



PHOENIX

BEYOND THE STELLAR EMPIRE

THE RULEBOOK

Credits

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Overview

This is an ambitious 4X* game allowing players to leave their mark and be part of a story literally decades in the telling.

The game has been continuously running since 1992 with the setting evolving alongside the rise and fall of factions, the ebb and flow of narrative arcs, but ultimately player diplomacy. Players entering this open-ended game join existing factions, or even create their own, and aspire to find their place in a vast galaxy.

The setting is asymmetric, with some factions vastly superior to others. Although all factions face their own challenges, this variety allows players to choose a power level and game style to suit their own preferences. The ability to control many assets gives every player the capacity and opportunity to take part in all aspects of the game if they choose to do so.

This is not a game to pick up lightly or quickly. Whereas all games have a learning curve, Phoenix has been described as having a learning cliff and a game written by engineers for engineers (actually, it was a game written by physicists). It has, however, been designed to have balanced and compelling mechanics even if this means not shying away from complexity where necessary. The draw of the game can therefore easily be missed by the casual gamer. To use the learning cliff analogy again, it is fair to say the view from the top of the cliff bears little resemblance to the one from the bottom.

While there is no consensus on what appeals most about the game, terms such as big picture, longevity, depth, variety, plotlines, and camaraderie often feature in descriptions.



Introduction

Phoenix: Beyond the Stellar Empire, or simply Phoenix, is a game set 200 years in the future when humanity's expanding Stellar Empire collided with alien species and various human factions that previously fled the draconian laws of the emperor.

Distant 'Peripheries' have been discovered. These are huge areas of space consisting of many star systems, accessible only by starships. The race is on to explore, exploit, colonise or even conquer them by several of the larger power factions. Some factions are there to make money, some to rule. Players can join one of these groups, called Affiliations, and seek to make a name for themselves on the bold new frontier.

From signing up and completing the first mission, it will be discovered just how much there is to do in this vast game. This, and the size of the rulebook, may even be a little daunting. Do not worry, learning the game is possible as new aspects are encountered. The rulebook is mostly for reference.

For the first days, players only need to follow the missions, submitting orders as turn reports are returned after processing. It is useful to contract the affiliations which appeal most to help decide which to join. Details on their recruitment profiles can be found on Nexus. They are located at the bottom of the Forum page under News/Blogs/Recruitment.

Position Types

There are several different types of playable positions in Phoenix: Starships, Bases, Ground Parties, Platforms, Agents and Political Positions. Players start in command of a Starship. Starships are all-purpose spacecraft capable of exploration, cargo haulage, and combat. Bases are installations founded on worlds throughout the Periphery. Ground Parties are composed of people and equipment (usually) and are commonly used to explore or conduct military operations on the surface of a world. Platforms are battle stations often built in orbit to protect a world. Political Positions are the assets' leaders (and possibly even a player's alter-ego) and represent the person who actually runs the Affiliations. Agents are normally used to infiltrate other players' bases.

Some of these positions have subtypes which are dealt with in their own appropriate section.

**4X - Explore, Expand, Exploit & Exterminate*

How to Play

Orders for individual positions are created as needed or desired on Nexus. Once the batch is completed, they are submitted for the next day's processing, often referred to as the Day's Run. All orders are processed, and the results called turn reports are uploaded to Nexus. Using this information, the next set of orders is created. While starships are free to play, certain orders (requiring Game Moderator response), a few update requests and weekly report generation have a fee. The turn fee costs are detailed in the Rules section of the Library on Nexus.

Players acquire more than one position but there is no need to play all of them, all the time. A ship or ground party can stay in the same location for weeks without any orders being processed for them, ready to resume action when commanded.

Turn Reports

Where necessary to aid explanation, example sections from turn reports are used and will look like below.

```
TURN REPORT

Starting Location:
  Quadrant Alpha 10 - Academy System (777)

>TU 222: Move to Starbase {91224} {Dock - Yes}
  Move to Alpha 9
  Move to Alpha 8
  Move to Alpha 7
  [-Planet Garden (9083) [0.6g]
  [-Moon Safari (4774) [0.8g]
  Scanned:
  IMP STARBASE FLOATING BY (48100) - {0-0} 10 kMus
  Entering orbit of Garden (9083)
  Scanned:
  FET STARBASE GROUNDED (91224) - {8-4} 50 kMus
  Landing on planet.
  Docking at FET STARBASE Grounded (91224).
  Scanned:
  FET STARBASE GROUNDED (91224) - {8-4} 50 kMus
  Total TU cost for this action is 78
```

Only the relevant section of the turn report will be shown and annotated.

From Sign-up to Established Player

While there is not strict path to follow, this is the typical route a player will take:

- Sign-up and first ship
- Complete first mission
- Create second ship and new mission

- Create political – which comes with more ships
- Join an affiliation
- Leave Halo (training grounds)
- Take on a few affiliation ships and jobs
- Trade and explore on behalf of the affiliation
- Establish some outposts
- Take on or establish a starbase
- Take on warships
- Become involved in colonisation
- Get involved in politics

The nature of the game is that some players will become more involved in some areas than others. Some may end up concentrating on colonisation while others fixate on war or politics.

Game Basics

The following units of measurement are used in Phoenix:

- *Money: Measured in Stellarars. All Stellar transfers are in whole numbers.*
- *Time: A game week consists of 5 daily runs (normally Monday to Friday) in which orders are processed for positions and the turn results are uploaded to Nexus. Every action performed has a time cost measured in Time Units (TUs). Positions can have a maximum of 300 TUs. These may all be used in a single set of orders processed in a single run. They accumulate at a rate of 60 TUs per day.*
- *Mass: Mass is measured in Mass Units (MUs). Every Item in the game has a weight in MUs. This may represent physical weight of the object but also includes subjective elements such as volume or ancillary equipment such as living space or storage container.*
- *Items: Any game object that has been given a specific number is an Item representing all instances of the ubiquitous object, e.g. Human Colonist (773). Items can be anything from raw materials, manufactured goods, technology and people.*

Every Ship, Platform and Ground Party may perform up to 300 Time Units (TUs) worth of actions in a single run. While they can be issued with many orders and therefore TUs worth of activity, orders will stop being processed when the position runs out of TUs. When this happens, the remaining orders are held over as Pending. They will be uploaded to Nexus where they can be viewed and will automatically be processed when the position has accumulated 300TUs or when an update report is requests. They can also be modified but then must be re-submitted.

Stop on Error is an option when issuing orders to prevent the position continuing to process further orders.

Example: Stop on Error is selected when picking up a Stargate Key as there is no point continuing on to the Stargate if the ship failed to pick up and install the key.

Wait for TUs/Day/Stardate order can be issued to hold processing of pending orders until the criteria is satisfied.

The Game Week

The Phoenix game week runs from Monday to Friday, weekly. All orders are processed, in random order after they have been downloaded from Nexus on a given day. It is possible to sequence positions allowing for orders on one position to be processed before those on another. This is often used to deliver Items to a ship before it moves away from its current location or to deliver modules to a base before it attempts to build complexes.

Position Maintenance Adjustments

Each position has a maintenance day where it performs its weekly adjustments such as paying wages. Ships and Ground Parties are not greatly affected by these so long as they are being run competently but adjustments for bases are much more numerous as this is when things like collecting revenues and resources, research, mining and factory production are calculated. Bases can change their maintenance day to fit in with other positions. This is useful ensuring minerals from secondary bases are delivered to the main base for manufacturing.

Weekly Adjustments

Following Monday's Run, there are a sequence of adjustments for the entire game. These include sales to planetary populations, star system income to claiming affiliations and potential decay of planetary infrastructure (amongst other things). Details can be found in the appropriate section.

Moderated Actions

Certain orders cannot be processed by the game engine and require the Phoenix GM (Game Moderator/GM) to deal with them. They allow players to attempt any non-standard (i.e. non-programmed) actions. As they require human moderation, they have a fee associated with them.

Moderation is designed to augment the game mechanics, not circumvent them. Attempts to change the rules of the game are almost certain to fail, such as 'open fire on allies' and 'make my ship go faster by..'. Surface Exploration and Investigations are two specific types of Special Action generally used when exploring a planet. They are explained fully in Exploration.

Moderated actions are processed after standard orders for all positions have been completed and the turn reports uploaded (and emails sent) to avoid delays. Special actions for bases will be deferred until after weekly maintenance if submitted on the same day.

Squadron Orders

It is possible to assign ships to a squadron. This allows orders given to a single ship to be applied to each ship in the squadron. This is useful for avoiding repeating orders to many positions. There is also the option of copying sets of orders to other positions. The pros and cons are covered in Starships.

Submitting Orders

Orders are normally completed for the positions to be processed on the next day's Run or through the use of Wait for TUs/Day/Stardate, at a specific day in the future. There are also standing orders that though processed on the next Run may not be implemented until required. In all cases, turns will only be downloaded and processed through the Submit button on the Orders page.

Between submitting orders and their download there is the opportunity to view and review queued orders for positions.

Daily Run

The progression of processes through the daily run accounts for why certain events may proceed orders.

Example: Deliveries of ore to a starbase on its maintenance day will fail to arrive prior to the starbase undertaking production. The confusion occurs as the starbase manifest (appended after processing) indicates that it has the required minerals.

- *Orders submitted for processing downloaded from Nexus (approx. 7am GMT).*
- *Weekly Maintenance for appropriate positions (includes submitted orders for maintaining bases).*
- *Maintenance is in position number order (lowest to highest).*
- *Special actions on maintaining bases deferred to GM Moderation.*
- *Collation of positions with submitted orders and pending orders to form Run List.*
- *Overwrite pending orders due to Squadron orders.*
- *Process Run List orders (stopping to check Sequencing again Moderation orders as necessary).*
- *Run List is in random position number order (but accounts for sequencing).*
- *All orders for the selected position on the Run List are processed before randomly selecting next position's orders to process.*
- *Run battles.*



- Append manifests.
- Upload part Turn Reports for positions awaiting moderation and completed Turn Reports.
- GM Moderation and completion of orders.
- Upload remaining Turn Reports.
- Monday Only – Weekly Adjustments made after the daily run.

Bank Holiday Double Runs

There is no processing on (English) bank holidays. Process will be either on the previous or following day. A double run will occur consisting of a full day's run, a short break and then a second complete run. Time constraints may require moderated actions to be deferred.

Leaving the Game

When a player wishes to leave the game, it is courteous to contact the leader of the affiliation and players dealt with in the game. Also let the moderator know. This will allow for redistribution of positions and the Phoenix Account to be suspended.

Politicals

When signing up to play, players create a Phoenix Account. All their positions will be associated with this Phoenix Account. A Phoenix Account may have a single Political position. The position represents a person with power and a measure of autonomy within the Phoenix universe and represent the face of a group of wealthy/influential backers.

Creating a political is required to control anything beyond ships. The basic level is free to play.

Once created the stellars (wealth) of all the positions are linked to a central stellar account. Each week, all positions draw wages from the central political fund. This is automatic and cannot be avoided.

Issues and Voting

The rank within an affiliation determines how many votes the political has. These are used to determine outcomes of issues raised by affiliation members. Most affiliations have the following political structure.

Rank	Votes
1	0
2	1
3	2
4	4
5	8

Data

While data is linked to a player's Phoenix Account it can only be transferred between political (other player's Phoenix Account) and to the political's affiliation.

Rights

Allow a political to raise an issue or submit a specific political order for other political positions in the affiliation to vote on (if necessary). Rights are normally granted from affiliation members that already have the right.

