTK	Logistic Pt. Cost
1	12	12	3
2	15	15	4
3	18	18	5
4	21	21	5
5	24	24	6

Table 35 Electron Torpedo Containment Strength

Modifications

Electron Torpedoes may be mounted on Standard Hardpoints, Capital Hardpoints, Dual Mounts, and Heavy Mounts. Electron Torpedoes may use the following weapon modifications; Overloaded, Miniaturization, Enveloping, and Proximity Fuse.

Crew

Electron Torpedoes require 12 crew per torpedo and 1 engineering crew per 50 tons.

CHAPTER 15 PROTON TORPEDO

Proton Torpedoes are constructed by selecting one entry from each table below. Proton torpedoes have a Thrust of 10 and a Signature equal to their initial Containment. Proton torpedo damage does not reduce due to range. Proton torpedoes have a range equal to one half the sensor range of the firing ship. Proton torpedoes may be intercepted by PD fire. If the projectile survives to reach the target, it does damage.

Aperture (cm)	EM Dmg	Thermal Dmg	Kinetic Dmg	Power Use	HTK	Hardpoints	Cost	Tons	Logistic Pt. Cost
20	5	25	5	35	1	4	150	75	35
40	5	27	5	37	1	4	300	150	37
60	6	27	5	38	1	5	450	225	38
80	6	29	5	40	1	5	600	300	40
100	6	29	6	41	2	6	750	375	41
120	7	31	6	44	2	6	900	450	44
140	7	31	7	45	2	7	1050	525	45
160	7	33	7	47	2	7	1200	600	47
180	8	33	7	48	2	8	1350	675	48
200	8	35	8	51	3	8	1500	750	51

Table 36 Proton Torpedo Aperture

Containment Strength	Signature	HTK	Logistic Pt. Cost
1	15	15	4
2	20	20	5
3	25	25	6
4	30	30	8
5	35	35	9

Table 37 Proton Torpedo Containment Strength

Modifications

Proton torpedoes may be mounted on Standard Hardpoints, Capital Hardpoints, Dual Mounts, and Heavy Mounts. Proton torpedoes may use the following modifications; Miniaturization, Overloaded, Enveloping, and Proximity Fuse.

Crew

Proton torpedoes require 12 crew per torpedo and 1 engineering crew per 50 tons.

CHAPTER 16 MISSILES

Missiles are created by selecting a Frame and adding warhead(s), engines, and other components. Missiles may have up to 20 component points (CP) worth of components. Signature, Thrust, and range are all dependent on the components used. The HTK of a missile is dependent on the Frame used.

Missile Launchers

Missile Launchers are created by selecting a Reload Rate on Table 42 on page 37.

Magazines

Magazines are required to store missiles prior to launch. A magazine may hold a number of CP of missiles based on the capacity.

Multiple Warhead Missiles

Multiple Warhead Missiles, or MIRV missiles are created by emplacing smaller missiles within a larger body. Each submunition missile requires an amount of CP equal to its own CP. Multiple warheads, as opposed to multiple submunitions are also possible. Warhead damage is cumulative.

Warhead	EM Dmg	Thermal Dmg	Kinetic Dmg	CP	Cost	LP Cost
Fission	1	2	1	1	25	4
Fusion	2	2	1	1	50	5
Antimatter	3	3	4	1	75	10
Plasma	4	6	4	2	100	14
Gravitic	8	5	5	2	150	18
Warp	8	8	8	2	200	24

Table 40 Missile Warheads

Engine	CP	Speed	Signature	LP Cost
Nuclear Torch	1	10	+4m	1
Nuclear Pulse	1	12	+8m	2
Ion Pulse	1	14	+12m	3
Grav Pulse	1	16	+16m	4
Plasma Torch	1	18	+20m	5
Plasma Pulse	2	20	+24m	6
Fusion Torch	2	22	+28m	7
Fusion Pulse	2	24	+32m	8
Antimatter Torch	2	26	+36m	9
Antimatter Pulse	2	28	+40m	10

Table 41 Missile Engines

Missile Launchers

Missile Launchers fire once per increment based on their Recycle Rate. Dual Missile Launchers fire two shots per increment based on their Recycle Rate. The Rocket Pod flushes its internal magazine in one salvo and cannot be reloaded in combat situations. Capital and Standard weapons have a negative modifier equal to 50 – (Missile CP) to intercept. Point defense weapons are +10 to hit missiles. The damage for missile weapons is dependent on the warhead type.

Frame	Signature	Cost	Fuel	HTK	LP Cost
Basic	40m + 4m/CP	50	3 turns	2	2
Standard	30m + 2m/CP	100	4 turns	4	4
Enhanced	20m + 1m/CP	200	6 turns	6	6
Advanced	10m + 0.5m/CP	400	8 turns	8	8

Table 38 Missile Frames

Component	Cost	CP	LP	Effect
Penetration Aids	5	1	1	5/5/5 damage to shields prior to warhead
Fuel Cell	10	1	1	1 Additional turn of powered flight
Sensor	20	1	2	1 channel, frees channel on ship
ECM	20	1	2	Provides missile with –5m Signature
ECCM	20	1	2	Provides missile with +5m Signature vs. ECM
Shield	10	1	2	Provides +5 HTK
Armor	5	1	2	Provides +2 HTK
Long Range Scanner	40	2	4	75m Resolution. Not suitable for targeting.
Submunition	Varies		Varies	Each submunition consumes CP equal to the missile CP
PD Hardpoint	10	10	5	Supports 1 PD weapon. 1 shot only.
Standard Hardpoint	20	20	10	Supports 1 Standard weapon. 1 shot only.
Capacitor	25	5	25	Provides 5 shots
Reactor	100	5	5	Provides 12 months of lifespan
Thermal Guidance	100	1	1	Allows for Thermal Guidance of the missile
HARM Guidance	150	1	1	Allows for HARM Guidance of the missile
Science Instruments	250	2	2	Gathers 1 point per hour

Table 39 Missile Components

Crew

Missile Launchers require 20 crew per launcher and 1 engineering crew per 50 tons.

Magazines

Magazine capacity is based on the Capacity tech. Missile launchers have an on-mount magazine of 20CP. Dual Missile Launchers have an on-mount magazine of 40CP. Rocket Pods have an on-mount magazine of 75CP

Components

Some components are available right away with the basic missile technology. Others, such as ECM require the pre-requisite technology.

Penetration Aids

Penetration Aids (Penaids) are designed to degrade shields on the target. Penaids ignore 5 EM/5 Thermal/5 Kinetic points of shields only before the warhead explodes. Penaids do not damage shields. Multiple Penaids stack.

Missile Armor

Missile Armor provides an additional 2 HTK to the missile. No more than 50% upgrade to the base missile HTK is allowed. Requires Armor I.

Fuel Cell

Fuel Cells provide 1 additional turn of powered flight.

Sensor

Sensors have a resolution of 25m. Sensors can allow a missile independent guidance, freeing up a channel on the firing ship. Additional sensor units on the missile add 2.5m of resolution per unit. Sensor unit has 1 channel. Additional units add 1 channel per unit. Requires Sensor I.

ECM

ECM provides the missile with -5m Signature. Requires Electronic Warfare I.

ECCM

ECCM provides the missile with +5m Resolution against ECM only. Requires Electronic Warfare I.

Missile Shield

Missile Shields add 5 HTK to the missile. Additional shield generators are not cumulative. Requires Shields I.

Long-Range Scanner

Has a resolution of 75m. Not usable for targeting. Requires Long-Range Scanners I.

Multiple Missiles

Each submunition requires a number of CP equal to their CP. Submunitions must be within scan range of

the firing ship or have self-contained sensor units. MIRVs are set to release at a specified distance from a target, or command released from the firing ship.

Thermal Guidance

This guidance package allows the missile to use Thermal guidance, freeing up sensor channels on the firing ship.

HARM Guidance

This guidance package allows the missile to use HARM guidance, freeing up sensor channels on the firing ship.

Science Instruments

This allows the missile or buoy to gather scientific data. Points are accumulated at one point per hour. Requires Science Instruments I.

Counter-Missiles

Missiles used as counter-missiles will do damage equal to their kinetic damage to missiles/seeking weapons.

Recycle Rate	Missile RoF	Mine RoF	Cost	LP Cost
1	1 per 6 turns	1 per 3 turns	50	1
2	1 per 5 turns	1 per 2 turns	100	2
3	1 per 4 turns	1 per turn	200	3
4	1 per 3 turns	3 per 2 turns	400	4
5	1 per 2 turns	2 per turn	600	5
6	1 per turn	5 per 2 turns	1,000	6

Table 42 Missile Launcher Recycle Rate

Launcher	HTK	Hardpoints	Cost	Tons	LP Cost
Missile Launcher	4	1	200	100	2
Dual Launcher	6	2	400	175	4
Rocket Pod	2	0.5	600	250	8
Mine Layer	2	1	400	150	2

Table 43 Missile Launchers

Magazine	Capacity	Cost	Tons	LP Cost
1	50 CP	25	100	2
2	100 CP	50	200	4
3	150 CP	75	300	6
4	200 CP	100	400	8
5	300 CP	150	600	12

Table 44 Magazines

Mines

Mines use missile components. Mines range in size from 2CP to 40CP. Mines will need a sensor unit to detect targets. Mines may be loaded purely with warheads, missiles, or hardpoints. Mine hardpoints may only mount Direct fire weapons or missiles. Mines may mount sensors, ECM/ECCM, armor,

shields, science instruments, and scanners. Mines have a Signature equal to one half the Signature of an equivalent sized missile. Minefields have a signature equal to the sum of all signatures of mines in the hex.

Mine Laying

Mines are deployed with a mine layer. This is a specialized missile launcher that ejects the mine from the ship. Mines are ejected into the hex the ship is in.

Mine Sweeping

Mines may be "swept" by a ship with a mine layer. Each turn a ship is in a hex adjacent to a suspected minefield, a roll is made to detect the mines. If the mines are detected, the sweeping ship may attempt to recover the mines. If the mines are friendly, the chance is 95%. If the mines are not friendly, the chance is 50%. Once the mines are recovered, they may be redeployed elsewhere. If a mine is not successfully recovered, it will detonate, potentially doing damage to the recovering ship. Buoys do not detonate.

Mine Components

PD Hardpoint - Allows the mounting of 1 PD class weapon. Sufficient power for 1 shot. Only Direct fire weapons.
Standard Hardpoint - Allows the mounting of 1 standard class weapon. Sufficient power for 1 shot. Only Direct fire weapons or Missiles.
Capacitor - Allows the firing of 5 additional shots.
Reactor - Allows for 12 months of lifespan. Power output is insufficient for weapon use.

Buoys

Buoys are mines that do not have an explosive payload.

CHAPTER 17 WEAPON MODIFICATIONS

All modification costs, weights and power requirements multiply together. Tonnage changes to weapons due to modifications do not change crew requirements. Mount modifications do change crew requirements.

Capital Weapons

All weapons, except missiles, may be mounted on Capital Hardpoints. Capital weapons take a number of Capital hardpoints equal to the number of standard hardpoints. Capital versions of weapons do twice the listed damage of each type. Capital weapons have 2x the cost and power of their non-capital cousins. Build Cost for Capital weapons are doubled.

Modified Hardpoints

Standard hardpoints may take a couple of modifications. These are Heavy Mount, Turreted, and Dual Mounts.

Heavy Mount

The heavy mount is a standard mount that houses a slightly larger weapon. Hardpoint requirements for a heavy mount are increased by two. Power and tonnage requirements for the weapon are doubled. Cost is increased by 50%. The range is increased by 3 hexes. Damage is increased by 1.5. Heavy mounts may be of any type (broadside, forward arc, rear arc) except spinal. Logistic Cost of Heavy Mounts are increased by 50% (round up).

Turreted Mount

Turreted mounts are standard mounts that may fire into any aspect. Hardpoint requirements for a turret mount are increased by one. Power and tonnage requirements are increased by 5. Cost is increased by 25%. No other attributes are affected. Logistic Point Cost for Turreted Mounts is doubled.

Dual Mount

Dual mounts are standard mounts with increased capacitors and emitters to allow an additional shot per turn. Power and tonnage requirements are increased by 50%, and the cost is doubled. Dual Mounts increase the Logistic Point Cost by 50%. Dual mounted weapons may target separate targets with each shot.

Spinal Mounts

Spinal mounts are only fired down the hex row the ship is facing (or facing away from in the case of a rear-mount spinal). Spinal mounted weapons require a number of hardpoints equal to the number of standard hardpoints. Spinal mounted weapons do twice the damage of normal weapons. Spinal Capital weapons do three times normal weapon damage. Spinal Mounts double the Logistic Point Cost of normal weapons and triple the Logistic Point Cost of Capital weapons.

Weapon Modifications

Armor-Piercing – Weapons with this modification do 1.5x damage to Armor and ½ normal damage to any other components. Cost for this modification is 1.5 normal. Logistic Point cost is 50% more (round up).

Autofire – Weapons with this modification weigh 1.5x normal and may fire twice each round. Cost for this modification is 3x normal. Autofire weapons increase the firing Signature by 1.5x. Autofire may not be applied to indirect fire weapons. Autofire increases the Logistic Point cost by 50% (round up). All Autofire shots must be against the same target.

1st Generation Miniaturization – This modification reduces the size of the weapon to ¾ normal. Damage is unaffected. Cost for this modification is 1.25x normal. 1st Generation Miniaturization increases the Logistic Point cost of the weapon by 50% (round up).

2nd Generation Miniaturization – This modification reduces the size of the weapon to ½ normal. Damage is unaffected. Cost for this modification is 2x normal. 2nd Generation Miniaturization doubles the Logistic Point cost.

3rd Generation Miniaturization – This modification reduces the size of the weapon to ¼ normal. Damage is unaffected. Cost for this modification is 4x normal. 3rd Generation Miniaturization triples the Logistic Point cost.

Overloaded – This modification increases the damage of the weapon to 2x normal. The weight of the weapon is 1.5x normal and the cost is 6x normal. Overloaded weapons may only fire every other round. Overloaded weapons have 3x the firing Signature. Overloaded weapons may not also be Autofire. Overloaded weapons double the Logistic Point cost.

Shield Penetrating – This modification allows weapons to do 1.5x damage to Shields and ½ normal damage to other components. Cost for this modification is 1.5 normal. Shield Penetrating weapons have 50% more Logistic Point cost (round up).

Extended Range – This modification allows the weapon to fire at a slightly longer range. The range is increased by 5 hexes. Extended range weapons require 1.5x power. The cost of the weapon is increased by 1.5x. Signature is increased 1.5x.

Extended Range weapons cost an additional 2 Logistic Points.

High-Energy Focus – This modification allows a beam/energy weapon to do increased damage. EM and Thermal damage types for that weapon are multiplied by 1.5 normal. High-Energy Focus increases the firing Signature by 2x. High-Energy Focus increases the cost of the weapons by 50%. High-Energy Focus increases the Logistic Point cost by 50% (round up).

Proximity Fuse – This modification allows indirect fire weapons to engage at range 1 instead of 0. Cost of the weapon is twice normal. In the case of missiles/mines, only the cost of warheads is increased. Proximity Fuses increase the Logistic Point by 25% (round up).

Pulse – This modification varies the frequency of beam weapons, increasing the kinetic impact by 1.5 normal. Pulse weapons increase the firing Signature by 2x. Pulse increases the Logistic Point cost by 50% (round up). Pulse increases the cost of the weapon by 50%.

Stealth – This modification reduces the firing signature of a weapon by 50% (round down). Weapon cost is 2x. Stealth doubles the Logistic Point cost.

Enveloping – This modification causes the weapon to have a wrap effect, applying damage to all shield/armor facings. Cost of the weapon is 5x and power requirements are 2x. Damage is unaffected. The collapse value of the shields/armor is only reduced once per shot, not once per facing. Enveloping multiplies the Logistic Point cost by 5.

CHAPTER 18 DRONES

Drones are comparable to unmanned fighters. Drones are built using components. Each drone takes a number of sensor channels to control by the controlling ship as listed in the Control Channels column. The Channels column shows how many targets the drone may engage. Resolution column shows the resolution of the drone's sensors. Recon, Light and Attack Drones are targeted by standard and capital weapons at -20 to hit. Heavy Attack Drones are at -10 to be hit by standard and capital weapons. Assault drones have no modifiers to be hit. Point defense weapons have +10 to hit Recon and Light drones and no modifiers to hit other drones. While docked, a drone may be refueled in 4 turns, plus one turn per extra fuel cell.

Drone Armor This provides armor protection for the drone. Armor level is one less than the racial maximum.
Drone Shields This adds shielding to the drone. Shields are one level less than the racial maximum.
Extra Fuel Cells This increases the flight time of the drone.
Speed Boost This increases the speed of the drone.
Drone ECM Unit This provides ECM capabilities to the drone.
Science Instruments This allows the drone to gather scientific data. The data is gathered at a rate of 2 points per day.
FTL Generator This allows the drone to enter FTL once. The FTL generator is the same generation as the race's ship FTL. No more than one generator may be place in a drone. Time in FTL does not affect strategic range.

Drone	Thrust	Max CP	Signature	Control Channels	Channels	Resolution	Structure	Flight Time	Cost	LP Cost
Recon Drone	20	6	1m + 0.5/CP	1	4	75m	5	25 turns	500	11
Light Attack Drone	18	9	2m + 0.5/CP	1	4	85m	8	20 turns	1,000	14
Attack Drone	15	12	3m + 1/CP	2	3	100m	12	15 turns	1,500	17
Heavy Attack Drone	12	15	4m + 1.5/CP	3	2	120m	18	10 turns	2,000	20
Assault Drones	9	18	5m + 2/CP	4	1	140m	30	5 turns	3,000	23

Table 45 Drones

Component	Cost	CP	LP	Signature	Channels	Resolution	Notes
Point Defense HP	10	0.5	5	+0.5m			Turreted
Standard HP	20	2	10	+1m			May not be modified by hardpoint modifications
Turreted Standard Hardpoint	30	3	15	+2m			May not be modified by hardpoint modifications.
Heavy Standard Hardpoint	40	4	20	+3m			May not be modified by hardpoint modifications.
Drone Sensors	20	1	5	+5m	+3	-35m	Sensor equipped drones add to the controlling ship's channels
Drone Armor	10	1	15				Provides armor for the Drone
Drone Shields	15	1	27				Provides shields for the Drone
Extra Fuel Cells	10	0.5	5				+5 turns of flight
Speed Boost	25	1	5	+10m			+5 thrust
Drone ECM Unit	50	1	10	-5m		-10m/ +15m/-15m	Modes: ECM/ECCM/Stealth
Science Instruments	150	2	2				Gathers 2 points per day.
FTL Generator	250	5	20				Allows the drone to jump into FTL once.

Table 46 Drone Components

Point Defense HP This adds a PD class hardpoint to the drone.
Standard HP This adds a standard class hardpoint to the drone.
Turreted Standard HP This adds a turreted standard class hardpoint to the drone.
Heavy Standard HP This adds a heavy standard class hardpoint to the drone.
Drone Sensors This allows the drone to act as a remote sensor platform for the controlling ship.

Extended Range

Drones may be used in a strategic mode. In this mode, the drones move at Thrust 1 with a duration equal to their normal Thrust x Duration in days, or at Thrust 2 with a duration of half the Thrust 1 duration.

CHAPTER 19 SHIP CONSTRUCTION

This section of the rules presents details on constructing ships. Ships have various systems, including power, weapons, command, electrical, and engines.

Logistic Points

Each ship component has a cost in Logistic Points. These points are used for balance purposes in non-campaign games.

Hulls

The base of every ship is its hull. The size of the hull determines the number of hardpoints, the speed, signature and structure. The minimum size of a hull is 100 tons. There is no maximum size for hulls, though practical considerations such as thrust impose limits. Hulls cost 1 LP per 100 tons.

Classification

Ships fall into one of four broad classes based on tonnage. These classes are Picket, under 2,500 tons; Escort, 2,500 to 5,000 tons; Cruiser, 5,000 to 12,000 tons; and Capital, over 12,000 tons.

Signature

The signature of the hull is determined by dividing the tonnage by 20. This is the base signature. ECM/ECCM, Stealth, and engines all modify the base Signature.

Hardpoints

There are three classes of hardpoints, Point Defense, Standard and Capital. Point Defense hardpoints have a 360 degree arc and are considered turreted. PD hardpoints must be defined as either dorsal or ventral. Standard hardpoints must be mounted in a broadside, spinal or turret. Capital hardpoints must be configured in pairs for broadside mounts (one in each), or in spinal mounts.

A ship may mount one Point Defense hardpoint per 250 tons of hull (round down). A ship may mount one standard hardpoint per 500 tons of hull (round down). A ship may mount one capital hardpoint per 1,000 tons of hull (round down). Capital hardpoints may not be used on ships smaller than Cruiser sized, regardless of size.

Structure

Ships have structure equal to 1/2 their tonnage. Ships designated as "Civilian" have structure equal to 1/4 their tonnage.

Cost

Ships have a base cost of 10 MCr per ton of hull. This may be reduced by the appropriate technology. Ships have a yearly upkeep cost equal to 10% of the total cost of the ship. Cargo holds do not factor into the upkeep cost of ships classed as freighters.

Thrust

Thrust is based on the engine type used. Each point of thrust requires an amount of power based on the engine. Hulls have a maximum Thrust based on the Hull technology. If this is exceeded, there is a 5% chance per Thrust over the rating per turn of structural failure.

Compensation

Ships have a Compensation rating equal to the Thrust of their engines. To exceed this rating, a ship must have Inertial Compensators. The maximum Compensation Rating is equal to 150% of the Thrust of the engines. This value may not exceed the maximum rated thrust for the hull material.

Cargo/Hangars

These are related in the fact that any ship may have them, but if a ship has 2/3 of their tonnage dedicated to the system, they are considered a Freighter or Carrier. Cargo, docking bay, and hangar tonnage does not count towards total tonnage for hardpoint calculation purposes.

Civilian Hulls

Civilian freighter hulls must reserve 2/3 of their tonnage for cargo holds. Civilian hulls have ½ the Structural Integrity of a comparable military hull. Civilian hulls are restricted to PD hardpoints and Standard. The number of hardpoints available is 1/2 for a comparable military hull.

Streamlining

Ships under 5,000 tons may be streamlined to facilitate landing on a planetary surface. This streamlining increases the cost of the hull by 50% and reduces the signature by 10%. Streamlining consumes mass equivalent to 10% of the tonnage of the ship.

Agile Ships

Agile ships are designed to turn faster than other ships of the same size. An Agile ship must be 5,000 tons or less. The cost for an Agile ship is an additional 50% of the hull cost. Agile ships consume an additional 5% tonnage of the hull. Agile ships always spend 1 Thrust to turn 60 degrees.

The Terran Confederation is designing a new destroyer. This destroyer will be streamlined and Agile. The base hull size is 5,000 tons. A hull this size normally costs 50,000 MCr. Making the ship streamlined costs an additional 25,000MCr, as does making the ship Agile. Streamlining will consume 10% of the available tonnage, or 500 tons. Making the ship Agile consumes ad additional 250 tons. The final hull cost is 100,000MCr, and the ship has 4,250 tons available for components. It can land on planets and has a Turn cost of 1 Thrust. The ship will have a Signature of 225m.

Shakedown Cruises

Each new ship must undergo a shakedown, or acceptance cruise. This cruise tests all of the systems on the ship. This cruise lasts four weeks. At the end of each week, there is a 5% chance of a system failing. If no systems fail, the ship is considered to pass acceptance trials. If a system fails, the ship must undergo a refit to repair the failed system and another shakedown cruise.

Crew

Each component requires a number of crew. Crew are listed as one of three types, Crew, Engineering and Command. Most components require Crew and Engineering. Every 25 Crew/Engineering requires 1 Command Crew.

Consolidated Crew Requirements

The following table lists all of the crew requirements for all components.

Component	Crew	Engineering	Command
Lasers	5	1/50 tons	
Mass Cannons	8	1/50 tons	
Kinetic Beams	12	1/50 tons	
Particle Beams	12	1/50 tons	
Plasma Cannons	15	2/50 tons	
Gauss Cannons	8	1/50 tons	
HV Cannons	5	1/50 tons	
Plasma Missiles	18	1/50 tons	
Particle Bombs	15	1/50 tons	
Electron Torpedo	12	1/50 tons	
Proton Torpedo	12	1/50 tons	
Missile Launcher	20	1/50 tons	
Dual Missile Launcher	20	1/50 tons	
Rocket Pod	20	1/50 tons	
Mine Layer	20	1/50 tons	
Sensors	3		1
ECM Suites	3		1

Component	Crew	Engineering	Command
EWD	2		
Long-Range Scanners	3		
Communication Suite	3		
Command Net	3		1
Science Instruments	10		
HEC Rings		3	
Life Support		1	
Ripple Detector	2		
Shuttlebays	3		
DCC	15		
Prototype IC		4	
Standard IC		2	
Enhanced IC		2	
Advanced IC		1	
Hangars	10		
Tractors		2	
Docking Bay	5		
Shields	5	1	
Power Plants		2	
FTL Drive		15	
Basic N-Space Drive		20	
Standard N-Space Drive		15	
Improved N-Space Drive		15	
Enhanced N-Space Drive		10	
Advanced N-Space Drive		10	
Psychic Scanners	3		
Psionic Inhibitor	5		
Psi Shields	5	1	
Psibombs	12		
Psychic Annihilators	18		
Shard Projectors	8		
Shard Bombs	12		
Shard Lance	18		
Shuttle	1		
Pinnace	1		
Cargo Shuttle	2		
Assault Shuttle	4		
Drop Pod	2		
Light Fighter	2		
Medium Fighter	2		
Heavy Fighter	3		
Assault Fighter	3		

Table 47 Consolidated Crew Requirements

Power Systems

Power systems supply the necessary power to the ship. This power is required for the electrical systems, support systems, engines, and command systems. Chapter 25 shows the available power systems.

Electrical Systems

Electrical systems include various systems like sensors, long-range scanners, communications, command net and science instruments. Each requires a number of power points to function, though not all need function simultaneously. Shield Generators are considered Electrical systems for damage purposes.

CHAPTER 20
ELECTRONICS

Sensors

Sensors are comprised of four main components; Base Sensor Class, Channel Class, Signature Class, and Resolution Class. These four classes combine to give Sensors all of the capabilities needed.

Crew

Each sensor requires 3 crew and 1 command crew. Each ECM Suite requires 3 crew and 1 command crew.

Base Sensor Class

The Base Sensor Class determines the sensor suite's base range, acquisition chance, and detection range. The detection range is the range at which the sensor suite can be detected at.

Sensor Class	Range (hex)	Acquisition	Detection Range (hex)	Cost	Tons	LP Cost
1	12	30%	20	10	1	3
2	19	35%	30	15	1	4
3	28	40%	40	20	1	7
4	39	45%	50	25	1	10
5	52	50%	70	30	1	13
6	67	60%	90	35	1	17
7	84	70%	110	40	1	21
8	99	80%	130	45	1	25

Table 48 Base Sensor Class

Channel Class

The Channel class determines the number of channels available to the ship.

Channel Class	Channels	Cost	LP Cost
1	10	5	3
2	20	10	5
3	30	20	8
4	40	40	10
5	50	80	13
6	60	160	15
7	70	320	18
8	80	640	20

Table 49 Channel Class

Signature Class

Signature Class	Active Mode	Passive Mode	Cost	LP Cost
1	20m	5m	10	5
2	40m	10m	20	10
3	60m	15m	30	15
4	80m	20m	40	20
5	100m	25m	50	25
6	120m	30m	60	30
7	140m	35m	70	33
8	160m	40m	80	40

Table 50 Signature Class

The Signature class determines the Active and Passive mode Signatures of the sensor suite.

Resolution Class

The Resolution class of the sensor determines the Standard of the sensor suite. Resolution of the sensor under stealth is multiplied by the ECM generation's Stealth Multiple.

Class	Standard Res.	Cost	LP Cost
1	60m	10	3
2	50m	15	4
3	40m	20	5
4	30m	25	6
5	20m	30	8
6	15m	35	9
7	10m	40	10
8	5m	45	11

Table 51 Resolution Class

ECM

ECM is used to make a ship harder to hit. ECCM is the counter point to ECM and used to negate ECM. Stealth is a special mode used to cloak the ship as much as possible. Each mode is classed by the generation of the mode. ECM is applied against the target ship's Signature.

Gen.	Bonus	Cost	Seeking Wpn. To Hit	Tons	LP Cost
1	-10m	5	-10%	1	3
2	-20m	10	-15%	1	5
3	-30m	15	-20%	1	8
4	-40m	20	-25%	1	10
5	-50m	25	-30%	1	13
6	-60m	30	-35%	1	15
7	-70m	35	-40%	1	18
8	-80m	40	-45%	1	20
9	-90m	45	-50%	1	23

Table 52 ECM Generation

ECCM is applied to your own sensors only to negate ECM.

Gen.	Bonus	Cost	LP Cost
1	+5m	5	1
2	+10m	10	3
3	+15m	15	4
4	+20m	20	5
5	+25m	25	6
6	+30m	30	8
7	+35m	35	9
8	+40m	40	10

Gen.	Bonus	Cost	LP Cost
9	+45m	45	11

Table 53 ECCM Generations

The ECCM generation defines the amount of ECM negated by the ECCM system.

Gen.	Bonus	Stealth Mult.	Cost	LP Cost
1	-15m	7x	20	4
2	-30m	6x	40	8
3	-45m	5x	60	11
4	-60m	4.5x	80	15
5	-75m	4x	100	19
6	-90m	3.5x	120	23
7	-105m	3x	140	26
8	-120m	2.5x	160	30
9	-135m	2x	180	34

Table 54 Stealth Generation

The Stealth generation defines the resolution of the ECM bonus while operating in Stealth mode. The Stealth Multiple is applied to the resolution of the sensor of the ship in stealth.

Miscellaneous Electronics

Ripple Detectors

Ripple detectors "see" the wake ripple of a ship travelling in Warpspace. Ripple detectors require 2 crew and cost 15 Logistics Points.

Emergence Wave Detectors

When ships exit Warpspace, they create emergence ripples in N-Space. These ripples are detectable by instruments. Emergence Wave Detectors (EWD) have a range of 10 Strategic Hexes. Emergence waves are an artifact of Warpspace and thus are detected instantly. EWD also detect wormhole usage. EWD require 2 crew. EWD cost 10 Logistic Points.

Long Range Scanners

Long range scanners are used to detect things at the system level. If a target has a signature greater than the resolution of the scanner, it is detected. This is opposite of how Sensors function. Generation 0 LRS are available with no prior research. LRS require 3 crew.

Gen.	Range (LM)	Pow	Res.	Sig.	Cost	Tons	LP
0	2	5	300m	25	150	10	2
1	5	10	230m	25	150	10	5
2	15	30	165m	50	150	10	15
3	45	90	105m	75	150	10	45
4	60	120	60m	100	150	10	60
5	90	180	20m	125	150	10	90

Table 55 Long-Range Scanners

Communication Suite

Communication Suites are used to keep ships in communication with each other and with planets. Comm. suites have effectively unlimited range; however, they are limited to light speed, which means that there is a lag for responses. Comm Suites require 3 crew. Comm Suites require 2 Logistic Points.

Example: The Katana is communicating with a planet at a distance of 1 light hour (216,000 strategic hexes). Each message takes 1 hour to get to its destination. The Katana would be better advised to move closer to the planet.

Command Net

Command Nets are a huge tactical advantage to ships equipped with them over ships that do not. The main advantage is it allows a higher grade crew to bring up a lower grade crew for initiative purposes. It also enables the lower grade crew to fire with the higher grade bonus. Each ship in a command net adds all of their sensor channels into a Command Net Sensor Pool. The ships in the command net can collectively make use of the channels in the Pool.

Gen.	Ships	Channels	Radius (hex)	Cost	Tons	Pow.	LP
1	3	100%	3	500	10	5	9
2	5	105%	5	750	10	5	25
3	8	110%	7	1,000	10	5	56
4	11	115%	9	1,250	10	5	99
5	14	120%	11	1,500	10	5	154

Table 56 Command Nets

The channels value is applied to the Command Net Channel Pool. The radius is the maximum range the ships can be from each other. This is checked from the ships farthest away from each other. Command Nets require 3 crew and 1 command crew.

Science Instruments

Science Instruments are necessary for survey operations (on page 92). Each generation of instruments provide 5 points per hour. There are five generations of Science Instruments. Each generation consumes 10 power and costs 500MCr. Science instruments use 50 tons, regardless of generation. Science Instruments require 10 crew. Science Instruments cost 5 Logistic Points per Generation.

High-Energy Capacitance Rings

High-Energy Capacitance Rings (HEC/HEC Rings) are used when a surge of power is required, i.e. entering Warpspace. All generations of rings take 10 turns to fully recharge. Each ring will release 25 points of power per generation. This power may not be utilized over multiple turns. There are five

generations of rings. HEC Rings require 3 engineering crew. HEC Rings cost 25 Logistic Points.

Item	Cost	Power	Tons
Emergence Wave Detector	500	10	10
Comm. Suite	20	5	5
Command Net	250/Gen	5/Gen	25
Science Instruments	500/Gen	10/Gen	50
HEC Rings	150/Gen	10	10
Ripple Detector	250	10	10

Table 57 Miscellaneous Electronics

CHAPTER 21 ELECTRONIC MODIFICATIONS

These are modifications to electronic systems. This category includes ECM/ECCM, EWD, LRS, and Sensors.

ECM/ECCM Modifications

These modifications are applied to ECM/ECCM systems. All modification costs are multiplicative.

ECM Modifications

Basic ECM Boost and Wide-Band ECM may be stacked with Improved Resolution, but not each other.

Basic ECM Boost

This doubles the cost of the ECM suite. ECM Boosted Suites provide a 50% bonus to the ECM value. Basic ECM Boost increases the Logistic Point Cost by 50% (round up).

Wide-Band ECM

Wide-Band ECM triples the cost of the ECM Suite. Wide-Band ECM further degrades the incoming signal. Wide-Band ECM suites have 2x the bonus listed. Wide-Band ECM doubles the Logistic Point Cost.

Improved Resolution

Improved Resolution ECM Suites provide double the bonus for ECCM. Improved Resolution ECM Suites cost double the normal Suite. Improved Resolution doubles the Logistic Point Cost.

Sensor Modifications

These modifications are applied to Sensors. All modification costs are multiplicative.

Basic Sensor Boost

Basic Sensor Boost doubles the cost of the Sensor suite. Basic Sensor Boost increases the Tactical Range of the sensors by 50%. Sensor Boost increases the Logistic Point Cost by 50% (round up).

Wide-Band Sensors

Wide-Band Sensors double the cost of the Sensor suite. Wide-Band Sensors increase the number of channels by 50%. Wide-Band Sensors increase the Logistic Point cost by 50% (round up).

Improved Resolution

Improved Resolution Sensors double the cost of the

sensor suite. Improved Resolution sensors decrease the resolution of the sensor by 50%. Improved Resolution increases the Logistic Point Cost by 50% (round up).

EWD Modifications

Extra Range

This modification increases the range of EWD by 5 hexes. It doubles the cost of the EWD and doubles the Logistic Point cost. This may only be applied once.

Long-Range Scanner Modifications

Enhanced Resolution

This modification lowers the resolution by 20%. The cost for this modification is 5x normal cost and triples the Logistic Point cost of the LRS. This modification may only be applied once.

Command Net Modifications

Increased Radius

This modification increases the radius for ships in a Command Net by 1 hex. This doubles the cost of the Command Net and doubles the Logistic Point cost.

Enhanced Channels

This modification increases the Channel capacity by 5%. This triples the cost of the Command Net and increases the Logistic Point cost by 2.5x. This modification may only be applied once.

Science Instrument Modifications

Increased Analysis Capacity

This modification increases the survey point generated to 8 per generation. This doubles the cost and Logistic Point cost of the instruments.