Asset Control - allows for the removal of affiliation owned assets from other affiliation owners.

Tax - sets tax level. Only affiliation owned positions pay taxes.

Political Rank - sets the political rank of a political in the affiliation. The rank determines the quantity of votes.

Position Transfer - only needed to transfer affiliation owned assets to recipients outside the affiliation.

Affiliation Stellar Transfer - transfers stellars from the affiliation funds to a destination position.

Post Position - anyone with this right can automatically add a position to the affiliation posted list.

Registrations/Charters - used for accepting/revoking registrations and creating charters on Nexus.

Relations - allows a political to change the relationship with other affiliations on Nexus.

Recruit - allows access and modification of the affiliation recruitment message on Nexus.

Treaties - allows the creation of treaties to be agreed by other affiliations.

Reports

Treaty Report - list of current treaties and treaty status

Issues - outstanding and recently resolved issues

Rank - lists the titles for the ranks of the politicals within the affiliation

Asset - lists affiliation basic information for owned bases

Players - lists players currently in the affiliation (even ones without politicals).

Posted List - lists ships that have bounties set on them

Ships - lists basic information for affiliation owned ships.

Affiliation - basic info on the affiliation such as tax rates, funds and descriptions.

Multiple Politicals/Phoenix Accounts

A Phoenix Account can only have one political. To have a second political, a second Phoenix Account must be created (by signing up again) and generally only done in exceptional situations. Sign-ups will be reviewed by the GM before being allowed and as such to avoid out of hand rejection, message the GM, explaining the situation and need before doing so.

A second Phoenix Account will not be granted the ship and wealth bonus at the time of creating a political.

There are some rules on running multiple Phoenix Accounts that need to be adhered to.

Being in multiple player-run affiliations is not allowed.

Players (the person not the Phoenix Account) may only be in one player run affiliation.

There are 2 exceptions to this:

Where the leadership of both affiliations are aware of the situation and have agreed to it.

Where one of the affiliations is Independent (IND).

The GM will take actions against anyone who breaks these rules. We monitor the people with multiple Phoenix Accounts. If there is a problem, contact GM.

Political Level

Political level represents the investment of the backers and has no bearing on political clout within the affiliation or in the wider Peripheries. There are 6 levels of Political, each subsequent level has increasing benefits. The level can be set through the Set Political Level order.

New politicals start at the Free level, i.e. no weekly turn fee.

A political must spend at least 4 weeks at its current level before it can be set to a lower level.

There is no interval restriction for setting a political to a higher level.

Benefits:

- *Weekly Stellar Income - Stellars are paid during political's weekly maintenance.*
- *Free Updates - These apply to outpost and platform update charges. Where limited weekly updates are added, these will be distributed over the week. Until aware of when they are added, it is sensible to refrain from requesting updates until the day before the political's weekly maintains.*
- *Starbase Troop Subsidy - As the title implies this subsidy is paid towards troop wages at starbases only. The amount is set during the political's maintenance. Maintaining starbases will draw from this fund until it has all gone or it is reset on the political's next maintenance.*
- *Starbase Creation Package - One-off package per Phoenix Account. Using the 'Claim Budget Starbase' starbase order will add items to the starbase. The claiming starbase must be on a populated world and cannot have claimed before, i.e. under a previous owner. Claiming, prevents the starbase from converting to outpost for 5 weeks.*

EEM Loans

It is possible to get a loan from the EEM (GM controlled faction).

- *The debt is normally repaid over a year and is assigned to a starbase.*
- *The maximum amount borrowable is based on the income of the political's asset pool though rarely more than a few million stellars.*
- *Repayment is weekly on maintenance day and is a set amount (normally capital amount / 50).*
- *Weekly interest is 0.05% of the outstanding amount which is added to the remaining debt.*
- *While a loan exists, the starbase cannot be transferred to another player or converted to an outpost.*
- *Application needs to be made through special action and should include the amount wanted and starbase that will incur the debt (if no repayment period is given, the GM will assign it over a year).*
- *The application can be refused though alternative arrangements may be offered if the starbase nominated is at risk or weekly repayments at too high. Where this occurs player acceptance of the alternative arrangement will be a free special action.*

Recovery of Bad Debt

The GM may step in to recover the debt if it becomes clear that the situation has become untenable such as player taking the loan leaving the game or capture of the indebted starbase. Final adjudication of how the debt is cleared will be determined by the GM (due to budget starbase bonus that can generate a nominal debt).



Game Knowledge


Data is split between unrestricted (common/public) knowledge and restricted.

Unrestricted data is universally known and can be used by anyone in the game. Generic items, public star systems and celestial bodies fall into these categories. This is effectively starting knowledge.

Restricted information is discovered through playing the game. It may be found through research, exploration and investigations or by treaties and direct transfer of the data from other players.

Restricted data is listed on political reports and is included automatically when using nexus interfaces.

System Knowledge

All public systems will be shown on the Jump Map and are identified by a . Restricted systems will only be shown if they are known.

There are two levels to restricted system knowledge:

Location Knowledge

This is the most basic level and allows the player to look at the system on Nexus. When a player only has this level of knowledge, the system will not be positioned in its correct location on Nexus Jump Map. The system icon may even show link spurs indicating that the player knows how to jump out of the system to adjacent systems. There will not be jump links directed towards this system.

This level of knowledge is normally granted at the time a player has a position within the system (generally the result of a transfer). The knowledge may also be transferred directly.

This system however cannot be reached by jumping as the player does not have navigation knowledge.



Public System
as shown by the (P)

Restricted System

Navigation Knowledge

This is originally granted through completion of a relevant stellar cartography project. Once granted, the system will appear in the correct location on the Nexus Jump Map along with links connecting to the appropriate destination.

Simply having positions in the system DOES NOT grant Navigational Knowledge, thus preventing the knowledge being transferred to third parties either by accident or design simply by transferring positions to another player.

Affiliation Treaties for system data will grant ACCESS to navigational data. If they remove the treaty the ACCESS is lost. Owners of ships in the system will still gain location data but the ability to jump into the system will cease.

Treaties do not chain – if the FLZ grant Access to Navigation Knowledge to the HEX, the HEX cannot create a treaty with the GTT to grant Access Navigation. At best they will only grant Location Knowledge.

Officers

Officers are complex items that may develop skills augmenting the position they are on. Obtaining officers is achieved through either the use of the Hire Officer order or via the Create Officer political order.

Hiring

Ships can hire an officer when landed at an urban sector on a populated planet. Hiring an officer this way costs 1500 stellars. These officers may not be naval officers.

Create Officer

The Create Officer political order promotes a life form present on the designated position to civilian officer for 1,000 stellars or naval officer for 11,000 stellars.

Empower Officer Political order

Empower Officer order issued by a political position converts a commanding officer of a ship to a naval officer. This order costs 10,000 stellars.

Naval and Civilian Officers

An officer can be either a civilian or a naval officer. Naval officers can utilise combat lists in to engage in combat rather than fleeing at the first available opportunity.

Combat Options	Civilian Officer	Naval Officer
Enemy List	No	Yes
Support List	No	Yes
Defend List	No	Yes
Do not target List	Yes	Yes
Auto Board	No	Yes
Never Flee	No	Yes
Drop Cargo	Yes	Yes
Flee	Yes	Yes

Officers have no item number but can be transferred via the pickup/deliver orders using the position-based identifier.

Officers are displayed with a # preceding a number.

Crew Report

OFFICERS

1	Black Kas (#1)	{ Civilian, 3 Pts, +8 CF, +1 Dodge }
---	----------------	--------------------------------------

Include the '#' when referring to the item when picking up or delivering officers.

The #id of the officer may change when they are transferred to another position taking the lowest number available. It will not however change while in a position.

Example: If officer #1 is transferred to a ship with two officers, #1 and #2, the officer transferred will become officer #3. If later, the receiving ship then delivers officer #1, the remaining two officers will continue to be #2 and #3. If a third and fourth officer are delivered to the position, they will assume #1 and #4 respectively.

This can cause some problems when attempting to juggle multiple officers in a single day.

Experience

Experience points (Pts) can be used for skill training. While all skills can be trained, combat restrictions on civilian officers and the role of the ship will mean the skill has no benefit until the officer is empowered (and possibly transferred to an appropriate ship).

Training Officer Skills

The 'train officer' order will only work if the officer is in a base or in a ship which is docked in a base. This can be either in the starport or docked at hiport.

Pts are converted to skills using the base's training complexes.

Skills are ranked levels 1 to 4. When determining the cost of training any skill to the next level, the sum of the levels determines the Pts cost while the next level of skill determines the stellar cost.

Sum of all Skill Levels	Pts required to increase a skill
0	1
1	2
2	4
3	8
4+	8

Stellar cost is based on the new level of the specific still being trained.

Skill Level	Stellar Cost
1	500
2	1000
3	2000
4	4000

Example: An officer with Navigation (3) Leadership (2) costs 23Pts ($= [1+2+4] + [8+8]$) and 5000stellars ($= [500+1000+2000] + [500+1000]$)

Gaining Officer Experience & Skills List

- Experience points are gained via civilian and naval activities.
- Experience is only gained on ships but works on other positions.
- Maximum of 32 unspent Pts.



- Pts are sometimes earned following the processing of an order. There is no official documentation of which activities are more likely to generate experience though the maximum probability of an officer gaining a Pt is 25% but more typically 15% based on a week's worth of orders.
- Pts are also gained for being involved in combat.

Pts per battle:

- Doing damage and taking damage (counts as being involved): 1Pt
- Doing more damage than usual (and being involved): 1Pt
- Taking more damage than usual (and being involved): 1Pt
- Doing damage to a position that is destroyed: 1Pt

Multiple Officers

When multiple officers are on board a ship, the probability of an individual officer gaining a Pt due to the activities of the ship has the formula:

Probability of Officer gaining Pt = (Base Probability of Officer gaining Pt) / (Number of officers)

Example: If there is a 10% base chance of a Pt being awarded to an officer and there are 4 officers, each officer has a 5% chance of gaining a Pt (=10%/4)

In combat, total awarded Pts are shared out amongst the officers using the following formula:

Pts per officer = (Combat Pts Awarded) / (Number of officers)

Example: 4Pts are awarded to a ship with 4 officers following a day's battle. Each officer gains 2Pts (=4/4)

Skill	Bonus (per level)
Accuracy	+0.5 Accuracy
Damage Control	+0.25 Defence Modifier (x3->x4) (HH Ships/platforms only)
Dodge	+0.5g Dodge (Ships only)
Exploration	Flagged to GM (investigations/special actions)
Fleeing	+0.5g Dodge when Fleeing
GPI	+25% GPI Sensor Factors
Jumping	-5% Jump Time
Leadership	+5% Crew Factors
Prospecting	-5% Tus
Navigation	+5% Manoeuvre Speed
Sensors	+5% Sensor Power
Stealth	-5% Visible Surface Area (Ships only)
Trade	-1 TUs Transaction Time

Skills are automatically utilised. When multiple officers exist on a ship, the officer with the highest skill is used. As purchase of initial skills is cheaper, some people utilise multiple officers on a ship, preferring the increased weekly wage to the expense of training.

Officer Prisoners & Loyalty

Officers are loyal to the affiliation of the recruiting affiliation (and remain so even if they are transferred to another affiliation). Their loyalty can be increased using the Increase Officer Loyalty. This makes them more expensive to Subvert should they be captured.

Officers on a position captured through combat will be converted into prisoners.

Their skills are not used by the position they are on (and are not detailed in the manifest report).

Their statistics can be determined through the Interview Officer Prisoner order.

Officer Prisoners will only lose their Prisoner status following Subverting* or Debriefing (an option in the Interview Officer Prisoner order). The cost in stellars is calculated from the table below.

Skill	Subvert Cost	Debrief Cost
Level 1	375	50
Level 2	1125	150
Level 3	2625	350
Level 4	5625	750
Naval	7500	1000
Loyalty	Level x 10	0

Loyalty bonus on officers captured under a Flag of Convenience will be ignored.

**If an attempt to subvert an officer fails due to a 'moratorium' the officer cannot be subverted, only Debriefed by the affiliation they are loyal to. Moratoriums apply to officers captured prior to the introduction of subverting officer prisoners.*



Starships

Ship specifications reflect the job they have been designed for. The typical roles they perform range from transport of goods for trading or colonisation, to exploration of new worlds, to combat. A merchant ship will have a large cargo capacity while an exploration vessel will have sensors and exploration modules. Warships will be packed with weapons and armour.

Travelling through space, trading, exploring and virtually all other actions require time to complete. While certain actions take a set amount of time, such as picking up and delivering items, the time requirement for other actions is based on the design of the ship and the type of action performed. Having more thrust engines will increase take-off speed for example.

Ships are defined by their design and class. Design is defined by quantity and type of hull along with armour while class is defined by their specialised role. A ship that has not been specialised has the Generic class.

Turn Reports

These consist of sections detailing the events occurring since the last turn report was generated, followed by the results of processed orders, next will follow any interactions and scans made after the position's orders were processed but before the end of the day's run and finally the manifest reports. These are a series of entries that are for the most part self-explanatory.

Ship Manifest

This consists of the following reports:

- *Command*
- *Navigation*
- *Crew*
- *Cargo*
- *Space Combat*
- *Boarding*
- *Target Lists*
- *Installed Items*
- *Pending Orders*

Security Code is needed by other positions when attempting to deliver items to the ship or pick items up from it.

Design, hulls, armour and type represent the superstructure of the ship, taken together giving an idea of the role the ship performs.

Integrity decreases each week. Once it drops below 20% there is a chance that the ship will decay and become debris. Undertaking a Maintenance Visit while at a base will restore the ship's integrity. The quantity of patches indicated will be supplied by the base as part of processing the order.

While sensor rating will remain constant providing there is no change to the installed items, planetary scan rating and sector scan rating will be derived from the sensor rating of the ship and the world currently being orbited. See Scanning.

PIR SHIP Betony (4446)

Ship Name and
unique number

Printed on 1st July 2019, Star Date 219.27.3

BETWEEN TURN REPORT

Financial

Date 27.2: 1 officer was paid 5 stellars.
199 troops were paid 199 stellars.

Events that have
happened since last
turn report

Information

Date 27.2: Weekly stress reduced integrity to 92.4%.

TURN REPORT

Starting Location:

Quadrant Alpha 9 - Discordia System (266)

Crew have not had shore leave for 30 weeks, their efficiency is reduced.

>TU 262: Move to planet orbit {266} {9121}

Move to Beta 9

Move to Gamma 9

| -Planet Scared (9121) [1.4g]

Entering orbit of Scared (9121)

Scanned:

AFT OUTPOST 266 SCARED BASIC 130D (54881) - {19-13} 39 kMus - Hiport

Total TU cost for this action is 70

Processed orders
and their results

>TU 192: Wait for Tus {300} {Exact - No}

>Turn Stopped:

Until 300 tus are available.

Start of the ship manifest.

Command Report

Command Report

Name:	Betony (4446)	Aff:	Pirate(90)
Wealth:	15818 Stellars	Ownership:	Player owned
Efficiency:	100%	TUs left:	192 tus
Security Code:	ZKXV	Security:	200%
Design:	Broadsword (8) Class Heavy Cruiser		
Hulls:	75 (Heavy Hull mkII)	Hull Damage:	0%
Integrity Mod:	0.5	Integrity:	92.4% (28.6 patches)
Armour:	80/80	Type:	Armour Plate (450)
Minimum Integrity:	94%	Auto R&R:	On
Refit Template:	None (0)		

Navigation Report

LOCATION

Scared (9121) Orbit - Quadrant Gamma 9 - Discordia System (266)

Sensor Rating:	56%	Sensor Profile:	65% (65%)
Planetary Scan Rating:	2%	Sector Scan Rating:	58%
ISR Drive Rating:	3	Jump Capability:	Yes (100 tus)
Manoeuvre Speed:	0.6 g	Orbit Time:	16 tus
Landing Time:	79 tus	Takeoff Time:	79 tus
Surface Area:	82	Embarking Size:	18750 mus

ISR Drive Rating, Jump Capability and various speeds and times are explained in Ship Movement.

Surface Area is rarely used directly (see Cloaking) but is an indicator of maximum boarders, target silhouette.

Embarking Size is the overall mass of the ship. A ship or platform wishing to embark this position must have at least this cargo capacity.

Space Combat Report

Combat Efficiency: 100%		Your Target Silhouette: 2.53			
Combat Speed: 5.91 g		Hard Points: 22 / 165			
DEFENCE					
Armour:	80	Scints:	0		
Dodge:	6.91 g	Manoeuvring Dodge:	7.98 g		
Shields:	None				
COMBAT OPTIONS					
Max Targets:	1	Target Type:	None		
Flee Option:	Flee	On Patrol:	Stop to Support/Defend		
TARGET PREFERENCES					
Position Type:	Ship	Ship Type:	Freighter		
Armour Type:	Ignore	Ship Size:	Medium (50 Hulls)		
Retarget:	Ignore	Retarget if Target:	Ignore		
TARGETING					
Targeting Bonus:	0	Sensor Power:	7.51		
Base Accuracy:	3	Officer Bonus:	0		
SPACE WEAPONS					
		ACC	AF	HP	DMG
12	Light Rail Gun (265)			12	
	- 83.33 salvos of HE	0	5		720
10	Tractor Beam (340)	+12	1	10	0
POINT DEFENCE SYSTEMS					
		SHOTS		ACC(%)	DMG
10	Gatling Laser (215)	10		20	1

This report is dealt with in detail in the Naval Combat chapter. Here it is enough to look at the differences between a freighter (above) and a fast skirmish design raiding ship (below).

Space Combat Report

Combat Efficiency: 99%
 Combat Speed: 2.64 g
 Flee Speed: 5.28 g

Your Target Silhouette: 1.99
 Hard Points: 40 / 126

DEFENCE

Armour: 100
 Dodge: 2.68 g
 Shields: None

Scints: 0
 Manoeuvring Dodge: 5.36 g

COMBAT OPTIONS

Max Targets: 1
 Flee Option: Never Flee

Target Type: Disable
 On Patrol: Stop to Support/Defend

TARGET PREFERENCES

Position Type: Ship
 Armour Type: No Armour (0 AR)
 Retarget: Ignore
 Ignore Incoming fire: Yes

Ship Type: Freighter
 Ship Size: Huge (200 Hulls)
 Retarget if Target: Ignore

TARGETING

Targeting Bonus: 2.63
 Base Accuracy: 5.63

Sensor Power: 7.39
 Officer Bonus: 0

SPACE WEAPONS

		ACC	AF	HP	DMG
10	Missile Launcher (205)			10	
	- 9 salvos of Missile	+6	8		2000
3	Torpedo Launcher (219)			30	
	- 4 salvos of Torpedo	+6	5		1800

POINT DEFENCE SYSTEMS

		SHOTS	ACC(%)	DMG
6	Gatling Laser (215)	10	20	1

The freighter has point defence to counter incoming missiles and intends to drop any cargo to boost its fleeing speed should it encounter an enemy. Target Preference have not needed to be set.

The raider on the other hand will not flee a combat encounter and preferentially targets huge unarmoured freighters. Further, even if counter attacked such as by

escorts, it would ignore incoming attacks and continue to fire missiles against its preferred targets. It also has an extremely high dodge which will reduce the accuracy of incoming attacks (though whether this is sufficient to make up for its weak armour is another matter). 'Target Silhouette' if the ship is added to the enemy's accuracy. Having a high value here makes the ship easier to hit.

Boarding Defence Report

SHORT RANGE GROUND UNITS

		PREF	DMG	FACTORS
1	Black Kas (#1)	Packed	10	10
199	Veteran Mercenary (479)	Close	796	796
			-----	-----
			806	806

Current Ground Factors: 408
 Maximum Boarders: 823 Units
 Scout Accuracy: +-21% (199 factors)

Boarding Defence Report is simply a list of the troops and other items that will be used to repel boarders. Maximum Boarders is based on the size of the ship, i.e. quantity of hulls and hull type. Boarding strongly favours the defenders (see Boarding).

Boarding Report				
Any ship size will be auto boarded.				
Any ship hull type will be auto boarded.				
BOARDING PARTY				
QTY	UNITS	MAX	DMG	FACTORS
150	Veteran Mercenary (479)	150	600	300
			-----	-----
			600	300
Orders transfered to newly captured positions:				
1. Move to System Quad {777} {1} {15}				
Auto Boarding List				
All DOM(57)	All DTR(58)	All FET(56)	All BHD(63)	
All GTT(52)	All SMS(53)	All FEL(49)	All FLZ(47)	
All GCE(4)	All HEX(23)	All AFT(54)	All DEN(67)	
All RIP(17)				

Ship Structure

Hull Type	Internal Capacity (MUs)	Integrity Loss Multiplier	Maximum Layers of armour	Notes
Heavy	30	0.5	2	Thick and strong, generally used for warships and exploration vessels
Normal	50	1	1	Used by freighters that see action from time to time
Light	70	2	0.5	Weak, used by standard freighters
Xtra Light	90	4	0.25	Used by freighters in very safe regions of space.

A ship consists of a specific number of hulls - the type of hull and the quantity determine the basic parameters of the ship. These include its resistance to damage and stress and how large (internal capacity) it is. There are four types of hull that span a range from large volume but thin and weak through to small volume but thick and able to withstand damage.

Heavy Hull Defence Modifier
x3 defence value for internal items (installed & cargo) on heavy hull ships (and platforms). Further increased up to x4 with maximum officer defence modifier skill.

Installation Space and Derived Stats

$$\text{Installation Space} = \text{Quantity of Hulls} \times \text{Internal Capacity}$$

Installed Item Purpose	Example Items
Maximising efficiency	Bridge
Providing living space for crew	Quarters & Bunks
Additional crew factors	AI Navigators
Moving between star systems	Jump Drive & Quantum Jump Drive
Taking off, landing and manoeuvring	Thrust & Landing Engines
Moving between planets in a star system	ISR Drive
Scanning	Sensors
Energy weapons	Photon Guns & Photon Cannons
Missile weapons	Missile & Torpedo Launchers
Defence	Shields, Scintillators & Gatling Laser
Launching space fighters	Fighter Bays
Transporting trade goods	Cargo & Ore Bays
Specialist operations	Recreation & Resource Ship Bays

The installation space of a ship determines the maximum mass that can be installed. These items include engines, living and cargo space, exploration equipment, weapons and a plethora of other things that will define the role of the ship.

Quantity of installed items generally determine capability. Installing quarters for example increases life support. The amount of space increases for each quarter installed. Cargo bays increase cargo capacity.

Installing more reaction drives allows the ship to take off faster and increases its combat manoeuvrability. Many stats are derived from the quantity and quality of the installed items.

Functional items on a ship are those that have been installed and require crew to operate them. This is called their crew factor cost. Mercenaries and other troops provide crew factors as do installed AI Navigators.