HEC Ring Modifications

Increased Charge Rate

This modification reduces the charge time of HEC Rings by 1 turn. It increases the cost of the Rings by 1.5x and doubles the Logistic Point cost. This modification may not be applied more than three times.

Increased Capacity

This modification increases the capacity of the HEC Rings to 35 points per generation. This triples the cost and Logistic Point cost of the Rings. It may not be applied more than once.

Metered Output

This modification allows the HEC Rings to discharge over multiple turns. Each application of the modification increases the number of turns by one. If this modification is applied to the Rings, they may not be discharged in one turn. This modification doubles the cost and Logistic Point cost of the Rings.

CHAPTER 22 SUPPORT SYSTEMS

Life Support

Life support is a required system. This includes air circulators, food stores, water stores, etc. A ship without life support will not be able to support its crew for very long. Cost and tonnage is included in the cost of the hull. Redundant life support systems have the power, cost and tonnage listed on Table 58. Redundant Life Support systems cost 5 Logistic Points.

Additional Crew Quarters

Ships may have crews larger than their designed components require to replace battle losses. Crew housing is accounted for in the hull and tonnage of components. Additional crew require quarters. Additional quarters consume 50 tons per 10 additional crew. Additional crew quarters require 5 Logistic Points.

Shuttlebays

Shuttlebays are required to carry small craft. Small craft are used to transfer cargo and crew between ships and other ships or planets. Shuttlebays have 4 hangar points. Additional bays after the first provides 1 additional hangar point. Shuttlebays may not rearm missiles on fighters or shuttles. Shuttlebays cost 5 Logistic Points per bay.

Docking Bays

Docking Bays are specialized bays for ships to dock with another ship for transport. Each bay supports 100 tons of ship. Docking bays do not support fighters or shuttles. Docking bays do not count towards Hull costs. Docking bays do not count towards hull size for hardpoint determination. Additional docking bays grant a 10 tons bonus in capacity after the first. Docking Bays cost 10 Logistic Point per bay.

Hangars

Hangars are used to house small craft and fighters. A ship with 2/3 of its available hull tonnage dedicated to hangars is considered a carrier. Hangars have 4 Bay Points per hangar. Additional hangars after the first provides 1 additional bay point. Hangars cost 10 Logistic Points per bay.

Damage Control Crew

Damage Control Crews are arguably the second most important support system. Damage control crews repair any combat damage that the ship sustains. Full information may be found in the Combat section (on page 19) Damage Control Crews cost 10 Logistic Points.

Inertial Compensators

Compensators allow a ship to exceed the Thrust of the engines safely. Ships may exceed the thrust of the engine by three levels without compensators, incurring penalties at each thrust beyond that. Inertial Compensators cost 10 Logistic Points per rating.

Tractor Beams

Tractor beams are used to have ships tow another. A ship may mount one tractor beam. A ship may only tow one other ship at a time. Tractor Beams cost 20 Logistic Points.

Radiators

Radiators are used to disperse heat. Ships have an innate radiator rating equal to their Hull divided by 500 (round up), with a minimum value of 1. Cargo holds and hangars do not count towards the radiator calculation.

Cargo Holds

For non-freighter hulls, cargo holds are an added expense. If the ship is classed as a freighter, the cargo holds are already included in the cost of the hull. Cargo Holds contain 100 tons of cargo. Multiple holds provide a 10 tons bonus to cargo capacity after the first hold. Cargo Holds cost 2 Logistic Points per hold.

Cargo Transfer

Each 100 tons of cargo takes 1 hour to transfer from ship to ship or from ship to ground (in the case of aerodynamic ships). This is modified by the Industrial Index. Transfer from orbit to ground requires the use of specialized atmospheric cargo ships, or shuttles. Each shuttle may transport tonnage shown in Table 73 on page 61.

Troop Bays

Troop Bays are required to transport troops on ships. Troop Bays hold 10 troop size points worth of troops on a ship. Multiple troop bays provide a 1 size point bonus in amount of troop size points held after the first. Troop Bays cost 4 Logistic Points per bay.

Troop Transfer

Troops may be transferred from Bay to shuttle at a rate of 1 Troop point per hour. As with Cargo, this is modified by the Industrial Index.

Cryo Pods

Cryo pods are used to transport population from one place to another, using minimal resources. One pod will hold 1 PP. Cryo Pods cost 1 Logistics Point per pod.

System	Power	Cost	Tons	Crew	Logistic Points
Life Support	1	10	1/500 tons	1 E	5
Addl. Crew Quarters	1	15	50 tons /10	-	5
Shuttlebay	2	200	50	3	5
Damage Control Crew	1	100	5	15	10
Inertial Compensators, Prototype	4x thrust	50	25	4 E	10/rating
Inertial Compensators, Standard	2x thrust	75	20	2 E	10/rating
Inertial Compensators, Enhanced	1x thrust	100	15	2 E	10/rating
Inertial Compensators, Advanced	1/2x thrust	150	10	1 E	10/rating
Hangars	2	250	100	10	10
Tractor	Variable	500	500	2 E	20
Cargo Holds	-	50	100	-	2
Troop Bay	1	100	100	-	4
Docking Bay	1	500	110	5	10
Radiators	-	100	10	-	1
Cryo Pod	25	500	500	2 E	1

Table 58 Support Systems

CHAPTER 23 PASSIVE DEFENSES

Passive defenses are comprised of shields and armor. Ships may only have one shield system and one armor system.

Shields

Shields are projections of force designed to stop incoming damage. Each ship has shields in eight aspects; Front Top, Front Bottom, Rear Top, Rear Bottom, Left Broadside Top, Left Broadside Bottom, Right Broadside Top, and Right Broadside Bottom. The arcs defined by the shields are the same as defined for weapon arcs. Each shield facing has the full Collapse value of the shield's level. Each level of shields provides protection against the damage types (EM, Thermal, and Kinetic). The level of protection reduces the damage that is applied to the ship. This value does not reduce from damage. Shields also consume power. Shields will reduce the incoming damage slightly before it is applied to the shields. Any remaining damage is applied to the Collapse value. Collapse value is reduced by the damage applied to it. If the Collapse value is less than the damage, the shield has been breached and is Collapsed. Remaining damage is applied to Armor. In each Bookkeeping Phase, the shields will rebalance themselves to an equal level. The player may opt to not rebalance the shields. If the shields are not rebalanced, power may be diverted from other shields to reinforce one shield aspect. No more than 25% of a shield's Collapse value may be diverted to another shield. Shields will also regenerate themselves at this point.

Gen.	Regeneration Rate	Power	Logistic Point Cost
1	2	5	3
2	4	10	6
3	6	15	9
4	8	20	12
5	10	25	15
6	12	30	18
7	14	35	21
8	16	40	24
9	18	45	27
10	20	50	30

Table 59 Shield Regeneration Generations

The regeneration rate applies to the Collapse value for Shields. Shields cannot be regenerated beyond their starting values.

Crew

Shield Generators require 5 crew and 1 engineering crew.

Activating Shields

Shields that are not activated at the beginning of combat may be activated. Shields gain an amount of Collapse value added each turn equal to their power requirements x 5. Shield Regenerators and HEC rings may increase this rate.

Armor

Armor is similar to shields, in that they both protect across the spectrum of damage types. Each facing has its own armor Collapse value. The biggest difference in comparing armor and shields is that armor does not regenerate (except Organic Armor). Once the Collapse value of armor is reached, the armor is considered to be breached, and will provide no further protection to that facing. Breached armor may only be repaired in a shipyard or similar facilities.

Gen.	Regeneration Rate	Power	Logistic Point Cost
1	1	3	2
2	2	5	3
3	3	8	5
4	4	10	6
5	5	13	8
6	6	15	9
7	7	18	11
8	8	20	12
9	9	23	14
10	10	25	15

Table 60 Organic Armor Regeneration Rates

The regeneration rate applies to Organic Armor Collapse values only.

Missile Decoys

Missile decoys are deployed outside of the shielding of the ship. There are two types of missile decoys, thermal and signature. The thermal decoys simulate a target with twice the thrust of the ship it is tethered to. The signature decoy presents a target with twice the signature of the tethered ship. Each type weighs 50 tons and requires 5 power. Each decoy also requires a standard hardpoint. Decoys have HTK based on hull technology. Missile Decoys cost 3 Logistic Points each.

Shield	Power	EM	Thermal	Kinetic	Collapse	Regen	Signature	Cost	Tons	LP Cost
Alpha	3	0	15	10	37	3	15	20	10	27
Beta	4	0	20	10	45	5	18	30	10	33
Gamma	5	0	25	15	60	6	24	40	10	44
Delta	7	5	30	15	75	7	30	50	10	55
Epsilon	8	5	35	20	90	9	36	60	10	66
Zeta	9	5	40	20	97	10	39	75	10	72
Eta	11	10	45	25	120	12	48	90	10	88
Theta	12	10	50	25	129	13	51	105	10	94
Iota	13	10	55	30	142	14	57	120	10	105
Kappa	15	15	60	30	157	16	63	135	10	116
Lambda	16	15	65	35	172	17	69	155	10	127
Mu	17	15	70	35	180	19	72	175	10	133
Nu	19	20	75	40	202	20	81	195	10	149
Xi	20	20	80	40	210	21	84	215	10	155
Omicron	21	20	85	45	225	23	90	235	10	166
Pi	23	25	90	45	240	24	96	260	10	177
Rho	24	25	95	50	255	26	102	285	10	188
Sigma	25	25	100	50	262	27	105	310	10	194
Tau	27	30	105	55	285	29	114	335	10	210
Upsilon	28	30	110	55	292	30	117	360	10	216
Phi	29	30	115	60	307	32	123	390	10	227
Chi	31	35	120	60	322	33	129	420	10	238
Psi	32	35	125	65	337	35	135	450	10	249
Omega	33	35	130	65	345	36	138	480	10	255

Table 61 Shields The Collapse value is how much damage the shield can sustain before collapsing. Collapsed shields do not regenerate. Collapsed shields are considered "Disabled" for damage control purposes. The Signature value is added to the ship while the shields are active. Power is how much power is required to power the shields. The Regen value is how much a shield will add to its Collapse value each turn.

A ship with Zeta Shields is struck by a 20cm Gauss Cannon with Autofire on a Dual Mount. All four shots hit the ship. The volley would normally do 16EM, 28TH, and 60K damage. The damage is reduced to 11EM, 0TH, and 40K. This is the damage that is applied to the armor. The shield's collapse rating is dropped to 46 from 97.

Armor	Power	EM	Thermal	Kinetic	Collapse	Signature	Cost	Tons	LP Cost
Alpha	0	10	5	0	30	0	10	10	15
Beta	0	15	5	0	40	0	15	10	20
Gamma	0	20	10	0	60	0	20	10	30
Delta	0	25	10	5	80	0	25	10	40
Epsilon	0	30	15	5	90	0	30	10	50
Zeta	0	35	15	5	110	0	40	10	55
Eta	0	40	20	10	140	0	50	10	70
Theta	0	45	20	10	150	0	60	10	75
Alpha—Reactive	0	40	30	10	160	26	70	10	67
Beta—Reactive	0	45	30	10	170	28	80	10	73
Gamma—Reactive	0	50	35	10	190	32	95	10	84
Delta—Reactive	0	60	40	20	240	36	110	10	95
Epsilon—Reactive	0	65	45	20	260	40	125	10	106
Zeta—Reactive	0	70	45	20	270	42	140	10	112
Eta—Reactive	0	80	55	30	330	48	155	10	128
Theta—Reactive	0	85	55	30	340	50	170	10	134
Alpha—Organic	5	60	15	10	170	0	190	10	90
Beta—Organic	5	65	15	10	180	0	210	10	95
Gamma—Organic	5	70	20	15	210	0	230	10	110
Delta—Organic	5	75	20	15	220	0	250	10	115
Epsilon—Organic	5	80	25	20	250	0	270	10	130
Zeta—Organic	5	85	25	20	260	0	295	10	135
Eta—Organic	5	90	30	25	290	0	320	10	150
Theta—Organic	5	95	30	25	300	0	345	10	155

Table 62 Armor The Collapse value is how much damage the armor can sustain before collapsing. The Signature value is added to the ship while they are active. Power is how much power is required to power the armor. Power is also used to regenerate the armor in the case of Organic Armor.

The ship from the previous example has Zeta armor. The damage that got through the shields is 11EM, 0TH, and 40K. The armor has a protection value of 35EM, 15TH, and 5K. This will stop all of the EM and TH damage and reduce the kinetic damage to 35. The armor's Collapse value is dropped to 75 from 110.

CHAPTER 24 DEFENSIVE MODIFICATIONS

Shield Modifications
All Shield Modifications may stack with each other. Costs are multiplied together. For example, a shield with EM Bands and Hardening costs 5x normal.

EM Bands
EM Bands double the cost of the shields. EM Bands provide 5 points of EM protection. EM Bands cost 5 Logistic Points.

Kinetic Bands
Kinetic Bands double the cost of the shields. Kinetic Bands provide 5 points of Kinetic Protection. Kinetic Bands cost 5 Logistic Points.

Thermal Bands
Thermal Bands double the cost of the shields. Thermal Bands provide 5 points of Thermal Protection. Thermal Bands cost 5 Logistic Points.

Shield Hardening
Shield Hardening costs 2.5 the cost of regular shields. Shield Hardening doubles the Collapse Value of the Shields. Shield Hardening doubles the Logistic Point Cost.

Shield Reflection
Shield Reflection costs 2.5 the cost of regular shields. Shield Reflection negates an amount of damage equal to the K value of the shield. Shield Reflection doubles the Logistic Point cost.

Armor Modifications
All Armor Modifications stack with each other. Armor modification costs are multiplied together.

EM Plating
EM Plating doubles the cost of the armor. EM Plating provides 5 points of EM protection. EM Plating costs 5 Logistic Points.

Kinetic Plating
Kinetic Plating doubles the cost of the armor. Kinetic Plating provides 5 points of Kinetic protection. Kinetic Plating cost 5 Logistic Points.

Thermal Plating
Thermal Plating doubles the cost of the armor. Thermal Plating provides 5 points of Thermal protection. Thermal Plating costs 5 Logistic Points.

Armor Hardening
Armor Hardening costs 2.5x the cost of normal armor. Armor Hardening doubles the Collapse Value of armor. Armor Hardening doubles the Logistic Point cost.

Armor Reflection
Armor Reflection costs 2.5x the cost of normal armor. Armor reflection negates 5 points of damage. Armor Reflection adds 5 to the Logistic Point cost.

Light Armor
Light Armor costs 1.5x the cost of normal armor. Light Armor halves the Collapse Value of armor. Light Armor weighs 5 tons instead of 10 tons. Logistic Points are unchanged.

Polarized Armor
Polarized Armor costs 3x the cost of normal armor. Polarized Armor cannot be used with shields. Polarized Armor combines the values of the generation of armor plus the equivalent level of shields. Polarized Armor requires power equal to the equivalent level of shields. Logistic Points are doubled for Polarized Armor.

The Terran Confederation fields a new class of ships with Polarized Armor. The ship has Delta Polarized Armor. Delta armor normally has 25/10/5 values. Delta Polarized Armor would have 30/40/20.

CHAPTER 25 POWER PLANTS

Power plants are classified by the Class, Type, Efficiency, and Armor. Efficiency and Armor are optional.

Power Plant Class

Class	Melt-down %	Power Base	Tons	Cost	LP Cost
Primitive	85	20	10	250	4
Basic	60	40	9	200	8
Standard	50	50	8	300	10
Improved	40	60	8	400	12
Enhanced	25	75	8	500	15
Advanced	10	100	7	600	20

Table 63 Power Plants

Power Plant Type

Type	Multiplier	Cost	Tonnage	LP Cost
Fission	1	x1	10	x1
Fusion	2	x1.5	8	x2
Antimatter	3	x2	6	x3
Plasma Core	4	x2.5	4	x4
Warp-Tap	5	x3	2	x5
Zero-Point Core	6	x4	1	x6

Table 64 Power Plant Type

The Multiplier is multiplied with the Power Base to arrive at the final power generated per power plant. Costs are additive.

Efficiency

Efficiency	Extra Power	Meltdown %	Cost	LP Cost
1	10%	+5%	+10%	+10%
2	20%	+10%	+20%	+20%
3	30%	+15%	+30%	+30%
4	40%	+20%	+40%	+40%
5	50%	+25%	+50%	+50%

Table 65 Power Plant Efficiency

The total power generated is modified by the extra power percentage. The meltdown chance is added to the power plant's base meltdown chance. There is an upper cap of 99% for meltdown chances.

Efficiency	Power Reduction	Meltdown % Reduction	Cost	LP Cost
1	10%	-5%	+10%	+10%
2	20%	-10%	+20%	+20%
3	30%	-15%	+30%	+30%
4	40%	-20%	+40%	+40%
5	50%	-25%	+50%	+50%

Table 66 Meltdown Efficiency

There is always a lower cap of 1% on meltdown chances.

Power Plant Armor

Armor	Additional HTK	Cost	LP Cost
1	2	500	2
2	4	750	4
3	6	1,000	6
4	8	1,250	8
5	10	1,500	10
6	12	1,750	12
7	14	2,000	14
8	16	2,250	16
9	18	2,500	18
10	20	2,750	20

Table 67 Power Plant Armor

Additional armor provides additional HTK for the power plant. The cost is added to the total cost of the power plant.

Crew

Each plant requires 2 engineering crew.

CHAPTER 26 ENGINES

There are two types of engines that are important to ship, N-Space and FTL. N-Space engines are used for movement in normal space. FTL engines are used to travel long distances between stars in relatively short times.

FTL Engine	Jump Rating	Time/ Jump (Days)	Insertion Power	Cost	Tons	Jump Delay	LP Cost	Jump Radius
Class I	5	10	50	500	150	5 turns	15	10 hexes
Class II	10	8	40	1,000	150	4 turns	18	8 hexes
Class III	15	6	30	2,000	150	3 turns	21	6 hexes
Class IV	20	4	20	4,000	150	2 turns	24	4 hexes
Class V	25	2	10	8,000	150	1 turn	27	2 hexes

Table 68 FTL Engines

Warpspace

Warpspace is a separate dimension from normal, or N-Space. Each ship in Warpspace is contained within a bubble. The radius of the bubble is 10x the tonnage of the ship in kilometers.

Ships in Warpspace leave a ripple effect, similar to a boat's wake in water. This ripple is detectable by scanners. The size of the ripple equal to the tonnage of ships divided by the FTL class multiplied by the distance of the trip. Ripples are detected at 1 LM per size of the ripple.

Warp Crash

Anything intersecting the bounds of the bubble from the interior will disrupt the bubble and force the ship inside into N-Space. This abrupt entrance into N-Space produces a splash similar to a Warp Anchor. The ship entering N-Space also takes damage equivalent to the tonnage of the ship in structural damage.

Warp Anchor

The Warp Anchor snags ships out of Warpspace and returns them to N-Space. The resultant "Warp Splash" locks ships from entering Warpspace in a radius dependent on the size of the ship. Picket class ships have a radius of 1 LM, Escort class ships have a radius of 3LM, Cruiser class ships have a radius of 6 LM, and Capital class ships have a radius of 10 LM. The splash's effects last for a number of hours equal to twice the radius of the splash. Warp anchors are either ship-mounted and have a range of 24 LM or are installations and have a range of 72 LM. Warp Anchors include ripple detectors.

FTL Engines

FTL engines or Faster-than-Light engines allow ships to travel between the vast empty distances between stars. Each generation of FTL drive can make a jump up to its maximum jump rating. Insertion power shows how much power is required to insert into Warpspace. Time per Jump shows how many days each jump takes to travel. FTL Engines require 15 Engineering crew.

A ship cannot enter into Warpspace within 10x the diameter of a system body. The gravitational fluctuations prevent a ship from safely entering into Warpspace inside that range. The minimum jump distance is 10 LM. As shown on Table 68, the Jump Delay is the number of turns before a ship may enter FTL after initiating the jump.

When a ship exits Warpspace, it has zero velocity. Each generation of FTL engine has a Jump Radius. The ship designates an entry hex and makes a percentage roll modified by Crew Grade. If the roll is 75% or less, the ship has hit the target hex, otherwise roll for deviation and distance based on the Jump Radius. If the FTL jump is in-system, then the roll is 95% or less modified by Crew Grade. Multiple FTL drives may not mounted on a ship.

N-Space Engines

N-Space engines have five classes, and ten types. These values determine the total amount of power consumed per thrust. Engines have a Signature of 10x Thrust.

Class	Power	Cost	Ton	Crew	LP Cost
Basic	6	500	250	20 E	4
Standard	5	1,000	225	15 E	5
Improved	4	1,500	200	15 E	6
Enhanced	3	2,000	175	10 E	7
Advanced	2	2,500	150	10 E	8

Table 69 N-Space Engines

The power is the amount of power required per thrust per 1,000 tons or fraction thereof. Engines have a base 5% chance of exploding when destroyed. The amount of damage is equal to 25% of the total power required by the engine.

Type	Multiplier	Cost	Ton	LP Cost
Nuclear Torch	10	100	100	10
Nuclear Pulse	9	200	100	11
Ion Pulse	8	400	100	12
Grav Pulse	7	800	100	13
Plasma Torch	6	1,600	100	14
Plasma Pulse	5	3,200	100	15
Fusion Torch	4	6,400	100	16
Fusion Pulse	3	12,800	100	17

Type	Multiplier	Cost	Ton	LP Cost
Antimatter Torch	2	25,600	100	18
Antimatter Pulse	1	51,200	100	19

Table 70 N-Space Engine Types

The multiplier is used to arrive at the final power per thrust rating of the engine and is applied to the power listed in Table 69. Engines add 100 tons per point of Thrust to their final tonnage.

Efficiency

Engines may have either a Thrust Efficiency or Power Efficiency. Thrust Efficiency adds to the thrust of the engine, while Power Efficiency reduces the power required for thrust.

Thrust Efficiency	Bonus Thrust	Power Cost	Explosion %	Cost	LP Cost
1	1	5%	+5%	500	2
2	2	10%	+10%	750	4
3	3	15%	+20%	1,000	6
4	4	20%	+30%	1,250	8
5	5	25%	+40%	1,500	10

Table 71 Thrust Efficiency

Each level of efficiency adds the bonus thrust listed. Each level costs additional power as a percentage of current power and increases the explosion chance when an engine is destroyed.

Power Efficiency	Thrust Cost	Power Reduction	Cost	LP Cost
1	2	5%	500	2
2	4	10%	750	3
3	6	15%	1,000	4
4	8	20%	1,250	5
5	10	25%	1,500	6

Table 72 Power Efficiency

The thrust cost will reduce the total available thrust by the amount listed, while reducing the power required by the listed percentage.

CHAPTER 27 SPECIAL RACIAL TECH

Psychic Technology

Psychic Scanners

Psychic Scanners are a variation of regular Long-Range Scanners. They are twice the size of regular Long-Range Scanners. The "psychic" Signature of a ship is equal to the number of crew on the ship multiplied by 2. Psychic Scanners use the same formula as regular Long-Range Scanners. Crew requirements are as normal Long-Range Scanners. Psychic Scanners cost twice as much Logistic Points as Long-Range Scanners. Psychic Scanners have the same cost as normal Long-Range Scanners.

Psionic Inhibitor

Psionic Inhibitors are a Class I weapon with a range of 8. They do no damage but impose a -10 to hit on targets struck for 1d5 rounds. EM protection protects against the Psionic Inhibitor. It has 25 EM damage for EM penetration purposes only. The Psionic Inhibitor requires 5 crew. Psionic Inhibitors cost 30 Logistic Points. Psionic Inhibitors have a cost of 150 MCr.

Psi Shields

Psi Shields are a variation of regular shields. They have twice the weight and cost of equivalent regular shields. Psi Shields have +25 EM protection over equivalent shields. No other values are changed. Psi Shields require crew equivalent to normal shields. Psi Shields cost an additional 25 Logistic Points.

Psibombs

Psibombs are a Class I weapon with a range of 5. They do no damage but impose a -10 to hit and +2 Initiative for 1d10 rounds to targets struck. EM protection protects against Psibombs. It has 40 EM damage for EM penetration purposes only. Psibombs require 12 crew. Psibombs cost 25 Logistic Points. Psibombs have a cost of 400 MCr.

Psychic Annihilators

Psychic Annihilators are a Class I weapon with a range of 3. They do no damage but reduce a crew's effective grade to Green. A Green crew struck suffers an additional -10 to hit and +2 Initiative. EM protection protects against Psychic Annihilators. It has 75 EM damage for EM penetration purposes only. Psychic Annihilators require 18 crew. Psychic

Annihilators cost 50 Logistic Points. Psychic Annihilators have a cost of 500 MCr.

Crystalline Technology

Crystal Hulls

Crystal Hulls cost twice as much as regular hulls and have half the structure of a regular hull. All beam weapons mounted on a Crystal Hull are considered to have the High-Energy Focus at no additional cost. Crystal Hulls cost twice as much as regular hulls.

Crystal Armor

Crystal Armor costs twice as much as equivalent regular armor. Crystal Armor may absorb an amount of EM damage equal to the EM rating. This absorbed energy may be used to increase the damage of Shard Projectors and Shard Bombs up to twice their damage value. If the armor is "full" of absorbed energy, it may not absorb any more until some is dissipated. The stored energy dissipates at 5 points per tactical turn. The dissipation occurs during End Turn Bookkeeping phase. Crystal Armor costs an additional 25 Logistic Points.

Shard Projectors

Shard Projectors are a Class I weapon with a range of 10. They do 4 Kinetic/0 Thermal/0 EM damage and are considered to be Armor Piercing. Shard Projectors require 8 crew. Shard Projectors cost 14 Logistic Points. Shard Projectors have a cost of 150 MCr.

Shard Bombs

Shard Bombs are a Class I weapon with a range of 6. They do 10 Kinetic/0 Thermal/0 EM damage and are considered to be Armor Piercing. Shard Bombs require 12 crew. Shard Bombs cost 24 Logistic Points. Shard Bombs have a cost of 300 MCr.

Shard Lance

The Shard Lance is a violent and sudden projection of the ship's hull. It may only be mounted on Crystal Hulls. It is a Class I weapon with a range of 0. It is considered Armor Piercing. It does damage equal to 10% of the structure of the firing ship in Kinetic damage. Shard Lances require 18 crew. Shard Lances cost 100 Logistic Points. Shard Lances have a cost of 600 MCr.

Machine Intelligence Technology

Machine Intelligence races get access to the Machine Intelligence tech line. The benefits from this line are not systems like Psychic or Crystalline tech lines.

Each tier of Machine Intelligence tech grants an advantage.

Tech I
This tier of technology allows the Machine Intelligence race to utilize MI instead of OI for population limits. The higher of the two is used.

Tech II
This tier of technology allows the Machine Intelligence race to spend half the normal RP for reverse engineering efforts.

Tech III
This tier of technology allows the Machine Intelligence race to add 1 to their Industrial Index. This is a global increase.

Tech IV
This tier of technology allows the Machine Intelligence race to increase the grade of their crews by 1 level. This is an immediate and global increase.

Tech V
This tier of technology allows the Machine Intelligence to buy off the negative traits associated with being a Machine Intelligence. This tier may be researched up to three times, each time removing one trait.

CHAPTER 28 SMALL CRAFT

Small Craft

Small craft includes shuttles of various types, pinnaces, and fighters. Small craft do not mount FTL engines and are therefore limited to the system they are in unless carried on a carrier. Fighters may be housed in boat bays, but due to the boat bay's lack of arming facilities may not be rearmed. Small craft are targeted by all weapons with a -20 to hit modifier. Weapons mounted on standard hardpoints on fighters have a maximum range of 12 hexes. Point Defense variations on the weapons are as on full-size ships. Fighters and small craft may not mount any shields or armor. Fighters mount compensators of sufficient rating to account for their maximum thrust. Troop Capacity is how many troop size points the small craft may carry.

Rearming Fighters

Missile-armed fighters may only be rearmed in

The engine available is based on what is available for ships. Each type adds the thrust to the base thrust of the fighter and adds to the signature.
Fighter engines do not apply to Shuttles, Pinnaces, Cargo Shuttles, or Assault Shuttles.

Flight Time

Small craft have a normal flight time of 30 minutes for shuttles (all types) and pinnaces. Drop Pods have a flight time of 3 minutes. Fighters have a flight time of 15 minutes.

Refueling

Fighters take 4 turns to refuel in combat conditions, or twice that in non-combat conditions. Shuttles take 8 turns in combat and 16 out of combat.

Small Craft Modifications

The following modifications may be made to small craft. Each modification consumes one PD hardpoint.

Craft	Max Thrust	PD HP	Std. HP	Hits to Kill	Res.	Channels	Sig.	Bay Points	Troop Capacity	Cargo Capacity	Crew	Cost	LP Cost
Shuttle	2	1	0	1	10m	1	5m	1	1	25 tons	1	50	8
Pinnace	3	2	0	1	15m	1	8m	1	2	50 tons	1	75	14
Cargo Shuttle	3	1	0	2	5m	0	12m	2	0	200 tons	2	100	10
Assault Shuttle	5	2	0	2	15m	2	3m	2	6	125 tons	4	125	17
Drop Pod	5	2	0	4	15m	2	5m	3	12	0	2	250	19
Light Fighter	12	2	1	2	30m	2	2m	1	0	0	2	250	34
Medium Fighter	10	3	2	4	25m	2	3m	2	0	0	2	375	59
Heavy Fighter	8	4	4	5	20m	2	6m	4	0	0	3	500	73
Assault Fighter	6	4	6	8	15m	2	8m	4	0	0	3	750	94

Table 73 Small Craft

Hangars. It takes 1 turn to reload 10CP worth of missiles in a Missile Launcher or Dual Missile Launcher. Rocket Pods require 10 turns to reload.

Fighter Engines

Each advance in sub-light drive technology provides a similar advance for fighter engines. Fighter engines are summarized on the following table.

Engine	Additional Thrust	Additional Signature	LP Cost
Nuclear Torch	0	+0m	0
Nuclear Pulse	+1	+5m	1
Ion Pulse	+2	+10m	2
Grav Pulse	+3	+15m	3
Plasma Torch	+4	+20m	4
Plasma Pulse	+5	+25m	5
Fusion Torch	+6	+30m	6
Fusion Pulse	+7	+35m	7
Antimatter Torch	+8	+40m	8
Antimatter Pulse	+9	+45m	9

Table 74 Fighter Engines

Modification	Cost	LP Cost	Effect
ECM	50	5	-10m
ECCM	50	5	-5m
Sensor	50	5	+25m Resolution, +3 Channels
Long Range Scanner	100	10	50m
Stealth	200	20	5x Resolution Mult. -25m Sig.
Long-Range Pack	100	10	Doubles the flight time of the small craft.

Table 75 Small Craft Modifications

Items work as their full-sized counterparts. Fighters utilizing missiles require Sensors or missiles with on-board sensors.

CHAPTER 29 GROUND COMBAT

Ground Units

Ground units or troops are created in Training Facilities. Each troop has a specialization increases the cost of the troop. Troops are also categorized by size. The size also affects the cost of the troop.

Troop	Training Points	Cost	Size
Company	5	10	1
Battalion	n/a		5
Brigade	n/a		21
Division	n/a		85

Table 76 Troop Types

Training points are the cost of the unit for training facilities. The size of the troop is how many vehicles are required to transport the troop. Troops are trained in Company levels only. Once four companies are trained, they can be combined into a Battalion. This requires a fifth HQ Company designated as the Battalion HQ. Once four battalions are formed, they can be formed into a Brigade. This requires an HQ Company designated as the Brigade HQ. Once four brigades are formed, they may be combined into a Division. This requires an HQ Company designated as Division HQ.

formations larger than a Company. For example, a Battalion may consist of two INF companies and two AST companies, along with the HQ Company. Troops cannot be grouped without an HQ company. Battalions and higher are considered stacked if they are moving as one unit.

Garrison This Company is used for defensive purposes. This is the basic troop type.

Recon This Company generates 1 Intel Point for Strategic Intelligence purposes. RCN units may disguise themselves as another troop type. This applies only for intelligence purposes.

Infantry This Company is the basic attack unit.

Assault This Company is usually used to attack fortified positions.

Heavy Assault This Company is used to attack heavily fortified positions.

Armor This Company is used in support of infantry/assault attacks.

Engineer This Company generates a bonus to the Build Rate for the colony they are stationed on. Also, able to increase the Defense value of troops stationed at the same objective by up to 50%. This increase occurs at a rate of 1 Defense per month.

Headquarters This Company allows for command options during ground attacks. HQ units move as fast as the slowest company in their formation.

Medical This Company will regenerate attached companies' Morale. The Morale regenerated by the

Specialization	Training Points	Cost	Attack	Defense	Size	Movement	Atk Range	Notes
Garrison (GAR)	0	0	0	6	+0	1	1	
Recon (RCN)	+10	+10	1	4	+0	3	3	Provides 1 Intel Point
Infantry (INF)	+5	+5	2	1	+0	2	2	
Assault (AST)	+10	+10	5	2	+0	2	1	
Heavy Assault (HVA)	+15	+15	6	3	+1	1	1	Mechanized
Armor (ARM)	+25	+25	8	4	+2	2	2	Mechanized
Engineer (ENG)	+25	+25	0	2	+1	2	1	Provides 0.25 build rate to the colony
Headquarters (HQ)	+25	+25	0	4	+0	Special	1	Provides command options
Medical (MED)	+30	+30	0	1	+0	1	1	Regenerates 5 Morale to attached companies per turn.
Air Superiority (AIR)	+40	+50	3	2	+1	4	5	Allows for air strike interdiction.
Security (SEC)	+10	+10	1	3 (6)	+0	2	1	Provides 2 Intel Points
Marine (MAR)	+10	+10	3	3	+0	2	2	Specialty unit mainly used in boarding actions
Scratch Defense (SCR)	0	0	1	1	0	1	1	Special, see description

Table 77 Troop Specializations

Each unit may be trained in a specialty. This adds to the training points, cost and may affect attack and defense strengths. The numbers in Table 77 are per Company. Different troop types may be mixed in

Medical Company will not increase it above the company's current Morale cap. The Medical company can regenerate its own Morale.

Air Superiority The AIR unit may attack ground units and be attacked by them or defend against Air Strike Options. To defend against an Air Strike, the

AIR unit must be within 2 hexes of the strike point. If it is, the AIR unit interdicts the Air Strike, negating its effect. Any Command points spent on the strike are lost.

Security The SEC unit may be used for security purposes in embassies or other facilities. When used as a defensive unit, the Defense value is doubled. The SEC also provides 2 Intel Points when emplaced in an embassy.

Marine The MAR unit is mainly used in boarding actions, both offensively and defensively. During a boarding action, the MAR gains +2 AV and DV.

Scratch Defense The SCR is a special unit comprised of ship's crew when no other defense unit is available during ship boarding combats. This unit may not be purchased normally. It is formed from ship's crew and requires 50 crew.

Morale

A company's Morale starts at 80. This increases by 2 points per month up to 100, and 1 point per month after that to a cap of 125. Personalities assigned to an HQ company with a Ground Combat bonus increase both the starting Morale and the Morale cap. If a company's morale falls below 25, they are considered unfit for combat duties and suffer -5 to Attack/Strength and -25 to combat rolls. Morale values for units larger than companies are averaged together.

Battlefield Setup

The field of battle is determined by Objectives. The invader determines objectives that he wishes to attack. Each facility on a planet is considered an Objective. Any know defensive units are also considered Objectives. In addition to these Objectives, each planet has a Capitol Objective. This Objective is required to be conquered for a planet to exchange hands. An invader can target a number of objectives equal to the number of Headquarter units deployed.

The battle map is a hex grid with the objective being in the center, and the next five hex rings out being the range bands.

The range bands are (from the innermost to outer) Point-Blank, Short, Medium, Long, and Far. Anything beyond Far is classified as Extreme.