Internal Space

Installed Items

- 2 AI Navigator (915) - 10 mus
- 1 Bridge (100) - 50 mus
- 12 Cargo Bay (134) - 25 mus
- 1 Cloaking Device mkIV (353) - 40 mus
- 5 ISR Type 4 Engines (155) - 10 mus
- 1 Jump Drive - Quantum (178) - 50 mus
- 138 Quarters (131) - 25 mus
- 2 Sensor mkIV (106) - 10 mus
- 6 Thrust Engine mkII (161) - 20 mus
- 20 Thrust Engine mkIII (162) - 20 mus

Install Space: 4500/4500

Weapon Space: 500/500

Internal Space Type	Function	Example Installed Items
Life Support	Transporting items requiring Life Support	Quarters
Cargo	Transporting any item not requiring Life Support	Cargo Bay
Ammo	Safely storing ammo Item Type	Magazine
Space Fighters	Launching Space Fighters & Space Bombers Item Types	Fighter Bays
Ore	Efficient transport of alloys & Ore Item Types	Ore Bay
Commercial	Transporting Life, Trade & Drugs Item Types	Commercial Pods
Defence	Protects life but does not provide space	Bridge

Unused installation space serves no purpose and cannot be used for any other purpose. For a ship to transport items, it is required to install specific items that have internal capacity appropriate to the items being transported.

Note that as items may fall into multiple categories, they will be assigned automatically to the appropriate internal space.

For convenience, Internal Space types are collectively referred to as cargo for convenience to differentiate between items that are being transported and functional items that have been installed.

The Cargo Report on a ship's turn indicates the Cargo capacities of a ship and how much is currently being used.

Cargo Report

CARGO

1	Basic Module (410) - 40 mus	40
2	Industrial Module (400) - 40 mus	80
1	Military Module (405) - 40 mus	40
1	Teleporter Module (425) - 40 mus	40
1	Transport Module (415) - 40 mus	40

Cargo: 240/240

Life Support: 47/1380

Installed and Cargo

Only items that have been installed and therefore listed in the Installed list are functional. Carrying weapons and shields in the cargo section will not be of any use should the ship be attacked. Removing items that have been installed in the ship can be achieved either by destroying the item or keeping the item intact. The latter option reduces the integrity of the ship.

Ship Bays

Specialist bays allow ships to perform some of the functions of bases. These include Recreation, Recruitment, Resource, Mining, Maintenance, Docks.

The ship seeking recreation, maintenance and repairs must be docked on the ship with the appropriate bays as though docked at a base before issuing the appropriate order.

A ship with resource or mining bays issues the order to utilise the bay on the appropriate resource id#. Doing so costs the ship integrity.

Crewing a Starship

As previously stated, installed items have a crew factor requirement. For the ship to run at normal operating efficiency (100%) the ship requires a crew whose total crew factors equals or exceeds this requirement.

Having insufficient crew factors to meet the installed item requirement will result in an efficiency of less than 100%. Where this is the case the TUs for undertaking orders is increased appropriately.

Example: If an action normally takes 100TUs to complete. If it has 50% efficiency, it will require 200TUs (=100/0.5).

While crew are the most able at running ships, other troops can also be used. The table below gives the crew factors provided by various troops. Veterans (troops that have gained experience) are better than normal troops.

Troop	Normal	Veteran
Crew	4	8
Marine	2	4
Mercenary	1	2
Soldier	1	2
Startrooper	1	2

Fixed Crew

Prevents personnel crewing the ship being accidentally picked up by another position delivered.

Bridge

Crew factor requirement for installed items presumes an installed bridge.

Installed Bridge	Item Crew Factor Requirement
Bridge	100%
Aux Bridge	133%
No Bridge	200%

Example: A warship's bridge is destroyed in combat but still has an Aux Bridge. The unmodified total crew factor requirement for its remaining installed items comes to 300 crew factors. This will now increase to 400 crew factor requirement.

AI Navigators

When installed they provide additional crew factors. They do not perform other roles undertaken by crew such as repelling boarders. A ship will not be operational with only AI's contributing to crew factors.

Captains

Under normal circumstances the captain is non-commissioned officer, i.e. one of the crew. An officer (see officers) can be assigned to a ship. As well as skills and superior close combat capability, officers also provide 8 crew factors; equivalent to veteran crew.

Wages

Wages are paid every week on maintenance day. These are drawn either from the player's political position, or from the individual ship if the player does not own a political position.

Standard weekly wages are equal to one stellar per troop (crew are classed as troops). Officers are paid 5 stellars per week, such is the price for having somebody more experienced than the standard crew.

While it is possible to set wages to be less than the standard amount, doing so is not advisable as it will cause crew to quit (even in space).

At times however due to various events such as combat there may be a shortfall in crew factors. This would normally mean that the ship is running at less than 100% efficiency. Setting the wages to greater than 1 stellar each per week can be used to increase the efficiency. For example, setting the wages to double will double the crew factors available.

Having more crew factors than necessary - either through extra troops or by paying extra wages - will never increase the efficiency of the ship above 100%. Only a recreation visit will do this.

When docked at a base (either in the starport or at the hiport), a ship can run a Visit Recreation complex, providing at least one recreation complex exists. Doing so will temporarily increase the efficiency of the ship. Initially the increase will be 50%. This efficiency bonus will drop to zero over few weeks. After 150 days since last R&R the ship will suffer a -20% crew factor penalty until there is a Recreation visit.

Half of stellars paid in wages are accumulated on ships and will be spent during recreation complexes (paid to the base owner).

$$\text{Maximum Stellar Spent per vist} \approx \text{Personnel on ship} \times \sqrt{(\text{Quantity Recreation Complexes})}$$

This will tap the accumulated wealth on the ship until it has been depleted. Only one recreation visit is allowed per turn.

Crew Report

CREW	FIXED	FACTORS
21 Human Crew (505) - 1 mus	-	84
26 Human Marine (506) - 1 mus	-	52
2 AI Navigator (915) - 10 mus	-	200
Crew Factors: 336	Required: 247	
Last R&R: 219.51.3 (0 Days)	R&R Bonus: +50%	

Integrity

Ships lose integrity each week at an approximate rate equal to their Integrity Mod (listed in the Command Report section of the manifest).

Hull Type	Weekly Integrity Drop
Heavy	0.5
Normal	1
Light	2
XLight	4

This table is for metal hulls mk I. Superior technology and organic hulls have lower integrity modifiers. Crystal hulls have higher integrity modifiers (compensated for by having superior defence).

Integrity decay is not linear, below 50% the chance of incurring multiple integrity losses becomes significant.

$$\% \text{ chance of additional Integrity Loss} = \frac{(100 - \text{current integrity})^3}{25000}$$

Each loss triggers another possible loss. At 10% integrity, a XL ship has a 3% chance of cascade breakdown, so it's not likely to blow too many ships up without any warning.

Ships may also lose integrity for manoeuvres such as jumping, entering orbit and landing.

Other things may cause integrity losses including but not limited to traversing wormholes and entering nebulae.

Ships in battle will suffer an integrity loss daily but only lose integrity when the battle goes to 4 rounds. The amount of integrity lost is based on the ship hull type.

HH - 1 week
NH - 4 weeks
LH - 1 week
XL - 1 week

The integrity modifier based on the hull type applies to all losses. Advanced tech may alleviate some of these losses.

Maintenance Visit

A maintenance visit restores integrity. It is conducted at a base with maintenance complexes or when docked in a ship with maintenance bays. The manifest shows how many patches are required to restore the ship up to 100% integrity.

Each hull type has a restoration coefficient:

Hull Type	Restoration Coefficient
Heavy	5
Normal	0.5
Light	0.1
XLight	0.1

$$\text{Weekly Restoration Cost} = \text{QTY Hulls} \times \text{Integrity Mod} \times \text{Hull Restoration Coefficient}$$

Patches

The standard patch (mkl) has an output of 100. Higher tech patches have a higher output. They will therefore restore integrity and damage appropriate to their level.

Patch mk	Restoration Points (Output)
mkl	100
mklI	125
mklII	150
mklIV	175
mklV	200

Example: A 100 Heavy Hull ship will require 2.5 standard patches to keep it in peak condition.

$$\text{QTY Patches} = \frac{(100 - \text{Current Integrity}) \times \text{Hulls} \times \text{Restoration Coefficient}}{(\text{Patch Restoration Points})}$$

Example: A 100 Normal Hull ship is at 25% integrity, i.e. lost 75% integrity. It will require 37.5 (=75x100x0.5/100) standard patches to restore integrity to 100%.

Example: A 75 Heavy Hull ship is at 40% integrity. It will require 225 (=60x75x5/100) standard patches.

Maintenance time will depend on patch output used by the visit and maintenance will be an order that runs until complete. It will take 5 TU per standard patch used, with a minimum of 20 TUs per maintenance visit.

$$\text{Maintenance Time (TU's)} =$$

$$\frac{(5 \times (100 - \text{Current Integrity}) \times \text{Hulls} \times \text{Restoration Coefficient})}{(\text{Patch Restoration Points})}$$

Example: A 100 heavy hull ship maintaining using Patches mkl will require approximately 12.5 TUs (= 2.5 patches x 5 TUs) per week spent on maintenance or 650 TUs per year, equating to approximately 2 weeks spent in maintenance.

As the manifest report indicates the quantity of standard patches (mkl) required to restore the ship to 100% integrity, a simple method to determine required time is:

$$\text{Maintenance Time (TU's)} =$$

$$\frac{(500 \times \text{Required Patches})}{(\text{Patch Restoration Points})}$$

Maintenance can be performed manually by issuing the 'Maintenance Visit' order but if a ship is docked with a base or ship with maintenance bays it is possible to use 'Maintenance Options' order to automatically run maintenance on the ship when it reaches the set integrity value.

Maintenance restoration is limited to 10% per maintenance complex. If the ship is docked at hiport, quantity of maintenance complexes is limited to quantity of orbital docks.

Damage

Repair of damage to armour and hulls also require patches.

Example Ship	Weekly Restoration Cost	Qty Patches (100 restoration points)	Qty Patches mkII (125 restoration points)
50 Heavy Hull	125 (=50x0.5x5)	1.25	1
100 Heavy Hull	250 (=100x0.5x5)	2.5	2
100 Heavy Organic Hull	200 (=100x0.4x5)	2	1.6
100 Normal Hull	50 (=100x1x0.5)	0.5	0.4
50 Light Hull	10 (=50x2x0.1)	0.1	0.08
100 Light Hull	20 (=100x2x0.1)	0.2	0.16
50 XLight Hull	20 (=50x4x0.1)	0.2	0.16

The quantity of patches is based on the % hull damage and the production of the hull with a bonus given to heavy hulls.

Hull Type	Standard Patches to Repair 1% Hull Damage
Heavy	0.5
Normal	1
Light	0.5
XLight	0.5

Example: A 100 Light Hull ship suffering 20% damage will require 10 (=20x100x0.5) patches.

Note that a Heavy Hull mkII will take on average 275 damage before being destroyed compared to 200 damage of a Heavy Hull but can effectively be repaired for the same cost. Normal hulls cost half the production of heavy hulls but are more expensive to repair.

Manoeuvres

All actions have a chance of reducing the integrity of a ship. The chance can range from 0% through to 100%, i.e. some will never reduce the integrity of a ship under normal circumstances. Each action also has a maximum integrity loss. Should the action trigger an integrity loss, the integrity of the ship will drop by a random amount up to the maximum integrity loss. Before this loss is applied to the ship however, it is first multiplied by the ship's integrity modifier. For example, a ship landing on a planet may incur a maximum integrity loss of 2%. For a ship constructed out of heavy hulls, the maximum loss will be 1% but for a ship constructed out of XLight hulls this could be as much as 8%.

Zero Integrity

Once a ship falls to zero integrity, it will suffer an integrity breakdown and be reclassified as debris, effectively consisting of a list of remaining items. Debris can be picked up by anyone (the debris will have the same position number as the original ship). No hulls or armour will survive an integrity breakdown.

Low Integrity

Even if a position has not dropped to zero integrity, it has a chance of blowing up or suffering an induced integrity breakdown but only if involved in combat or otherwise suffering damage. Once a ship has suffered over 50% hull damage, each damaging hit has a chance of forcing an integrity check to avoid blowing up. The chance of forcing an integrity check is proportional to the total damage sustained by the ship.

An integrity check to avoid blowing up is based on the current integrity of the ship up to a maximum of 80%. Having integrity of at least 80% will ensure the greatest chance of avoiding blowing up in combat.

Installing/Uninstalling Items

Both installing and uninstalling items will reduce the integrity of a ship. This is based on the quantity of items and not the size of them. Jettisoning the items avoids the integrity drop but has the unfortunate side effect of destroying the item. The theory is that the item is cut out, leaving the ship intact while uninstalling the item removes the installed item intact at the cost of the hull.

Due to integrity losses only ships with current integrity greater than 20% will be allowed to have items installed in them. If current integrity falls below 20% any further attempts to install items will fail.

Refit

The refit order will install missing items in line with either the ship's blueprint or template (as indicated by the order parameter). Items that should not be installed are uninstalled and removed. When refitting, patches will automatically be used if available to counter normal integrity losses caused by installing and uninstalling items.

Refit to Template

Often a ship has been reconfigured from the original blueprint design. This is especially true where new weapon configurations have been tested and proved to be more effective than the ones listed on the original blueprint. As such refitting to the original blueprint would end up removing a lot of useful items. As such it is possible to design templates using the position editor based on the desired configuration of installed items.

Ships performing the Refit to Template order must be docked with a base with 1 active shipyard per 10 ship hulls. They also need to own the base or have the security code to be allowed to do a refit.

The base will try to convert the fitting to a template that has been designed on the phoenix nexus position editor. There is no integrity loss for the installation, but patches are used to add the items safely. If 'Use low Tech' is not checked the best items available at the base will be used.

All uninstalled items will be returned to the base that the ship is docked at.

Upgrading Ships

Ships can be upgraded, improving armour and hulls. Hulls and armour retain the same characteristics, i.e. Light Hulls can only be upgraded to Light Hulls mkII and Ablative Armour mkII can only be upgraded to Ablative Armour mkIII.

The order Upgrade ship can be issued by a ship while docked a base with 1 shipyard for every 10 hulls of the ship.

There are 3 types of upgrade:

- *Hull Size Upgrade - requires hull upgrade patches and increases the ship size to the target hulls.*
- *Hull Tech Upgrade - requires hull upgrades items.*
- *Armour Tech Upgrade - requires armour upgrades items.*

The items must be available in the bases the ship is currently docked with or landed at and the ship requires security clearance via a pickup authorisation or the security code or other access.

Size upgrade allows the size of existing ships to be increased with respect to original blueprint size:

- *20% up to 100 hulls, e.g. a 50 hull ship can be increased to 60 hulls.*
- *10% after 100 hulls, e.g. a 150 hull ship can be increased to 165 hulls.*
- *Cannot increase size past 200 hulls.*
- *Requires the difference in hulls in upgrade patches.*

Tech upgrades allow the armour or hulls to be upgraded in mk:

- *Only 1 mk increase per upgrade, upgrade mkIII can only be used on mkII items.*
- *Require one upgrade patch per ship hull or armour plate as appropriate.*
- *Uses hulls/armour upgrade patches.*
- *The upgrade patches mineral expensive, i.e.*



cheaper to build mkII ship than upgrade a mkI ship but overall cheaper to upgrade mkI ship than scrap it and build a mkII.

- Upgrading increases integrity to 100%.

Ship Class (Generic & Specialist Roles)

The installed items on a ship identify its role to positions scanning the ship.

Example: Ships built from Light or XLight hulls with a large proportion of their installation space given over to cargo bays will be given the class Freighter while a Heavy Hulled ship with large numbers of quarters will be classed as Troop Transport.

Upgrade Ship Class

The above mechanics apply to Generic class ships. A ship may be upgraded or built to perform a specialist role. Ships with a non-Generic ship class gain the features of the specialist role when upgrading using the Upgrade Ship Class order.

Freighter [x8]

The freighter has a large coupling spine to which external pods can be attached (by either installation or picking up).

Cost:

1 Freighter Upgrade [50mu] / Hull

Restriction:

Core ship of 50 Hulls or larger of type Light or XLight

Class Features:

Can mount 1 Pod per 25 hulls

Jump Drive: 50 TUs

Landing: Can Not Land

Transactions: 2 TUs

Cloaking: Disabled

Pod Options:

Cargo Pods (5800) - 10000mu Cargo

Habitation Pod (5801) - 5000mu Lifeform Cargo

Ore Pod (5802) - 37500mu Ore Cargo

Commercial Pod (5803) - 10000mu Trade/Life/Drugs Cargo

External Cryo Pod (5804) - 9000mu Life

External Pods Maintenance

Each pod loses integrity in line with the ship they are coupled to. This is stated in the tech manual as an equivalent value in Ship Hulls. The production material is used to determine the actual weekly maintenance cost.

Example: Cargo Pods are constructed from 175 Light Hulls. As such their weekly maintenance cost per pod is:

$$0.35 (=175 \times 2 \times 0.1 / 100) \text{ patches.}$$

The quantity of patches is accounted for in the manifest report next to integrity.

Integrity loss on pods is integrated into the overall integrity of a ship for the purposes of the manifest report, i.e. a 50 Light hull ship with 2 pods will have a weekly patch cost of 400 Light Hulls ($=2 \times 175 + 50$).

Where Light Pods are coupled with XLight hulls, the overall integrity will drop appropriately to the relative quantities of XLight hulls to Light hulls.

Example: A single Light Pod (175 hulls) coupled to a 175 XLight hull ship will have a weekly decay rate of 3% ($=175 \times 2 + 175 \times 4 / 350$). Weekly patch cost = 1.05 patches ($=3 \times 350 \times 0.1 / 100$).

Example: A 50 XLight hull ship with 2 Light Pods will have a weekly decay rate of 2.25% ($=2 \times 175 \times 2 + 50 \times 4 / 400$). Weekly patch cost = 0.9 patches ($=2.25 \times 400 \times 0.1 / 100$).

Scanning

Sensors are the eyes and ears of a ship. They are needed to detect enemies, find minerals on planetary surfaces, locate asteroids amongst other things. Space is however big and not everything is immediately visible to the sensors of the ship, even if they are close by.

Passive & Active Scanning

Sensors work in Passive and Active modes. Passive scanning is the most common, listing positions and during order processing and positions detected by the ship while inactive (between turn report). Worlds and other celestial objects are also reported and if previously unknown will automatically be added to the player's data archive.

Active scanning is achieved through orders such as scan location and detailed scan. In the case of Scan Location, the quantity of TUs is submitted. This number will then be modified by the efficiency of the ship as it is bound by the same mechanics as moving through space.

Scanning works on three principles, these are range of detection, scanning power and the profile of the object being scanned.

Only the location being moved into will be scanned.

Example: A ship leaving orbit will scan the orbital quadrant it is entering but not the orbit it is leaving.

Range of Sensors

Sensors only reach out to a portion of the region of surrounding space being moved through which generates a probability of an object being encountered (falling within sensor range) based on the direction of the ship.

Probability of Traversing Quadrant Encounter (e.g. from Alpha 10 to Beta 10):

$$\text{Traversing Quadrant Encounter Probability} = (100\%) / (\text{Orbital Ring})$$

Probability of Traversing Orbital Ring Encounter (e.g. from Alpha 10 to Alpha 9):

$$\text{Traversing Orbital Ring Encounter Probability} = (100\%) / \text{Orbital Ring}^2$$

Regions smaller than orbital quads are always in sensor range always have 100% chance of an encounter.

Sensor Rating

Sensor Rating is the % chance of detecting an object with 0% Sensor Profile within sensor range.

Objects can have sensor ratings greater than 100% and less than 0%. Local environments may have a negative (never positive) effect on the chance of detection.

Example Environmental Modifiers:

- *Nebulas*
- *Asteroid Fields*
- *Deployed Stealth Nets*
- *Optical Depth**
- *Planetary Terrains*
- *Unique Situations implemented by the GM*
- *Cloaking (reduces chance of detection to zero)*

*This modifier will be reflected as a modified Sensor Rating for the manifest.

Sensor Rating is logarithmically proportional to the total sensor output of all installed sensors i.e. doubling quantity of installed sensors does not double sensor rating. A single sensor will give a positive sensor power resulting in a sensor rating greater than 0%.

Sensor rating is not affected by position efficiency.

Sensor Profile

Every object, including ships, bases, celestial bodies and ground parties have a sensor profile. This can be a large negative to a large positive. If an object cannot normally be missed it will have a sensor profile greater than 100%. Note that commonly known objects and those that have been added to a player's information database will automatically be included in appropriate scans. These objects include celestial bodies and bases.

Sensor profile is largely determined by surface area. The lighter hull ships are designed to have maximum volume for cargo and therefore have large surface areas when compared to ships that are built from the same number of a heavier hull type. Sensor profile is not affected by position efficiency.

The table below gives an indication of the basic sensor profile of a 50 hull ship for varying hull types.

Hull Type	Scanner Profile for a 50 hull ship
Heavy	25.6%
Normal	54.5%
Light	80.8%
Xtra Light	105.4%

Korondite & Stealth Plates

Certain types of armour plates reduce the sensor profile of the ship. As the number of plates that can be fitted to a ship is proportional to the hull type, heavy hull ships can utilise the most plates. Smaller ships also benefit from low profile due to size.

Scan Location

TUs assigned to the order are used to run multiple and partial passive scans as though moving through the location. This will be ISR Speed when in space or Orbit Time when in orbit.

For example, if traversing an orbital quadrant would take a ship 24TUs assigning 240TUs to the Scan Location order equivalent to moving through the orbital quadrant 10 times.

Efficiency is only used when determining TU cost to perform active scan, e.g. a ship at 50% efficiency will take twice as long to perform the scan, e.g. when assigning 50TUs, the order will take 100TUs.

When in a quadrant, the ISR speed of the ship determines how many passes it can do in an area. If it does pass into sensor range of the object a scan at the position's sensor rating is performed. If the sensors are not powerful enough to detect the object when the ship pass it then it will never be detected.

Example: A ship with ISR Drives-3, Scans Location for 120 TUs in the 10th Orbital Ring.

This equates to 4 Traversing Quadrant Encounter checks ($=120/10 \times 3$).