The Orientation bands are Far Right Flank, Near Right Flank, Forward, Near Left Flank, Far Left Flank, and Rear. These orientations apply to the numbered facings on the hex as in the display.

The Objective is in the center spot of the map.
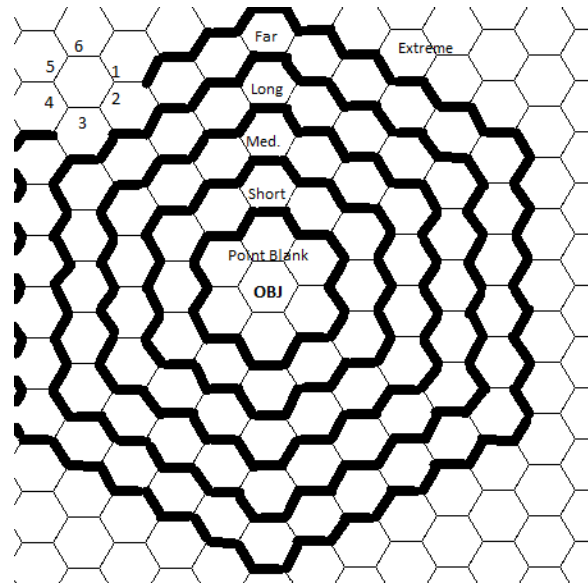
Figure 5 Ground Display

Prior to setting up, both sides roll for initiative. This is a d10 roll. Grade and General modifiers apply to this roll. With high grade and a low roll, negative numbers for the initiative are possible. This is perfectly alright.

The invader nominates a number of targets based on Grade.

An Average general with one HQ unit may designate six potential drop sites. Five of these drop sites will be false drops. If he had six HQ units, he could make 6 true drops.

In combination with the grade, each targeted objective requires one HQ unit. False objectives may be targeted to confuse the defender. The defender has

Grade	Number of Objectives	Base Drop Quality	False Drop Detection %
Green	2	Poor	15%
Poor	4	Poor	25%
Average	6	Average	35%
Veteran	8	Average	40%
Crack	10	Excellent	50%
Elite	12	Excellent	60%

Table 78 Grade & Objectives

a chance of detecting a false target. This chance is based on the grade of the defending general and the quality of the false drop. An attacker may increase the quality of a false drop by limiting the number of drops made (both real and false). A false drop may only be raised one level in quality. Each potential drop that is not made increases the quality of one drop.

Drop Quality	Modifier
Poor	+20
Average	0

Table 79 Drop Quality

The quality of the false drop adds or subtracts to the chance. If the defender rolls under the chance to detect, they are able to determine the drop is false.

The Drop

Once the false and real drops have been determined, the defender places defensive troops around the targets he is defending. The attacker then determines his Landing Zones. Landing Zones are at Far range. The attacker determines a hex as the landing zone, and rolls 1d10. (d10: 1 = On target, 2-3 = 1 band out, 4-6 = 1 band in, 7-0 = 2 bands in). A second d10 roll is made to determine accuracy in the drop. (d10: 1-2= Right Far Flank, 3-4= Near Right Flank, 5= Forward, 6-7= Near Left Flank, 8-9= Far Left Flank, 0= Rear). Each band closer to the target than Far results in the attacker suffering a 5 point Morale hit per band.

The Terran Confederation Marines are making a drop on a suspected Obsidian Blade stronghold. The Marine general is average and has 2 HQ units with him. He designates the Capitol and a defense base as the true drops. He marks another defense base and a shipyard as false drops. The defensive ground commander is Green. He has 5 HQ units. These get placed at the Capitol, the two defensive bases, the shipyard and a research center. The Obsidian Blade commander has a base 35% chance to detect the false drops. He rolls for each drop, getting a 62 for the capitol, 19 for base 1, 36 for base 2, and 64 for the shipyard. Of the false drops, he did not roll low enough to determine they were false, and so deploys his troops to each of the four sites.

Turn Order

Each turn progresses in the following order:
- Low Initiative Movement
- High Initiative Movement
- High Initiative Firing
- Low Initiative Firing
- Command Options

Movement

Each turn a troop may move one hex per movement point. A unit of mixed troop types can only move as fast as the slowest troop. You may not move away from the objective further than Extreme range. If you do so, you have retreated from the battle and it is considered a loss.

Firing

Each troop that attacks adds the attack values of the units. Each defending unit adds the defense values. The attacker makes a percentile roll. For each point the attacker's value is higher than the defender's, there is a +5 to the roll. Conversely, each point the defender is higher than the attacker imposes a –5 to the roll. If the is over 50% the attacker hits.

Firing Modifiers

The following table lists all of the applicable modifiers to the attack roll.

Situation	Modifier
Geology - Very Flat	ARM/HVA x 2 attack
Geology - Flat	ARM/HVA x 1.5 attack
Geology - Standard	No modifier
Geology - Rugged	INF/GAR x 1.5 defense
Geology - Very Rugged	INF/GAR x 2 defense
Gravity - Six levels deviation	-30
Gravity - Five levels deviation	-25
Gravity - Four levels deviation	-20
Gravity - Three levels deviation	-15
Gravity - Two levels deviation	-10
Gravity - One level deviation	-5
Attack has higher AV vs. defender DV	+1 per 5 difference
Defender has higher DV vs. attacker AV	-1 per 5 difference

Gravity modifiers are based on the planet the attack is taking place and the attacker/defender native gravity.

Damage

Each generation of armor tech provides 2 Morale to the unit. Each generation of shield tech provides 1 Morale to Mechanized units. Each unit does damage equal to the attack strength. Damage is applied to the unit's Morale.

Counterattacks

After damage is applied to the defender, the attacker suffers damage equal to ½ the defender's attack strength, if the attack hit. If the attacker's attack fails, the damage suffered is equal to the defender's attack strength.

Command Options

At the end of each turn, both the attacker and defender may use one or more command options. A number of options are available based on the grade of the Headquarters unit. The grade of the General also provides Command Options as below.

- Green – 1 Command Option
- Poor – 1 Command Option
- Average – 1 Command Option
- Veteran – 2 Command Options
- Crack – 2 Command Options
- Elite – 3 Command Options

Command options are per HQ unit and their grade plus any General's grade. Units not deployed do not provide Command Options to the battle until they are deployed. Command options do not regenerate during the battle.

You drop a brigade of INF onto the battle. This gives you five HQ units (1 per battalion plus the brigade HQ). If the HQ units are all Veteran, then you have 10 Command Options for the battle.

Command options available are Orbital Strike, Resupply, Forced Move, Artillery Strike, Counterbattery, Reinforcements, Air Transport, Naval Bombardment, Disengage, and Nuclear Strike.

Orbital Strike An orbiting ship fires weapons at the battlefield. Damage is calculated based on one non-missile weapon on the ship. A target band/slice is designated, and deviation rolled as for a drop. Each grade above Average provides a –1 to the roll. Half the damage done in the strike also does damage to the neighboring areas. Not available if there are no ships in orbit. *Cost:* 1 Option.

Orbital Barrage This is a variation of the Orbital Strike. An orbiting ship fires all of its non-missile weapons at the objective. The deviation is rolled for as for a drop. Each grade above average provides a -1 to the roll. Neighboring areas take half the damage done in the strike. Twenty-five percent of the damage done in the strike is applied to areas two spaces out. Ten percent of the damage in the strike is done to areas three spaces out. Not available if there are no ships in orbit. *Cost:* 4 Options.

Resupply This option will restore a unit's health. Each option spent will heal 10 Morale. *Cost:* 1 Option.

Forced Move This option allows a unit to move one additional hex. *Cost:* 2 Options.

Artillery Strike This option is only available if there are unengaged Armor Companies on the planet. Provides a barrage of five 10 Morale point hits on the target, rolling for deviation as a drop. Two adjacent areas suffer 5 points of damage. *Cost:* 1 Option.

Counterbattery This option is available only after an Artillery Strike. It requires unengaged Armor. When this option is used, Armor companies involved in an Artillery Strike are suppressed for 5 turns and may take no actions. *Cost:* 1 Option.

Reinforcements This option will bring in additional units as reinforcements. Each unit enters a random side at the outermost ring. Each unit brought in costs

1 option.

Air Transport This option allows a unit to move an additional two hexes. *Cost:* 2 Options.

Naval Bombardment Provides a barrage of five 10 Morale hits on the target, rolling for deviation as a drop. Two adjacent hexes suffer 5 points of damage. *Cost:* 1 Option.

Nuclear Strike This is a nuclear attack on the battlefield. The Nuclear Strike may be Strategic or Tactical. A Strategic strike requires the use of five silos and performs a 100 point Morale hit on the entire battlefield. High-tech units (greater than TL 4) reduce the amount of damage suffered by 10. A Tactical Strike covers a 4 hex-radius area on the battlefield. Designate and roll for deviation as normal. A Tactical strike requires 1 silo. The strike does a 50 point Morale hit to all units in the area. Units higher than TL 4 reduce this damage by 10. *Cost:* 6 Options.

Disengage This option allows a unit to disengage from combat. The unit moves two range bands out away from the objective. Any opposing unit that is engaged with the disengaging unit may make one attack on the unit. *Cost:*1 Option.

Boarding Combat

At times, there will be the desire to board and capture an opposing ship. The attackers will require assault shuttles to board the target. To capture a ship, the attackers must capture the bridge and engineering, or eliminate all defensive troops. Combat is conducted as ground combat, with the exception that Command Options are not available.

Units allowed in boarding actions are GAR, MAR, INF, AST, HVA, MED, ENG, RCN, and SEC. Ships without dedicated defensive troops May form a scratch unit from crew. Each 50 crew allocated to defense this way forms one unit. The unit has 1 AV and 1 DV. This unit may only be used defensively. The number of range bands available is based on the size of the ship. Picket and Escort ships only have Medium and closer. Cruiser ships have Long and closer, while Capital ships have Far and closer.

Bombardment

Bombarding a planet may only be accomplished with missile weapons. Each missile that strikes a planet will kill a number of PP equal to the sum of the warhead damages divided by 10. Additionally, the Organic Index is reduced by the Thermal damage /10. This will recover at a rate of 0.1 per year until the original level is recovered. Recovery may be sped up by the expenditure of 500MCr per 0.1 OI. A maximum of 1 OI recovery may be bought in this manner.

Housing

Barracks are required for ground troops spending any length of time on a planet. Each barracks may house 400 troop size worth of units. The barracks also include armories, motor pools, and other facilities required by the unit.

Transport

Troops to be transported require on-board troop bays. Each bay may hold up to 10 troop size points. For assaults, troops must be transferred to shuttles. If the troop ship is atmospheric capable, the troops may disembark directly from the troop bay. Troops may be transported in cargo bays at a rate of 1 troop size point for 25 tons of cargo. Troops transported in this manner suffer -50 Morale.

CHAPTER 30 CAMPAIGN RULES

This section of the rules allows you to create and run an interstellar empire and take it to new heights of glory and dominance or fall onto the forgotten waste heap of history.

Turns are played out differently than in the Tactical game. Each turn is 1 month. Various events and actions take place on each of these turns. Turns are run simultaneous between all players.

Turn Definition

A Turn is defined as all of the prerecorded actions each player takes. A Turn is 1 month. This month is standardized to 30 days.

Turn Flow

Events occur on each turn in the following order.

- Execute planned movement from previous turn
- Collect Income
- Conduct Research
- Build ships/improvements
- Conduct trade/espionage
- Plan movement for next turn

Execute movement

In this phase, all ships that had planned movement execute their movement orders. This is the phase in which opposing fleets come together and clash. Timing is very important at this stage also.

Strategic Scale

Each system should be mapped out using 1 hex = 8 LM. This resolves out to 1 strategic hex equaling 14,400 tactical hexes. This also makes one strategic hex equal to 1 AU. Strategic hexes are abbreviated as SHex.

Jump Lanes

Jump lanes are routes through hyperspace that are navigable. To chart a route through hyperspace, a ship must carry Science Instruments. The route that is charted is based on the generation of instruments carried.

Science Instrument Gen.	Route Time Multiplier
1st Generation	3x
2nd Generation	2x
3rd Generation	1x
4th Generation	1/2x
5th Generation	1/4x

Table 80 Jump Lane Plotting

The relative distance calculation is **(Distance between stars) x Route Multiplier / FTL Generation**. So, two stars that are 10 LY distant, with a route charted with third Generation instruments have an effective distance of 10LY. With second generation FTL engines the effective distance becomes 20LY. Uncharted routes have an automatic 10x multiple and carry a 10% chance that something occurs to the travelling ship. A jump lane must be calculated for regular travel between two stars. Multiple jump lanes may be calculated between two stars. Ships with Science Instruments reduce the chance of mishap by 2% per generation.

d10	Event
1-2	Ship Lost
3-4	Ship Emerges 1d10 LY from planned point
5-6	Ship emerges 1d10+5 LY off planned point
7-8	Ship emerges 1d10+10 LY off planned point
9-0	Ship emerges 1d10 +15LY off planned point

Table 81 Jump Mishaps

Directionality is random.

Wormholes

Wormholes are rifts in N-Space. Travel through a wormhole requires FTL engines to protect the ship from the stresses of hyperspace. Wormholes are rated in Capacity, Visibility, and Approaches. Wormholes are not necessarily the same Class on both termini. Travel through a wormhole is calculated as a jump lane with 5th Generation Science Instruments. Wormhole usage is detectable by EWD and ground sensors within range.

Wormhole Class	Capacity	Visibility	Approaches
Class A	300 tons/hr.	5%	1d10+10
Class B	500 tons/hr.	10%	1d10+5
Class C	800 tons/hr.	15%	1d10+2
Class D	1,500 tons/hr.	20%	1d10
Class E	3,000 tons/hr.	25%	1d10-2, min 1
Class F	10,000 tons/hr.	30%	1d10-4, min 1
Class G	20,000 tons/hr.	35%	1d5-1, min 1
Class H	30,000 tons/hr.	40%	1d2

Table 82 Wormholes

Capacity determines how much tonnage may be shipped through the wormhole per hour. Any tonnage in excess of this collapses the wormhole for a number of hours determined by the following formula. **(Excess tonnage / 10)²**. For example, a 500 ton ship transits a Class A wormhole. The wormhole is collapsed, and no further ships may transit for the next 400 hours (16 days, 16 hours).

Visibility is the chance that active sensors will detect a wormhole. Scientific instruments add 10% per generation to the detection chance. If you are within the 20,000km event horizon, the wormhole is automatically detected.

The number of *Approaches* determines how many systems a wormhole may lead to. Calculating an approach requires 1 day + 1 day per existing approach. This is divided by the generation of science instruments.

Wormholes have a 20,000km event horizon. No permanent structures may be placed within 2 hexes of a wormhole. This event horizon exists on both ends of a wormhole.

Wormholes should have a bearing from the system primary. Roll on the following table for the bearing

Roll (d12)	Bearing
1	000
2	030
3	060
4	090
5	120
6	150
7	180
8	210
9	240
10	270
11	300
12	330

Table 83 Wormhole Bearings

Special Movements

There are four special system structures that may be constructed. These allow the improvement of FTL speeds.

Acceleration Rings

Acceleration Rings will improve the speed of FTL capable ships by 50%. Acceleration Rings require the ship to have FTL engines.

Jump Rings

Jump Rings require rings at both ends and allow FTL speeds twice normal speed. Jump Rings require the ship to have FTL engines.

Jump Gates

Jump Gates allow travel between linked pairs at instantaneous speed. Jump Gates require the ship to have FTL engines.

Star Gates

Star Gates allow travel between any other Star Gate. Speed is instantaneous, and ships do not require FTL engines.

Collect Income

In this phase, each empire collects any taxes and income for the turn. This may be spent in the next phases or saved for later expenditures. Each system that an empire holds uncontested generates income for that empire. Contested systems do not generate any usable income. Income generated by the system may only be used in the system, unless it is transported to a central depository. As there are no faster than light communications other than courier ships, income moved in this manner is delayed for use until it reaches the central depository. System income is determined by adding all of the Exploitation Values of inhabited planetary bodies and multiplying by the tax rate. The tax rate for a system is expressed as a percentage. Taxes may be raised above the base rate or lowered below the base rate. Every five full percentage points above or below decreases or increases the population's Complacency Index (CI). The tax rate may not be adjusted above 100% or below 0%.

Population	Modified Tax Rate
Outpost	10%
Small Colony	20%
Colony	35%
Large Colony	50%
Small Core	65%
Core	75%
Large Core	85%
Very Large Core	95%

Table 84 Population Tax Rates

The size of the colony affects the amount of taxes collected. The Modified Tax Rate (shown in Table 84) is the maximum tax available from this colony. Incoming taxes are multiplied by that amount. The "lost" income is considered to be used for overhead and maintenance. Any modifiers due to the Capitalism trait are applied after the modified tax rate is applied.

The Terran Confederation has a base tax rate of 55%. The colony Terminus Station is Outpost sized. It has a nominal income of 250MCr. This would normally result in a taxed income of 113MCr. Because of its size, the effective income is 11MCr.

Economic Health

Each turn, the player rolls 1d10 on the Economic Health table. The following modifiers are applied to the roll:

EH	Economic Modifier
8	115%
9	120%

Table 87 Economic Health

Improvement	Imp. Points	Requirements	Structure Points	Cargo Space	Ground Slots	Orbital Slots	Manned	Cost
Repair Yard	10		100	10,000	2	1	Yes	1,500
Ship Yard	25		200	25,000	4	2	Yes	3,000
Research Facility	50	Small Core Pop	50	10,000	1	2	Yes	15,000
University	20	Large Core Pop		-n/a-	2	—	Yes	10,000
Remote EWD Buoy	5			50	—	—	No	250
Training Facility	10			-n/a-	2	—	Yes	5,000
Mobile Repair Docks	50		75	37,500	—	—	Yes	4,000
Fleet Command Center	100	Small Core Pop	250	250,000	2	3	Yes	10,000
Defense Installation	100		350	350,000	1	1	Yes	15,000
Scanning Installation	100		75	75,000	1	1	Yes	15,000
Intelligence Agency	100		75	75,000	2	3	Yes	25,000
Acceleration Ring	100		50	50,000	—	—	No	10,000
Jump Rings	100		50	50,000	—	—	No	12,500
Jump Gate	120		75	90,000	—	—	No	15,000
Star Gate	150		100	150,000	—	—	No	20,000
Troop Barracks	20		20	4,000	1	1	Yes	500
Repository	5		50	2,500	1	1	Yes	500
Embassy	5	Must be in a foreign colony	25	500	—	—	Yes	2,500
Warp Anchor	10	May be emplaced on any orbital body	10	100	—	—	No	1,000
Courier Drone Base	25		20	250	1	1	No	500

Table 85 Colony Structures

-1 if the last roll resulted in a downswing.

-1 for losing a trade treaty.
-1 per war.
+1 if the last roll resulted in an upswing.
+1 for a new trade treaty.
+1 for a new peace treaty.

After all of the modifiers are applied to the roll, the final total is compared to the following table.

D10	Modifier
< 1	Strong downswing (-2 EH)
2-3	Mild downswing (-1 EH)
4-7	No change (+/- 0 EH)
8-9	Mild upswing (+1 EH)
> 10	Strong upswing (+2 EH)

Table 86 Economic Health Modifiers

Economic Health (EH) is an empire-wide modifier to the income of the colonies. Optionally, EH may be rolled separately for each colony.

EH	Economic Modifier
1	80%
2	85%
3	90%
4	95%
5	100%
6	105%
7	110%

The EH cannot go below 1 or higher than 9. Any trend that improves the EH is considered an upswing. Any trend that lowers the EH is considered a downswing.

The Terran Confederation currently has an EH of 5. They are in no wars and have no trade treaties. At the end of the turn, the roll for EH is a 3, indicating an economic downturn. Their next turn's income is reduced to 95% of what it normally would be. They also gain a -1 modifier to their next roll as they are in a downward trend.

Wealth Transportation

To be used outside of the system the wealth is generated, it must be transported to the location where it is to be spent. The term MegaCredit (MCr) is a generic term for the income derived from populations. MCr can consist of hard currency, precious metals, gems, or other items that carry value. When transporting MCr, 500MCr takes up 1 ton of cargo space.

Conquered Worlds

Worlds that have been conquered have reduced income. They are treated as Outposts. This improves to their normal population level at a rate of one level per year.

Conduct Research

In this phase, each empire may start a new research project, or continue an existing project. Each research project requires either a research facility or university to start. A research facility may only be maintained in systems with a Small Core population or larger. See Chapter 33 Research for more information.

Build Ships/Improvements

Each empire may build improvements to their systems in this phase. Each improvement has a cost

Pop.	Orbital Limits	Ground Limits	Build Rate	II Mod	PC
Outpost	1	1	0	-1	1
Small Colony	2	1	1	0	1
Colony	2	2	2	+1	2
Large Colony	3	3	4	+2	3
Small Core	4	4	6	+2	4
Core	6	8	9	+1	7
Large Core	9	12	12	0	10
Very Large Core	12	16	18	-1	14

Table 88 Population Build Limits/Rates

in Improvement Points.

Orbital Limits is the number of facilities that can be in orbit of the colony.

Ground Limits is the number of ground facilities the colony may support.

Build Rate is the amount of Improvement Points that the colony produces in one month. This is modified by Industrial Index.

II Mod is the modifier to the Industrial Index for the colony. The minimum value for the Industrial Index is one.

PC is the amount of Political Capital the colony generates per turn.

Multiple settlements in a system may collaborate on improvements that do not require slots.

Industrial Index

The Industrial Index of a settlement affects numerous aspects of that settlement. The Industrial Index is a gauge of how automated or efficient the settlement is at performing work. Values that are affected by the Industrial Index multiply their base value by the Industrial Index to arrive at the final value. By default, the Industrial Index is 1 for a settlement. The Industrial Index is directly tied to the Manufacturing Technology line.

Planetary Industry

There are times a need for construction arises at a location without a shipyard. In that situation, planetary industry may be used to construct ships, missiles, mines, drones, and small craft. The base value for this is the planetary build rate x 5 tons for ships. For mines and missiles, the value is planetary build rate x 5cp. For drones, the value is planetary build rate x 2.5cp. For small craft the value is planetary build rate x 2 bay points. In all cases this value is modified by the Industrial Index.

The colony outpost of Hel's Kitchen has a Large Colony population. The build rate is 4. Without a shipyard, the colony may produce 20 tons of shipping per month, 20cp of missiles/mines, 10cp of drones, and 8 bay points worth of small craft. If the Industrial Index is higher than 1, these values are increased.

Facility Limits

Each population may support a number of facilities. This is based on the size of the population (see Table 88). If a population shares the planet with another population, and one of them is conquered, calculate the new population size. If the number of facilities exceeds the amount able to be supported, each facility (not just the excess) suffers a 10% penalty per facility in excess to its output. In addition, the increased inefficiency reduces the tax income by 2% per excess facility.

Decommissioning Facilities

A facility may be decommissioned for a one-time cost of 25% of its purchase price. At this point, the facility no longer counts for excess facilities, does not affect income, and does not produce any output. The slot used by the facility, however is still occupied. If the population increases and the facility limit is increased, the decommissioned facility still considered to occupy the slot. A decommissioned facility may be recommissioned for a one-time cost of 50% of its purchase price and a time of one month per slot it occupies. A decommissioned facility may not be recommissioned if doing so would put the system over the facility limit.

Aggressive Decommissioning Facilities

At times, you may have a facility on one of your planets that you do not control. In this case you may attempt to aggressively decommission the facility. For each slot the facility consumes, you need to have at least 50 AV of ground troops to take it over and destroy it. In the case of a facility that does not consume a slot, treat it as having 1 slot.

Selling/Demolishing Facilities

A facility may be sold to another empire on the same planet for an agreed upon price. Once sold, the facility counts against the new owner's limits and frees the slots from the seller's limits.

Facilities may also be demolished. In this case, a one-time charge of 10% of the build cost is incurred. The demolition takes 1 month per 2 slots occupied and when completed, frees the slots for further use. If the facility does not consume a slot, treat it as having 1 slot.

Facility Transportation

Most facilities may be transported. Each facility requires tonnage equal to the Cargo Space column (on page 69). The destination must have sufficient Orbital or Ground Slots to accommodate the facility. A newly transported facility requires one month per 10,000 tons of facility (or fraction) to be reassembled and rebuilt. This is modified by the Industrial Index.

Repair Yard

Repair yards are only capable of repairing or replacing systems on a ship. Repair yards may repair/replace 200 tons of systems per turn. The Repair Cost must be paid for each component repaired. Repair yards may only work on one ship at a time. A Repair yard using ground slots may only repair ships capable of atmospheric entry.

Ship Yard

Shipyards are capable of repairing ships as repair yards and constructing new ships. A shipyard has a build rate of 100 per turn +5 per grade of Director. Multiple shipyards increase the build rate. Shipyards using Ground slots may only construct ships that are

Item	Base Rate	Per Grade
Ships, Construction	100 tons	+5 tons
Ships, Mothballing	1,000 tons	+100 tons
Ships, Reactivating	500 tons	+25 tons
Ships, Refitting	200 tons	+50 tons
Ships, Repair	200 tons	+5 tons
Mines/Missiles	50 cp	+10 cp
Drones	25 cp	+5 cp
Small Craft	16 bay pts	+4 bay pts

atmospheric capable.

Example: The Terran Confederation has two shipyards at Mars. A 5000 ton Katana-class cruiser would take one yard 50 months, or just over 4 years to complete. If both yards work on the ship, the time is reduced to 25 months, or 2 years, 1 month. Of course, graded leaders at one or both yards would reduce the build time.

Research Facility

Research Facilities are required to initiate and sustain research projects. A research facility may initiate two projects per month and sustain 2 projects + 1 per grade of Director. A research facility generates 30 research points +5 per grade of Director, which are spread out among each on-going project. Research facilities and Universities may only collaborate if they are in the same system.

University

Universities may also initiate and sustain research projects. Universities may initiate one project per month and sustain up to 1 project + 1 per grade of Director. A university generates 20 research points plus 5 per grade of Director, which are spread out among each on-going project. If multiple research facilities/universities are collaborating on a project, 1 facility is named the prime research location. Every other collaborating facility applies ½ of the assigned points to the project.

Example: The United Terran Confederation is researching Plasma Cannons. The University on Sol is designated the Prime center for the project. The research facility on Mars and Ganymede are contributing. UofSol assigns 15 points to the project; Mars and Ganymede each contribute 10. The total RP's for the turn are 25 (15 + (10/2) + (10/2))

Remote EWD Buoy

Remote Emergence Wave Detector Buoys contain EWD, Long range scanners, and an automated comm. suite. They are used in places where there are no pickets or other installations to detect emergence waves. REWD can send an omnidirectional message out to 5 SHex, or a directional message to a specific colony/outpost out to 15 SHex.

Training Facilities

Training Facilities are used to train military personnel. A training facility generates 25 troop points per turn.

Mobile Repair Docks

Mobile Repair Docks are large (10,000+ ton) freighter hulls with a repair yard crammed into it. It has the same capabilities as a repair yard, with the exception that it takes 2 turns per system repaired/replaced.

Fleet Command Center

Fleet Command Centers are required to command fleets. Each Command Center may issue orders to 1 fleet, plus 1 for each grade of the Command Center Admiral. A FCC is required to attach an admiral to a

fleet.

Fleet Nomenclature

At a bare minimum, a fleet is defined as 2 or more ships that are attached together to perform a task. This could optionally be broken down further as a squadron being defined as 3-14 ships acting together, a division being 2-4 squadrons, and a fleet as 2-4 divisions.

Defense Installation

Defense Installations are weapon emplacements on or orbiting planets/population centers. Defense installations have 40 PD hardpoints, 30 Standard hardpoints, and 30 Capital hardpoints. They also have 25 Hangars and space for 100 troop size worth of troops. Defense Installations are considered to have the latest generations of armor, shields, and ECM/ECCM. Defense Installations have 25 Magazines (if required).

Troop Barracks

This installation is required to house troops outside of a Defense Installation. Barracks are required for ground units to increase their Morale. Barracks hold 400 size worth of troops.

Scanning Installation

Scanning Installations emplace a number of scanners and sensors to gather and correlate information. Scanning Installations have the latest generation of long-range scanners. Scan installations include a Ripple Detector and EWD.

Intelligence Agency

Intelligence Agencies are required to run Intelligence Operations. Each Agency may run 1 operation, plus 1 for each grade of the Agency Director.

Jump Rings

While not planetary installations, they do have similar characteristics to installations. Each of the ring/gates must be placed within 6 SHex of the stellar primary. The rings/gates must also adhere to the planetary limits for FTL travel. This category includes Acceleration Rings, Jump Rings, Jump Gates and Star Gates.

Repository

A repository, also called a central depository is used to store wealth generated by the system and shipped in from other systems. If a repository is not present in a system, the system cannot receive wealth from other systems. Wealth not in a repository is lost by the owner only when the system is lost.

Embassy

An embassy is emplaced on a foreign colony. It is necessary for two empires to go beyond a Non-Aggression treaty. It can also provide cover for clandestine espionage operations. Embassies may only be placed if both parties agree to the embassy. The owner of the embassy may close it as outlined under Decommissioning Facilities (see page 70). If the owner of the planet the embassy is on wishes to have it removed, they may ask the owner, or aggressively decommission it themselves.

Warp Anchor

This emplaces a warp anchor on the body. Any unfriendly ship that enters the range of the warp anchor is pulled out of Warpspace.

Courier Drone Base

This base allows the population to fire courier drones. A courier drone is a recon drone with an FTL Generator and 2 fuel cells. The courier drone may be used to transmit data to other sections of the empire.

Ships

Components on a ship are assumed in the build time. Ships may be placed in mothball status at a rate of 1,000 tons per month. Mothballed ships have an annual upkeep of 1% of their cost. Ships may be reactivated at a rate of 500 tons per month. Shipyard director levels affect these rates.

Refits

Ships may be refit to newer technology at a rate equal to 200 tons per month. The cost for a refit is the cost of the new components. Old components may be stored, used elsewhere, or sold for 10% of the Component Cost.

Mothballing

Ships may be mothballed, and thus reducing the upkeep required of them to 1% of the normal upkeep.

Scrapping

A ship may be scrapped, and 25% of its Hull cost reclaimed. Weapons and systems are assumed to be left intact. If these components are to be removed, the ship must undergo a "refit" which takes ½ of the time of a normal refit. This "scrap refit" removes components and places them in storage or sold for 10% of the Component Cost. The scrapping action takes 1 turn.

Conduct Diplomacy

Trade and Espionage are linked because many espionage programs are carried out under the guise of

trade missions.

Political Capital

Political Capital is gained from colonies. The amount is dependent on the size of the colony. This is further modified by the type of government. This capital may be stored from turn to turn. It is spent during negotiations.

Trade

Trade agreements may be for goods, research, hardware or information. To initiate a trade, the offering race must roll above the target's Xenophobia score. If that roll is successful, the target is willing to listen to the offer. For the target race to accept the offer, the offering race must roll over the target's Arrogance. This roll is modified by circumstances as listed in (Table 90 Trade Circumstances).

Circumstance	Modifier
Trade includes technology that cannot be used by receiver	-20
Trade includes technology currently under research by receiver	+5
Trade includes hardware with obsolete technology by receiver standards	-30
Trade includes hardware with unknown technology by receiver standards	+20
Target has been at war with offering race before	-1/2 Xeno score
Offering race spends Political Capital	+1/pt. of Capital
Target spends Political Capital	-1/pt. of Capital

Table 90 Trade Circumstances

A trade of goods will result in each side gaining an income bonus equal to 1% of the other's income. This increases by 1% per turn until a maximum of 2d10% is reached. Hardware in a tech trade must be shipped to the receiver.

Espionage

Each act of espionage requires an espionage team. Espionage teams may be in Active mode or Passive mode. Active mode espionage teams may conduct operations. Passive mode teams only gather Strategic intelligence.
Espionage is directed at a target's facilities. Operations and their targets and results are shown below.

Operation	Target	Result
Counter-espionage	Any	Decrease the success chance by 10%
Create Network	Any	Creates a network for transmission of information.
Detect Personality	Any	Attempts to discover any covert Personalities at the

Operation	Target	Result
		location.
Insertion	Any	Inserts an operative/recon company into the target
Sabotage	Defense Installation	Installation makes all rolls at –10 for 1d10 turns.
Gather	Fleet Command	Gain a full count of ships and fleets
Sabotage	Fleet Command	Modify orders for one random fleet.
Theft	Fleet Command	Steal fleet orders for one random fleet.
Gather	Intel Agency	Gain information on either active operations or passive operations.
Sabotage	Intel Agency	Negate one random operation
Theft	Intel Agency	Steal 2d10 Intel points.
Gather	Research/ University	Gain a full list of technologies known by the defending target.
Sabotage	Research/ University	Negate research points for this turn.
Theft	Research/ University	Steal 2d10 RP for tech in research.
Theft	Scan Installation	All data gathered by the installation is copied for 1d10 turns.
Sabotage	Scan Installation	The installation is rendered inoperative for 1d5 turns.
Gather	Ship yard	Gather specs on one ship type built at this yard.
Sabotage	Ship yard	Negate production for this turn.

Table 91 Intelligence Operations

Each operation requires a roll against the target's Xenophobia. The spying race adds their Arrogance to the roll. If the roll is greater than the Xenophobia score, the operation succeeds. If the roll is lower than the Xenophobia, a second roll against the target's Aggressiveness is made. If this roll is higher than the Aggressiveness, the operative escapes undetected. If the operative is detected, the aggressor race loses Political Capital based on the action performed. Losses in Political Capital cannot reduce it below zero.

Ship Yard Actions

Sabotage – This action will negate production for one turn. Resources are expended, but no benefit is gained. Detection loses 2d10 PC.
Gather – Specifications of one ship type built at this yard is stolen. Detection loses 1d10 PC.

Research Facility/University

Sabotage – Research points for this facility are lost for this turn. Resources are expended, but no RP are gained. Detection loses 3d10 PC.

Theft – The instigating race gains 2d10 RP in a field being researched at this facility. If the race has all of the applied research being researched at this facility, apply half of the points to a related theoretical research. If there is no theoretical research that is applicable, no RP is gained. Detection loses 2d10 PC.

Gather – The complete list of known technologies is gained. Detection loses 1d10 PC.

Fleet Command Center

Theft – One random fleet has their orders copied. Detection loses 2d10 PC.

Sabotage – One random fleet has their orders

Action	Facility	Result
False Fleet Orders	Fleet Command	Extra orders filed that spies may steal.
False Fleet Composition	Fleet Command	Falsify fleet composition on true orders.
False Research Reports	Research/University	Creates a pool of 1d10 per grade of false RP
False Intel Reports	Intelligence Agency	Creates a pool of 1d10 per grade of false Intel Points
False Scan Reports	Scanning Installation	Creates false reports that may be copied by spies.

Table 92 Counter Intel Actions changed. This must be proceeded by a Theft operation. Detection loses 3d10 PC.

Gather – A full count of ships and fleets is gained. No specifications are gained, though ship classes are (not individual ship names). Detection loses 1d10 PC.

Intel Agency

Sabotage – One random operation in progress is negated. Detection loses 2d10 PC.

Theft – The instigating race gains 2d10 Strategic Intel points on the defending race. Detection loses 2d10 PC.

Gather – Gain information on a random active operation or gain information on emplaced passive assets. Detection loses 1d10 PC.

Defense Installation

Sabotage – The targeted installation makes all rolls with a penalty of -10 for 1d10 turns. Detection loses 1d10 PC.

Scan Installation

Theft – All data gathered by the scan installation is copied for 1d10 turns. Detection loses 1d10 PC.

Sabotage – The scan installation is rendered inoperative for 1d5 turns. Detection loses 2d10 PC,

Global

Counterespionage – Decrease the success chance of a foreign operation by 10%. Or conduct a Facility Counterespionage action.