Each time the chance to pass close enough to scan an object is $(100/\text{Orbital Ring})\% = 10\%$ which can be expressed as a probability of an encounter of 0.1 and therefore a 0.9 probability of not having an encounter. The order attempts 4 passes of the location with only a probability of 0.1 that it will be close enough to the object to have an effective scan. So roughly it has a 34% ($= (1 - 0.94) \times 100\%$) chance of passing a target object once or more.

$$\%Chance\ of\ Encounter = \left(1 - \left(1 - \frac{1}{Orbital\ Ring} \right)^{Passes} \right) \times 100$$

Orbital Ring	% Chance of an Encounter				
	1 pass	2 passes	3 passes	4 passes	5 passes
1	100	100	100	100	100
2	50	75	88	94	97
3	33	56	70	80	87
4	25	44	58	68	76
5	20	36	49	59	67
6	17	31	42	52	60
7	14	27	37	46	54
8	13	23	33	41	49
9	11	21	30	38	45
10	10	19	27	34	41
11	9	17	25	32	38
12	8	16	23	29	35
13	8	15	21	27	33
14	7	14	20	26	31
15	7	13	19	24	29

Sensor Nets

These are deployed by Platforms in a location. These spread out across the location increasing the chance of a ship passing through the location will come within range of the platform's sensors. When accompanied with tractor beams and a lot of sensors (as the platform still needs to successfully scan the passing ship) they act as a spider's web, stopping the ship for combat (see Platforms).

Orbital Probes

Probes are little more than a one-shot-sensor attached to a very powerful reaction drive. They can be aimed at a location in a star system such as an asteroid belt, nebula or orbit of a celestial body. When used to probe a belt or nebula they will return details of the hazard data. When used to probe a celestial body they will perform a scan of the orbit (using the same mechanics of a ship entering orbit).

The output of orbital probe is the equivalent to sensor output (which is used to determine the sensor power or the scan). In both cases they are a useful method of scanning a location without putting the ship at risk.

Cloaking

Related to scanning and detection is the ability to cloak. All cloaking devices are advanced technologies, but as they are not uncommon their use is described here.

Cloaking devices make the ship completely undetectable irrespective of the sensor power of the scanning position. They also effectively make the cloaking position blind while cloaked, i.e. the cloaking position cannot scan.

All cloaking devices can operate for a limited amount of time. After this, the position will become charged with exotic particles. These do not interfere with the normal running of the position but are easily detected, which means that the position cannot be cloaked again until the charge dissipates. This normally requires 300TUs of activity to pass since the last activation.

Example: If a ship uses its cloak as its last action on a turn, the manifest will state that it is ready in 300TUs. If the ship performs 50TUs worth of actions on the next day, the manifest will state that it will be ready in 250TUs. If however only an update is requested and no actions are carried out, it will still state that it ready in 300TUs. If the ship continues to do nothing, this number will only begin to fall after the ship has accumulated 300TUs worth of available TUs. After this period the ready time will fall at 60TUs per further day of inactivity.

All cloaking devices work on an optimum surface area that can be cloaked. In ships, this equates to total installation space (quantity of hulls multiplied by internal capacity). If the surface area of the ship attempting to cloak is greater than this value, the cloak will not work.

Blockade

Ships are capable of blockading celestial bodies from the orbital quadrant. Positions entering and leaving the orbit of the celestial body are treated as though in sensor range and will be checked against enemy lists to determine if they are intercepted.

It is possible to move directly between moons and their parents to avoid blockades.

Movement

There are three types of drives in Phoenix:

- *Jump Drives to move between star systems.*
- *ISR Drives to move through inter-planetary within a star system.*
- *Reaction drives to move through orbits and reach world surfaces.*

Issuing any of the following move orders will automatically use the fastest route and perform the various individual manoeuvres such as taking off, leaving orbit and traversing space and jumping between the intervening systems.

- *Move to Base*
- *Move to Orbit*
- *Move to System*
- *Move to System Quad*
- *Move to World XY*

It is possible however to issue orders for each part of the flight path individually. This is sometimes necessary if a specific route is required e.g. avoiding navigational hazards.

If the route to the destination requires the use of Wormholes or Stargates (see below), the move order will fail. Orders need to be issued to orbit the appropriate celestial body, transition it using the appropriate order then continue with orders to move to the intended destination.

Other move and dock orders require the ship to be in the local vicinity, e.g. Dock at Hiport requires the ship to be in orbit of the appropriate world.

Stellar Navigation

Within the galaxy are millions of stars each with various celestial bodies orbiting around them. These celestial bodies may include large gas giants, terrestrial worlds or hostile rocky bodies. There could be asteroids and possibly unusual phenomena. Together these are known as a star system, or more commonly just system.

A primary star always exists at the centre of the system. Around this, the system is broken down into 4 quadrants and 15 rings known as orbitals. This is a schematic map representing relative location and ISR paths rather than physical distance. In Phoenix, relative location is based on iso-gravitational regions. These are effectively relative travel times for ships moving from one location to another.

Each star system is separated from other systems by phenomenal distances that almost invariably render reaching nearby stars at sub-light speeds impossible. Phenomenon called Inverse Spatial Resonance (ISR) uniquely connects one location with another through the dimensions known colloquially as subspace.

Ships can use this to move from one region of space to another without travelling through the intervening real space.

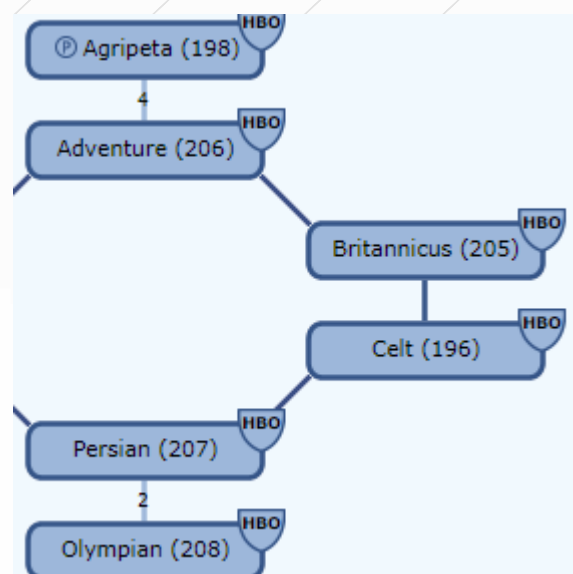
While the transition is effectively instantaneous, engaging the drive and establishing the exotic fields is not and is determined by the quality of the Jump Drive (for moving between systems) or ISR Drive (for moving around a system).

Jumps

Jumping is the means by which a ship moves from one system to another.

- *Periphery maps show known jump routes (links) between star systems.*
- *Only routes to known systems can be used.*
- *Distance between stars is measured in Jump Distance.*
- *Unless specified on the map, Jump Distance between linked systems is 1 Jump Distance.*
- *Jump Drives have a Jump Range of 4 Jump Distance per jump.*
- *Jumping bypasses systems within the Jump Range.*
- *Jump Drive quality determines time (TU) cost to perform a Jump.*
- *Where multiple jump engines are installed, the fastest will always be used.*
- *Unstable stars may increase the time cost (reported on System Scan).*
- *Unless specified on a System Scan, all jumps must be initiated from the 10th orbital or beyond.*
- *The ship will arrive in the new system in the same orbital quadrant it jumped from.*
- *A jump will be aborted if Hazard Alert has been set and a hazard exists in the destination orbital quadrant.*

Example:



A ship travelling from Agripeta to Olympian will first just jump to Adventure as the Jump Distance is 4, then jump directly to Persian, bypassing Britannicus and Celt. It must stop in Persian as the Jump Distance between Persian and Olympian is 2 (and therefore the overall distance between Adventure and Olympian is 5). A return journey however has the ship initially jumping to Britannicus (4 Jump Distance), then Adventure and finally Agripeta.

System Location and System Navigation Knowledge

System location knowledge is granted where a player has at some point gained control of a position within a restricted knowledge system. This is generally the case of the transfer of a position within the system to the player. Location knowledge allows the player to view the system on Nexus. Where the player only has location knowledge, the system will not be shown in its true location on Nexus. It will normally be shown at the bottom of the periphery map - possibly showing unconnected links to known systems.

Location knowledge alone does not allow a ship to jump to the system though ships within the system can jump out to systems for which they have navigation knowledge.

Where a system is not a public (common knowledge) system, jumping into the system requires navigation knowledge.

Ways of obtaining navigation knowledge:

- *Joining an affiliation that has navigation knowledge at affiliation level.*
- *Completing appropriate level of stellar cartography from a nearby system.*
- *Affiliation treaty with an affiliation that has knowledge.*
- *Direct transfer to player's political from another political.*

NB - Navigation knowledge allows some degree of control over how access to the restricted system is disseminated by players and affiliations.

Inter-Planetary Movement

Moving directly in or out (across orbital rings) requires time equal to the rating of the ship's ISR drive (1 being the fastest, 4 the slowest).

Crossing quadrants requires this rating multiplied by the orbital number the ship is in. The ship will automatically take the route that costs the least TUs overall. If a different route is desired, two or more movement orders need to be used, to fix waypoints.

Where a route involves a jump as well as system movement a predetermined route will be followed.

TURN REPORT

Starting Location:

Quadrant Alpha 10 - Academy System (777)

>TU 222: Move to Starbase {91224} {Dock - Yes}

Move to Alpha 9

Move to Alpha 8

Move to Alpha 7

[-Planet Garden (9083) [0.6g]

[-Moon Safari (4774) [0.8g]

Scanned:

IMP STARBASE FLOATING BY (48100) - {0-0} 10 kMus

Entering orbit of Garden (9083)

Scanned:

FET STARBASE GROUNDED (91224) - {8-4} 50 kMus

Landing on planet.

Docking at FET STARBASE Grounded (91224).

Scanned:

FET STARBASE GROUNDED (91224) - {8-4} 50 kMus

Total TU cost for this action is 78

Learning how this works is important for plotting routes that account for hazards.

There is a normal requirement of 1 ISR drive per 10 hulls. A ship however can utilise less. This will place greater strain on the ISR drives and can lead to overload. If the drives overload, one will be destroyed, and the remaining drives have to be reset. This is done automatically but takes time. After they have been reset another attempt will be made at creating a field.

Drive Requirement

The ISR drive rating effectively limits the size of the field and formation time. Faster drives (lower ratings) can only be utilised by certain hull types.

Hull Type	ISR Drive Type Limit
Heavy	1,2,3,4
Normal	2,3,4
Light	3,4
Xtra Light	4

A ship with ISR 1 Drives will move 4 times faster through interplanetary space than one with ISR 4 Drives. As space is a premium on warships, installing slower ISR drives is a valid option especially as slower drives are considerably smaller.

Asteroid Fields

As ISR drives use a similar principle to jump drives, moving the ship a short distance through the system without entering the intervening space, they are not perfectly accurate.

A micro-jump may be out by a few thousand kilometres. This is fine for moving through the voids of interplanetary space where such discrepancies are negligible but can prove hazardous when attempting to move through asteroid fields.

The first rule therefore is to simply avoid them.

NB - for an asteroid field to be even charted on a system map it must be considered a navigational hazard, i.e. densely populated (unlike the one in the Solar System). It is possible to determine means of safely crossing asteroid fields providing that there is not an accompanying nebula (see Asteroids).

Navigational Hazard Avoidance

Navigational Hazard Status order when activated, prevents ships from entering orbital quads containing known asteroid fields and nebulas.

Thrust Movement

Reaction drives are used in situations where ISR fields cannot be generated. This includes manoeuvring around celestial bodies, which can be broken down into landing, taking off, entering orbit and leaving orbit. They are also used in combat.

Each engine produces a standard amount of thrust. It is the total thrust against the total mass of the ship that determines its manoeuvrability and the maximum gravitational field it operates in. The Navigation Report lists the TUs required for landing and taking off from worlds. Leaving orbit costs the same as entering orbit. The ship can only land unaided on worlds if the Manoeuvre Speed is equal to or larger than the world gravity rating (see Docking).

Combat Speed

Reaction drives determine combat speed and are used in the following circumstances:

- *Intercepting enemy ships.*
- *Determine how many weapons and rounds of fire against disengaging enemies.*
- *Fleeing enemy ships.*
- *Limiting enemy fire when disengaging from combat.*

In the above circumstances, the combat speed of the ship is compared to appropriate enemy ships to determine the outcome.

Combat speed is based on manoeuvrability modified by the Integrity Mod for the type of hulls used in the ship construction. All other things being equal, a Heavy Hull ship will have a Combat Speed 8 ($=0.5/4$) times that of an XLight hull ship.

Current integrity also applies as a direct modifier to combat speed.

Example:

Integrity	100%	20%
Combat Speed	4.33g	0.87g
Dodge	4.33g	0.87g
Manoeuvring Dodge	6.53g	1.73g

Engines

Standard thrust engines have a range of boosters from small manoeuvring thrusters used for quick bursts to flip and spin the ship, through to larger continuous boosters to accelerate and decelerate the ship.

Combat engines have sacrificed long burn boosters in favour of small high intensity ones. As such they give much greater performance than standard engines but only count for combat speed.

Landing engines on the other hand are primarily long steady burst boosters that are suitable only for non-combat operations.

Ground Movement

If a ship is landed and an order is given to move to another planetary sector, the ship will remain on the ground, moving through the intervening sectors rather than taking off into orbit providing that the TUs required to reach the target sector is less than taking off into orbit and landing again.

World maps wrap east to west and when moving, will automatically take this into account when determining which sector to move into when moving across a world's surface.

Docking

Docking with a base can be either with the base's hiport or by landing in the starport of the base. While docked the ship is granted certain benefits and restrictions:

Orbital Docks

Orbital docks are employed to aid docking with a base or taking off into orbit. Time cost to use orbital docks is 40 TUs. They are automatically used if the ship has insufficient Manoeuvre Speed or Landing time is greater than 40TUs.

Ship size limit for using docks = $25 \text{ Hulls} \times \text{Active Orbital Docks}$

There is no limit to the number of positions that can use the orbital docks in a single week.

Orbital docks also grant access to base facilities for ships docked at hiport.

Example: Integrity restoration is based on active maintenance complexes for ships docked in the starport. Integrity restoration is based on the lower of active maintenance and orbital docks while in docked at hiport.

Embarking

Providing cargo space is at least equal to the embarkation size of another position (ship, ground party, debris or platform), it can be transported by the ship.

The position doing the transporting initiates the procedure through the embark order.

	Docked at Hiport*	Docked in Starport
Base Shield Protection	No	Yes
Planetary Shield Protection	No	Yes
Access Complexes	Authorised Only	Yes
Auto Maintain	Authorised Only	Yes
Auto R&R	Authorised Only	Yes
Involved in Space Combat	Yes	No – splash damage only
Can be boarded	Yes	Boarder must first enter starport
Can be directly targeted	Yes	Boarding only
Undocking	Into orbit	Into sector
Transactions with docked base	Yes	Yes
Transactions with nearby bases	Yes	No

*When docked at Hiport, access to complexes are limited to quantity of Orbital Docks

The embarked position can leave of its own accord through any movement order or can be disembarked.

Phenomena

As well as the standard move orders, there are two more special commands dealing with Stargates and Wormholes. Using these relocates the ship to another star system without jumping or having to follow a jump route.

Stargates

- Need to be orbiting Stargate to use it.
- Stargates link to one or more other Stargates simultaneously.
- Entering relocates ship to orbit of linked stargate in another system.
- Require Key or Exit Visa specific to the individual gate to enter.
- Using a Stargate costs 100TUs.

Wormholes

- Need to be orbiting Wormhole to use it.
- Wormholes link to one Wormhole at a time.
- Origin Wormhole may link to multiple Terminus Wormholes sequentially.
- Link will change after a fixed period of days (although the period may be anything up to infinity).
- Unlinked Terminus Wormholes cannot be entered and report as Unstable.
- Entering relocates ship in orbit to Wormhole currently linked.
- Using a Wormhole will incur an integrity loss (may be zero).
- Ships suffering Integrity Breakdown will convert to Debris at destination.
- Wormholes may have a ship mass limit (compared against Embarkation Mass).

- Using a Wormhole costs 100TUs.

Hazards

Imprecise ISR Drives make traversing Asteroid Belts and Nebulous hazardous.

Probe Navigational Hazard may report the probability of a hazard causing damage or integrity loss to a ship and the maximum amount that can be incurred.

Asteroid Belts

Asteroid belts are failed planetary bodies that contain particles of rock from small grains of dust to boulders kilometres across.

Damage may be avoided by dodging (probability mechanics not disclosed).

Damage is applied externally, i.e. shields and armour will mitigate before applied internally and to structure.

Nebula

Nebulae are composed of gaseous particles. These are too small to physically damage the hulls of the ship but can weaken the structure of the ship through various ways reducing the integrity of the ship.

All ships passing through a nebula suffer integrity loss. Base integrity loss is modified by Integrity Mod of the ship.

Transport

While most items can be carried in internal cargo space, items with specialist internal space can be installed. The game determines optimum placement of items being transport.

There are six types of internal space:

Ammo

Damage caused by exploding ammo is initially channelled into installed magazines.

Explosive damage incurred is on average half Explosive Damage Value.

Example: A Torpedo (220) is hit while in a Magazine (220) and explodes for 350 damage (approximately 600/2 explosive damage). This will destroy the magazine (100 defence) and the remaining 250 damage will be applied to the ship following standard cascade mechanics.

Absorbed

Where ammo exceeds ammo capacity, exploding ammo has a linear probability of channelling explosive damage directly into the position.

Example: Following the loss of a few magazines there is twice the mass of torpedoes as capacity. If a torpedo explodes, there is a 50% chance that the explosive damage will be applied directly to the ship instead of being contained by a magazine.

Ore

As ore does not need custom fitted housing, life support or thermal regulation, containers can extend beyond the superstructure of the ship, effectively holding more than their designated install space.

Commercial

This covers both living and non-living items of Life, Drugs and Trade item types.

Space Fighters

Space fighter capacity determines the mass of space fighters and bombers launched in combat. Where excess fighters and bombers are present, a proportion of each based on relative mass will be launched and detailed in manifest. Loss of capacity will reduce quantity of active space fighters and bombers.

Life Support

Life forms cannot be carried in Cargo. Any life forms will default to life supported internal space once more appropriate internal space has been filled.

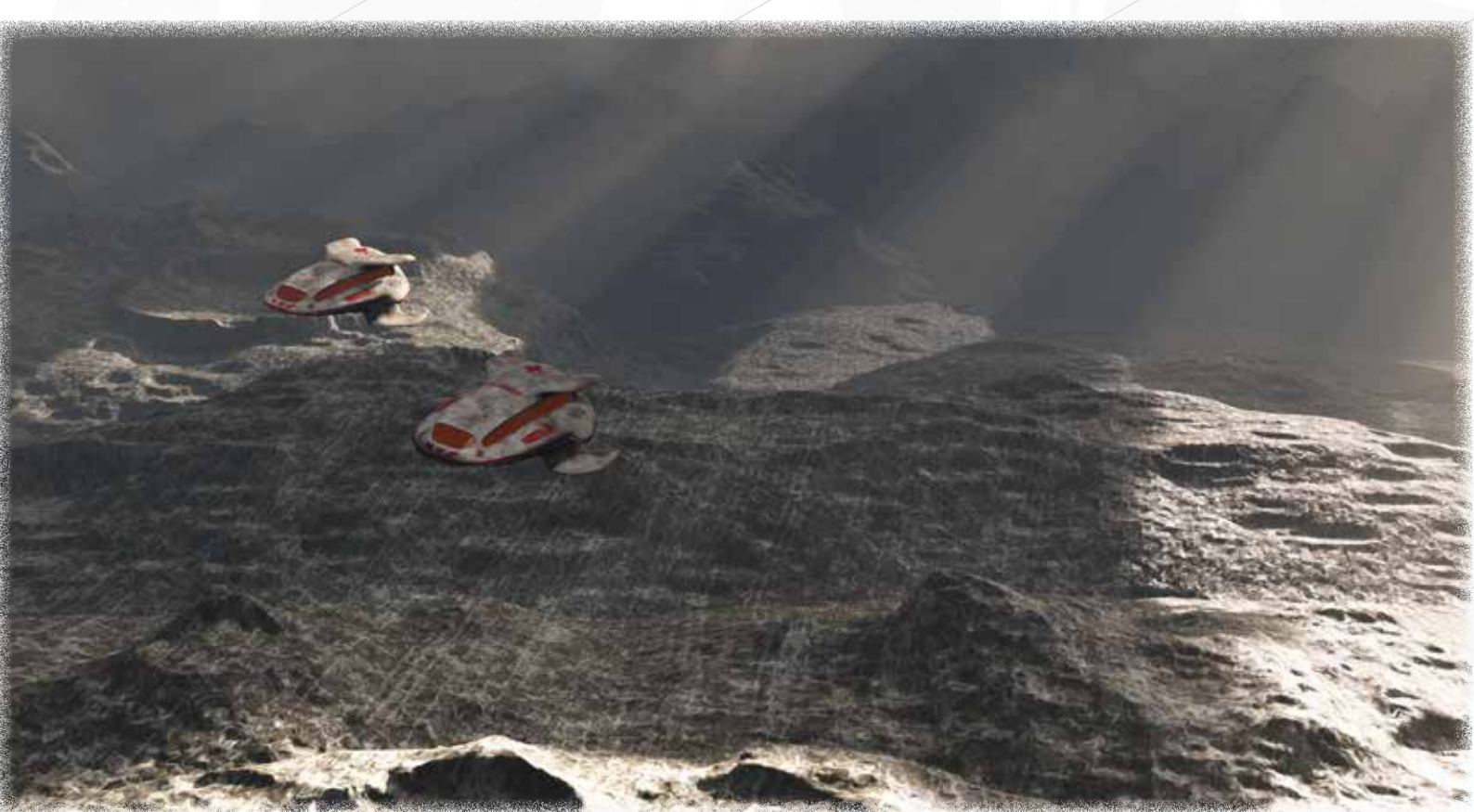
Transfer of life forms paid a wage (personnel, some civilians) incurs an automatic charge equal to the standard weekly wages of the life form transferred.

Cargo

Any items, apart from life forms will default to cargo once more appropriate internal space has been filled.

Defence

Damage that would normally be applied to life forms is first applied to these items and only damage that penetrates will be applied to living items. Note that this does not actually grant internal space, e.g. Bridges grant defence for crew but do not increase life support capacity of a ship.



Item vs Item Type

Pickup/Deliver Item

- Requires Specific Item Number
- Used for micromanagement of items being transported

Example: Compare Structural Modules (40MUs) and Structural Modules mkIV (10MUs). It is more 4 times more efficient to transport mkIV modules. Issue the pick-up for Structural Modules mkIV (423).

Pickup/Deliver Item Type

- Use Item Type Category (dropdown option in order editor)
- Used for convenience

Example: A world has multiple outposts (with hiports) each mining different ores. Orders need only have a squadron in orbit pickup the Item Type Ore (49) for each outpost without needing to look up what each outpost is mining.

Item Groups

This is a list of items set by a base and is a quasi-Item Type. It is used by ships in the same manner as Pickup Item Type.

Authorisations

These are issued by Bases and Politicals as per the parameters of the order, allowing positions to transact with the base without the requirement to use security codes.

The buy and sell orders are used to deal with base markets. They do not need authorisations.