Insertion – Insert an operative or recon company onto the target location. Detection loses 1d5 PC.

Detect Personality – If the operation is a success, one random covert personality at the location is exposed. Detection loses 1d10 PC.

Create Network – This operation creates a network which allows information to be funneled back to a central hub. Data takes 1 turn per light year of distance between the active location and the hub. Additional actions of this type decrease the time to a maximum of 1 turn per 5 light years of distance. If this action is not taken, all information gained stays at the target location until specific action is taken to move it.

Counterespionage
A team may be assigned to counterespionage at a facility. A team assigned to counterespionage adds their rating to the racial Xenophobia for that facility only.

Facility Counterespionage
Facilities may engage in counterespionage activities. These activities may include filing false fleet orders, generating false research reports, or listing incorrect scan data. The number of false reports that may be created is limited to 1 for Green/Poor grade directors, 2 for Average, 3 for Veteran/Crack, and 4 for Elite. When a facility with multiple orders has a successful espionage action performed against it, the order that is acquired is randomly determined. Any false orders are included in this pool of orders.

False Fleet Orders
These are orders that indicate a fleet is headed to a location it is not.

False Fleet Composition
These orders falsify the composition of a fleet. Fleet strength may be overstated or understated.

False Research Reports
These reports subtract from the RP of the race that steals them.

False Intel Reports
These reports subtract from the Intel Points of the race that steals them. This affects Strategic Intel.

False Scan Reports
These reports are false survey reports for a system, i.e. overstating mineral abundance, understating mineral abundance, hiding the presence of a black hole, false wormhole characteristics, etc.

Treaties

Relations between races are listed by their treaties. These treaties are War, Limited Hostilities, No Contact, Non-Intercourse, Non-Aggression, Limited Defense, Mutual Defense, and Alliance.
To accept a treaty, the target race must roll over the average of their Xenophobia and Arrogance. Treaties may only be raised one level at a time. Each treaty must be in place for 2d10 + 1/10th Xenophobia months and the Relationship Status Score must be met before another treaty may be offered.
War (less than -50) – Ships of either side will engage in hostilities. Planetary systems are under attack. IFF set to Hostile.
Limited Hostilities (-50 to -25) – One side is engaging in border violations. Ships outside their borders are set upon by privateers. IFF set to Hostile.
No Contact (-24 to +25) – Neither side has contact with the other, through design or chance. This is the default diplomatic relation. IFF set to Neutral.
Non-Intercourse (26 to 50) – Races are not engaged in any relations. Ships from the other side are refused entry into the other's space. IFF set to Neutral.
Non-Aggression (51 to 75) – Trade ships may travel freely through the other's space. IFF set to Neutral.
Limited Defense (76 to 100) – The race accepting this offer may rely upon the other for border security and limited help in defending themselves. IFF set to Friendly.
Mutual Defense (101 to 125) – If either side is attacked, the other will aid in repulsing the invader. IFF set to Friendly.
Alliance (126+) – Close-knit allies. Integrated defense plans. Warships freely travel the other's space and defend it as their own. IFF set to Friendly.

Relationship Status

The Relationship Status between two races starts at zero. For each month of contact, the status changes by the value of $100 - XE_{player} - XE_{NPR}$. If this result is negative, the relations are deteriorating and may result in hostilities. The number in parenthesis next to each treaty type is the Relationship Status score required for the treaty. Diplomacy teams add their score to the base Status.

Political Capital
Political Capital may be spent to improve the Relationship Status. Each point of Political Capital spent increases the Relationship Status by one point. Status may not be increased more than one level via Political Capital.

War Check

This is a roll that an NPR makes when the Relationship Status Score is below -50. A percentile roll is made against the race's Aggressiveness. If the roll is less than or equal to the Aggressiveness, the NPR declares war against the race with which they have the status with. Player races may declare war on other players or NPRs at will. A player declaring war on an NPR will result in a RS score of -100 immediately.

Peace

If two races are at war, to declare peace the Relationship Status must be -25 or higher. A race may opt for peace before this if they have lost one or more colonies, 50% of their ships, or their home world. The race offering peace needs to roll above their Aggressiveness. If the check succeeds, the race offers peace. The other race must then roll over their Aggressiveness to accept. If one or more races are player races, the decision to offer or accept peace is up to the player. If the peace offer is accepted, the Relationship Status is set to Non-Intercourse and a score of 50. For every 100 MCr in value of reparations or trade value offered by the race offering peace, the other roll is made at +10. Political Capital may be spent (by either side) to modify the roll by +/- 1 per Political Capital spent.

Communications

Before any meaningful communications may be carried out between races, communications must be established. Each turn the races are attempting communications, a roll is made against the averaged Xenophobia scores of both races. If the roll is over the value, full communications have been established. If the roll is under the value, but over the Xenophobia score of one of the races, partial communications have been established, and the next roll is granted +10. If the roll is under **both** Xenophobia scores, there has been a setback in communication attempts, and the next roll suffers a -10. A roll of 00 always grants full communications. A roll of 01 always results in No Communications. Further attempts after this are futile. If No Communications is reached, the Relationship Status is set to 0, regardless of where it was before. It can rise no higher than 50.

Tactical Intelligence

Long range scanners required. Each generation supplies 2 points per generation of Intelligence per day of observation. This accumulation rate holds only at strategic levels. At tactical levels (10,000km/hex), accumulation occurs at the rate of 2 pts/generation per turn (30 seconds). Sensors may also be used at tactical levels. Tactical Intel accumulates over multiple battles. Level 1 must be gained prior to previous levels being resumed.

Level 1
Gross ship size – Picket (under 2,500 tons), Escort (2,500-5,000 tons), Cruiser (5,000-12,000 tons), Capital (12,000+ tons)
Race – Race that built the ship, (if the race is known) unless new owners have retrofit more than 50%. Then it is identified as "Unknown"

Level	TacIntel Points	Intel Gained
1	2	Gross Ship size, Race
2	5	Civilian/Military, Fine Ship size
3	10	Tonnage
4	20	Active Shields
5	40	Drive Type
6	80	Hardpoint modifications
7	120	Shield modifications
8	160	Armor modifications
9	200	Fighter size (if launched)
10	250	Weapon modifications (requires weapon fire)
11	300	Missile/Drone/Mine size (if deployed)
12	350	Shield/Armor generation

Table 93 Tactical Intelligence Levels

Level 2
Civilian/Military – Differences in Civilian and Military power curves are able to be determined. Fine Ship Size – Tonnage to the nearest 500 tons.

Level 3
Tonnage – Total tonnage of the ship.

Level 4
Active Shield – Whether or not shields are active, but not any Shield Mods or Generation.

Level 5
Drive Type – Type of drive being used and observed Thrust if not known.

Level 6
Hardpoint Modifications – Turrets or Heavy mounts are distinguishable at this level.

Level 7
Shield Modifications – Additional bands, Hardening, Reflection is distinguishable at this level, if the shields are active.

Level 8
Armor Modifications – Additional Plating, Hardening, and Reflection is distinguishable at this level.

Level 9
Fighter Size – If fighters have been launched prior to gaining this level, size of the fighters are now distinguishable.

Level 10
Weapon Modifications – Miniaturization, Autofire, etc. is distinguishable. This requires active weapon fire.

Level 11
Missile/Drone/Mine size – If deployed, sizes of these munitions are distinguishable.

Level 12
Shield/Armor Generation – Generations of shields and armor are distinguishable, as is type of armor (regular, organic, reactive) and shield regenerators. Generations beyond the current state is "Advanced".

Strategic Intelligence

Strategic Intelligence is gained at a rate of 1 point per month of normal contact with a race. Recon troops and Intelligence Operatives may increase this rate. Passive gathering is a matter of just observing and reporting. Active gathering is actively seeking out intelligence. If the troop/operative is discovered engaged in spying, a roll against the target's Aggressiveness is made. If the roll is higher than the

Resource	Rate	Detection Chance
Recon Company, Passive	+1	15%
Recon Company, Active	+2	20%
Operative, Passive	+2	5%
Operative, Active	+4	10%

Table 94 Strategic Intel Rates

Aggressiveness, the offending troop/operative is deported. If the roll is lower, the troop/operative is captured. In the case of detection, there is a +1% to the detection chance for every 10 points (or fraction) of the target's Aggressiveness. This added detection degrades at 1% per month. Deportation results in the offending race losing 1d10 Political Capital. Capture results in the offending race losing 1d10 Political Capital, and the capturing race losing 1d10 Political Capital.

Passive Intelligence
The Strategic Intelligence gained from normal contact is considered Passive Intelligence. Strategic Intelligence levels 12 and 13 may not be acquired from passive intelligence.

Level 1
This level grants knowledge of the name the race calls itself. This level is automatically gained on establishment of Full Communications.

Level 2
This grants a rough count of the systems the target claims. This should be rounded to the nearest 10's.

Level 3
This level grants a rough count of the population of the target. The population should be rounded to the nearest 100 PP.

Level	Strategic Intel Points	Strategic Intel
1	Special	Race Name
2	10	Rough System Count
3	20	Rough Population Count
4	40	Fine System Count
5	80	Fine Population Count
6	160	Rough Fleet Count
7	320	Rough Ship Count
8	640	Core Sector location
9	1,280	Fine Fleet Count
10	2,560	Fine Ship Count
11	5,120	Homeworld Location
12	10,240	Personality Locations
13	20,480	Fleet Location

Table 95 Strategic Intelligence Levels

Level 4
This level grants an exact count of systems the target claims.

Level 5
This level grants an exact count of the population of the target.

Level 6
This level grants a rough count of the number of fleets the target operates. This should be rounded to the nearest 10's.

Level 7
This level grants a rough count of ships. This should be rounded to the nearest 100s.

Level 8
This grants the distance to the target's core sector, as defined by that target.

Level 9
This level grants the exact count of fleets the target operates.

Level 10
This grants the exact count of ships the target has in service.

Level 11
This grants the exact location of the target's homeworld.

Level 12
This grants the location of all of the target's overt personalities. May not be gained by passive intelligence.

Level 13
This grants the location of all of the target's fleets. May not be gained from passive intelligence.

Changes
If there are changes to a known level, i.e. a change in system counts, the spying race will not receive the new information until enough points have been gathered equal to the difference between the level and the one prior.

The Taurus Republic is utilizing a Recon company and two operatives to gain strategic intelligence on the Ursae Republic. They have gained 1300 points, which is enough to grant level 9 granting the exact count of fleets operated. While progressing to level 10, the UR forms another fleet, making the intel gathered previously out of date. Once the TR gains 620 points (1280-640 = 640 – 20 already gained) again, they will have the new number. Of course, this number may also be gained by active intelligence methods. Their progress towards level 10 is not impeded during this intelligence update period.

Plan Movement
This is the phase where movement orders for all fleets are assigned to be carried out in successive turns.

Speed	LS per Day	SHex per Day	LS per Week	SHex per Week	SHex per Month
1	96	0.2	672	1.4	6
2	192	0.4	1,344	2.8	12
3	288	0.6	2,016	4.2	18
4	384	0.8	2,688	5.6	24
5	480	1.0	3,360	7.0	30
6	576	1.2	4,032	8.4	36
7	672	1.4	4,704	9.8	42
8	768	1.6	5,376	11.2	48
9	864	1.8	6,048	12.6	54

Speed	LS per Day	SHex per Day	LS per Week	SHex per Week	SHex per Month
10	960	2.0	6,720	14.0	60

Table 96 N-Space Movement Rates

Fleets are given orders to move between planets and facilities and between systems. Travel times between systems are determined by the FTL engines and any Jump Lanes.

Crews

Ships require crews to function properly. A ship with a full crew operates at its normal grade level. A ship that has suffered 25% losses operates one level lower. A ship that has suffered 50% losses operates two levels lower. Ships with 25% or less crew cannot function and are adrift.

Readiness

Ship crews may not be at 100% battle stations for more than 12 hours. Each hour past this, they suffer a cumulative +1 Init/-5 to hit. Crews require 8 hours of downtime, plus 1 additional hour for each hour past 12 hours at battle stations. A crew not at battle stations, and fully rested can reach battle stations in 3 tactical turns for average crews. This is modified by 1 turn plus or minus depending on crew grade, i.e. Crack crews take 2 turns, Green crews take 5 turns. A ship not at battle stations may maneuver and fire 2 levels below its rating until crew reaches battle stations.

Detailed Readiness (Optional)

With this optional rule, the above procedure is replaced by the following:

Ships not at battle stations will activate 1 system per turn at Average grade crews. Each grade above Average increases the number of systems activated by 1 per turn. Grades below Average increase the amount of time to activate a system by 1 turn. A system is defined as a single weapon, a single defensive system, engines, tactical electronics systems, and auxiliary command systems. Ships are always assumed to have motive systems manned as well as the primary command system (bridge). Systems with no crew requirements are always operational.

Experience

Ship crews gain experience at a base rate of 5xp per month. Crews may only gain one level above their base level through time experience. After that, it may only gain more experience through combat. Experience awards are listed on Table 103 on page 85. Totals for various grades are listed on Table 102 on page 84.

Combat Losses

If a ship is in combat and loses crew, crew XP is reduced a percentage equal to the percentage of crew lost.

Crew Replacement

Training facilities are used to create and replace crew. One Troop Point (TP) generates 100 crew, 50 Engineering Crew, or 20 Command Crew. This costs 2MCr. TP used for crew may not be used for ground units. If insufficient crew are available for a ship, that ship operates at a level determined by the XP total of the trained crew as a percentage of the total crew.

A new cruiser has been commissioned however there is not enough trained crew. The ship normally needs 500 crew and only 200 are available. This is 40% of the regular crew. With a base grade of Average (401xp), the ship has a base grade of Poor (160xp). A ship with no trained crew is considered Green (0xp).

Ship Surrenders

If a ship surrenders (on page 14), a roll is made against the average of Willpower and Aggressiveness to purge the ship's computers of useful data. If the roll is below this value, then the data is purged. If the data is not purged, the capturing race gains 1d100 x 10 Strategic Intel points immediately. The captured ship may also be retrofit, or reverse engineered as per the rules on page 115.

Complacency Index

Each settlement of a race has a base Complacency Index (CI) of 0. This is raised and lowered by actions of the central government.

Situation	CI Modifier
Defense Installation Present (Small Core +)	+5 per year
Defense Installation not present (Small Core +)	-5 per year
Excessive taxation	-1 per 5% per month
Light taxation	+1 per 5% per month
At war	-1 per month (-10 max)
At peace	+1 per month (+10 max)
Less than ¼ potential Naval Support used	-5 per year
More than ¾ potential Naval Support used	+5 per year
Overpopulation (75% maximum population)	-5 per year
Homeworld	+10

Situation	CI Modifier
Outpost	-2
Core or larger	+2
Former rebel	-10
Hive Mind	+10
Psychic	+20
Representative Gov't	+10
Theocracy Gov't	+15
Personal Gov't	-10
Consciousness Gov't	+10
Individual Gov't	-10
Tribal Gov't	-5
State/Clan Gov't	+5
National Gov't	+10

Table 97 Complacency Index Modifiers

Defense Installation – This modifier applies if there are one or more Defense Installations present or not present on the planet.

Excessive Taxation – This applies to a tax rate higher than the racial base tax rate.

Light Taxation – This applies to a tax rate lower than the racial base tax rate.

At War/Peace – This applies if the race is at war or peace. The modifier changes by 1 per month.

Naval Support – This modifier is dependent on the amount of naval support used.

Overpopulation – This modifier applies if the population is over 75% of the maximum population for the planet. If the race has Crowded Planets advantage, this modifier does not apply until 100% population. If the race has the Sparse Populations disadvantage, this modifier applies at 50% population.

Outpost/Core – This applies to the size of the settlement.

Former Rebel – This applies if the settlement has rebelled before and been reassimilated.

Hive Mind – This applies if the race is a hive mind.

Government – The government that the race operates under all modifies the Complacency Index.

Taxation cannot be increased above 100% or below 0%.

Loyalty Check
If a settlement's CI reaches -20, a Loyalty Check is forced. Percentile dice are rolled and compared to the average of the racial Aggressiveness and Willpower. Political Capital may be spent to offset the roll at a rate of +1 per capital spent. If the roll is under this value, the settlement is in rebellion. Fifty percent of all military units in the system join the rebellion, while the remainder remains loyal. Income is diverted for use of the rebel government.

Rebels
Stats for a rebel race are +/- 1d10 from the parent race. Rebel states can only be reintegrated via conquering. The parent race may also allow the rebel government to exist as a separate entity. Communications between the rebels and central government are considered to be Full. Rebel races have the same advantages and disadvantages as the parent race. Any Personalities in the rebel system have a 50% chance of going to the rebellion.

Multi-Faction Starts
This refers to a special case where more than one player or non-player empire exists on the same planetary body. Creation for each race is done independently, though certain restrictions should be adhered to, mainly breathable atmosphere type.

Facilities & Personalities
Each population maintains its own pool of facilities, both ground and orbital. Each population also maintains its own Personalities.

Minerals
The mineral abundance and indices are communal for the planet that the populations reside. Each population past the second imposes a -5% penalty to values globally.

Dave is creating a three-empire game, starting on the same planet. The planet has the following minerals: Normal Heavy Metals (12), Abundant Radioactives (17), Normal Non-Metallics (10), and Motherlode Industrial Metals (28). This gives the planet a final MI of 10.5. The Exploitation Index is 7,035. Each empire has a tax rate of 50% and a modified tax rate from population of 37.5%. This brings the income of each empire to 2,638. Because there are three empires, this is further reduced to 2,506.

Communications
Each empire on the same planet start with Full communications. Political treaties should be at Non-Aggression at a minimum.

CHAPTER 31 RACE GENERATION

Empire Creation

A number of things are required to define an empire. A home system should be generated according to the rules presented in System Creation (on page 86). In addition, a racial profile should be created. Each race starts with 1 year of income (12 x starting system income). Each race starts with a "Fleet fund" equal to 36 x starting income. Each race starts with a "Missile fund" equal to 36 x starting income. The missile fund may only be used for missiles, buoys, and mines. The Fleet fund may only be used to purchase ships. Starting population is a Small Core population (250 PP). Empires start with a base amount of Training points worth of ground units on their homeworld. The formula for this is Pop Size in PP / 100 * AG, with a minimum value of 5. Each system in the player's empire begins at an Economic Health of 5. Any funds not spent from the fleet fund or the missile fund is added to starting funds after being reduced to 10%.

Starting Calculations

- Starting Income = 12 x System Income.

- Fleet Fund = 36 x Starting Income.

- Missile Fund = 36 x Starting Income.

- Starting Population = 250PP.

- Training Fund = (PP/100) x AG.

- Economic Health = 5.

- Additional Starting Income = (remaining Fleet Fund / 10) + (remaining Missile Fund / 10).

Racial Profiles

Each race has four characteristics to define them. These are Willpower (WP), Arrogance (AR), Aggressiveness (AG), and Xenophobia (XE). Each characteristic ranges from 1-100 and does not change.

Generating Stats

There are three methods to generating stats. These are detailed below.

Method I
Stats are generated by rolling 1d100 for each stat.

Method II
The race has 200 points to allocate to the four stats. No stat may be lower than 1 or higher than 100. For 20 points, a race may gain 1 point for Traits.

Method III
The race starts with values of 50 in each stat. The race has 100 points to allocated to the stats (plus or minus). For 20 points, a race may gain 1 point for Traits.

Willpower (WP) - This is a measure of how stubborn a race can be. Higher Willpower races will tend to be more stubborn.

Arrogance (AR) - This is how the race deals with others. Higher Arrogance scores show a tendency to try to dominate other races.

Aggressiveness (AG) - This is a measure of how likely a race is to initiate hostile actions. Higher scores are more hostile.

Xenophobia (XE) - This is a measure of how much a race will like or trust other races. High Xenophobia scores are less likely to trust others.

Atmosphere Type

Each race should choose an atmosphere that they can breathe. A race may only choose one atmosphere type.

Atmosphere	Point Cost
Tainted Atmosphere – Oxygen	0
Tainted Atmosphere – Carbon Dioxide	0
Hostile Atmosphere – Methane	-2
Hostile Atmosphere – Sulfur Dioxide	-2
Tainted Atmosphere – Nitrogen	-3
Hostile Atmosphere – Hydrogen	-3
Hostile Atmosphere – Vaporous Dihydrous Monoxide	-4
Atmosphere – None	8/2[+]

[+] If the race is a Lithovore, the cost is 2, otherwise it is 8.

Traits

Each race should start with a base of 6 points for Advantages. Additional points can be attained through Disadvantages. It is suggested that a cap on points from Disadvantages be in place.

Advantage	Point Cost
Research Bonus +5%	2
Troop Bonus +5%	2
Espionage Bonus +5%	2
Industrial Bonus +5%	2
Research Bonus +10%	4
Troop Bonus +10%	4
Espionage Bonus +10%	4
Industrial Bonus +10%	4

Advantage	Point Cost
Increased Base Grade +1 Grade	4
Increased Growth Rate +5%	4
Gravity Tolerance 1	4
Capitalist +5%	4
Long Lived	4
Strong	4
High Morale	4
Loyal	4
Increased Growth Rate +10%	6
Increased Base Grade +2 Grades	8
Gravity Tolerance 2	8
Capitalist +10%	8
Hive Mind	8
Machine Intelligence	8/4[++]
Psychic Race	10
Crystalline Race	10/4[+++]
Lithovore	10
Shadow Ships	8
Elusive	8
Reactor Theorist	10
Strong Hulls I	2
Strong Hulls II	4
Deadly Weapons	4
Optimal Defenses	4
Crowded Planets	4
Optimistic	2

Table 98 Racial Advantages

[++] If a Machine Intelligence is also a Hive Mind, the cost for Machine Intelligence is 4.
[+++] If the Crystalline Race is a Lithovore, the cost is 4.

Atmospheres

Tainted Atmosphere – Oxygen Race breathes Oxygen. This gives the planets with an Oxygen atmosphere an OI of 1 for this race.
Tainted Atmosphere – Carbon Dioxide Race breathes Carbon Dioxide. This gives planets with a Carbon Dioxide atmosphere an OI of 1 for this race.
Tainted Atmosphere – Nitrogen Race breathes Nitrogen. This gives planets with a Nitrogen atmosphere an OI of 1 for this race.
Hostile Atmosphere – Hydrogen Races breathes Hydrogen. This gives planets with a Hydrogen atmosphere an OI of 1 for this race.
Hostile Atmosphere – Methane Race breathes Methane. This gives planets with a Methane atmosphere an OI of 1 for this race.
Hostile Atmosphere – Sulfur Dioxide Race breathes Sulfur Dioxide. This gives planets with a Sulfur Dioxide atmosphere an OI of 1 for this race.
Hostile Atmosphere – Vaporous Dihydrous Monoxide Races breathes Vaporous Dihydrous Monoxide. This gives planets with an atmosphere of

Vaporous Dihydrous Monoxide an OI of 1 for this race.
Atmosphere – None Race can live in a vacuum. Races with this advantage treat a vacuum as an OI of 1 instead of -4.

Advantages

Research Bonus (+5%/+10%) Race has a bonus of +5%/+10% to their cumulative research points gained.
Troop Bonus (+5%/+10%) Race has a bonus of +5%/+10% to ground combat attack rolls.
Espionage Bonus (+5%/+10%) Race has a bonus of +5%/+10% to espionage actions.
Industrial Bonus (+5%/+10%) Race has a bonus of +5%/+10% to build rates.
Increased Growth (+5%/+10%) Race has a bonus of +5%/+10% to racial growth.
Gravity Tolerance (1/2) Treat a non-racial standard gravity as one or two steps closer to standard.
Capitalist (+5%/+10%) Race adds 5%/10% to tax income. This bonus does not count towards excessive taxation.
Long Lived Racial Personalities live for 10 years longer than normal.
Strong Ground units gain 10% bonus to combat values (round up).
High Morale Ground Units have a morale cap of 140.
Loyal Rebellion chances reduced by 10%.
Increased Base Grade (+1/+2 Grades) Race's base crew grade is +1 or +2 grades.
Hive Mind The race shares a consciousness amongst all members. Crews start at +1 grade. Personalities may not exceed 1600 experience. Hive Minds must take Consciousness Government modifier and may not take Individual Government scope. Hive minds gain experience as a race, although at 10% of the normal rate. Hive Minds cannot take advantages or disadvantages that affect crew grades.
Machine Intelligence The race is not organic or has modified itself to include more technology than organic. Machine Intelligence races are considered to have an Atmosphere – None attribute. A Machine Intelligence race is granted one 2 point attribute but suffers all of the -1 point attributes (excepting the one in opposition to the advantage). Crews of Machine Intelligences do not gain experience. Personalities gain xp as normal. Machine Intelligences also gain access to the Machine Intelligence Tech line.
Psychic Race The race has access to the Psychic Technology Tree.
Crystalline Race The race has access to the Crystalline Technology Tree. If the race is also a Lithovore, the cost is reduced to 4.

Lithovore The race lives on minerals and uses the MI for base maximum populations and population growth instead of OI.
Shadow Ships The signature of the race's ships is reduced by 10% (round down).
Covert The ships of the race have an innate ECM 1 value.
Reactor Theorist The ships of the race generate 10% more power than normal.
Strong Hulls (I/II) The race adds 10%/25% to the structure of their ships. This includes drones and small craft.
Deadly Weapons The race adds 10% to damage of their weapons (minimum +1 per type).
Optimal Defenses The race adds 10% to defenses (minimum +1 per type).
Crowded Planets The race uses 125% of the OI (or MI) for population calculations.
Optimistic The race gains +10 to their Complacency Index.

Special Cases
Hive Mind/Machine Intelligences – This racial combination is quite popular in science fiction literature. The race has the following traits:

- Crews are at +1 grade

- The race does not have Personalities

- Experience gain is at 10% for crews. All gained xp is shared between all crews.

- The race must choose the Consciousness government modifier.

- The race cannot choose the Individual government scope.

- The race has the trait "Atmosphere – None"

- The race is granted one of the following: Research Bonus +5%, Troop Bonus +5%, Industrial Bonus +5%, Espionage Bonus +5%

- The race suffers all of the following traits, except the one that is the inverse of the granted bonus: Research Penalty -5%, Troop Penalty -5%, Espionage Penalty -5%, Industrial Penalty -5%

- The race gains access to the Machine Intelligence Tech line.

- All facilities are treated as if they have a Senior Personality in charge.

- Teams are granted a +10 bonus to their scores.

- Machine races cannot take the Short Lived disadvantage or the Long Lived advantage.

- Every five turns of ground combat against the same foe, the Hive Mind/Machine Intelligence gains +1 Defense.

Disadvantages

Disadvantages	Cost
Research Penalty –5%	-1
Troop Penalty –5%	-1
Espionage Penalty –5%	-1
Industrial Penalty –5%	-1
Decreased Base Grade -1 Grade	-1
Decreased Growth Rate –5%	-2
Gravity Intolerance	-2
Weak Capitalism	-2
Free Spirit	-2
Excessive Spending	-4
Short Lived	-4
Weak	-4
Low Morale	-4
Overt	-6
High Signature Ships	-6
Energy Inefficient	-8
Fragile Hulls I	-2
Fragile Hulls II	-4
Eternal War	-10
Humane Weapons	-4
Offense First	-4
Pessimistic	-2
Sparse Populations	-4

Table 99 Racial Disadvantages

Research Penalty -5% The race has a penalty of 5% to gained research points.
Troop Penalty -5% Race has a penalty of 5% to ground combat.
Espionage Penalty -5% Race has a penalty of 5% to espionage actions.
Industrial Penalty -5% Race has a penalty of 5% to industrial output.
Decreased Growth -5% Race has a penalty of 5% to racial growth.
Decreased Base Grade (-1 Grade) Race's base crew grade is -1.
Gravity Intolerance Treat non-racial standard gravity as one step further away.
Weak Capitalism The race gains 5% less taxes. This does not count towards excessive taxation.
Free Spirit Rebellion chances increased by 10%.
Excessive Spending The race spends 5% extra when paying for anything.
Short Lived Racial Personalities live for 10 years less than normal.
Weak All ground units have ¾ normal values (round up).
Low Morale All ground units start at 60 Morale and have a cap of 100.

High Signature Ships The signature of the race's ships is increased by 10% (round up).
Overt The ECM on ships of the race function one level lower. If no ECM is present, the ship's signature is increased by 10m.
Energy Inefficient The ships of the race generate 10% less power than normal.
Fragile Hulls I/II The ships of the race have 90%/75% of the normal structure. This includes drones and small craft.
Eternal War The race cannot have diplomatic relations greater than War.
Humane Weapons The weapons of the race do 10% less damage (minimum -1 damage per type).
Offense First The defenses of the race provide 10% less protection (minimum -1 value per type).
Pessimistic The race suffers -10 Complacency Index.
Sparse Population The race uses 75% of the OI (or MI) for maximum population calculations.

Personalities

Each Empire begins with 5 "personalities". These personalities are Governors, Admirals, Researchers, Directors, etc. Each personality has 2 positive Traits, and 1 negative Trait. Each personality lives for 30 years of game time.
An empire may support 1 personality per 100 PP. If the race is not at maximum personalities, a new personality has a 20% chance of appearing per month. Personalities *must* be assigned to a physical location. Each Personality is declared either Overt or Covert. Overt Personalities may have their location discovered through Strategic Intelligence. Covert Personalities may only be discovered through an Espionage mission.

Personality Stats

Each Personality has a set of stats rolled similar to Racial stats. The Personality stats are Willpower (WP), Arrogance (AR), Aggressiveness (AG), Xenophobia (XE), Intelligence (IQ), and Strength (ST). Stats for personalities are calculated by taking the racial stat and adding 1d10 and subtracting 1d10.
Willpower (WL) – A measure of how stubborn the Personality can be. Higher willpower equates to more stubbornness.
Arrogance (AR) – A measure of how the Personality deals with others.
Aggressiveness (AG) – A measure of how likely the Personality is to resort to confrontational resolutions to situations.
Xenophobia (XE) – A measure of how much the Personality will trust alien races. Higher Xenophobia equates to less trust.
Intelligence (IQ) – A measure of how intelligent the Personality is and is generated by rolling 4d10 + 30.

IQ/10 (round up) is added to any RP generated by this Personality.
Strength (ST) – A measure of how strong a Personality is and is generated by rolling 4d10 + 30. ST/10 (round up) is added to any ground combat rolls this Personality is involved in.

Stat Rolls
If a Personality needs to roll against a stat, percentile dice are rolled and compared to the value of the stat. If the roll is lower than or equal to the stat, the roll is successful, otherwise it is a failure.

Personality Traits

Certain traits, such as Old Aged/Elderly and Youth are mutually exclusive. Re-roll the trait in these circumstances. If the same trait is rolled more than once, the player may re-roll or apply the trait twice.

Roll	Trait
01-08	Espionage Genius
09-17	EW Genius
18-25	Fiscal Genius
26-34	General
35-42	Intuitive Mathematician
43-51	Logistics Expert
52-59	Loyal
60-68	Political Expert
69-76	Research Genius
77-85	Strategic Genius
86-93	Tactical Genius
94-00	Youth

Table 100 Positive Traits

Tactical Genius – The Personality gains a -1 to Initiative rolls.
Strategic Genius – The Personality is able to increase the efficiency of Command Nets and link in one additional ship.
EW Genius – EW systems the Personality controls directly gain a one level bonus.
Fiscal Genius – A system governed by the Personality gains 5% additional income. This does not count for excessive taxation.
Research Genius – The Personality generates 5 extra RP. This is added after any Racial bonuses or penalties.
Espionage Genius – The Personality gains a 5% bonus to all espionage rolls.
General – The Personality grants +1 to Attack and Defense for any ground units controlled by the Personality.
Intuitive Mathematician – The Personality generates 2 extra RP per turn. This is added after any Racial bonuses or penalties. The Personality also reduces the chance of a jump lane mishap by 2%.
Youth – The personality lives for an extra 10 years.

Logistics Expert – Costs associated with the facility the Personality are assigned to are reduced by 5%.
Loyal – The Personality's chance to join a rebellion is 25%.
Political Expert – This adds +3 Political Capital to the colony the personality is assigned to.

Roll	Trait
01-08	Absent Minded
09-17	Agitator
18-25	Combat Paralysis
26-34	Elderly
35-42	G-Intolerance
43-51	Incompetence
52-59	Lavish Spender
60-68	Old Aged
69-76	Politically Inept
77-85	Security Leak
86-93	Slow Learner
94-00	Tactical Ineptitude

Table 101 Negative Traits

Old Aged – The Personality lives for 10 years less time.
Elderly – The Personality lives for 20 years less time.
Lavish Spender – The costs associated with the facility the Personality is stationed at are increased by 5%.
Security Leak – Espionage attempts against the Personality are granted a 5% bonus.
Absent Minded – The Personality generates 5 less RP than normal. This is calculated after Racial bonuses and penalties.
G-Intolerance – The Personality becomes incapacitated if a ship he is on exceeds compensator ratings.
Combat Paralysis – The Personality suffers a 5% penalty to all combat rolls he influences.
Incompetence – The Personality suffers a 1% penalty to all combat rolls, RP generated, and Income.
Tactical Ineptitude – The Personality suffers +1 to Initiative rolls.
Slow Learner – The Personality gains 5% less experience.
Agitator – The chances of the Personality joining a rebellion is 75%.
Politically Inept – The Personality imposes a -3 to Political Capital gained at the colony he is assigned to.

Experience
Personalities gain experience at a rate of 5 points per turn. Additional experience awards are given per station the personality is assigned to. All personalities start at 0 Experience.

Experience Points	Rating (Pers./Crew)
0-200	Novice/Green
201-400	Junior/Poor
401-800	Average
801-1200	Senior/Veteran
1201-1600	Veteran/Crack
1601+	Elite

Table 102 Experience

A Personality may never exceed Average (401 xp) through time/facility awards. Additional experience is only awarded through combat. Ratings are listed as Personality/Crew. *Note – a Veteran Personality is a grade higher than a Veteran crew*.

Personality Independence
When orders are given to a Personality that might conflict with a Personality's traits, i.e. a Personality with Combat Paralysis instructed to engage in battle; a Willpower roll is made. If the roll is above the WP, the Personality follows orders. If the roll is below, the Personality disobeys the order.

Personality Death
When a personality dies due to old age, combat or other mishap, a new personality replaces the old one in 1d10 months.

Facility Experience Awards
Personalities are assigned to specific Facilities. Facilities in this sense also include Fleets. Fleet experience awards also apply to crews.

Facility	Action	Award
Fleet	Won Battle	+100
Fleet	Lost Battle	+25
Fleet	Inconclusive Battle	+10
Ship yard	First Hull size constructed	+50
Ship yard	First of new class constructed	+20
Ship yard	Hull constructed	+10
Ship yard	Small Craft constructed	+5
Research/University	Project Completed successfully	+50
Research/University	Theoretical Advance	+50
Troop	Battle won	+100
Troop	Lost Battle	+25
Troop	Inconclusive Battle	+10
Fleet Command	Fleet engaged in battle	+25
Fleet Command	Fleet lost in battle	+10
Fleet Command	Fleet in inconclusive battle	+5
Defense Installation	Battle Won	+100
Defense Installation	Battle Lost	+25
Defense Installation	Inconclusive Battle	+10
Intelligence Agency	Successful Operation	+50
Intelligence Agency	Enemy Agent Exposed	+20
Intelligence Agency	Operative inserted	+10
Survey Fleet	Plot Jump Lane (first)	+50

Facility	Action	Award
Survey Fleet	Plot Jump Lane (subsequent)	+10
Survey Fleet	Survey Systems	+25
Survey Fleet	Survey Planet	+25

Table 103 Facility Experience Awards

Teams

Teams may be formed for specific applications. Each team may be led by a Personality. Each team has a rating of 5d10. If a Personality is leading the team, add 10% of the Personality's IQ to the team's rating. The team's rating is added to rolls. Available team types are:

- Communication/Diplomacy – Adds to Communication attempts and Diplomacy rolls.
- Xenoarchaeology – Used to decipher artifacts.
- Trade – Used to facilitate trade agreements.
- Espionage – Used to conduct espionage operations.

Each month the team is actively engaged in their field, they have a chance to gain points added to their rating. The chance is the difference between 100 and the rating x 2. If the roll is under the chance to gain points, the team gains a number of points equal to 1 point per 10% the roll is exceeded by. A team's rating is capped at 100.

The Terran Confederation forms a Diplomacy team. The rating of the team is determined to be 21 with rolls of 6, 3, 3, 4, and 5. After one month, the chance of a gain is 158%. The roll is 13, which is under the chance by 145%. The team gains 14 points to their rating and now have a rating of 35. The next month their chance of gaining points is 130% (100-35 = 65 x 2).

A team (other than espionage) may be used for espionage. If a team is used in this manner, 1/20th of the team's rating is generated as Intelligence. The team also only provides ½ their normal rating to their normal function. Espionage teams used for intelligence gathering generate 1/10th their rating in Strategic Intelligence points per month.

Government

Each Empire has a government. Governments are described by a modifier (M) and scope (S). Together, these define the abilities and penalties of each government.

Modifier/Scope	Res.	Intel	Combat	Tax	PC
Representative (M)	+20%	-10%	+10%	+20%	+3
Theocracy (M)	-20%	+10%	+20%	+5%	+2
Personal (M)	+10%	-10%	+10%	0	0
Consciousness (M)	+15%	+10%	+10%	+30%	+1
Individual (S)	+5%	-20%	+10%	-10%	0
Tribal (S)	-10%	+10%	+15%	0	+1
State/Clan (S)	0	0	+10%	+10%	+2
Nation (S)	+5%	-20%	0	+20%	+3

Table 104 Government Modifiers

Research is added or subtracted from the base research points generated.

Intel is added or subtracted from relevant rolls. Intel also grants a bonus (or penalty) to accumulated Strategic Intel points. The Intel modifier is applied to all espionage rolls against the race.

Combat bonus/penalties are added/subtracted from all combat rolls.

Tax is added to a base of 25% to arrive at the final maximum tax rate.

PC or Political Capital is added to the amount gained per turn.

Starting Technology

Each race starts with 5,000 RP to be spent on Theoretical and Applied Sciences. No rolls are necessary for the tech gained in this manner. Any excess RP may be banked to jump-start beginning research.

Low Tech Start

As an option, races may begin with only 3,000 RP to be spent. Chances are that not all techs necessary for space flight will be available from the start.

High Tech Start

As an option, races may begin with 7,000 RP. This will give the necessary basic technologies, plus a few advanced areas. Players may start with 1 Outpost on a system body.

Some suggestions for starting tech include Physics I, Chemistry I, Construction I, Electronics I, Fission I, FTL I, Inertial Comps I, Engines I, Metallurgy I, Science Instruments I and Sensors I. These techs cost 3,250 and give you the basics for unarmed exploration ships.

Starting Facilities

Races should start with the following facilities: 1 Shipyard, 1 Research Center, 1 Defense Installation, and 1 Scanning Installation. Determination of whether these are Orbital, or Ground is left up to the player.

CHAPTER 32 SYSTEM CREATION

The first step in generating a system is to give the system an identifier. This can be a random number (d1000), a sequential number, or some other designation. In addition, a coordinate should be determined for the system. We recommend a ±20 coordinate in X, Y and Z-axes. The point grid should be at 1 light-year increments.

> *Example: The star Cooper's Folly is at coordinates -14X, 08Y, 13Z and its designation is entered into the survey logs as Cooper's Folly – DK012(-14,08,13). In the nomenclature of the UTC Survey Corps, the Scout's name, in this case, Dorian Kelley determines the designation. As this is the twelfth system Captain Kelley has surveyed, it is designated DK012.*

This coordinate system allows you to calculate the distance between systems easily with the following formula.

$$D = \sqrt{(x_1-x_2)^2 + (y_1-y_2)^2 + (z_1-z_2)^2}$$

Where x_1 and x_2 are the x-coordinates, y_1 and y_2 are the y-coordinates, and z_1 and z_2 are the z-coordinates. This will give you the distance in light-years.

Generating Systems

Generating stellar systems is accomplished by rolling on the following tables.

Nebulae

Nebulae are clouds of interstellar gas. There is a 1 in 20 chance that a single system is in a nebula. If this occurs, then the size of the nebula should be determined. Nebulae are 1d10+5 LY in each axis. Any previously generated systems in this volume should be considered outside the nebula and the boundaries of the nebula should be changed to reflect this.

Stellar Systems

The first step is to determine the number of stars present in the system.

d100	Primaries
01-30	2
31-80	1
81-95	3
96-00	4

Table 105 Number of Primaries

Multiple Primaries

Systems with multiple primaries must roll to determine closeness. A simple percentile roll is made, with results of 01-60 being a distant companion, and 61+ being a close companion. Close companions are 1d10+45 AU distant. Distant companions are 2d10 + 135 AU distant. In both cases, no planet may exist greater than one-half the distance between the companions.

Stellar Age

Once you have determined the number of stars present, the relative age must be determined. The age of the stars falls into two general classifications, Young and Mature. Most stars are in the Young classification. These are also the stars most likely to have planets. Stellar age should be rolled once per system, regardless of the number of stars present.

d100	Stellar Age
01-90	Young
91-00	Mature

Table 106 Stellar Age

Young Stars

After determining the age of the star, rolling on the following

d100	Spectrum	Wormhole Chance	Wormhole Distance	Green Zone
01-05	Blue (O)	25%	1d10 x 10	n/a
06-10	Blue-White (B)	20%	1d10 x 10	n/a
11-15	White (A)	20%	1d10 x 10	n/a
16-35	Yellow-White (F)	15%	1d10 x 10 + 100	1.0 – 2.0
36-55	Yellow (G)	10%	1d10 x 10 + 100	0.75 – 1.37
56-75	Orange (K)	5%	1d10 x 10 + 150	0.5 – 1.0
76-00	Red (M)	5%	1d10 x 10 +150	0.25 – 0.75

Table 107 Spectrum – Young Stars

The Green Zone is the habitable zone where water is liquid, and life may exist. The zone between the star and the Green Zone is the Red Zone and outside is the Blue Zone. The values in the table above are in AU.

Mature Stars

d100	Spectrum	Wormhole Chance	Wormhole Distance
01-15	Pulsar	50%	1d10 x 10 – 50
16-60	Red Giant (M-III)	5%	1d10 x 10 + 150
61-80	White Dwarf	50%	1d10 x 10 -50
81-95	Neutron Star	75%	1d10 x 10 – 50

d100	Spectrum	Wormhole Chance	Wormhole Distance
96-00	Black hole	25%	1d10 x 10 - 50

Table 108 Spectrum - Mature Stars

If a distance of less than 1 is rolled for the wormhole, treat it as 1.

Pulsars – Any ship in range of the pulse takes 100 Kinetic/100 Thermal/250 EM damage. This is modified by the distance to the pulsar from the ship.

Range	Pulsar Strength
0-5 hexes	100%
6-10 hexes	75%
11-20 hexes	50%
21-50 hexes	25%

Table 109 Pulsar Strength

Black Holes – Black holes have a rating of 1d10. This rating specifies how big the black hole is in tactical hexes as well as the pull. Each turn a ship is in the system with a black hole, it moves towards the black hole a number of hexes (system or tactical) equal to twice the rating. If a ship enters any black hole hex, it is destroyed.

Wormholes

Planet Size (d100)	Microgravity (< 0.1g)	Very Low (0.1-0.5g)	Low (0.5-0.8g)	Standard (0.8-1.2g)	High (1.2-2.0g)	Very High (2.0-4.0g)	Extreme (4.0+g)
Very Small	01-30	31-80	81-100	—	—	—	—
Small	01-10	11-50	51-90	91-100	—	—	—
Medium	—	01-10	11-35	36-75	76-100	—	—
Large	—	—	01-10	11-25	26-60	61-90	91-100
Very Large	—	—	—	01-10	11-50	51-80	81-100
Giant	—	—	—	—	01-10	11-30	31-100

Table 110 Planetary Gravity

If a wormhole is present, roll on Table 111 to determine the type of wormhole. Black holes, Blue, Blue-White and White stars subtract 20 from the roll. Orange and Red stars add 20 to the roll. Pulsars, White Dwarfs, and Neutron stars subtract 40 from the roll. Red Giants add 40 to the roll.

Roll	Wormhole Type	Bearing
Below 15	Class A	1d5 SHex
16-30	Class B	1d10 SHex
31-40	Class C	1d10+5 SHex
41-50	Class D	1d10+10 SHex
51-60	Class E	2d10+15 SHex
61-70	Class F	2d10+20 SHex
71-85	Class G	3d10+25 SHex
86+	Class H	3d10+30 SHex

Table 111 Wormhole Types

Orbits

Planets can form around any young star. Roll on the following table to determine how many orbital rings are orbiting the star. Treat results of 0 or less as the star having no orbits.

Star	Number of Orbits
Blue	2d10-15
Blue-White	2d10-12
White	2d10-10
Yellow-White	2d10-8
Yellow	2d10-8
Orange	2d10-8
Red	2d10-8

Table 112 Number of Orbits

Once you have determined the number of orbits, roll on the following tables for each orbit to determine the type of planet.

d100	Orbit Contents
01-15	Empty Orbit
16-70	Rocky
71-85	Asteroid
86-00	Gas Giant

Table 113 Orbit Contents

Orbital Distance

Orbits are calculated by first determining the constant for the system. This is accomplished by rolling (1d5+5)/20. This results in values between 0.3 and 0.5. This is the distance in AU of the innermost orbit. The second orbit is calculated by adding the rolled constant to 0.4. Each succeeding orbital distance is calculated by the formula:

$$d = 0.4 + k \times 2^m$$

Where k is the constant generated, and m is the orbit number –2.

Orbital Movement

Each planetary body moves 1 SHex every other month.

Kuiper Belts

Once the number of orbits has been determined, double the distance of the farthest out orbit. This is the location of the Kuiper Belt. The Kuiper Belt is the home of rogue asteroids and comets. The width of the Kuiper Belt is equal to the orbital constant k. Kuiper Belts should have an MI determined for it. Roll on

Table 116 (below) for the main composition of the Kuiper Belt.

Planets

Once you have determined the contents of each orbit, you need to determine the specifics of any planetary body in the orbit.

Planet Size

The next step is to determine the size of the planet. For a gas giant, add 50 to the roll.

d100	Planetary Size	OI Mod
01-20	Very Small (1d5 x 500km)	-0.5
21-45	Small (1d10 x 1,000km)	-0.25
46-70	Medium (2d10 x 1,000km)	+/- 0
71-85	Large (2d10 + 5 x 1,000km)	+ 1.0
86-95	Very Large (3d10 x 2,000km)	+ 1.5
96+	Giant (5d10 + 25) x 3,000km	+ 2.0

Table 114 Planetary Size

Gravity

After determining the size, the next step is to determine the gravity of the planet (see Table 110).

Planetary Type

When a Rocky type planet is generated, roll on the following table to determine the type of Rocky world it is.

For Red Zone orbits, subtract 20 from the roll. For Green Zone orbits, subtract 10. For all other orbits, add 30 to the roll.

d100	Type	Organic Index	Mineral Index
01-25	Hothouse (V)	2	1
26-60	Terrestrial (T)	4	4
61-90	Barren (B)	0.1	2
91-00	Ice (F)	1	2

Table 115 Planetary Types

Asteroids

Roll	Type	OI	MI	Description
01-06	Type M	.1	4	Metallic
07-68	Type S	.1	2	Stony
69-93	Type C	.1	1	Hydrated Mineral
94-00	Type I	.1	.5	Icy

Table 116 Asteroid Types

Asteroids are considered to have Microgravity for gravitational effects to OI and MI. Rolling for atmosphere and temperature is optional for asteroids.

Atmosphere

The atmosphere is determined based on the size and gravity of a planet. Roll on both tables to determine atmospheric pressure and composition. Tainted atmospheres require a filter or respirator to filter out the contaminants. Hostile atmospheres require full sealed suits. In some cases, the atmosphere requires armored suits to combat corrosiveness.

Gravity (d100)	Vac.	Very Thin	Thin	Std.	Dense	Very Dense
Micro-gravity	01-95	96-00	—	—	—	—
Very Low	01-45	46-90	91-00	—	—	—
Low	01-25	26-50	51-75	76-00	—	—
Standard	01-10	11-30	31-50	51-75	76-95	96-00
High	01	02-15	16-35	36-55	56-80	81-00
Very High	01	02	03-10	11-30	31-65	66-00
Extreme	01	02	03	04-10	11-50	51-00

Table 117 Atmospheric Pressure

Vacuum is defined as less than 0.095atm of breathable atmosphere. Very Thin is defined as less than 0.25atm and greater than a vacuum. Thin is defined as between 0.25atm and 0.5atm. Standard is defined as between 0.5 and 2atm. Dense atmosphere is defined as greater than 2.0atm. Very Dense is defined as greater than 8.0atm.

Atmosphere Pressure	OI Modifier
Vacuum	-4.0
Very Thin	-2.0
Thin	-1.0
Standard	+/- 0
Dense	-1.0
Very Dense	-2.0

Table 118 Atmospheric Pressure OI Mod

Oxygen, Carbon Dioxide, Nitrogen are classed as Tainted atmospheres. Sulfur Dioxide, Methane, Hydrogen. Vaporous Dihydrous Monoxide. and Vacuum are classed as Hostile. The native atmosphere of the race is always "Breathable." The Organic Index for native atmosphere is 1, not 0.25.

d100	Atmospheric Gas	Mineral Index	Organic Index	Allowed Types
01-15	Carbon Dioxide	1	0.25	V, T, F, B
16-30	Hydrogen	1	0.25	V, T, F
31-60	Oxygen	1	0.25	V, T, F

d100	Atmospheric Gas	Mineral Index	Organic Index	Allowed Types
61-75	Nitrogen	1	0.25	V, T, F
76-85	Methane	1	0.25	V, T, F, B
86-95	Sulfur Dioxide	1	0.25	V, T, F, B
96-00	Vaporous Dihydrous Monoxide	1	0.25	V, T, F, B
--	Vacuum	1	-4	V, T, F, B

Table 119 Atmospheric Gas

Moons

The chance for a planet to have one or more moons is based on the size. Needless to say, moons do not have moons, regardless of their size.

Planet Size	Number of Moons
Very Small	(diameter/100) – 1d5
Small	(diameter/500) – 1d5
Medium	1d5
Large	1d5 + diameter/1,000
Very Large	1d10 + diameter/5,000
Giant	2d10 + diameter/10,000

Table 120 Number of Moons

Types of Moons
Once the presence of a moon or moons has been determined, the size and type of moons must be determined. Gas giants add 15 to the roll.

Roll	Type	Size	OI	MI
01-15	Moonlets	1d100km dia.	0	0
16-30	Small	2d100km dia.	0	0
31-50	Medium	1d10 x 100km dia.	0	2
51-75	Large	1d10 x 250km dia.	Roll	Roll
76+	Giant	2d10 x 500km dia.	Roll	Roll

Table 121 Types of Moons

A gas giant may give off enough heat for a moon to support life. The chance for this is the gas giant's diameter divided by 10,000. If this occurs, treat the moons as being in the Green Zone, otherwise treat them as being in the same zone as the gas giant. Only Large and Giant moons may support atmospheres. Treat a Large Moon as a Very Small planet and a Giant moon as a Small planet for purposes of type, atmosphere, and gravity. Roll on Table 115 (page 88) for Large and Giant moons, adding 50 to the roll.

Moon Orbits
Moons orbit their planet in similar fashion to the planet and their primary. For each moon, roll 3d10. This is the number of tactical hexes the moon orbits the planet at. Add 1d10 for each moon after the first. Each moon revolves around it's planet at the rate of 6 hexes per month.

Special Characteristics

Some planets have special characteristics. These are determined by the following table.

d100	Characteristic	Effect
01-75	None	None
76-84	Planetary Rings	Adds a planetary ring Astrographic feature
85-92	Retrograde Rotation	Gravity is one category lower.
93-98	Extreme Axial Tilt	-1 OI
99	Pick one and roll again	Roll again for a second feature
00	Special Finds	See Table 137

Table 122 Special Characteristics

Planetary Rings This result adds a planetary ring Astrographic feature. Rings have a width of 1d5 hexes. Roll 3d10 for the orbital distance of the rings. Remove any moon(s) in the ring.

Retrograde Rotation This result decreases the gravity by one category.

Extreme Axial Tilt This result reduces the OI by 1.

Pick one and roll Again Pick one result from the higher results and roll a second time. If this result occurs again, pick and roll again. Special Finds cannot be chosen in this method.

Special Finds See Table 137 for more details.

Minerals

Each planetary body has a classification for each of the five mineral categories. These categories are Heavy Metals, Radioactives, Non-Metallics, Ornamentals, and Industrial Metals. Each classification modifies the Mineral Index of the planetary body.
Gravity will affect the Mineral Abundance roll. Microgravity subtracts 20 from the roll. Very Light gravity subtracts 10 from the roll. Low gravity subtracts 5 from the roll. Standard gravity applies no modifier. High gravity adds 10 to the roll. Very High gravity adds 20 to the roll. Extreme gravity adds 30 to the roll.

d100	Abundance	MI Modifier	Rating
01-10	Scarce	0.25	1d10-5
11-30	Little	0.5	1d10
31-70	Normal	1	1d10+5
71-90	Abundant	1.5	1d10+10

d100	Abundance	MI Modifier	Rating
91-00	Motherlode	2	1d10+20

Table 123 Mineral Abundance

Minimum values for Rating are 1. Mineral Indices are added together and used as a multiplier for the Rating. The Rating is used in the Exploitation Value.

Mineral Bonuses (Optional Rule)
If a planet has abundant or motherlode quantities of minerals, the following bonuses are gained. Motherlode abundancies are not cumulative with Abundant.

Mineral Category	Abundance	Effect
Heavy Metals	Abundant	+5 Shipyard Capacity
Heavy Metals	Motherlode	+10 Shipyard Capacity
Radioactives	Abundant	+1 Research Point
Radioactives	Motherlode	+2 Research Points
Non-Metallics	Abundant	+ 0.5 Industrial Index
Non-Metallics	Motherlode	+1 Industrial Index
Ornamentals	Abundant	+5 Exploitation Index
Ornamentals	Motherlode	+10 Exploitation Index
Industrial Metals	Abundant	+1 Population Build Rate (see Table 88)
Industrial Metals	Motherlode	+2 Population Build Rate (see Table 88)

Exploitation Index
Each category provides the rating x 10 in Exploitation Index. This is multiplied by the Industrial Index of the population on the body to determine the Exploitation Value. This is used for the tax base. Industrial Index is 1, unless advances have been researched under Manufacturing Technology.

Organic Index
The Organic Index directly affects the amount of population the body can sustain. Organic Index is modified by Gravity, Atmosphere, Temperature, and Hydrosphere. As with Mineral Index, the Organic Index is added together to provide the final value. A race native to a planet always treats the generated Temperature, Gravity, and Atmospheric Pressure as 1.0 OI. This only affects the race's home planet.

Gravity	OI Modifier
Microgravity	0.25
Very Low	0.5
Low	0.75
Standard	1.0
High	0.75
Very High	0.5
Extreme	0.25

Table 124 Organic Index Modifiers

Population Capacity
The Organic Index multiplied by 1,000 PP is the maximum amount of population the body can support. A Population Point is defined as 1 million population.

Geophysical Makeup
This helps define the general landscape and is related to gravity. Roll on the following table with modifiers below. The GC Modifier on Table 126 shows any modifiers to ground combat units on the planet.

Gravity	Modifier
Microgravity	+20
Very Low	+10
Low	+5
Standard	0
High	-5
Very High	-10
Extreme	-20

Table 125 Gravity Modifiers

d100	Geology	GC Modifier
01-15	Very Flat	ARM/HVA x 2 attack
16-35	Flat	ARM/HVA x 1.5 attack
36-65	Standard	No modifier
66-85	Rugged	INF/GAR x 1.5 defense
86-100	Very Rugged	INF/GAR x 2 defense

Table 126 Geology

Hydrosphere
The hydrosphere of the planet shows how much water is present. Atmosphere is a contributing factor here. If the atmosphere is Vaporous Dihydrous Monoxide, there is an additional +50 to the roll.

Atmosphere	Modifier
Vacuum	-40
Very Thin	-20
Thin	-10
Standard	0
Dense	+10
Very Dense	+20
Orbits 1 & 2	-50
Orbits 3 & 4	0
Orbits 5+	-30

Table 127 Hydrospheric Modifiers

d100	Hydrosphere	OI Modifier
01-30	No Water (0%)	0
31-60	Arid (1 - 25%)	0.25
61-80	Dry (26-50%)	0.5
81-95	Wet (51-80%)	1.0
96+	Very Wet (81-100%)	1.25

Table 128 Hydrosphere

Temperature
The temperature of the planet is modified by the atmospheric pressure. Vacuum imposes a -40 to the roll. Very Thin imposes -20 to the roll. Thin imposes

-10 to the roll. Orbits 1 and 2, add 30 to the roll. Orbits outside 5 subtract 30 from the roll.

Roll	Temperature	Organic Index
Below 20	Frigid	.25
21-40	Cold	.5
41-60	Temperate	1
61-80	Warm	.5
81+	Hot	.25

Table 129 Planetary Temperature

Biosphere

The biosphere of a planet shows the frequency and complexity of life that can be found on the surface.

Organic Index	Biosphere
– 0.5	No Life
0.6 – 1.0	Very Scarce
1.1 – 3.0	Scarce
3.1 – 4.5	Abundant
4.5 +	Prolific

Table 130 Biosphere

Population

This entry defines the level of population on the planet. This value is modified by the biosphere as follows (No Life –40, Very Scarce –20, Scarce –10, Abundant +20, Prolific +40). It should be noted that a high-tech civilization need not be native to the planet, so there may be a population on a planet with No Life for the Biosphere. If the population is not high-tech, the result may be disregarded. Economic Health is determined for the non-player race by rolling 1d10. The result of this is the current EH value.

d100	Population	Example
Below 10	None	None
11-20	Outpost	1d10 PP
21-35	Small Colony	1d10 + 10 PP
36-45	Colony	2d10 + 20 PP
46-60	Large Colony	(1d5 + 5) x 10 PP
61-75	Small Core	1d5 x 100 PP
75-90	Core	(1d5 + 5) x 100 PP
91-95	Large Core	1d5 x 1,000 PP
96+	Very Large Core	(1d5 + 5) x 1,000 PP

Table 131 Population Levels

Technology

This entry determines the level of technology that any existing population has reached. Roll for Technology level.

d100	Tech Level	Tech Level	RP Avail.	Troop Pts.
01-25	Primitive	0	0	1/turn
26-45	Pre-Industrial	1	0	2/turn
46-75	Industrial	2	1	3/turn
76-95	Post-Industrial	3	1d10 x 100	4/turn
96-00	High Technology	4	1d10 x 2,000	5/turn

Table 132 Technology Levels

Tech Levels
Each year of game time elapsed adds 1 to the roll for Research Points. The troop points generated are superseded by Training Facilities.
Primitive This race is using stone or bronze tools. They will not advance without outside aid.
Pre-Industrial This race is in an era similar to the middle ages or renaissance in our history. The race will not advance without outside aid.
Industrial This race is in the heyday of the industrial revolution. Each year the race gains 1 RP which is applied to theoretical areas. This race *might* advance to a high tech race if the game duration is long enough. Once the race has accumulated 1,000 RP by any means, they are promoted to Post-Industrial.
Post-Industrial This race is in the information age. They gain 1d10 x 100 RP per year, applied to theoretical technologies. Once the race has gained 5,000 RP they are considered a High Tech race.
High Technology This race is in conditions similar to the starting conditions for players.

Racial Characteristics

Each race encountered will have four characteristics to define them. These are Willpower (WP), Arrogance (AR), Aggressiveness (AG), and Xenophobia (XE). Each characteristic ranges from 1-100 and does not change.
Willpower (WP) - This is a measure of how stubborn a race can be. Higher Willpower races will tend to be more stubborn.
Arrogance (AR) - This is how the race deals with others. Higher Arrogance scores show a tendency to try to dominate other races.
Aggressiveness (AG) - This is a measure of how likely a race is to initiate hostile actions. Higher scores are more hostile.
Xenophobia (XE) - This is a measure of how much a race will like or trust other races. High Xenophobia scores are less likely to trust others.

Expansion

If the technology of the population is High Technology, roll on the following table for how big the civilization is.

d100	Exploration	Exploitation
01-10	None	None
11-20	Moon(s) of homeworld	Outpost on 1 or 2 moons
21-30	Nearest planets	Colonies on moons/planets
31-40	Entire home system	Extensive colonization of local system

d100	Exploration	Exploitation
41-50	Neighboring system	1 or 2 outposts outside home system
51-60	Systems within 5 LY	Small colony outside the home system
61-70	Systems within 10-20 LY	1-2 large colonies, and 5-6 small colonies
71-80	Systems within 20-40 LY	2-4 large colonies, and 10+ small colonies
81-90	Systems within 40-60 LY	1-2 core planets, 5-8 large colonies, 20+ small colonies
91-00	Systems within 60-100 LY	4-6 core planets, 10-15 large colonies, 30+ small colonies

Table 133 Expansion/Exploration

Average the Aggressiveness and Willpower of the race. This is added to the Exploration score. Subtract the Xenophobia score from the Exploitation score.

Populations
Each planetary body that is capable of supporting life (of whatever form) has a maximum amount of population that may be supported. Maximum population is calculated by OI x 1,000 PP.

Population Sizes
Organic Index is added to the Yearly Growth and any racial modifiers.

Population Size	Population (in PP)	Yearly Growth
Outpost	0-10	15%
Small Colony	11-20	12%
Colony	21-50	10%
Large Colony	51-100	8%
Small Core	101-500	6%
Core	501-1,000	4%
Large Core	1,001-5,000	2%
Very Large Core	5,001+	1%

Table 134 Population Size

Naval Support
Each population may support free a number of tons equivalent to PP x 25 x Industrial Index. Stationed tonnage in excess of this value is charged a monthly fee of 1 MCr per ton. Any excess support may be stockpiled, up to 10x PP or shipped elsewhere. Tech level 3 is required for Naval Support.
Each ship has an innate support value equal to its Structure. Support is drawn from this value first and then from any populations. Supply totals for uncontested systems may be pooled from all populations. Civilian ships are not included for Naval Support calculations. Cargo ships are calculated using their non-cargo tonnage.

Support Transport
Excess support may be transshipped at a rate of 5 tons per point.

Supply Depots
Supply Depots may be constructed for 5,000MCr / Industrial Index. Each depot may store 20,000 supply points. Each Small Core or larger population in the empire allows for one Supply Depot. Each depot beyond this costs (Current number of Depots +1) x 5,000MCr /Industrial Index.

Missile Silos
Missile silos are required for Nuclear Strike Command Options. At TL 3, each Capital has 1d10-3 silos. This is increased by 1 per 50 troops. Once a silo has been used as part of a Nuclear Strike, it requires 1d10+3 months to become functional again. Missile silos may be present at TL 2 (but no earlier). The chance of TL 2 missile silos is 25%.

Ground Unit Support
Ground Unit support is based on Tech Level (see Table 132). Tech Level also limits the type of unit available.

Tech Lvl	Troop Pts	Types	Capital
0	1 per 10 PP	INF	1 per unit
1	1 per PP	INF	1 per 10 units
2	2 per PP	INF/HVA	1 per 20 units (10 max)
3	5 per PP	INF/HVA/GAR/AIR	1 per 75 units (3 max)
4	10 per PP	All but ARM	1

Table 135 Ground Unit Support

Each troop size unit in excess of the value above is charged a monthly fee of 100MCr per size unit. Capitals represent strongpoints. To force a planet to surrender, all Capitals must be taken.

Uplifting
A player or NPR may uplift a race that is below TL 4. For each 2,000 MCr x TL + 1 spent on the race, they increase by 1 TL. Between each uplift an accommodation period must be observed. This is 1d10 + new TL x 5 months. If the race is uplifted prior to this period expiring there is a 75% chance that the world engages in a self-destructive war and reduces its TL by 1. If this occurs, the race will reject any further uplift attempts.

Survey Operations
Each system has to be explored before it can be colonized or exploited. Upon entry into the system the only information know is the number of primaries or unusual primaries. The survey force accumulates Survey Points at a rate equal to all science instruments Survey ratings. These levels are listed on

the following table. Any level greater than 2 requires the survey ship to be in orbit of the planet being surveyed.

Level	Survey Knowledge
0	Stellar Type/Spectrum
1 (50 SP)	Number of gas giant/Jovian planets
2 (100 SP)	Type of rocky/ice planets
3 (200 SP)	Atmospheric Conditions
4 (400 SP)	Temperature/Hydrosphere
5 (800 SP)	Asteroids/Moons
6 (1600 SP)	Organic Index
7 (3200 SP)	Mineral Index

Table 136 Survey Levels

Industrial and high tech populations in a system generate electromagnetic and thermal signatures. These signatures are detectable by long-range scanners. The signature of a population is equal to Pop (in millions)^2 x (Tech Level). This signature decreases by 10% per SHex distance. This signature is modified by the racial traits Shadow Ships and High Signature Ships.

If survey missiles or survey satellites (science instrument equipped buoys) are employed, the survey data needs to be collected by a ship.

Special Finds

Each system has a 1% chance of having a special attribute. These attributes range from relics and artifacts that increase research to special minerals. Roll of the following tables for the special find.

d100	Type of Find	Notes
01-15	Theoretic Science Artifact	d%: 01-50 = Minor, 51-85 = Standard, 86-00 = Major
16-30	Applied Science Artifact	d%: 01-50 = Minor, 51-85 = Standard, 86-00 = Major
31-45	Hardware	5d100 MCr worth of hardware
46-60	Saleable valuables	1d10 x 1,000 MCr is found
61-75	Special Resource	Provides 1d10 x 100 income for 1d10 + 10 months
71-90	Ruins	d%: 01-50 = Minor, 51-85 = Standard, 86-00 = Major
91-00	Structure	d%: 01-50 = Acceleration Rings, 51-75 = Jump Rings, 76-90 = Jump Gate, 91-00 = Star Gate

Table 137 Special Finds

Artifacts
Artifacts require time to decipher and gain the benefits. Minor artifacts require one month to provide

the bonus. "Standard" artifacts require three months to provide their bonus. Major artifacts require twelve months to provide their bonus. In each case the artifact must be researched by a Xenoarchaeology team. After the required time, a roll is made against the team's rating. If the roll is equal or under the rating, the artifact has been deciphered and the bonus is applied. If the roll fails, another attempt may be made in succeeding months.

Minor Artifacts
Minor Artifacts grant 100 RP to a random technology. Minor artifacts also grant a +20 to the Xenoarchaeology team's effective rating.

Artifacts
Standard Artifacts grant 500 RP to a random technology. Standard artifacts provide no bonus to the roll.

Major Artifacts
Major artifacts grant 1,000 RP to a random technology. Major artifacts impose a -20 penalty to the Xenoarchaeology team's effective skill.

Hardware
Hardware should be randomly generated. The price of the hardware may not exceed the value rolled. Items consisting of components not available to the race may be utilized or reverse engineered.

Ruins
Ruins are classed similar to Artifacts. Ruins require a Xenoarchaeology team to explore the ruins. Each month the team adds their rating to a running total and compares it to the value required for the ruin. Additional teams may be assigned to ruins. Additional teams add ½ their rating to the total.

Minor Ruins
Minor ruins require 500 score. They provide 200 RP for 24 months that may be assigned to any research project. Minor ruins also provide an extra 50MCr income per month for 1d10+5 months.

Standard Ruins
Standard ruins require 1,000 score. They provide 400 RP for 48 months that may be assigned to any research project. Standard Ruins also provide an extra 100 MCr income per month for 1d10+10 months.

Major Ruins
Major ruins require 2,000 score. They provide 800 RP for 64 months that may be assigned to any research project. Major Ruins also provide an extra

200 MCr income per month for (1d10+10) x 2 months.

Structures
These are remnants of former civilizations. For structures requiring linked pairs, determine the end point randomly.

Colonization
Colonization requires the expenditure of cargo and credits. Any ship or ships with sufficient cargo space available may transport colonists.

In-System Colonization
To colonize a planetary body in-system requires an expenditure of 1,000MCr per Population Point (PP). In addition, each PP requires 10,000 tons of cargo capacity. To merely transport population between colonies in-system requires an expenditure of 500Cr per PP moved and the use of 5,000 tons of cargo.

Extra-Solar Colonization
To colonize a planetary body in another system requires an expenditure of 5,000MCr per PP moved and the dedication of 20,000 tons of cargo capacity. To transport to another colony outside the system, an expenditure or 2,500Cr per PP is required, along with the dedication of 10,000 tons of cargo capacity.

Hostile Environment Colonization
If a body is to be colonized that has an atmosphere classed as Hostile, a domed structure must be built. This gives the potential settlement an OI based on the race's native atmosphere. Domed structures cost 500MCr per PP. A domed settlement may not exceed Large Colony in size. Enclosed colonies may be built on bodies with atmospheres that are not native to the race. Hostile Environment Colonization requires an additional 50% cargo capacity.

Planetary Technologies

Planetary Improvement Tree
The Planetary Improvement tree contains technologies that allow a race to improve the conditions on a planet. Technologies include Organic Improvement, Mineral Improvement, and Maximum Population Improvement.

Organic Improvement
Each generation of this technology allows a +1 to the Organic Index to the planets affected to a maximum of +5. This costs 5,000 MCr per plus.

Mineral Improvement
Each generation of this technology allows +1 to the Mineral Index to the planets affected to a maximum of +5. This costs 7,500 MCr per plus.

Maximum Population Improvement
Each generation of this technology allows the population maximum to be raised by 10% to a maximum of +50%. This costs 10,000 MCr per plus.

CHAPTER 33 RESEARCH

Each project requires a number of points to complete. When enough research points are accumulated for a project, a percentage roll is made. The number needed for success is based on the formula $((Rc + Grade) * 5\%) + 50$, where Rc is the number of Research Centers working on this project and Grade is the Grade of the Director. A roll above the number is a failure, and the research continues for another turn. A roll of 100 (00) is a critical flaw and ½ of the Research Points accumulated for the project are lost. A roll less than the number is a success. A roll of 01 is a critical success and ½ of the Research Points accumulated may be applied to projects in the same tree. Certain technologies require base research to be accomplished before the practical knowledge may be researched. To start a project, the Initiation Cost of the desired project must be paid. Each turn thereafter until project completion, the Sustain Cost must be paid. If the Sustain Cost is not paid on any turn, RP are not accumulated. After three turns of non-payment, accumulated RP starts decreasing at a rate of 10 RP per turn. Any time after this point to start the research again costs one-half the Initiation Cost.

Theoretical Technology

Physics

Tree	RP Needed	Initiation Cost	Sustain Cost
I	500	12,500	625
II	600	15,000	750
III	700	17,500	875
IV	800	20,000	1,000

Table 138 Physics

Physics I
At this level of Physics, the following Applied Science areas are opened: Engine Tech, Laser Tech, Inertial Compensators, Shield Tech, FTL Tech, Power Tech, and Fission.

Physics II
At this level of Physics, the following Applied Science areas are opened: Fusion and High-Energy Capacitors.

Physics III
At this level of Physics, the following Applied Science areas are opened: Antimatter and Force Tech.

Physics IV
At this level of Physics, Astrophysics is opened. Electron Torpedo and Proton Torpedo Applied Sciences are opened.

Chemistry

Tree	RP Needed	Initiation Cost	Sustain Cost
I	500	12,500	625
II	600	15,000	750

Table 139 Chemistry

Chemistry I
At this level of Chemistry, the Applied Science area of Armor is opened.

Chemistry II
At this level of Chemistry, the Applied Science area of Mineral Improvement is opened. Geophysics I is also required for Mineral Improvement.

Biology

Tree	RP Needed	Initiation Cost	Sustain Cost
I	600	15,000	750
II	700	17,500	875
III	800	20,000	1,000

Table 140 Biology

Biology I
At this level of Biology, the Applied Science area of Organic Improvement is opened. Geophysics II is also required for Organic Improvement.

Biology II
At this level of Biology, the Applied Science area of Population Improvement is opened. Geophysics III is also required for Population Improvement.

Biology III
At this level of Biology, the Applied Science areas of Anagathics and Cryogenics are opened.

Construction

Tree	RP Needed	Initiation Cost	Sustain Cost
I	500	12,500	625
II	600	15,000	750
III	700	17,500	875
IV	800	20,000	1,000
V	900	22,500	1,125

Table 141 Construction

Construction I
At this level of Construction, the following areas of Applied Science are opened: Metallurgy, Missile Tech, and Hangars.

Construction II
At this level of Construction, the following areas of Applied Science are opened: Enhanced Metallurgy, Troops, and Small Craft

Construction III
At this level of Construction, the following areas of

Applied Science are opened: Advanced Metallurgy, Mines, and Fighters.

Construction IV
At this level of Construction, the following areas of Applied Science are opened: Composites.

Construction V
At this level of Construction, the following area of Applied Science is opened: Enhanced Composites.

Military Science

Tree	RP Needed	Initiation Cost	Sustain Cost
I	700	17,500	875
II	800	20,000	1,000
III	900	22,500	1,125
IV	1,000	25,000	1,250
V	1,200	30,000	1,500

Table 142 Military Science

Military Science I
At this level of Military Science, the following area of Applied Science is opened: Kinetic Weapons.

Military Science II
At this level of Military Science, the following area of Applied Science is opened: Command Net and EWD Modifications.

Military Science III
At this level of Military Science, the following area of Applied Science is opened: Weapon Modifications and LRS Modifications.

Military Science IV
At this level of Military Science, the following Applied Science areas are opened: ECM Modifications, Command Net Modifications, and Sensor Modifications.

Military Science V
At this level of Military Science, the following Applied Science areas are opened: Shield Modifications, Science Instrument Modifications, HEC Ring Modifications, and Armor Modifications.

Industry

Tree	RP Needed	Initiation Cost	Sustain Cost
I	500	12,500	625
II	600	15,000	750

Table 143 Industry

Industry I
At this level of Industry, the following area of Applied Science is opened: Manufacturing.

Industry II
At this level of Industry, the following area of Applied Science is opened: Drones.

Electronics

Tree	RP Needed	Initiation Cost	Sustain Cost
I	500	12,500	675
II	600	15,000	750
III	700	17,500	875

Table 144 Electronics

Electronics I
At this level of Electronics, the following areas of Applied Science are opened: Science Instruments and Sensors.

Electronics II
At this level of Electronics, the following area of Applied Science is opened: Electronic Warfare.

Electronics III
At this level of Electronics, the following area of Applied Science is opened: Long-Range Scanners.

Astrophysics

Tree	RP Needed	Initiation Cost	Sustain Cost
I	800	20,000	1,000
II	900	22,500	1,125
III	1,000	25,000	1,250
IV	1,200	30,000	1,500

Table 145 Astrophysics

Astrophysics I
At this level of Astrophysics, the following area of Applied Science is opened: Particle Bombs and Particle Weapons.

Astrophysics II
At this level of Astrophysics, the following area of Applied Science is opened: Plasma.

Astrophysics III
At this level of Astrophysics, the following area of Applied Science is opened: Warpspace.

Astrophysics IV
At this level of Astrophysics, the following are of Applied Science is opened: Zero-Point Tech.

Geophysics

Tree	RP Needed	Initiation Cost	Sustain Cost
I	600	15,000	750
II	700	17,500	875
III	800	20,000	1,000

Table 146 Geophysics

Geophysics I
At this level of Geophysics, the following area of Applied Science is opened: Mineral Improvement. Chemistry II is also required for Mineral Improvement.

Geophysics II
At this level of Geophysics, the following area of Applied Science is opened. Organic Improvement. Biology I is also required for Organic Improvement.

Geophysics III
At this level of Geophysics, the following area of Applied Science is opened: Population Improvement. Biology II is also required for Population Improvement.

Applied Sciences

Fission

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Physics I	100	1,250	62.5
II	Fission I	200	2,500	125
III	Fission II	300	3,750	187.5
IV	Fission III	400	5,000	250
V	Fission IV	500	6,250	312.5
VI	Fission V	600	7,500	375

Table 147 Fission

Fission I
Components received at this level are Primitive Fission, Mine Reactors, and Fission Warheads.

Fission II
Component received at this level is Basic Fission.

Fission III
Component received at this level is Standard Fission.

Fission IV
Component received at this level is Improved Fission.

Fission V
Component received at this level is Enhanced Fission.

Fission VI
Component received at this level is Advanced Fission.

Shield Tech

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Physics I	400	5,000	250
II	Shield I	500	6,250	312.5

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
III	Shield II	600	7,500	375
IV	Shield III	700	8,750	437.5
V	Shield IV	800	10,000	500
VI	Shield V	900	11,250	562.5
VII	Shield VI	1,000	12,500	625
VIII	Shield VII	1,200	15,000	750
IX	Shield VIII	1,400	17,500	875
X	Shield IX	1,600	20,000	1,000
XI	Shield X	1,800	22,500	1,125
XII	Shield XI	2,000	25,000	1,250
XIII	Shield XII	2,200	27,500	1,375
XIV	Shield XIII	2,400	30,000	1,500
XV	Shield XIV	2,600	32,500	1,625
XVI	Shield XV	2,800	35,000	1,750
XVII	Shield XVI	3,000	37,500	1,875
XVIII	Shield XVII	3,200	40,000	2,000
XIX	Shield XVIII	3,400	42,500	2,125
XX	Shield XIX	3,600	45,000	2,250
XXI	Shield XX	3,800	47,500	2,375
XXII	Shield XXI	4,000	50,000	2,500
XXIII	Shield XXII	4,200	52,500	2,625
XXIV	Shield XXIII	4,400	55,000	2,750

Table 148 Shields

Shields I
Component received at this level is Alpha Shields.

Shields II
Components received at this level are Shield Penetration, Beta Shields.

Shields III
Components received at this level is Shield Regeneration I, Gamma Shields.

Shields IV
Components received at this level is Delta Shields.

Shields V
Components received at this level is Shield Regeneration II, Epsilon Shields.

Shields VI
Components received at this level is Shield Regeneration III, Zeta Shields.

Shields VII
Components received at this level is Eta Shields.

Shields VIII
Components received at this level is Shield Regeneration IV, Theta Shields.

Shields IX
Components received at this level is Iota Shields.

Shields X
Components received at this level is Shield Regeneration V, Kappa Shields.

Shields XI
Components received at this level is Lambda Shields.

Shields XII
Components received at this level are Mu Shields, Shield Regeneration VI.

Shields XIII
Components received at this level are Nu Shields.

Shields XIV
Components received at this level are Xi Shields, Shield Regeneration VII.

Shields XV
Components received at this level are Omicron Shields.

Shields XVI
Components received at this level are Pi Shields, Shield Regeneration VIII.

Shields XVII
Component received at this level is Rho Shields.

Shields XVIII
Components received at this level are Sigma Shields, Shield Regeneration IX.

Shields XIX
Components received at this level are Tau Shields.

Shields XX
Components received at this level Upsilon Shields, Shield Regeneration X.

Shields XXI
Components received at this level are Phi Shields.

Shields XXII
Components received at this level are Chi Shields.

Shields XXIII
Components received at this level are Psi Shields.

Shields XXIV
Components received at this level are Omega Shields.

Inertial Compensators

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Physics I	100	1,250	62.5
II	Inertial Comp I	200	2,500	125
III	Inertial Comp II	300	3,750	187.5
IV	Inertial Comp III	400	5,000	250

Table 149 Inertial Compensators

Inertial Comp I
The component received at this level is Prototype Inertial Compensators.

Inertial Comp II
The component received at this level is Standard Inertial Compensators.

Inertial Comp III
The component received at this level is Enhanced Inertial Compensators.

Inertial Comp IV
The component received at this level is Advanced Inertial Compensators.

FTL Drive

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Physics I	100	1,250	62.5
II	FTL I	200	2,500	125
III	FTL II	300	3,750	187.5
IV	FTL III	400	5,000	250
V	FTL IV	500	6,250	312.5

Table 150 FTL Drive

FTL I
The component received at this level is FTL Class I, Ripple Detectors, and Warp Anchor.

FTL II
The component received at this level is FTL Class II and EWD.

FTL III
The component received at this level is FTL Class III.

FTL IV
The component received at this level is FTL Class IV.

FTL V
The component received at this level is FTL Class V.

Laser Tech

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Physics I	100	1,250	62.5

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
II	Laser I	200	2,500	125
III	Laser II	300	3,750	187.5
IV	Laser III	400	5,000	250

Table 151 Lasers

Laser Tech I
This grants Laser Apertures 5cm to 25cm, Laser RoF Tech, and Laser Frequency Tech, and grants Ground troops +1 Attack value.

Laser Tech II
This grants Laser Apertures 30cm to 50cm.

Laser Tech III
This grants Laser Apertures 55cm to 75cm.

Laser Tech IV
This grants Laser Apertures 80cm to 100cm.

Laser RoF Tech

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Laser I	0	0	0
II	Laser RoF I	200	2,500	125
III	Laser RoF II	300	3,750	187.5
IV	Laser RoF III	400	5,000	250
V	Laser RoF IV	500	6,250	312.5
VI	Laser RoF V	600	7,500	375

Table 152 Laser RoF

Laser RoF Tech I
This grants Class I Laser RoF.

Laser RoF Tech II
This grants Class II Laser RoF.

Laser RoF Tech III
This grants Class III Laser RoF.

Laser RoF Tech IV
This grants Class IV Laser RoF.

Laser RoF Tech V
This grants Class V Laser RoF

Laser RoF Tech VI
This grants Class VI Laser RoF.

Laser Frequency Tech

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Laser I	0	0	0
II	Laser Freq I	200	2,500	125
III	Laser Freq II	300	3,750	187.5
IV	Laser Freq III	400	5,000	250
V	Laser Freq IV	500	6,250	312.5

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
VI	Laser Freq V	600	7,500	375
VII	Laser Freq VI	700	8,750	437.5
VIII	Laser Freq VII	800	10,000	500
IX	Laser Freq VIII	900	11,250	562.5

Table 153 Laser Frequency

Laser Frequency Tech I
This grants the Far Infrared Frequency.

Laser Frequency Tech II
This grants the Mid-Infrared Frequency.

Laser Frequency Tech III
This grants the Near Infrared Frequency.

Laser Frequency Tech IV
This grants the Visible Frequency.

Laser Frequency Tech V
This grants the Near Ultraviolet Frequency.

Laser Frequency Tech VI
This grants the Extreme Ultraviolet Frequency.

Laser Frequency Tech VII
This grants the Soft X-Ray Frequency.

Laser Frequency Tech VIII
This grants the Hard X-Ray Frequency.

Laser Frequency Tech IX
This grants the Gamma Ray Frequency.

Engine Tech

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Physics I	100	1,250	62.5
II	Engines I	200	2,500	125
III	Engines II	300	3,750	187.5
IV	Engines III	400	5,000	250
V	Engines IV	500	6,250	312.5
VI	Engines V	600	7,500	375
VII	Engines VI	700	8,750	437.5
VIII	Engines VII	800	10,000	500
IX	Engines VIII	900	11,250	562.5
X	Engines IX	1,000	12,500	625

Table 154 Engines

Engine Tech I
This grants Nuclear Torch Engine and Basic Engine Class.

Engine Tech II
This grants the Nuclear Pulse Engine.

Engine Tech III
This grants the Ion Pulse Engine and Standard Engine Class.

Engine Tech IV
This grants the Grav Pulse Engine.

Engine Tech V
This grants the Plasma Torch Engine and Improved Engine Class.

Engine Tech VI
This grants the Plasma Pulse Engine.

Engine Tech VII
This grants the Fusion Torch Engine and Enhanced Engine Class.

Engine Tech VIII
This grants the Fusion Pulse Engine.

Engine Tech IX
This grants the Antimatter Torch Engine and Advanced Engine Class.

Engine Tech X
This grants Antimatter Pulse Engine.

Power Tech

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Physics I	100	1,250	62.5
II	Power I	200	2,500	125
III	Power II	300	3,750	187.5
IV	Power III	400	5,000	250
V	Power IV	500	6,250	312.5

Table 155 Power

Power Tech I
This grants Power Efficiency I and Thrust Efficiency I.

Power Tech II
This grants Power Efficiency II and Thrust Efficiency II.

Power Tech III
This grants Power Efficiency III and Thrust Efficiency III.

Power Tech IV
This grants Power Efficiency IV and Thrust Efficiency IV.

Power Tech V
This grants Power Efficiency V and Thrust Efficiency V.

Fusion Tech

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Physics II	500	5,000	250
II	Fusion I	750	7,500	375
III	Fusion II	1,000	10,000	500
IV	Fusion III	1,250	12,500	625
V	Fusion IV	1,500	15,000	750
VI	Fusion V	1,750	17,500	875

Table 156 Fusion

Fusion Tech I
The components granted at this level are Fusion Warheads and Primitive Fusion.

Fusion Tech II
The component granted at this level is Basic Fusion.

Fusion Tech III
The component granted at this level is Standard Fusion.

Fusion Tech IV
The component granted at this level is Improved Fusion.

Fusion Tech V
The component granted at this level is Enhanced Fusion.

Fusion Tech VI
The component granted at this level is Advanced Fusion.

High-Energy Capacitor Tech

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Physics II	500	5,000	250
II	HEC Tech I	750	7,500	375
III	HEC Tech II	1,000	10,000	500
IV	HEC Tech III	1,250	12,500	625
V	HEC Tech IV	1,500	15,000	750

High-Energy Capacitor Tech I
This tech grants HEC Rings I.

High-Energy Capacitor Tech II
This tech grants HEC Rings II.

High-Energy Capacitor Tech III
This tech grants HEC Rings III.

High-Energy Capacitor Tech IV
This tech grants HEC Rings IV.

High-Energy Capacitor Tech V
This tech grants HEC Rings V.

Antimatter Tech

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Physics III	1,000	10,000	500
II	Antimatter I	1,250	12,500	625
III	Antimatter II	1,500	15,000	750
IV	Antimatter III	1,750	17,500	875
V	Antimatter IV	2,000	20,000	1,000
VI	Antimatter V	2,250	22,500	1,125

Table 157 Antimatter

Antimatter Tech I
This tech grants Antimatter Warheads and Primitive Antimatter.

Antimatter Tech II
This tech grants Basic Antimatter.

Antimatter Tech III
This tech grants Standard Antimatter.

Antimatter Tech IV
This tech grants Improved Antimatter.

Antimatter Tech V
This tech grants Enhanced Antimatter.

Antimatter Tech VI
This tech grants Advanced Antimatter.

Force Tech

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Physics III	1,000	10,000	500
II	Force I	1,500	15,000	750
III	Force II	2,000	20,000	1,000
IV	Force III	2,500	25,000	1,250
V	Force IV	3,000	30,000	1,500
VI	Force V	3,500	35,000	1,750
VII	Force VI	4,000	40,000	2,000
VIII	Force VII	4,500	45,000	2,250
IX	Force VIII	5,000	50,000	2,500
X	Force IX	5,500	55,000	2,750

Table 158 Force

Force Tech I
This level grants access to Kinetic Beam Apertures 5 & 10cm, Fire Delay 0, and grants Ground troops +1 Attack value.

Force Tech II
This level grants access to Kinetic Beam Apertures 15 & 20cm.

Force Tech III
This level grants access to Kinetic Beam Apertures 25 & 30cm and Fire Delay 1.

Force Tech IV
This level grants access to Kinetic Beam Apertures 35 & 40cm, and Tractor Beams.

Force Tech V
This level grants access to Kinetic Beam Apertures 45 & 50cm and Fire Delay 2.

Force Tech VI
This level grants access to Kinetic Beam Apertures 55 & 60cm.

Force Tech VII
This level grants access to Kinetic Beam Apertures 65 & 70cm and Fire Delay 3.

Force Tech VIII
This level grants access to Kinetic Beam Apertures 75 & 80cm.

Force Tech IX
This level grants access to Kinetic Beam Apertures 85 & 90cm and Fire Delay 4.

Force Tech X
This level grants access to Kinetic Beam Apertures 95 & 100cm and Fire Delay 5.

Particle Bomb Tech

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Astrophysics I	1,000	10,000	500
II	Particle Bomb Tech I	1,500	15,000	750
III	Particle Bomb Tech II	2,000	20,000	1,000
IV	Particle Bomb Tech III	2,500	25,000	1,250
V	Particle Bomb Tech IV	3,000	30,000	1,500

Table 159 Particle Bomb

Particle Bomb Tech I
This tech grants Apertures 10-20cm and Containment Strength 1.

Particle Bomb Tech II
This tech grants Apertures 30-40cm and Containment Strength 2.

Particle Bomb Tech III
This tech grants Apertures 50-60cm and Containment Strength 3.

Particle Bomb Tech IV
This tech grants Apertures 70-80cm and Containment Strength 4.

Particle Bomb Tech V
This tech grants Apertures 90-100cm and Containment Strength 5.

Electron Torpedo Tech

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Physics IV	1,000	10,000	500
II	Electron Torpedo Tech I	1,500	15,000	750
III	Electron Torpedo Tech II	2,000	20,000	1,000
IV	Electron Torpedo Tech III	2,500	25,000	1,250
V	Electron Torpedo Tech IV	3,000	30,000	1,500

Electron Torpedo Tech I
This tech grants 10 & 20cm Apertures and Containment Strength 1.

Electron Torpedo Tech II
This tech grants 30 & 40cm Apertures and Containment Strength 2.

Electron Torpedo Tech III
This tech grants 50 & 60cm Apertures and Containment Strength 3.

Electron Torpedo Tech IV
This tech grants 70 & 80cm Apertures and Containment Strength 4.

Electron Torpedo Tech V
This tech grants 90 & 100cm Apertures and Containment Strength 5.

Proton Torpedo Tech

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Physics IV	1,000	10,000	500
II	Proton Torpedo Tech I	1,500	15,000	750
III	Proton Torpedo Tech II	2,000	20,000	1,000
IV	Proton Torpedo Tech III	2,500	25,000	1,250
V	Proton Torpedo Tech	3,000	30,000	1,500

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
IV				

Table 160 Proton Torpedo

Proton Torpedo Tech I
This tech grants 20 & 40cm Apertures and Containment Strength 1.

Proton Torpedo Tech II
This tech grants 60 & 80cm Apertures and Containment Strength 2.

Proton Torpedo Tech III
This tech grants 100 & 120cm Apertures and Containment Strength 3.

Proton Torpedo Tech IV
This tech grants 140 & 160cm Apertures and Containment Strength 4.

Proton Torpedo Tech V
This tech grants 180 & 200cm Apertures and Containment Strength 5.

Plasma Tech

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Astrophysics II	1,500	15,000	750
II	Plasma Tech I	2,000	20,000	1,000
III	Plasma Tech II	2,500	25,000	1,250
IV	Plasma Tech III	3,000	30,000	1,500
V	Plasma Tech IV	3,500	35,000	1,750
VI	Plasma Tech V	4,000	40,000	2,000

Table 161 Plasma

Plasma Tech I
This grants access to Primitive Plasma Core, Plasma warheads and High-Energy Plasma Weapons.

Plasma Tech II
This grants access to Basic Plasma Core.

Plasma Tech III
This grants access to Standard Plasma Core.

Plasma Tech IV
This grants access to Improved Plasma Core.

Plasma Tech V
This grants access to Enhanced Plasma Core.

Plasma Tech VI
This grants access to Advanced Plasma Core.

High-Energy Plasma Weapon Tech

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Plasma Tech I	2,000	20,000	1,000
II	HEWP Tech I	2,500	25,000	1,250
III	HEWP Tech II	3,000	30,000	1,500
IV	HEWP Tech III	3,500	35,000	1,750
V	HEWP Tech IV	4,000	40,000	2,000

Table 162 High-Energy Plasma Weapon

High-Energy Plasma Weapon Tech I
This grants access to 25 & 50cm Apertures, Containment Strength 1, and grants Ground troops +1 Attack value.

High-Energy Plasma Weapon Tech II
This grants access to 75 & 100cm Apertures and Containment Strength 2.

High-Energy Plasma Weapon Tech III
This grants access to 125, 150 & 175cm Apertures and Containment Strength 3.

High-Energy Plasma Weapon Tech IV
This grants access to 200 & 225cm Apertures and Containment Strength 4.

High-Energy Plasma Weapon Tech V
This grants access to 250, 275 & 300cm Apertures and Containment Strength 5.

Warpspace Tech

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Astrophysics III	2,500	25,000	1,250
II	Warpspace Tech I	3,000	30,000	1,500
III	Warpspace Tech II	3,500	35,000	1,750
IV	Warpspace Tech III	4,000	40,000	2,000
V	Warpspace Tech IV	4,500	45,000	2,250
VI	Warpspace Tech V	5,000	50,000	2,500

Table 163 Warpspace

Warpspace Tech I
This grants access to Primitive Warp Tap, Warp warheads, and opens Jump Gate Tech.

Warpspace Tech II
This grants access to Basic Warp Tap.

Warpspace Tech III
This grants access to Standard Warp Tap.

Warpspace Tech IV
This grants access to Improved Warp Tap.

Warpspace Tech V
This grants access to Enhanced Warp Tap.

Warpspace Tech VI
This grants access to Advanced Warp Tap.

Zero-Point Tech

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Astrophysics IV	3,000	30,000	1,500
II	Zero-Point Tech I	4,000	40,000	2,000
III	Zero-Point Tech II	5,000	50,000	2,500
IV	Zero-Point Tech III	6,000	60,000	3,000
V	Zero-Point Tech IV	7,000	70,000	3,500
VI	Zero-Point Tech V	8,000	80,000	4,000

Table 164 Zero-Point

Zero-Point Tech I
This grants access to Primitive Zero-Point Core and Gravitic warheads.

Zero-Point Tech II
This grants access to Basic Zero-Point Core.

Zero-Point Tech III
This grants access to Standard Zero-Point Core.

Zero-Point Tech IV
This grants access to Improved Zero-Point Core.

Zero-Point Tech V
This grants access to Enhanced Zero-Point Core.

Zero-Point Tech VI
This grants access to Advanced Zero-Point Core.

Armor Tech

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Chemistry I	500	5,000	250
II	Armor I	750	7,500	375
III	Armor II	1,000	10,000	500
IV	Armor III	1,250	12,500	625

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
V	Armor IV	1,500	15,000	750
VI	Armor V	1,750	17,500	875
VII	Armor VI	2,000	20,000	1,000
VIII	Armor VII	2,250	22,500	1,125
IX	Armor VIII	2,500	25,000	1,250
X	Armor IX	2,750	27,500	1,375
XI	Armor X	3,000	30,000	1,500
XII	Armor XI	3,500	35,000	1,750
XIII	Armor XII	4,000	40,000	2,000
XIV	Armor XIII	4,500	45,000	2,250
XV	Armor XIV, Biology III	5,000	50,000	2,500
XVI	Armor XV	6,000	60,000	3,000
XVII	Armor XVI	7,000	70,000	3,500
XVIII	Armor XVII	8,000	80,000	4,000
XIX	Armor XVIII	9,000	90,000	4,500
XX	Armor XIX	10,000	100,000	5,000
XXI	Armor XX	12,000	120,000	6,000
XXII	Armor XXI	14,000	140,000	7,000

Table 165 Armor

Armor Tech I
This grants access to Alpha Armor.

Armor Tech II
This grants access to Beta Armor and Power Plant Armor 1.

Armor Tech III
This grants access to Gamma Armor.

Armor Tech IV
This grants access to Delta Armor and Power Plant Armor 2.

Armor Tech V
This grants access to Epsilon Armor.

Armor Tech VI
This grants access to Zeta Armor and Power Plant Armor 3.

Armor Tech VII
This grants access to Eta Armor.

Armor Tech VIII
This grants access to Theta Armor, Alpha Reactive Armor and Power Plant Armor 4.

Armor Tech IX
This grants access to Beta Reactive Armor.

Armor Tech X
This grants access to Gamma Reactive Armor and Power Plant Armor 5.

Armor Tech XI
This grants access to Delta Reactive Armor.

Armor Tech XII
This grants access to Epsilon Reactive Armor and Power Plant Armor 6.

Armor Tech XIII
This grants access to Zeta Reactive Armor.

Armor Tech XIV
This grants access to Eta Reactive Armor and Power Plant Armor 7.

Armor Tech XV
This grants access to Theta Reactive Armor and Alpha Organic Armor.

Armor Tech XVI
This grants access to Beta Organic Armor and Power Plant Armor 8.

Armor Tech XVII
This grants access to Gamma Organic Armor.

Armor Tech XVIII
This grants access to Delta Organic Armor and Power Plant Armor 9.

Armor Tech XIX
This grants access to Epsilon Organic Armor.

Armor Tech XX
This grants access to Zeta Organic Armor and Power Plant Armor 10.

Armor Tech XXI
This grants access to Eta Organic Armor.

Armor Tech XXII
This grants access to Theta Organic Armor.

Mineral Improvement Tech

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Chemistry II, Geophysics I	500	5,000	250
II	Mineral Improvement I	750	7,500	375
III	Mineral Improvement II	1,000	10,000	500
IV	Mineral Improvement III	1,250	12,500	625
V	Mineral Improvement IV	1,500	15,000	750

Table 166 Mineral Improvement

Mineral Improvement Tech I
This allows an empire to increase Mineral Index of its planets by 1 for a cost.

Mineral Improvement Tech II
This allows an empire to increase Mineral Index of its planets by 1 for a cost.

Mineral Improvement Tech III
This allows an empire to increase Mineral Index of its planets by 1 for a cost.

Mineral Improvement Tech IV
This allows an empire to increase Mineral Index of its planets by 1 for a cost.

Mineral Improvement Tech V
This allows an empire to increase Mineral Index of its planets by 1 for a cost.

Organic Improvement Tech

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Biology I, Geophysics II	500	5,000	250
II	Organic Improvement I	750	7,500	375
III	Organic Improvement II	1,000	10,000	500
IV	Organic Improvement III	1,250	12,500	625
V	Organic Improvement IV	1,500	15,000	750

Table 167 Organic Improvement

Organic Improvement Tech I
This allows an empire to increase Organic Index of its planets by 1 for a cost.

Organic Improvement Tech II
This allows an empire to increase Organic Index of its planets by 1 for a cost.

Organic Improvement Tech III
This allows an empire to increase Organic Index of its planets by 1 for a cost.

Organic Improvement Tech IV
This allows an empire to increase Organic Index of its planets by 1 for a cost.

Organic Improvement Tech V
This allows an empire to increase Organic Index of its planets by 1 for a cost.

Population Improvement Tech

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Biology II, Geophysics III	500	5,000	250
II	Population Improvement I	750	7,500	375
III	Population Improvement II	1,000	10,000	500
IV	Population Improvement III	1,250	12,500	625
V	Population Improvement IV	1,500	15,000	750

Table 168 Population Improvement

Population Improvement Tech I
This allows an empire to increase the maximum population limit by 10% for a cost.

Population Improvement Tech II
This allows an empire to increase the maximum population limit by 10% for a cost.

Population Improvement Tech III
This allows an empire to increase the maximum population limit by 10% for a cost.

Population Improvement Tech IV
This allows an empire to increase the maximum population limit by 10% for a cost.

Population Improvement Tech V
This allows an empire to increase the maximum population limit by 10% for a cost.

Metallurgy

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Construction I	100	1,250	50
II	Metallurgy I	200	2,500	100

Table 169 Metallurgy

Metallurgy Tech I
Hulls cost 10MCr/ton at this level. Hulls have a Signature of Tons/20. Maximum Thrust is 5. Missile Decoys have 10 HTK. Small craft gain +1 HTK. Grants access to Enhanced Metallurgy.

Metallurgy Tech II
Hulls cost 9MCr/ton at this level. Defense value of Ground troops is increased by 1. Hulls have a Signature of Tons/25. Maximum Thrust is 6. Missile Decoys have 13 HTK. Small craft gain +1 HTK.

Missile Tech

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Construction I	100	1,250	50
II	Missile Tech I	200	2,500	100
III	Missile Tech II	300	3,750	150
IV	Missile Tech III	400	5,000	200
V	Missile Tech IV	500	6,250	250
VI	Missile Tech V	600	7,500	300
VII	Missile Tech VI	700	8,750	350
VIII	Missile Tech VII	800	10,000	400

Table 170 Missile Tech

Missile Tech I
This grants Basic Frames, Magazine Capacity 1, Reload Rate 1, and grants Ground troops +1 Attack value.

Missile Tech II
This grants Standard Frames.

Missile Tech III
This grants Reload Rate 2 and Magazine Capacity 2.

Missile Tech IV
This grants Enhanced Frames and Reload Rate 3.

Missile Tech V
This grants Magazine Capacity 3 and Advanced Frames.

Missile Tech VI
This grants Reload Rate 4 and Missile Decoys.

Missile Tech VII
This grants Magazine Capacity 4 and Reload Rate 5.

Missile Tech VIII
This grants Magazine Capacity 5 and Reload Rate 6.

Hangar Tech

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Construction I	750	2,000	100
II	Hangar Tech I	1,000	2,500	125
III	Hangar Tech II	1,250	3,000	150

Table 171 Hangar

Hangar Tech I
This grants access to Shuttlebays.

Hangar Tech II
This grants access to Fighter Hangars.

Hangar Tech III
This grants access to Docking Bays.

Enhanced Metallurgy

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Metallurgy I, Construction II	500	5,000	250
II	Enhanced Metallurgy I	750	7,500	375

Table 172 Enhanced Metallurgy

Enhanced Metallurgy I
Hulls cost 8MCr/ton at this level. Hulls have a Signature of Tons/30. Maximum Thrust is 9. Missile Decoys have 15 HTK. Small Craft gain +1 HTK. Gives access to Advanced Metallurgy.

Enhanced Metallurgy II
Hulls cost 7MCr/ton at this level. Defense of Ground troops is increased by 1. Hulls have a Signature of Tons/35. Maximum Thrust is 10. Missile Decoys have 18 HTK. Small craft gain +1 HTK.

Small Craft

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Construction II	400	4,000	200
II	Small Craft I	500	5,000	250
III	Small Craft II	600	6,000	300

Table 173 Small Craft

Small Craft Tech I
This allows access to Shuttles and Cargo Shuttles.

Small Craft Tech II
This allows access to Pinnaces.

Small Craft Tech III
This allows access to Assault Shuttles and Drop Pods.

Troop Tech

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Construction II	400	4,000	200
II	Troop Tech I	500	5,000	250
III	Troop Tech II	600	6,000	300
IV	Troop Tech III	700	7,000	350

Table 174 Troop

Troop Tech I
This grants access to Troop Barracks, Troop Bays and grants troops +1 Attack (max +1).

Troop Tech II
This grants access to Armor and grants troops +1 Defense (max +1).

Troop Tech III
This grants troops +1 to Attack (max +2).

Troop Tech IV
This grants troops +1 to Defense (max +2).

Advanced Metallurgy

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Enhanced Metallurgy I, Construction III	800	8,000	400
II	Advanced Metallurgy I	900	9,000	450

Table 175 Advanced Metallurgy

Advanced Metallurgy Tech I
Hulls cost 6MCr/ton at this level. Hulls have a Signature of Tons/40. Maximum Thrust is 13. Missile Decoys have 20 HTK. Small craft gain +1 HTK. Gives access to Composite Tech.

Advanced Metallurgy Tech II
Hulls cost 5MCr/ton at this level. This also grants Ground troops +1 to Defense value. Hulls have a Signature of Tons/45. Maximum Thrust is 14. Missile Decoys have 23 HTK. Small craft gain +1 HTK.

Mines

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Construction III	800	8,000	400
II	Mines I	900	9,000	450
III	Mines II	1,000	10,000	500

Table 176 Mines

Mines Tech I
Mines cost 0.4MCr/CP at this level.

Mines Tech II
Mines cost 0.2MCr/CP at this level.

Mines Tech III
Mine cost 0.1MCr/CP at this level.

Fighter Tech

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Construction III	500	5,000	250
II	Fighter I	750	7,500	375
III	Fighter II	1,000	10,000	500
IV	Fighter III	1,250	12,500	625

Table 177 Fighters

Fighter Tech I
This grants access to Light Fighters.

Fighter Tech II
This grants access to Medium Fighters.

Fighter Tech III
This grants access to Heavy Fighters.

Fighter Tech IV
This grants access to Assault Fighters.

Composite Tech

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Advanced Metallurgy I, Construction IV	1,000	10,000	500
II	Composites I	1,500	15,000	750

Table 178 Composites

Composite Tech I
Hulls cost 4MCr/ton at this level. Hulls have a Signature of Tons/50. Maximum Thrust is 17. Missile Decoys have 25 HTK. Small craft gain +1 HTK., Gives access to Enhanced Composite Tech.

Composite Tech II
Hulls cost 3MCr/ton at this level. Defense values of Ground troops are granted +1. Hulls have a Signature of Tons/55. Maximum Thrust is 18. Missile Decoys have 28 HTK. Small craft gain +1 HTK.

Enhanced Composite Tech

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Composite Tech I, Construction V	1,500	15,000	750
II	Enhanced Composites I	2,000	20,000	1,000

Table 179 Enhanced Composites

Enhanced Composite Tech I
Hulls cost 2MCr/ton at this level. Hulls have a Signature of Tons/60. Maximum Thrust is 21. Missile Decoys have 30 HTK. Small craft gain +1 HTK

Enhanced Composite Tech II
Hulls cost 1MCr/ton at this level. Defense values of Ground troops are granted +1. Hulls have a Signature of Tons/65. Maximum Thrust is 22. Missile Decoys have 33 HTK. Small craft gain +1 HTK.

Kinetic Weapon Tech

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Military Science I	500	5,000	250
II	Kinetic Weapons I	1,000	10,000	500
III	Kinetic Weapons II	1,500	15,000	750
IV	Kinetic Weapons III	2,000	20,000	1,000
V	Kinetic Weapons IV	2,500	25,000	1,250
VI	Kinetic Weapons V	3,000	30,000	1,500
VII	Kinetic Weapons VI	3,500	35,000	1,750
VIII	Kinetic Weapons VII	4,000	40,000	2,000
IX	Kinetic Weapons VIII	4,500	45,000	2,250
X	Kinetic Weapons IX	5,000	50,000	2,500
XI	Kinetic Weapons X	5,500	55,000	2,750
XII	Kinetic Weapons XI	6,000	60,000	3,000
XIII	Kinetic Weapons XII	6,500	65,000	3,250

Table 180 Kinetic Weapons

Kinetic Weapon Tech I
This level grants access to Mass Cannon calibers 1 & 2cm, Launch Velocity 1,000km/s, and grants Ground troops +1 Attack value.

Kinetic Weapon Tech II
This level grants access to Gauss Cannon calibers 1 & 2cm, Gauss Cannon Cycle Rate 1, and Mass Cannon calibers 3 & 4cm.

Kinetic Weapon Tech III
This level grants access to Hyper-Velocity Cannon calibers 1 & 2cm, Gauss Cannon calibers 3 & 4cm, Mass Cannon calibers 5 & 6cm, Packet Size 1 and Launch Velocity 1,200km/s.

Kinetic Weapon Tech IV
This level grants access to Hyper-Velocity Cannon calibers 3 & 4cm, Gauss Cannon calibers 5 & 6cm, Mass Cannon calibers 7 & 8cm, and Packet Size 2.

Kinetic Weapon Tech V
This level grants access to Hyper-Velocity Cannon calibers 5 & 6cm, Gauss Cannon calibers 7 & 8cm, Mass Cannon calibers 9 & 10cm, Launch Velocity 1,400km/s, Gauss Cannon Cycle Rate 2, and Packet Size 3.

Kinetic Weapon Tech VI
This level grants access to Hyper-Velocity Cannon calibers 7 & 8cm, Gauss Cannon calibers 9 & 10cm, Mass Cannon calibers 11 & 12cm, and Packet Size 4.

Kinetic Weapon Tech VII
This level grants access to Hyper-Velocity Cannon calibers 9 & 10cm, Gauss Cannon calibers 11 & 12cm, Mass Cannon calibers 13 & 14cm, Launch Velocity 1,600km/s, and Packet Size 5.

Kinetic Weapon Tech VIII
This level grants access to Hyper-Velocity Cannon calibers 11 & 12cm, Gauss Cannon calibers 13 & 14cm, Mass Cannon calibers 15 & 16cm, Gauss Cannon Cycle Rate 3, and Packet Size 6.

Kinetic Weapon Tech IX
This level grants access to Hyper-Velocity Cannon calibers 13 & 14cm, Gauss Cannon calibers 15 & 16cm, Mass Cannon calibers 17 & 18cm, Launch Velocity 1,800km/s and Packet Size 7.

Kinetic Weapon Tech X
This level grants access to Hyper-Velocity Cannon calibers 15 & 16cm, Gauss Cannon calibers 17 & 18cm, Mass Cannon calibers 19 & 20cm, Launch Velocity 2,000km/s, and Packet Size 8.

Kinetic Weapons Tech XI
This level grants access to Hyper-Velocity Cannon calibers 17 & 18cm, Gauss Cannon calibers 19 & 20cm, Launch Velocity 2,500km/s, Gauss Cannon Cycle Rate 4, and Packet Size 9.

Kinetic Weapon Tech XII
This level grants access to Hyper-Velocity Cannon calibers 19 & 20cm and Launch Velocity 3,000km/s.

Kinetic Weapon Tech XIII
This level grants access to Launch Velocity 3,500km/s, Gauss Cannon Cycle Rate 5, and Packet Size 10.

Command Net Tech

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Military Science II	500	5,000	250
II	Command Net I	1,000	10,000	500
III	Command Net II	2,000	20,000	1,000
IV	Command Net III	4,000	40,000	2,000
V	Command Net IV	8,000	80,000	4,000

Table 181 Command Net

Command Net Tech I
This grants access to Command Net Generation 1.

Command Net Tech II
This grants access to Command Net Generation 2.

Command Net Tech III
This grants access to Command Net Generation 3.

Command Net Tech IV
This grants access to Command Net Generation 4.

Command Net Tech V

This grants access to Command net Generation 5.

Weapon Modifications

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Military Science III	750	7,500	375
II	Weapon Modifications I	1,000	10,000	500
III	Weapon Modifications II	1,250	12,500	625
IV	Weapon Modifications III	1,500	15,000	750
V	Weapon Modifications IV	1,750	17,500	875
VI	Weapon Modifications V	2,000	20,000	1,000

Table 182 Weapon Modification

Weapon Modification Tech I

This level grants access to Autofire and Armor Piercing.

Weapon Modification Tech II

This level grants access to 1st Generation Miniaturization and Shield Penetrating.

Weapon Modification Tech III

This level grants access to Extended Range and Overloaded.

Weapon Modification Tech IV

This level grants access to 2nd Generation Miniaturization and Proximity Fuse.

Weapon Modification Tech V

This level grants access to High-Energy Focus and Pulse.

Weapon Modification Tech VI

This level grants access to 3rd Generation Miniaturization, Enveloping and Stealth.

EWD Modifications

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Military Science II, FTL II	1,000	10,000	500

Table 183 EWS Modification

EWD Modification Tech I

This grants access to the Extra Range Modification.

Long-Range Scanner Modifications

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Military Science III, LRS Tech I	1,000	10,000	500

Table 184 Long-Range Scanner Modification

LRS Modification Tech I

This grants access to the Enhanced Resolution modification.

Command Net Modifications

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Military Science IV, Command Net I	1,000	10,000	500
II	Command Net Modification I	1,500	15,000	750

Table 185 Command Net Modification

Command Net Modification Tech I

This grants access to Increased Radius modification.

Command Net Modification Tech II

This grants access to Enhanced Channels modification.

Science Instrument Modifications

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Military Science V, Science Instrument I	1,500	15,000	750

Table 186 Science Instrument Modification

Science Instrument Modification Tech I

This grants access to Increased Analysis Capacity modification.

HEC Ring Modifications

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Military Science V, HEC I	1,500	15,000	750
II	HEC Ring Modification I	2,000	20,000	1,000
III	HEC Ring Modification II	2,500	25,000	1,250

Table 187 HEC Ring Modification

HEC Ring Modification Tech I

This grants access to Increased Charge Rate modification.

HEC Ring Modification Tech II

This grants access to Increased Capacity modification.

HEC Ring Modification Tech III
This grants access to Metered Output modification.

ECM Modifications

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Military Science IV, EW I	1,000	10,000	500
II	ECM Modification I	1,500	15,000	750
III	ECM Modification II	2,000	20,000	1,000

Table 188 ECM Modification

ECM Modification Tech I
This grants access to Basic ECM Boost.

ECM Modification Tech II
This grants access to Wide-Band ECM.

ECM Modification Tech III
This grants access to Improved Resolution.

Sensor Modification Tech

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Military Science IV, Sensor I	1,000	10,000	500
II	Sensor Modification I	1,500	15,000	750
III	Sensor Modification II	2,000	20,000	1,000

Table 189 Sensor Modification

Sensor Modification Tech I
This grants access to Basic Sensor Boost.

Sensor Modification Tech II
This grants access to Wide-Band Sensors.

Sensor Modification Tech III
This grants access to Improved Resolution.

Shield Modification Tech

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Military Science V, Shield I	1,500	15,000	750
II	Shield Modification I	2,000	20,000	1,000
III	Shield Modification II	2,500	25,000	1,250

Table 190 Shield Modification

Shield Modification Tech I
This grants access to EM Bands, Thermal Bands, and Kinetic Bands.

Shield Modification Tech II
This grants access to Shield Hardening.

Shield Modification Tech III
This grants access to Shield Reflection.

Armor Modification Tech

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Military Science V, Armor I	1,500	15,000	750
II	Armor Modification I	2,000	20,000	1,000
III	Armor Modification II	2,500	25,000	1,250

Table 191 Armor Modification

Armor Modification Tech I
This level grants access to EM Plating, Thermal Plating, and Kinetic Plating.

Armor Modification Tech II
This level grants access to Armor Hardening and Light Armor.

Armor Modification Tech III
This level grants access to Armor Reflection and Polarized Armor.

Manufacturing Tech

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Industry I	1,000	10,000	500
II	Manufacturing I	1,500	15,000	750
III	Manufacturing II	2,000	20,000	1,000
IV	Manufacturing III	2,500	25,000	1,250
V	Manufacturing IV	3,000	30,000	1,500

Table 192 Manufacturing

Manufacturing Tech I
This grants an Industrial Index of x2.

Manufacturing Tech II
This grants an Industrial Index of x3.

Manufacturing Tech III
This grants an Industrial Index of x4.

Manufacturing Tech IV
This grants an Industrial Index of x5.

Manufacturing Tech V
This grants an Industrial Index of x6.

Drone Tech

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Industry II	2,000	10,000	1,000
II	Drones I	2,500	12,500	1,250
III	Drones II	3,000	15,000	1,500
IV	Drones III	3,500	17,500	1,750
V	Drones IV	4,000	20,000	2,000

Table 193 Drones

Drone Tech I
This level grants access to Recon Drones, PD Drone Hardpoints, Standard Drone Hardpoints, Drone Sensors and Drone Armor.

Drone Tech II
This level grants access to Light Attack Drones, Drone Turreted Hardpoints, and Drone Shields.

Drone Tech III
This level grants access to Attack Drones, and Extra Fuel Cells.

Drone Tech IV
This level grants access to Heavy Attack Drones and Speed Boost.

Drone Tech V
This level grants access to Assault Drones and Drone ECM.

Science Instrument Tech

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Electronics I	500	5,000	250
II	Science Instruments I	750	7,500	375
III	Science Instruments II	1,000	10,000	500
IV	Science Instruments III	1,250	12,500	625
V	Science Instruments IV	1,500	15,000	750

Table 194 Science Instruments

Science Instrument Tech I
This grants access to 1st Generation Science Instruments.

Science Instrument Tech II
This grants access to 2nd Generation Science Instruments.

Science Instrument Tech III
This grants access to 3rd Generation Science Instruments.

Science Instrument Tech IV
This grants access to 4th Generation Science Instruments.

Science Instrument Tech V
This grants access to 5th Generation Science Instruments.

Sensor Tech

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Electronics I	250	1,250	125
II	Sensors I	500	2,500	250
III	Sensors II	750	3,750	375
IV	Sensors III	1,000	5,000	500
V	Sensors IV	1,250	6,250	625
VI	Sensors V	1,500	7,500	750
VII	Sensors VI	1,750	8,750	875
VIII	Sensors VII	2,000	10,000	1,000

Table 195 Sensors

Sensor Tech I
This level grants Base Sensor Class 1, Channel Class 1, Signature Class 1, and Resolution Class 1.

Sensor Tech II
This level grants one of the following: Base Sensor Class 2, Channel Class 2, Signature Class 2, or Resolution Class 2. Sensor Tech II must be researched multiple times to gain multiple benefits.

Sensor Tech III
This level grants one of the following: Base Sensor Class 3, Channel Class 3, Signature Class 3, or Resolution Class 3. Sensor Tech III must be researched multiple times to gain multiple benefits. Prior levels must be researched before later levels may be taken.

Sensor Tech IV
This level grants one of the following: Base Sensor Class 4, Channel Class 4, Signature Class 4, or Resolution Class 4. Sensor Tech IV must be researched multiple times to gain multiple benefits. Prior levels must be researched before later levels may be taken.

Sensor Tech V
This level grants one of the following: Base Sensor Class 5, Channel Class 5, Signature Class 5, or Resolution Class 5. Sensor Tech V must be researched multiple times to gain multiple benefits.

Prior levels must be researched before later levels may be taken.

Sensor Tech VI
This level grants one of the following: Base Sensor Class 6, Channel Class 6, Signature Class 6, or Resolution Class 5. Sensor Tech VI must be researched multiple times to gain multiple benefits. Prior levels must be researched before later levels may be taken.

Sensor Tech VII
This level grants one of the following: Base Sensor Class 7, Channel Class 7, Signature Class 7, or Resolution Class 7. Sensor Tech VII must be researched multiple times to gain multiple benefits. Prior levels must be researched before later levels may be taken.

Sensor Tech VIII
This level grants one of the following: Base Sensor Class 8, Channel Class 8, Signature Class 8, or Resolution Class 8. Sensor Tech VIII must be researched multiple times to gain multiple benefits. Prior levels must be researched before later levels may be taken.

Electronic Warfare Tech

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Electronics II	250	1,250	125
II	EW I	500	2,500	250
III	EW II	750	3,750	375
IV	EW III	1,000	5,000	500
V	EW IV	1,250	6,250	625
VI	EW V	1,500	7,500	750
VII	EW VI	1,750	8,750	875
VIII	EW VII	2,000	10,000	1,000
IX	EW VIII	2,250	11,250	1,125

Table 196 Electronic Warfare

Electronic Warfare Tech I
This level grants the following: 1st Generation ECM Mode, 1st Generation ECCM Mode, and 1st Generation Stealth Mode.

Electronic Warfare Tech II
This level grants one of the following: 2nd Generation ECM Mode, 2nd Generation ECCM Mode, or 2nd Generation Stealth Mode. Electronic Warfare Tech II must be researched multiple times to gain multiple benefits.

Electronic Warfare Tech III
This level grants one of the following: 3rd Generation ECM Mode, 3rd Generation ECCM Mode, or 3rd Generation Stealth Mode. Electronic Warfare Tech III must be researched multiple times to gain multiple benefits. Prior levels must be researched before later levels may be taken.

Electronic Warfare Tech IV
This level grants one of the following: 4th Generation ECM Mode, 4th Generation ECCM Mode, or 4th Generation Stealth Mode. Electronic Warfare Tech IV must be researched multiple times to gain multiple benefits. Prior levels must be researched before later levels may be taken.

Electronic Warfare Tech V
This level grants one of the following: 5th Generation ECM Mode, 5th Generation ECCM Mode, or 5th Generation Stealth Mode. Electronic Warfare Tech V must be researched multiple times to gain multiple benefits. Prior levels must be researched before later levels may be taken.

Electronic Warfare Tech VI
This level grants one of the following: 6th Generation ECM Mode, 6th Generation ECCM Mode, or 6th Generation Stealth Mode. Electronic Warfare Tech V must be researched multiple times to gain multiple benefits. Prior levels must be researched before later levels may be taken.

Electronic Warfare Tech VII
This level grants one of the following: 7th Generation ECM Mode, 7th Generation ECCM Mode, or 7th Generation Stealth Mode. Electronic Warfare Tech V must be researched multiple times to gain multiple benefits. Prior levels must be researched before later levels may be taken.

Electronic Warfare Tech VIII
This level grants one of the following: 8th Generation ECM Mode, 8th Generation ECCM Mode, or 8th Generation Stealth Mode. Electronic Warfare Tech V must be researched multiple times to gain multiple benefits. Prior levels must be researched before later levels may be taken.

Electronic Warfare Tech IX
This level grants one of the following: 9th Generation ECM Mode, 9th Generation ECCM Mode, or 9th Generation Stealth Mode. Electronic Warfare Tech V must be researched multiple times to gain multiple benefits. Prior levels must be researched before later levels may be taken.

Long-Range Scanner Tech

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Electronics III	500	2,500	250
II	Long-Range Scanner Tech I	1,000	5,000	500
III	Long-Range Scanner Tech II	1,500	7,500	750
IV	Long-Range Scanner Tech III	2,000	10,000	1,000
V	Long-Range Scanner Tech IV	2,500	12,500	1,250

Table 197 Long-Range Scanners

Long-Range Scanner Tech I
This grants access to 1st Generation Long-Range Scanners.

Long-Range Scanner Tech II
This grants access to 2nd Generation Long-Range Scanners.

Long-Range Scanner Tech III
This grants access to 3rd Generation Long-Range Scanners.

Long-Range Scanner Tech IV
This grants access to 4th Generation Long-Range Scanners.

Long-Range Scanner Tech V
This grants access to 5th Generation Long-Range Scanners.

Particle Weapon Tech

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Astrophysics I	500	5,000	250
II	Particle Weapons I	750	7,500	375
III	Particle Weapons II	1,000	10,000	500
IV	Particle Weapons III	1,250	12,500	625
V	Particle Weapons IV	1,500	15,000	750
VI	Particle Weapons V	1,750	17,500	875
VII	Particle Weapons VI	2,000	20,000	1,000
VIII	Particle Weapons VII	2,500	25,000	1,250
IX	Particle Weapons VIII	3,000	30,000	1,500
X	Particle Weapons IX	3,500	35,000	1,750

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
XI	Particle Weapons X	4,000	40,000	2,000

Table 198 Particle Weapons

Particle Weapon Tech I
This grants access to Particle Weapon Aperture 5cm and Electron Particles.

Particle Weapon Tech II
This grants access to Particle Weapon Aperture 10cm and Neutrino Particles.

Particle Weapon Tech III
This grants access to Particle Weapon Aperture 15cm and Muon Particles.

Particle Weapon Tech IV
This grants access to Particle Weapon Aperture 20cm and Tau Particles.

Particle Weapon Tech V
This grants access to Particle Weapon Aperture 25cm and Photon Particles.

Particle Weapon Tech VI
This grants access to Particle Weapon Aperture 30cm and Boson Particles.

Particle Weapon Tech VII
This grants access to Particle Weapon Aperture 35cm and Gluon Particles.

Particle Weapon Tech VIII
This grants access to Particle Weapon Aperture 40cm and Graviton Particles.

Particle Weapon Tech IX
This grants access to Particle Weapon Aperture 45cm and Baryon Particles.

Particle Weapon Tech X
This grants access to Particle Weapon Aperture 50cm and Meson Particles.

Particle Weapon Tech XI
This grants access to Tachyon Particles.

Jump Gate Tech

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Warpspace I	2,400	30,000	1,200
II	Jump Gate I	2,800	35,000	1,400
III	Jump Gate II	3,200	40,000	1,600
IV	Jump Gate III	3,600	45,000	1,800

Table 199 Jump Gates

Jump Gate Tech I
This allows construction of Acceleration Rings.

Jump Gate Tech II
This allows construction of Jump Rings.

Jump Gate Tech III
This allows construction of Jump Gates.

Jump Gate Tech IV
This allows construction of Stargates.

Anagathic Tech

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Biology III	1,000	10,000	500

Table 200 Anagathics

Anagathics I
This level of Anagathic tech increases the lifespan of Personalities by one year. This tech can be researched more than once. Each successive research project has double the cost, RP and sustaining cost.

Cryogenic Tech

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Biology III	2,000	20,000	1,000
II	Cryogenics I	2,500	25,000	1,250
III	Cryogenics II	3,000	30,000	1,500
IV	Cryogenics III	3,500	35,000	1,750
V	Cryogenics IV	4,000	40,000	2,000

Table 201 Cryogenic Tech

Cryogenics I
This level of Cryogenics reduces the cargo capacity per PP by 1,000 tons. This level grants Cryo Pods.

Cryogenics II
This level of Cryogenics reduces the cargo capacity per PP by 2,000 tons.

Cryogenics III
This level of Cryogenics reduces the cargo capacity per PP by 3,000 tons.

Cryogenics IV
This level of Cryogenics reduces the cargo capacity per PP by 4,000 tons.

Cryogenics V
This level of Cryogenics reduces the cargo capacity per PP by 5,000 tons.

Psychic Tech

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Psychic Race Advantage	1,000	5,000	500
II	Psychic I	1,500	7,500	750
III	Psychic II	2,000	10,000	1,000
IV	Psychic III	2,500	12,500	1,250
V	Psychic IV	3,000	15,000	1,500

Table 202 Psychic Tech

Psychic I
This level of Psychic Tech grants Psychic Scanners.

Psychic II
This level of Psychic Tech grants Psionic Inhibitor.

Psychic III
This level of Psychic Tech grants Psi Shields.

Psychic IV
This level of Psychic Tech grants Psibombs.

Psychic V
This level of Psychic Tech grants Psychic Annihilators.

Crystalline Tech

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Crystalline Race Advantage	1,000	5,000	500
II	Crystalline I	1,500	7,500	750
III	Crystalline II	2,000	10,000	1,000
IV	Crystalline IV	2,500	12,500	1,250
V	Crystalline V	3,000	15,000	1,500

Table 203 Crystalline Tech

Crystalline I
This level of Crystalline Tech grants Crystal Hulls.

Crystalline II
This level of Crystalline Tech grants Crystal Armor.

Crystalline III
This level of Crystalline Tech grants Shard Projectors.

Crystalline IV
This level of Crystalline Tech grants Shard Bombs.

Crystalline V
This level of Crystalline Tech grants Shard Lance.

Machine Intelligence Tech

Level	Prerequisite	RP	Initiate Cost	Sustain Cost
I	Machine Intelligence Racial Trait	1,000	5,000	500
II	MI Tech I	1,500	7,500	750
III	MI Tech II	2,000	10,000	1,000
IV	MI Tech III	2,500	12,500	1,250
V	MI Tech IV	3,000	15,000	1,500

Machine Intelligence I
This technology allows the Machine Intelligence to use the Mineral Index for population effects.

Machine Intelligence II
This technology allows the Machine Intelligence to reverse engineer for ½ the normal RP cost.

Machine Intelligence III
This technology grants the Machine Intelligence a permanent +1 to their Industrial Index.

Machine Intelligence IV
This technology allows the Machine Intelligence to increase the Grade of their crews by one level.

Machine Intelligence V
This technology allows the Machine Intelligence to buy off negative traits associated with being a Machine Intelligence. This tech may be researched multiple times to buy off each of the traits (one per research).

Reverse Engineering

Reverse Engineering
Sometimes technology will be found, either by capturing alien vessels in battle, or finding discarded artifacts on planets. If the technology is not currently known, it must be reverse engineered. To reverse engineer an item, the total RPs needed for the components are added together. This value is reduced to 75%. This is the total RP needed to reverse engineer the item. If one or more components are already known, they are disregarded when calculating the RP needed.

Captured Technology
Items may be retrofit to be used without reverse engineering. This is a normal retrofit operation. Components may be installed in ships by piece, or ships may be used whole, with just needed components being installed.

Captured Ships
Captured ships may be used by the race that captured it. Captured ships need to undergo a refit to become useable for the capturing race. The ship shows on long-range scans as the original race, unless more than 50% of the ship has been refit to the new owner's technology.

Appendix A: Sample Ships

The following ships are constructed with the following technologies; Physics I, Chemistry I, Construction I, Electronics I, Fission I, Shields I, Inertial Comps I, FTL I, Laser I, Laser Frequency I Engines I, Armor I, Missiles I, Metallurgy I, Science Instruments I, and Sensors I. These technologies have a Research Point cost of 4,250, and so can be used in Normal Tech Start games. LPV is the Logistic Point Value of the ship. LPV for missile-armed ships includes the LPV of the missiles.

As a note, the Signatures are given in a format of XX/YY where XX is the value of the ship at speed 0 with sensors off, and YY is the value of the ship at full speed and sensors on.

Exploration Ships

These ships are meant to scout out surrounding stars and planets.

Science Vessel – 844 tons, 16,715 MCr. LPV 226
Picket Class, Sig 38m/137m, Structure: 422
Primitive Fission (5), Radiators: 2
Sensor Class I
Channel Class I
Signature Class I
Resolution Class I
Science Instruments I
Alpha Shields
Alpha Armor
FTL Class I
Basic Nuclear Torch Engine (Thrust 8)
Prototype Inertial Compensators
Streamlined
This ship generates 5 Survey points per day. This ship requires 50 power to enter FTL; this may be accomplished by shutting N-Space engines down.

FTL Warships

These ships are meant for defense and offense. Ideal usage would be used in a fleet situation.

Unarmed Scout – 819 tons, 15,970 MCr. LPV 204
Picket Class, Sig 37m/127m, Structure: 410
Primitive Fusion, Radiators: 2
Sensor Class I
Channel Class I
Signature Class I
Resolution Class I
FTL Class I
Basic Nuclear Torch Engine (Thrust 8)

Prototype Inertial Compensators
Streamlined
This ship requires 50 power to enter FTL; this may be accomplished by shutting N-Space engines down.

Fleet Escort – 919 tons, 20,970 MCr. LPV 273
Picket Class, Sig: 41m/162m, Structure 490
Primitive Fission (6), Radiators: 2
Sensor Class I
Channel Class I
Signature Class I
Resolution Class I
Alpha Shields
Alpha Armor
FTL Class I
Basic Nuclear Torch Engine (Thrust 8)
Prototype Inertial Compensators
5cm Far Infrared Lasers (4, 2x each broadside)
Streamlined
This ship requires 50 power to enter FTL; this may be accomplished by shutting N-Space engines down.

Fleet Destroyer – 1,349 tons, 39,630 MCr. LPV 324
Picket Class, Sig: 61m/198m, Structure: 675
Primitive Fission (7), Radiators: 3
Sensor Class I
Channel Class I
Signature Class I
Resolution Class I
Alpha Shields
Alpha Armor
FTL Class I
Basic Nuclear Torch Engine (Thrust 8)
Prototype Inertial Compensators
25cm Far Infrared Lasers (6, 3x each broadside)
Streamlined
This ship requires 50 power to enter FTL; this may be accomplished by shutting N-Space engines down.

Fleet Missile Destroyer – 1,400 tons, 23,475 MCr. (5,250 MCr missile cost) LPV 902
Picket Class, Sig: 62m/161m, Structure: 684
Primitive Fusion (5), Radiators: 3
Sensor Class I
Channel Class I
Signature Class I
Resolution Class I
FLT Class I
Basic Nuclear Torch Engine (Thrust 8)
Prototype Inertial Compensators
Missile Launcher (6, 3x each broadside, 1/6 turn RoF)
Magazine (1)
Streamlined
Missiles (4CP) Thrust 10, Sig 60m, 3/6/3 dmg, 42 count.

This ship requires 50 power to enter FTL; this may be accomplished by shutting N-Space engines down.

Cruiser – 3,179 tons, 62,555 MCr (13,125 missile cost) LPV 2556
Escort Class, Sig: 159m/365m, Structure: 1,590
Primitive Fission (10), Radiators: 7
Sensor Class I
Channel Class I
Signature Class I
Resolution Class I
FTL Class I
Basic Nuclear Torch Engine (Thrust 8)
Prototype Inertial Compensators
Magazine (6)
Missile Launcher (6, 3x each broadside, 1/6 turn RoF) Standard Hardpoint
25cm Far Infrared Laser (6, 3x each broadside) Standard Hardpoint
25cm Far Infrared Laser (6, 2x each broadside, 2 spinal) Capital Hardpoint
5cm Far Infrared Laser (20x, turreted) Point Defense Hardpoints
Missiles (4CP) Thrust 10, Sig 60m, 3/6/3 dmg. 105 count)
This ship requires 50 power to enter FTL; this may be accomplished by shutting N-Space engines down.

Commercial Ships
Freighter – 7,929 tons, 91,835 MCr, LPV 206
Cruiser Class, Sig:400m/410m, Structure: 1,982
Primitive Fission (27), Radiators: 2
Sensor Class I
Channel Class I
Signature Class I
Resolution Class I
FTL Class I
Basic Nuclear Torch (Thrust 1)
Prototype Inertial Compensators
LRS, Generation 0
Shuttlebay (4 bay points)
        Cargo Shuttle (2)
Cargo Holds (68), Capacity: 7,135 tons
This ship requires 50 power to enter FTL. Sufficient power is generated to enter FTL while under Thrust.

Colony Ship –

Luxury Cruise Liner –

Missiles
Mk I Fission Missile
4 CP LPV 15

3x Fission warhead (3/6/3 dmg)
Nuclear Torch Engine – 10 Thrust
60m Signature, 125MCr each

Mk II Fission Multiple Warhead Missile
17 CP LPV 63
Nuclear Torch Engine – 10 Thrust
4x Mk I Fission Missile submunition
108m Signature, 425MCr each

Appendix B: The Terran Confederation

The homeworld of the Terran Confederation is Earth. Earth has a population of eight billion people. Highly industrialized, Earth boasts no less 4 orbital shipyards. Along with numerous ground facilities, it is the most heavily fortified planet in Human space.

Heraldry
The flag of the Terran Confederation is a blue field on top with a white field on the bottom. In the center is an inverted circle.
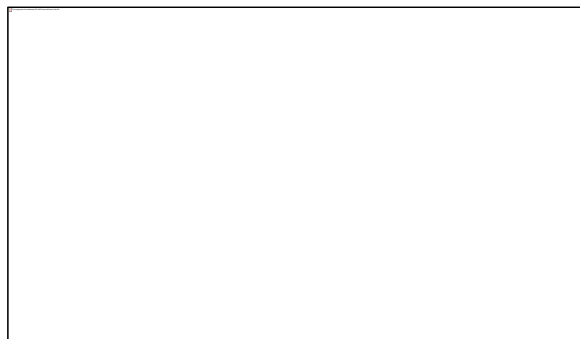
Stats
Willpower: 75
Aggressiveness: 60
Arrogance: 85
Xenophobia: 20

Traits
The Terran Confederation has the following traits: Tainted Atmosphere – Oxygen, Espionage Bonus +5%, Capitalist +5%, Free Spirit, Decreased Growth -5%.

Government
The Terran Confederation's government is A representative nation. This gives the Terran Confederation a +25% bonus to research, -30% penalty to espionage (modified to -25% from traits), +10% combat, and 65% base tax rate.

Colonies

System	Name	System Body	Size
Sol	Earth	Sol III	Large Core
Sol	Mars	Sol IV	Small Core
Sol	Luna	Sol III-A	Colony
Sol	Deimos	Sol IV-A	Outpost
Sol	Io	Sol V-D	Colony
Sol	Ganymede	Sol V-C	Colony

System	Name	System Body	Size
Alpha Centauri A	Nova Terra		Small Core
Alpha Centauri A	Einstein	AC IV Moon	Small Colony
Alpha Centauri A	Kepler	AC V Moon	Outpost
Barnard's Star	Elysium		Core
	Clarke	II Moon	Small Colony
	Heinlein	III Moon	Outpost
Alpha Mensae	Stronghold		Small Core
	Patton	III Moon	Outpost
	Nimitz	IV Moon	Outpost
	Jackson	VI Moon I	Outpost
	Alexander	VI Moon II	Small Colony
Wolf 359	Lupus		Core
	Loup	II Moon	Outpost

Table 204 Terran Confederation Colonies

Foreign Relations
The Terran Confederation still looks on the Taurus Republic as wayward colonies and continues to apply political pressure as well as economic on the Taurus Republic. Patrols are also on constant lookout for clues to the location of the Obsidian Blade homeworld.

Fleet
The current Terran Confederation fleet consists of 69 warships. The fleet is divided into 3 working fleets with 61 of the warships. The remaining eight are on picket duties or couriers.

First Fleet
This fleet is stationed at Terra. It is tasked with defense of the Sol system.
BB *Vengeance* TCNS-2001 (Flag), Admiral Francis Bellanveaux, Captain Alexis Garamond
CA *Katana*, TCNS-1201, Captain Aaron Tolliver
CA *Sabre* TCNS-1213, Captain David Douglas
CA *Cutlass* TCNS-1203, Captain Raymond Paris
CV *Harrier* TCNS-1801, Captain Matthew Webber
CL *Washington* TCNS-902, Captain Arnold Delmorgan
CL *London* TCNS-904, Captain Wolfgang Drumm
CL *Madrid* TCNS-917, Captain Max Vallot
CL *Rome* TCNS-910, Captain Bertrand de Villiers
DDE *Lincoln* TCNS-3030, Captain Lars Svensson
DDE *Juneau* TCNS-3003, Captain Xian Lu
DDE *Phoenix* TCNS-3024, Captain Remo Stevens

DDE *Sacramento* TCNS-3026, Captain Aristotle Demetriou
DDE *Baton Rouge* TCNS-3031, Captain George Hennesy
DDE *Salem* TCNS-3019, Captain Michael Lachance
DDE *Pierre* TCNS-3020, Captain Orville Rung
DDE *Cheyenne* TCNS-3023, Captain Roger McAdams
CTC *Mercury* TCNS-101, Commander Elijah Renquist
CTX *Kingfisher* TCNS-705 Commander Alex Hatzis

Second Fleet
This fleet is stationed at Stronghold in the Alpha Mensae system.
BB *Reprisal* TCNS-2006 (Flag), Admiral Thomas Pemberton, Captain Gerrold Farley
BB *Retribution* TCNS-2005, Captain Marcus Long
CA *Claymore* TCNS-1204, Captain Tanya Snyder
CA *Falchion* TCNS-1214, Captain Erich von Grau
CA *Rapier* TCNS-1211, Captain Harrison Gyles
CL *Tokyo* TCNS-901, Captain Floyd Hagood
CL *Athens* TCNS-914, Captain Sean Emeric
CL *Beijing* TCNS-915, Captain Kurtis Juelf
CL *Berlin* TCNS-906, Captain Basil Vitti
CL *Zagreb* TCNS-913, Captain Ellis Daines
DDE *Albany* TCNS-3001, Captain Michele Trump
DDE *Montgomery* TCNS-3002, Captain Mike Light
DDE *Little Rock* TCNS-3025, Captain Ashley Poe
DDE *Denver* TCNS-3007, Captain Kristal Lloyd
DDE *Dover* TCNS-3027, Captain Bert Gillan
DDE *Hartford* TCNS-3028, Captain Paula Vinnet
DDE *Tallahassee* TCNS-3010, Captain Jean Valenzano
DDE *Boise* TCNS-3011, Captain Julia Edvalson
CTC *Thoth* TCNS-106, Commander Mike Leseur
CTX *Hawk* TCNS-703, Commander Jonas McClimans
CTX *Raptor* TCNS-706, Commander Andres Sexton

Third Fleet
This fleet is based out of Sol and tasked with anti-piracy duties.
CVA *Enterprise* TCNS-2301 (Flag), Admiral Trinidad Propp, Captain Carolyn Pelis
CVA *Venture* TCNS-2302 Captain Jude Schurmann.
CVA *Endeavor* TCNS-2303, Captain Rafaela Ringwood
BB *Retaliation* TCNS-2004, Captain Jeffery Witherell
CA *Poignard* TCNS-1215, Captain Logan Forry
CA *Khopesh* TCNS-1212, Captain Tad Whitman
CL *Moscow* TCNS-916, Captain Melissa Bolton
CL *Stockholm* TCNS-911, Captain Houston Sloane
DDE *Springfield* TCNS-3029, Captain Harriette Rubeck
DDE *Topeka* TCNS-3014, Captain Carrol Linson
DDE *Frankfort* TCNS-3015, Captain Jim Gramer
DDE *Boston* TCNS-3016, Captain Katie McCluney
DDE *Trenton* TCNS-3018, Captain Everett Tennon
DDE *Nashville* TCNS-3022, Captain Misty McDonald
DDE *Austin* TCNS-3021, Captain Darren Garrett
CTC *Seshat* TCNS-105, Commander Jon Wear
CTX *Eagle* TCNS-701, Commander Lucy Faith
CTX *Albatross* TCNS-702, Commander Rodrigo San Juan

Reserves
The following ships are considered reserves and are stationed at various locations.
CV *Harasser* TCNS-1802, Captain Stephany Keiser Nova Terra (Alpha Centauri IV)
CV *Aggravator* TCNS-1803 Captain Wally Tuckett Elysium (Barnard's Star III)
CL *Mexico City* TCNS-909, Captain Melanie McColm Lupus (Wolf 359 V)
CL *Lisbon* TCNS-912, Captain Kristofer Bellow Nova Terra (Alpha Centauri IV)
CTC *Hermes* TCNS-102, Commander Shannon Burstein Nova Terra (Alpha Centauri IV)
CTC *Oghma* TCNS-107, Commander Bryant Rendina Elysium (Barnard's Star III)
CTC *Sarasvati* TCNS-104, Commander Nolan Whited Lupus (Wolf 359 V)
CTX *Gyrefalcon* TCNS-704, Commander Buddy Paterno Mars (Sol IV).

Technology
The Terran Confederation has the following technologies in Theoretical Sciences: Physics III, Chemistry I, Biology I, Construction IV, Military Science II, Electronics III, Astrophysics II, and Industry II. They have the following Applied Sciences: Fission III, Shields IV, Inertial Compensators III, FTL III, Laser Tech II, Laser Rate of Fire Tech III, Laser Frequency Tech IV, Engine Tech III, Engine Efficiency II, Fusion III, High-Energy Capacitance Rings II, Antimatter III, Force Weapons III, Particle Bombs I, Proton Torpedoes I, Plasma I, Armor VII, Metallurgy II, Missile VI, Hangar II, Enhanced Metallurgy II, Small Craft III, Troop Tech II, Advanced Metallurgy II, Mines I, Fighter III, Composites II, Kinetic Weapons IV, Command Net III, Manufacturing III, Drones III, Science III, Sensors III, Channels III, Signature III, Resolution III, Electronic Warfare (ECM) IV, Electronic Warfare (ECCM) IV, Electronic Warfare (Stealth) III, Long-Range Scanners III, and Particle

Weapons II.

Ship Classes

Mercury-class Fast Courier (CTC), hull numbers 100-299.
Eagle-class Scout Corvette (CTX), hull numbers 700-899.
Tokyo-class Light Cruiser (CL), hull numbers 900-1199.
Sword-class Cruiser (CA), hull numbers 1200-1499.
Harrier-class Carrier (CV), hull numbers 1800-1999.
Vengeance-class Battleship (BB), hull numbers 2000-2199.
Enterprise-class Assault Carriers (CVA), hull numbers 2300-2499.
Albany-class Destroyer Escort (DDE), hull numbers 3000-3199.

Ship Designs

Fast Courier
Mercury-class CTC – 636 tons, 11,154 MCr.
Picket Class, Sig: 14m/122m, Structure: 318
Antimatter (3), Radiators: 2
Sensor Class III
Channel Class III
Resolution Class III
Signature Class III
Shields – Delta
Armor – Zeta
Class III FTL
Standard ION Pulse (Thrust 8)
Enhanced Inertial Compensators
Streamlining

Scout Corvette
Eagle-class CTX – 660 tons, 12,120 MCr.
Picket Class, Sig: 15m/190m, Structure: 330
Antimatter (4), Radiators: 2
Sensor Class III
Channel Class III
Resolution Class III
Signature Class III
Long-Range Scanners III
Shields – Delta
Armor – Zeta
Class III FTL
Standard ION Pulse (Thrust 8)
Enhanced Inertial Compensators
Streamlining

Destroyer
Albany-class DDE – 1,874 tons, 19,952 MCr.
Escort Class, Sig: 47m/293m, Structure: 937
Antimatter (6), Radiators: 4

Sensor Class III
Channel Class III
Resolution Class III
Signature Class III
Shields – Delta
Armor – Zeta
Class III FTL
Standard ION Pulse (Thrust 8)
Enhanced Inertial Compensators
8cm Mass Cannon (6, 3x each broadside)
4cm PD Mass Cannon (8 turreted)
Damage Control (1)
Command Net III
EW Suite (ECM4, ECCM4, Stealth3)

Light Cruiser
Tokyo-class CL – 2,763 tons, 24,138 MCr. (119,700MCr. for missiles)
Escort Class, Sig: 68m/188m, Structure: 1,368
Antimatter (8), Radiators: 6
Sensor Class III
Channel Class III
Resolution Class III
Signature Class III
Shields – Delta
Armor – Zeta
Class III FTL
Standard ION Pulse (Thrust 8)
Enhanced Inertial Compensators
Missile Launchers (12, 5x each broadside, 2x forward)
Magazines (4, 840cp Capacity, 210 Pilum shipkiller missiles)

Cruiser
Sword-class CA – 7,459 tons, 67,407 MCr. (228,000MCr for missiles)
Cruiser Class, Sig: 186m/658m, Structure: 3,730
Antimatter (19), Radiators: 15
Sensor Class III
Channel Class III
Resolution Class III
Signature Class III
Shields – Delta
Armor – Zeta
Class III FTL
Standard ION Pulse (Thrust 6)
Enhanced Inertial Compensators
Missile Launchers (20, 8x each broadside, 4x forward)
Magazines (8, 1600cp Capacity, 400 Pilum shipkiller missiles)
8cm Mass Cannons (10, 5x each broadside)
8cm Capital Mass Cannons (14, 5x each broadside, 4x forward)
4cm PD Mass Cannons (10x turreted)

Command Net III
ECM Suite (ECM4, ECCM4, Stealth3)

Battleship

Vengeance-class BB – 13,327 tons, 124,911 MCr (311,760MCr for missiles)
Capital Class, Sig: 333m/1203m, Structure: 6,664
Antimatter (28), Radiators: 27
Sensor III
Channel III
Signature III
Resolution III
Shields – Delta
Armor – Zeta
Class III FTL
Standard ION Pulse (Thrust 6)
Enhanced Inertial Compensators
Missile Launchers (40, 15x each broadside, 10x forward)
Magazine s (12, 2600cp Capacity, 433 Javelin shipkillers)
8cm Mass Cannons (20, 10x each broadside)
8cm Capital Mass Cannons (30, 10x each broadside, 10x forward)
4cm PD Mass Cannons (20 turreted)
Damage Control Crews (10)
Command Net III
ECM Suite (ECM4, ECCM4, Stealth3)

Carrier

Harrier-class CV – 9,985 tons, 74,585 MCr. (332,500 MCr for fighters)
Cruiser Class, Sig: 250m/576m, Structure: 4,993
Antimatter (25), Radiators: 20
Sensor Class III
Channel Class III
Resolution Class III
Signature Class III
Shields – Delta
Armor – Zeta
Class III FTL
Standard ION Pulse (Thrust 6)
Enhanced Inertial Compensators
Hangars (68, 339 capacity, 70x F-1 Crossbow Heavy Fighters, 14x FE-2 Spyglass Recon Fighters) 7 flights of 10 F-1 and 2 FE-2.
8cm Mass Cannon (10, 4x each broadside, 2x forward)
4cm PD Mass Cannon (16 turreted)
Damage Control (4)
Command Net III
EW Suite (ECM4, ECCM4, Stealth3)

Enterprise-class CVA – 14,997 tons, 106,671 MCr. (576,500 MCr for fighters)
Antimatter (28), Radiators: 30

Sensor Class III
Channel Class III
Resolution Class III
Signature Class III
Shields – Delta
Armor – Zeta
Class III FTL
Standard ION Pulse (Thrust 6)
Enhanced Inertial Compensators
Hangars (117, 584 capacity, 120x F-1 Crossbow Heavy Fighters, 26x FE-2 Spyglass Recon Fighters)
12 flights of 10 F-1 and 2 FE-2. 2 FE-2 reserve.
8cm Mass Cannon (10, 4x each broadside, 2x forward)
4cm PD Mass Cannon (16 turreted)
Damage Control (4)
Command Net III
EW Suite (ECM4, ECCM4, Stealth3)

Fighters

F-1 Crossbow Heavy Fighter – 4,100 MCr.
Heavy Fighter (6 Thrust, Sig: 16m)
8cm Mass Cannon (4)
4cm PD Mass Cannon (4)

FE-1 Spyglass Heavy Fighter – 3,250 MCr.
Heavy Fighter (6 Thrust, Sig: 16m)
8cm Mass Cannon (4)
ECM, ECCM, Sensor

Missiles

Pilum Shipkiller – 570 MCr.
4cp Advanced Frame, Sig: 26m
Antimatter Warhead (2 – 6/6/8)
Sensor
ION Engine (14 Thrust)

Javelin Shipkiller – 720 MCr.
6cp Advanced Frame, Sig: 28m
Antimatter Warhead (4 – 12/12/16)
Sensor
ION Engine (14 Thrust)

Arrow Defense Missile – 475 MCr.
2cp Advanced Frame, Sig: 24m
Antimatter Warhead (1 – 3/3/4)
ION Engine (14 Thrust)

System Readouts

Sol System

Dist.	Planet	Dia.	Type	Grav	Atmo.
0.4	Mercury	4,879	B	VLow	Vacuum
0.7	Venus	12,103	V	Std.	Hostile
1	Terra	12,762	T	Std.	Breath.
1.5	Mars	6,792	B	Low	CO_2
2.3	Asteroid	--	S		
5.2	Jupiter	139,822	G		
9.5	Saturn	120,536	G		
19.6	Uranus	51,118	G		
30	Neptune	49,528	G		
36	Pluto/Charon	2,306	F	Micro	Vacuum

Table 205 Sol System

The Terran Confederation has populations on Terra, Mars, Luna, Deimos, Io, and Ganymede.

Pop	Location	MI	OI	EI	EV	Tax	Income
1,000	Terra	10	6	540	5400	55%	2,970
150	Mars	5.75	1.1	340	3400	42%	1,428
50	Io	5.25	0.35	350	3500	23%	805
25	Ganymede	6.25	1.25	300	3000	23%	690
50	Luna	5.25	.25	350	3500	23%	805
50	Deimos	5.25	.35	300	3000	23%	690
							7,388

Table 206 Sol System Populations

Personalities

The Terran Confederation has the following personalities.

Name	Game Age	Overt/ Covert	Location	WL	AR	AG	XE	IQ	ST	XP	Trait 1	Trait 2	Trait 3
Joyce Baker	46	Overt	Confed Naval Command	81	60	83	27	39	44	0	Intuitive Mathematician	Strategic Genius	Old Age
Ralph Morry	32	Covert	CBI	77	59	82	26	54	52	0	Espionage Genius	EW Genius	Absent Minded
Walter Perra	58	Overt	Gov. of Terra	80	69	86	27	48	57	0	Logistics Expert	Espionage Genius	Elderly
Kelly Cooke	21	Overt	Gov. of Nova Terra	74	58	83	22	49	58	0	Youth	Fiscal Genius	Absent Minded
Victor Frost	34	Covert	USol - Terra	83	59	84	22	50	51	0	Espionage Genius	Logistics Genius	G-Intoler-ance

Table 207 Terran Confederation Personalities

Facilities

The Terran Confederation has the following facilities.

On Earth, the Confederation has the North American Yards, Huang Chou Yards, EuroFed Yards, and the New Guinea Yards, all orbital shipyards. Defense Battery Alpha is an orbital defense installation, while Defense Battery Beta is a ground defense installation on Earth. The Terran Confederation Bureau of Intelligence is a ground intelligence facility. West Point Academy is a ground training facility. The Confederation Central Bank is a ground repository. Fort Tempest is a ground barracks. The Confederation Naval Command is a ground fleet command. University of Sol – Terra is a ground university.

Mars is home to the Ares Yards, an orbital shipyard. Defense Battery Gamma and Delta are orbital defense installations. Anhur Base is a ground barracks and New Sandhurst is a ground training facility. The Martian Institute of Technology is a ground research facility.

Luna is home to the orbital Lunar Yards, a shipyard. Farside Base is a ground scanning installation, and Fort Imbrium is a ground barracks.

Deimos is home to the Deimos Salvage Yards, an orbital repair yard.

Io has the Galileo Scanning Facility, a ground scan installation. The Io Reclamation Yards are an orbital repair yard. Defense Battery Epsilon is an orbital defense installation. Fort Jove is a ground barracks.

Ganymede is home to the Outsystem Scanner, a ground scanning facility. Defense Batteries Rho and Sigma are orbital defense installations.

Nova Terra in the Alpha Centauri system is home to the Nova Terra Yards, an orbital shipyard. Nova Terra also has the Centauri Telescope an orbital scanning facility. Defense Battery Nova is an orbital

defense installation. Fort Asimov is a ground barracks. Fort Hades is a ground training facility. The Nova Terra Skunkworks is a ground research facility.

Einstein is home to Confederation Naval Command Auxiliary Headquarters, a ground fleet command center. Defense Battery Relativity is an orbital defense installation.

Kepler is home to the Kepler Yards, an orbital repair yard and Defense Battery Zeus, a ground defense installation.

Elysium in the Barnard's Star system is home to the Erisian Academy, a ground research facility. Fort Campbell is a ground training facility. Elysium Bureau of Investigation is a ground intelligence facility. Fort Hubbard is a ground barracks. Defense Battery Zeta is a ground defense installation. Elysium Yards are an orbital shipyard, as are the Bradbury Yards. Defense Battery Torch is an orbital defense installation, and the Chandler Yards are orbital repair yards.

Clarke is home to Defense Battery Rama, an orbital defense installation. The HAL Institute is an orbital scanning installation. Fort Makenzie is a ground barracks.

Heinlein is home to Fort Lazarus, a ground defense installation and Zebediah Yards, an orbital repair yard.

Ground Forces

The Terran Confederation has the following Ground Forces.

1st Brigade – HQ Unit (Fort Tempest)
    1st Battalion – HQ Unit (Fort Tempest)
        101st Recon – RCN
        51st Infantry – INF
        4001st MASH – MED
        2001st CB – ENG
    2nd Battalion – HQ Unit (Fort Hubbard)
        102nd Recon – RCN
        53rd Infantry – INF
        201st Assault – AST
        301st Heavy Assault – HVA
    3rd Battalion – HQ Unit (Fort Imbrium)
        52nd Infantry – INF
        81st Armor – ARM
        54th Infantry – INF
        302nd Heavy Assault – HVA
    4th Battalion – HQ Unit (Fort Asimov)
        21st Garrison – GAR
        103rd Recon – RCN
        4002nd MASH – MED
        401st Security – SEC

2nd Brigade – HQ Unit
    5th Battalion HQ – HQ Unit (Anhur Base)
        801st Air Wing – AIR
        802nd Air Wing – AIR
        803rd Air Wing – AIR
        804th Air Wing – AIR
    6th Battalion HQ – HQ Unit (Fort Jove)
        82nd Armor - ARM
        202nd Assault – AST
        22nd Garrison – GAR
        2002nd CB – ENG
    7th Battalion HQ – HQ Unit (Fort Makenzie)
        104th Recon – RCN
        23rd Garrison – GAR
        203rd Assault – AST
        303rd Heavy Assault - HVA
    8th Battalion HQ – HQ Unit (Fort Lazarus)
        83rd Armor – ARM
        2003rd CB – ENG
        4003rd MASH – MED
        402nd Security - SEC

Appendix C: The Novaya Ruskayan Commonwealth

82 Eridani III is the home of the Novaya Ruskaya Commonwealth. It has a population of 3 billion. Novaya Ruskaya as the world is called, also is home to the largest university outside of the Sol system. Novaya Ruskaya is also home to several prominent multi-system conglomerates, foremost amongst them Contre Drive Systems and Interstellar Business Machines.

Stats

Willpower: 70
Aggressiveness: 50
Arrogance: 50
Xenophobia: 30

Colonies

The NRC has colonies on 4 moons in the 82 Eridani system, as well as a small outpost in the P Eridani system. The P Eridani colony, also known as Novaya Eridani is the first outsystem colony for the NRC.

Foreign Relations

While firm allies with the Terran Confederation, the Commonwealth does not particularly trust them completely. The NRC Navy keeps a firm eye on all of the NRC holdings. Recently, the Trit'ikk'it opened a trade enclave on Novaya Ruskaya.

Fleet

This Novaya Ruskaya Commonwealth Navy consists of 59 ships. The fleet is organized into three fleets with 56 of the ships. The remaining three ships are considered reserves.

First Fleet

The First Fleet is stationed at Novaya Moskaya. It is tasked with system defense.
CV *Moskva* NMFS-2000 (Flag), Admiral Pyotr Vasiliov, Captain 1st Rank Vladimir Armanov.
CV *Petrograd* NMFS-2002, Captain 1st Rank Fyodor Maximilianov.
CV *Minsk* NMFS-2004, Captain 1st Rank Stefania Petrova.
BC *Poltava* NMFS-1501, Captain 1st Rank Grigori Antonov.
BC *Borodino* NMFS-1502, Captain 1st Rank Pavel Petrov.

BC *Chesma* NMFS-1504, Captain 1st Rank Olga Stepanova.
CA *Aprosinya* NMFS-1000, Captain 1st Rank Aleksei Gudurov.
CA *Lyubov* NMFS-1002, Captain 2nd Rank Lev Ivanov.
CA *Praskovya* NMFS-1003, Captain 2nd Rank Semyon Romanov.
CA *Stepanova* NMFS-1004 Captain 2nd Rank Illyich Gordunov.
CA *Mariya* NMFS-1005 Captain 2nd Rank Vladimir Petrovich.
CA *Vasilia* NMFS-1006 Captain 2nd Rank Pyotr Alexandrov.
CA *Nataliya* NMFS-1007 Captain 2nd Rank Alina Kharkova.
CA *Ekaterina* NMFS-1008 Captain 2nd Rank Pavel Ivanov.
CA *Svetlana* NMFS-1009 Captain 2nd Rank Alexei Drakunov.
DDE *Burnyi* NMFS-500, Commander Anatoli Umarov.
DDE *Smeliy* NMFS-501, Commander Josep Rodenkov.
DDE *Mstislav* NMFS-502, Commander Tatyana Orlova.
DDE *Tarantul* NMFS-503, Commander Leonid Pushtrov.
DDE *Molniya* NMFS-504, Commander Ivan Porfov.
DDE *Vidra* NMFS-505, Commander Grigori Alexsov.
DDE *Dyelfin* NMFS-506, Commander Alexa Gudrunova
DDE *Akula* NMFS-507, Commander Alexei Stepanov
DDE *Myedvyed* NMFS-508, Commander Ivan Relikov
DDX *Sova* NMFS-100, Commander Pavel Petrovich
DDX *Kollibri* NMFS-101, Commander Stefaniya Chekova

Second Fleet

CV *Khabarovsk* NMFS-2001 (Flag), Admiral Dmitri Gudunov, Captain 1st Rank Ilsa Karkova
CV *Ekaterinaburg* NMFS-2003, Captain 1st Rank Leonid Orlov
BC *Volk* NMFS-1503, Captain 1st Rank Anton Aliyev
BC *Irbis* NMFS-1504, Captain 1st Rank Bogdan Yezhov
CA *Alya* NMFS-1010, Captain 2nd Rank Tatiana Izmaylova
CA *Galina* NMFS-1011, Captain 2nd Rank Radomir Korzhakov
CA *Polina* NMFS-1012, Captain 2nd Rank Natasha Kolosova

CA *Zenaida* NMFS-1013, Captain 2nd Rank Nikita Levkin
CA *Kira* NMFS-1014, Captain 2nd Rank Nina Mednikova
CA *Zoya* NMFS-1015, Captain 2nd Rank Oleg Nechayev.
DDE *Lunevye* NMFS-509, Commander Rasim Pogodin
DDE *Rosomaha* NMFS-510, Commander Viktor Potopov
DDE *Gepard* NMFS-511, Commander Illyich Pashin
DDE *Rysi* NMFS-512, Commander Vadim Poda
DDE *Horki* NMFS-513, Commander Rebeka Stepashin
DDE *Kalan* NMFS-514, Commander Krasimir Sedov
DDE *Hohlac* NMFS-515, Commander Miloslav Titov
DDX *Sokol* NMFS-102, Commander Maxim Ulyanov
DDX *Orlinye* NMFS-103, Commander Radmila Tarasova

Third Fleet
BC *Abaza* NMFS-1505 (Flag), Admiral Oksana Kharzin, Captain 1st Rank Milosz Sharov
BC *Butakov* NMFS-1506, Captain 1st Rank Timur Yubkin
CA *Angelika* NMFS-1016, Captain 2nd Rank Andrey Yazov
CA *Bozena* NMFS-1017, Captain 2nd Rank Nina Shvernik
CA *Gennadiya* NMFS-1018, Captain 2nd Rank Slawoj Tsaritsyn
CA *Snezana* NMFS-1019, Captain 2nd Rank Mira Umanova
DDE *Eridan* NMFS-516, Commander Milan Sedov
DDE *Akruks* NMFS-517, Commander Stanimir Polunin
DDE *Akubins* NMFS-518, Commander Aleksey Poda
DDE *Adara* NMFS-519, Commander Jaromir Nardin
DDX *Kunicy* NMFS-104, Commander Zoya Loban

Reserves
CA *Natasha* NMFS-520, Captain 2nd Rank Oleg Mashir
CA *Libuse* NMFS-521, Captain 2nd Rank Rustem Karev
DDX *Voron* NMFS-105, Commander Ilya Zotov

Technology

Ship Classes
Cossack-class Fleet Scout (DDX), hull numbers 100-199.

Tarantul-class Destroyer Escort (DDE), hull numbers 500-599.
Czar-class Cruiser (CA), hull numbers 1000-1199.
Kirov-class Battlecruiser (BC), hull numbers 1500-1699.
Moskva-class Carrier (CV), hull numbers 2000-2199.

Ship Designs

APPENDIX D: THE URSAE REPUBLIC

The home world of the xenophobic Ursae Republic is 61 Ursae Majoris. The Ursae Republic is slowly colonizing most of the bodies in their home system. The total population of the 61 Ursae Majoris system is 4.2 billion.

Stats

Willpower: 90
Aggressiveness: 85
Arrogance: 90
Xenophobia: 95

Colonies

The Republic has placed colonies and outposts on 16 system bodies in the 61 Ursae Majoris system. In addition to these, they have a colony on DM +36 1979 A IV (Ursae Minoris).

Foreign Relations

Fiercely xenophobic, the Republic trusts no one. All foreign flagged ships are stopped in the outer system and any trade cargo is shipped in system by local carriers. The URN patrols their holdings regularly.

Fleet

No firm numbers exist for the ships of the Ursae Republic Navy. It is estimated that their navy consists of at least 50 ships.

Technology

Ship Classes

Alfa-class Scout (DDX)
Bela-class Escort (DDE)
Caucasus-class Cruiser (CA)
Delta-class Battleship (BB)
Echo-class Carrier (CV)

Ship Designs

First Fleet

APPENDIX E: THE OBSIDIAN BLADE

Delta Trianguli A IV is the planet known to the pirate clans of the Obsidian Blade as Bolthole. With a population just under 1 billion, the planet is sparsely settled.

Stats

Willpower: 80
Aggressiveness: 40
Arrogance: 50
Xenophobia: 10

Colonies

The Obsidian Blade as a political entity is not overly interested in founding colonies, though a few of the bigger pirate clans have established off-planet enclaves around the system.

Foreign Relations

The main interest of the Obsidian Blade is commerce, specifically, the commerce of others. They raid trade convoys and sometimes smaller outposts and enclaves. The major powers of the region are continually on the watch for OB ships.

Fleet

The Obsidian Blade does not operate formal fleets. However, a number of pirate clans organize themselves into structures similar to fleets.

Technology

Ship Classes

Dagger-class Scout (SC)
Cutlass-class Frigate (FG)
Blackbeard-class Cruiser (CA)
Treasure-class Carrier (CV)

Ship Designs

Star Reaver Clan

CV *Windfall* (Flag), John Le Morte.
CA *Rackham*, Henry Teach.
CA *Anne Bonney*, Elisabeth Cormac.
CA *Kidd*, "Red" Avery.
FG *Saber*, Black John.
FG *Cutlass,* Fury-of-Death (Kal'Shak).
SC *Dagger*, Captain One-Eye Jack.

Illustrious Liberators Clan

CV *X*, Dread Robert.
CA *Hornigold*, Nine-Finger Pete.
CA *Mary Read*, Edward Every
CA *Killigrew*, Black Betty
CA *Worley,* "Irish" O'Malley
FG *Lance*, Gentleman Jim
FG *Napoleon*, "Twelve" Sterling
FG *Cutlass II*, John Henry
SC *Dirk*, James Able

Silent Death Clan

CV *Jackpot*, Jackson Madeira
CV *Fortune,* Blake Morgan
CA *de Bouff*, Hank "Dutchman" Stark
CA *Nathaniel Butler* Ironman Jeeves
CA *Grace O'Malley*, Iris White
FG *Longbow*, Blackheart
FG *Calliope*, "Tiny" Jim Hawkins
SC *Poignard*, Richard Drake
SC *Eagle,* Black Jack Frobisher

APPENDIX F: THE TAURUS REPUBLIC

Tau Ceti IV is the home world of the Taurus Republic. Formerly a holding of the Terran Confederation, they seceded from the Confederation, and after six years of skirmishes, were granted peace. The population of the Republic is 6 billion. The Republic fields a large number of hulls and very well trained crews.

Stats

Willpower: 90
Aggressiveness: 30
Arrogance: 40
Xenophobia: 35

Colonies

The Republic has only two colonies in their home system. These are both research enclaves on the moons of Tau Ceti IV.

Foreign Relations

The Tau Ceti Naval Academy is one of the best in Human space. That, combined with their growing fleet has them eyeing a few neighboring systems for potential colony sites. They regularly patrol the common lanes between the Republic and the Confederation.

Fleet

Technology

Ship Classes

Ship Designs

First Fleet

Second Fleet

Third Fleet

Reserves

APPENDIX G: THE KAL'SHAK DOMINION

The Kal'Shak homeworld lies outside of Human space. Most analysts surmise that the homeworld of the Dominion lies somewhere within the Scutum-Crux arm of the galaxy. No individual Kal'Shak has ever confirmed or denied this.

Stats

Willpower: 80
Aggressiveness: 95
Arrogance: 85
Xenophobia: 40

Colonies

The Kal'Shak Dominion has no known colonies in Human Space.

Foreign Relations

The main goal of the Dominion is to eradicate or subjugate any and all species they can.

Fleet

Technology

Ship Classes

Ship Designs

First Fleet

Second Fleet

Third Fleet

Reserves

APPENDIX H: THE TRIT'IKK'IT HEGEMONY

No human has much of any idea where the Trit'ikk'it call home, but over the last 50 years, the insect-like aliens have established a number of trade enclaves with the Human governments. The only exceptions to this are the Ursae Republic, with who the Hegemony is at war, and the Obsidian Blade.

Stats

Willpower: 60
Aggressiveness: 40
Arrogance: 35
Xenophobia: 25

Colonies

The Hegemony has no real colonies in Human space. The total population of the established trade enclaves is less than 1 million.

Foreign Relations

The Hegemony looks to increase trade with the friendly powers while continually attempting to curb the attacks on them by the Ursae Republic.

Fleet

Technology

Ship Classes

Ship Designs

First Fleet

Second Fleet

Third Fleet

Reserves

APPENDIX 1: GLOSSARY

This is a list of acronyms and abbreviations commonly used in the game.

- AG – Aggressiveness. Measure of how likely a race will initiate hostilities.
- AIR – Air Superiority Unit, type of ground unit.
- AR – Arrogance. Measure of how a race deals with another race.
- ARM – Armor unit, type of ground unit.
- AST – Assault unit, type of ground unit.
- Capital – A class of ships. Ships over 12,000 tons are classed as Capital ships. Also, a class of weapon mount.
- CI – Complacency Index.
- Comp – Short for Compensators
- Cruiser – A class of ship. Ships between 5,000 and 12,000 tons are classed as Cruisers.
- DAC – Damage Allocation Chart. Same as DAT.
- DAT – Damage Allocation Table. Same as DAC.
- DCC – Damage Control Crews
- DM – Defensive Maneuvers
- ECCM – Electronic Counter-Counter Measures
- ECM – Electronic Counter Measures
- EM – Electromagnetic, a type of damage.
- ENG – Engineer unit, type of ground unit.
- Escort – A class of ship. Ships between 2,500 and 5,000 tons are classed as Escorts.
- EWD – Emergence Wave Detector.
- FCC – Fleet Command Center
- FTL – Faster Than Light
- GAR – Garrison unit, type of ground unit.
- HARM – Homing Anti-Radiation Missile.
- HEC – High Energy Capacitors.
- HEC Rings – Same as HEC.
- HQ – Headquarters unit, type of ground unit.
- HST – High Speed Turn
- HTK – Hits to Kill. How much damage a system can sustain.

- HVA – Heavy Assault unit, type of ground unit.
- HVC – Hyper Velocity Cannons
- IC – Inertial Compensators.
- IFF – Identification Friend or Foe. System used to determine which ships are friendly.
- II – Industrial Index.
- INF – Infantry unit, type of ground unit.
- K – When capitalized means Kinetic, a type of damage. Lower case refers to kilo, as in kilometers.
- LM – Light Minute. Distance light travels in one minute or 60 seconds. 17,987,547km, 1,800 tactical hexes.
- LS – Light Second. Distance light travels in one second. 299,792km, 30 tactical hexes.
- LY – Light Year. Distance light travels in one year. 9,460,730,777,120km.
- m – Meters. Used mainly in describing scanners.
- MED – Medical unit, type of ground unit.
- MI – Mineral Index.
- N-Space. Also, Einsteinian or Euclidean space. Normal space. The universe in which we reside.
- OI – Organic Index.
- PC – Political Capital.
- PD – Point Defense
- Picket – A class of ship. Ships under 2,500 tons are classed as Pickets.
- RCN – Recon unit, type of ground unit.
- Resolution – How detailed the scanner can resolve to. Measured in meters (m).
- REWD – Remote EWD.
- RP – Research Points. The scale by which technologies are gained.
- RS – Also RS score. Relationship Status. The numeric value showing the relationship between two races.
- SEC – Security unit, type of ground unit.
- SHex – Strategic Hex. A system level hex equal to 8 LM, or 14,400 tactical hexes.
- Signature – How large of a scanner cross section the ship has. Measured in meters (m).
- Th – Thermal, a type of damage.

- TL – Tech Level. An arbitrary scale of relative advancements.
- Warpspace – A realm of space that compresses distances to allow for faster than light travel.
- WP – Willpower. Measure of a race's stubbornness.
- XE – Xenophobia. Measure of how much a race will like or trust another race.

APPENDIX N: INSPIRATIONAL SOURCES

The following list of movies, books, and games are the inspiration for Astra Imperia. Series are only listed by their first title. This list is by no means complete.

Asimov, I. (1951). *Foundation.* Gnome Press.
Asimov, I. (1952). *Foundation and Empire.* Gnome Press.
Asimov, I. (1953). *Second Foundation.* Gnome Press.
Castle, N. (Director). (1984). *The Last Starfighter* [Motion Picture].
Chadwick, F. (1988). *Space: 1889*. Game Designer's Workshop.
Chadwick, F., Brown, T. B., Smith, L. W., & Miller, M. (1986). 2300 AD. *Traveller 2300*. Game Designer's Workshop.
Claremont, C. (1987). *First Flight.* Ace.
Clarke, S. A. (1968). *2001: A Space Odyssey.* New American Library.
Cole, S. V. (1976). *Starfire*. Amarillo Design Bureau.
Cole, S. V. (1979). *Star Fleet Battles*. Amarillo Design Bureau.
Emmerich, R. (Director). (1994). *Stargate* [Motion Picture].
Gygax, G., & Arneson, D. (1974). *Dungeons & Dragons*. Tactical Studies Rules, Inc.
Haldeman, J. (1974). *The Forever War.* St. Martin's Press.
Heinlein, R. A. (1947). *Rocket Ship Galileo.* Scribner's.
Heinlein, R. A. (1959). *Starship Troopers.* G. P. Putnam's Sons.
Heinlein, R. A. (1964). *Farnham's Freehold.* G. P. Putnam's Sons.
Herbert, F. (1965). *Dune.* Chilton Books.
Hogan, J. P. (1977). *Inherit the Stars.* Del Rey Books.
Hogan, J. P. (1982). *Voyage from Yesteryear.* Del Rey Books.
Jackson, S., Barton, W. A., & Pulver, D. (1999). GURPS. *GURPS: Space.* Steve Jackson Games.
Kast, D. (2000). *Starmada.* Majestic Twelve Games.
Larson, G. A. (Director). (1978). *Battlestar Galactica* [Motion Picture].
Lucas, G. (Director). (1979). *Star Wars* [Motion Picture].
Miller, M. W. (1977). *Traveller*. Game Designer's Workshop.
Niven, L. (1970). *Ringworld.* Ballantine Books.
Parisot, D. (Director). (1999). *Galaxy Quest* [Motion Picture].
Pinnacle Entertainment Group. (2013). Savage Worlds. *Savage Worlds Science Fiction Companion*. Pinnacle Entertainment Group.
Priestly, R. (1987). *Warhammer 40,000*. Games Workshop.
Resnick, M. (1986). *Santiago: A Myth of the Far Future.* Tor Books.
Ringo, J. (2010). *Live Free or Die.* Baen Books.
Ringo, J., & Weber, D. (2001). *March Upcountry.* Baen Books.
Roddenberry, G. (Director). (1966). *Star Trek* [Motion Picture].
Straczynski, J. M. (Director). (1994). *Babylon 5* [Motion Picture].
TSR Staff. (1982). *Star Frontiers*. TSR, Inc.
Tuffley, J. (1991). *Full Thrust*. Ground Zero Games.
Walmsley, S. (2004). *Aurora*. Steve Walmsley.
Weber, D. (1991). *Mutineer's Moon.* Baen Books.
Weber, D. (1992). *Path of the Fury.* Baen Books.
Weber, D. (1992). Starfire. *Imperial Starfire (Starfire 3rd Edition)*. Task Force Games.
Weber, D. (1993). *On Basilisk Station.* Baen Books.
Weber, D. (1999). *Apocalypse Troll.* Baen Books.
Weber, D. (2002). *The Excalibur Alternative.* Baen Books.
Weisman, J. (1984). *Battletech*. FASA.
Weisman, J. (1989). *Shadowrun*. FASA.

APPENDIX X: COMMON CALCULATIONS

The following are some of the more common calculations that are needed.

Colonization

1000 MCr x Population Point transported = Colonization Cost

10000 tons x Population Point transported = Colonization cargo requirements

500 MCr x Population Point transported = Transport Cost

5000 tons x Population Point transported = Transport cargo requirements

5000 MCr x Population Point transported = Extra-Solar Colonization Cost

20000 tons x Population Point transported = Extra-Solar Colonization cargo requirements

2500 x Population Point = Extra-Solar Transport Cost

10000 x Population Point = Extra-Solar Transport Cargo requirement

500 MCr x Population Point = Domed Structure (Hostile Environment)

7500 x Population Point = Hostile Environment Cargo requirements

30000 x Population Point = Hostile Environment Extra-Solar Cargo requirements

Exploitation Value
Mineral Abundance Value x 10 x Industrial Index = Exploitation Value

Hardpoints
Tonnage / 250 = Number of Point Defense Hardpoints

Tonnage / 500 = Number of Civilian Point Defense Hardpoints

Tonnage / 500 = Number of Standard Hardpoints

Tonnage/ 1000 = Number of Capital Hardpoints

Jump Lanes
(Distance between stars x Route Multiplier) / FTL Generation = Effective Jump Lane Distance

Lock On
Signature of Target – Targeting Ship Sensor Resolution +/- Target ECM + Targeting Ship Sensor Acquisition + Crew Grade = Lock On Percentage

Maximum Population
Organic Index x 1000 = Maximum Population in PP

Naval Support
Population in PP x 25 x Industrial Index = Naval Support in tons

Orbit Calculations
(1d5 + 5) / 20 = Orbital Constant (k)

$0.4 + (k \times 2^m)$ = Orbital Distance, where m = Orbital Shell number – 2

Planetary Industry Rates
(Planetary Build Rate x 5) x Industrial Index = Ship tons per month

(Planetary Build Rate x 5) x Industrial Index = Mines and Missile CP per month

(Planetary Build Rate x 2.5) x Industrial Index = Drones CP per month

(Planetary Build Rate x 2) x Industrial Index = Small Craft Bay Points per month

Population Signature
Population (in millions) [2] x Tech Level = Base Signature of Population

Radiators (Innate)
(Tonnage – Hangar/Cargo Tonnage) / 500 = Radiators (Innate)

Relationship Status Change
100 – Player's XE – NPR XE = Relationship Status Change

Research
(Research Centers + Director Grade) x 5 + 50 = Research chance (%)

Signature
Tonnage / 20 = Signature

Starting Player Calculations
Starting Income = 12 x System Income.

Fleet Fund = 36 x Starting Income.

Missile Fund = 36 x Starting Income.

Starting Population = 250PP.

Training Fund = (PP/100) x AG.

Economic Health = 5.

Additional Starting Income = (remaining Fleet Fund / 10) + (remaining Missile Fund / 10).

Structure
Tonnage / 2 = Military Structure Value

Tonnage / 4 = Civilian Structure Value

Thrust
Tonnage / 1000 = Power per Thrust

Tractoring
(Tonnage of Tractoring Ship + Tonnage of Towed Ship) / 1000 = Power per Thrust Required.

Wormhole Collapse Duration
$(\text{Excess Tonnage} / 10)^2$ = Collapse Duration in Hours

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If you enjoy reading stories about battles in space against pirates or invading alien armadas and wish you could partake in the battles or even conduct your own, then Astra Imperia is geared for you. Astra Imperia is a tactical and strategic space simulation. Astra Imperia can be considered two games in one, a tactical space combat, and a strategic stellar empire simulation. Presented here are the rules you need to conduct your own battles, from a single cruiser defending a convoy against pirates, to a clash of mighty fleets fighting for supremacy to rule the stars.