Squadrons Using Item Type Transactions

When using a squadron (without copy order option), Pick-up and Deliver Item Type will use the total mass across the squadron rather than for each individual ship. This is generally convenient as it allows different item types to be transported without having to divide up the cargo into orders for each ship, i.e. when transporting 10,000 shields and 20,000 modules the first ships in the squadron will fill up with shields and the last will take all the modules rather than allocating X shields and Y modules to each ship.

Transaction Failure

There are many reasons for why a transaction (buy, sell, deliver etc) may fail. Below is a list of the more common reasons.

- Items not in cargo (may be installed).
- No authorisation or incorrect security code.
- Wrong ID used for item or position being transacted with.

- Insufficient TUs.
- No hiport (when transacting from orbit with a base).
- Appropriate side has no stellars (for buy and sell).
- Item no longer on market, i.e. others have beaten the position to the deal.
- Insufficient internal space.
- Item cannot be moved e.g. attempting to pick up a complex or tooled tech.
- At wrong location (occurs more often than people admit).

Item Groups

Items assigned to Item Groups show in separate sections of the manifest and are suitable for the following purposes:

- Convenience, e.g. listing certain items in their own category
- Projects e.g. multiple items for constructing a base elsewhere.
- Private Deals e.g. where payment has been given for multiple items.
- Prevent items from being removed from base, e.g. personnel and ordnance.

Orders associated with Item Groups

- Create Item Group in Base
- Pick Up from Item Group
- Set Delivery Item Group
- Fix Item Group
- Remove Item Group

NB Authorisations currently do not exist for Item Groups.

Base Editor

The feature on Nexus allows bases to be copied from existed ones and edited or created from scratch.

Import Base populates the editor with existing base data.

Create Item Group in Base creates and submits orders for the selected base of the items that are required to build the base.

- Remove Item Group

New Mine Alpha (18)

ExportImportCopyDelete

Name:New Mine Alpha

Group:Personal

Security:Recruit

Wages per 1000:1000

Needs Domes:

Outpost:

Installed Items

0ConAdd Item

Installed

- 3Command Centre (1000)
- 100Merchandising (1024)
- 20Mine (1002)

Cargo

- 500Employee (475)

Required modules

- 15Military Module (405)
- 1515Basic Module (410)
- 115Transport Module (415)
- 1015Structural Module (420)
- 415Industrial Module (400)

Stats

Security	Total	Security Factors	Slaves
	0	0	
Efficiency	63.8%		
Enclosed MUs	100000 / 0		
Work Hours	25000 / 61500		
Command Complexes	3 / 2		
Merchandising Capacity	10000		
Wages	Slave	Employee	Troop
	0	500	0
Shield Factor	0.0		
Shield Depth	0.0		
Shield Recharge	0.0 / r		
Needed Employees	730		

Production

Ablative Armour Plate (460)Add Prod Item

Factories0

Production

Total Materials

Mass Production

Robotic Defence Bunker (8)Add Mass Prod It

Factories0

Mass Production

Total Materials

Merchandising - 25439.310851227 stellars

Global Max:140Global Drop:3

Local Max:430Local Drop:35

Step:10

Import

Embassy(36226)Import Base

Create Item Group in Base

CancelApply

Import to use existing base as template.

Submits Create Item Group and associated orders in the selected base.

[x] [↔] Issued Orders

Create Item Group

Name:New Mine A ...

Set Item in Group

Group Name:New Mine A ...

Item:Military Module (405)

Quantity:15

Add:False

Set Item in Group

Group Name:New Mine A ...

Item:Basic Module (410)

Quantity:1515

Add:False

Set Item in Group

Group Name:New Mine A ...

Item:Basic Module (410)

Quantity:1515

Add:False

Set Item in Group

Group Name:New Mine A ...

Item:Basic Module (410)

Quantity:1515

Add:False

Set Item in Group

Group Name:New Mine A ...

Item:Basic Module (410)

Quantity:1515

Add:False

Set Item in Group

Group Name:New Mine A ...

Item:Basic Module (410)

Quantity:1515

Add:False

Set Item in Group

Group Name:New Mine A ...

Item:Basic Module (410)

Quantity:1515

Add:False

Trading

It is possible to interact with both bases and civilian populations though the mechanics are slightly different.

Trading with Bases

These are player-controlled positions and the markets are created by the owning player. Interaction uses the Buy and Sell orders and the markets may be visible on Nexus. Scan Market order from the appropriate location will generate a market report if one exists. Items on Private markets are not advertised and knowledge of them is agreed between the potential customer and the base owner.

If a hiport exists, the transaction can be completed while in orbit.

All deals use stellars.

Trading with Civilians

Civilian markets are not reported online. Trading with civilians can be achieved through three orders.

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Contact Civilian Traders

This order generates a list of important and exports for the world largely based on infrastructure. Ticking the 'Seeking Private Deals' attempts to discover if the civilians know of any deals being offered within the current Periphery (known worlds only). They are more likely to be from the current world if no Off-world Deal exists.

Exports

This is a list of sales. These are restocked periodically and as such the amount available may not be the maximum that is available on any given week. Changes in planetary infrastructure may also alter the list.

The price is per unit and in stellars.

Imports

The major difference between exports and imports is that civilian traders pay in guilders. A Guilder is a zero mu item of Item Type Trade and treated in the same way as Trade Items, i.e. sold through Merchandising complexes or possibly integrated into infrastructure.

Example Civilian Market

>TU 250: Contact Civilian Traders (New Deal - Yes)
Making contact with Mobile Bay(676) civilian traders.

Civilian Markets		
QTY	Export Item	Stellars
3200	Agricultural Implements (30969)	3.38
320	Agricultural Machinery (33556)	20.35
3200	Alcohol (30145)	0.34
8000	Anti-Personnel Device (820)	3.6
80	Light Hull (50)	135
800	Light Tank (821)	19
320	Luxury Foods (30010)	3.38
160	Military Module (405)	100
600	Transport Module (415)	88
800	Truck (794)	28

QTY	Import Item	Guilders
27200	Basic Elements (2)	0.09
30400	Hydrocarbons (3)	0.08
32000	Metals (1)	0.09
2400	Pulac (21)	0.83
2400	Rare Earth Elements (22)	0.82
2400	Thorium (20)	0.81

Off-world Deals

Location: Dryfus (973) - Fortoon System (174) available for 15 more days.

QTY	Private Sale Item	Stellars/mu
478	Fortoon Intoxicants (51743)	0.26

Type: Legal Risk: None

Off-world Deals

- Maximum of 5 trade deals per political.
- Maximum of 1 trade deal per world.
- Limited to known worlds with populations.
- Not all searches are successful.
- Most likely unique commercial goods (Trade, Drugs, Life).
- Priced on item local value & appropriate world commercial multiplier.

Commercial Goods

Commercial goods (of Item Type Trade, Drugs or Life) have a variable value when sold through Merchandising Complexes as part of weekly Planetary Sales at their Local Value. This is based on their intrinsic (origin) value modified as follows:

$$\text{Local Value} = \text{Origin Value} \times \text{Distance Multiplier} \times \text{Species Modifier}$$

Distance Multiplier (distance between item's origin system and current system):

- Item does not have an origin system x1
- Same system x1
- Same system (different planet) x3
- Different System x8
- Different Periphery x10-16 (10 for adjacent periphery, 16 for the furthest)

$$\text{Species Multiplier} =$$

$$1 + (\text{Item Species Population}) / (\text{Total Population})$$

Squadrons

New are created by a political order. Ships can then be assigned to the squadron. Any ship in the squadron can give orders for the entire squadron. This is achieved using the 'Start Squadron Orders' followed by a list of orders to be completed by the entire squadron.

Orders are processed for the entire squadron one at a time. Where a movement order is given that will involve multiple manoeuvres these are handled individually. The entire squadron will for example perform a jump, then ISR, then an enter orbit.

There are options to halt the entire fleet if one position halts.

Before attempting any action, the fleet will have their TUs reduced to the ship with the least TUs.

Only ships in the location of the one issuing squadron orders will be included for the run.

Creating and Modifying Squadrons

To create a squadron and issue orders, do the following:

- Political issues 'Create Squadron {Alpha}' order.
- Avoid using numbers as when naming a squadron.
- Once created a squadron is assigned and ID#. Either the squadron name or the ID# can be used in future.
- Individual ships issue 'Join Squadron {Alpha}' order.
- Squadron command can be transferred to another political or it can be flagged as 'open access' where anyone in the squadron can issue squadron orders.
- Squadrons can be disbanded via a political order, and this is done automatically if the commanding political leaves the affiliation or the game.
- Ships can issue orders to join or leave a squadron.
- Ships automatically leave the squadron if transferred or leave the affiliation.

Controlling Squadrons

After the squadron has been created, to issue squadron orders:

- Any squadron ship can issue orders to the whole squadron in the location.
- Nominated 'lead' ship issue 'Start Squadron Orders'
- Orders following 'Start Squadron Orders' are processed for each ship.
- Processing 'Start Squadron Orders' will delete all pending orders on squadron ships in the location.
- Orders not flagged for squadron use will be ignored.
- Squadron orders can be ended by issuing 'End Squadron orders'; this is automatically issued at the end of a squadron turn if it is not present.
- Each Squadron order is first executed by the lead ship, then by all other ships in the squadron.

Other Considerations

- All ships that are at the same location as the ship issuing the squadron orders will have the orders run for them.
- Wait for TUs does not function for squadrons.
- The orders will stop processing as soon as a ship in the squadron runs out of TUs or experiences a problem that cannot be ignored.
- Only the ship issuing the squadron order can run orders independent of the squadron after processing 'End Squadron Orders.'
- Sequencing ships to run before the ship issuing 'Start Squadron Orders' is possible, though may impact on TUs available for the squadron and if they move away from the location, they will not be included when the squadron runs.
- After every 'movement step' there will be a check to see if any of the squadron have entered a battle. If a ship enters a battle, all the other ships will be flagged in the battle.
- 'Ignore Squadron Ship' can be issued after 'Start Squadron Orders' to ignore one of the ships that would normally be included in the squadron orders.
- Single printout option collates the results for all ships on the turn report of the lead ship rather than generating a turn report for every ship.

Copy Orders

This 'Start Squadron Orders' option copies the orders on the lead ship to all ships in the squadron.

- Option to copy orders only to ships in the location of the lead ship.

- Copy orders does not copy the Sequence that may have been assigned to the lead ship.
- Each ship receiving the orders runs them independently.
- Ships may not stop for combat due to independent behaviour.
- Ships do not check for lowest TUs between actions.
- Ships attempt to complete the full list of issued orders before the next ship is processed.

Transactions Using Item Type

When using a squadron (without copy order option), Pick-up and Deliver Item Type will use the total mass across the squadron rather than for each individual ship. This is generally convenient as it allows different item types to be transported without having to divide up the cargo into orders for each ship, i.e. when transporting 10,000 shields and 20,000 modules the first ships in the squadron will fill up with shields and the last will take all the modules rather than allocating X shields and Y modules to each ship.



Bases

Bases are fixed installations constructed to withstand the harshest environments from the colds of space to the eruptions of molten rock on an unstable moon.

Starbases and Outposts

	Starbase	Outpost
Turn Fee	Weekly	Per update request (once free updates used*)
Turn Report	Maintenance Day and by Update request	By update request
Updates	Unlimited	Set by Political Level
Restricted Complexes	None	Merchandising, Factories
Default Wages	1 stellar	1.5 stellars
Improved Security	No	Yes

**Political level sets quantity of update requests per week. These are used for outpost and platform updates (see Politics section).*

Bases is the collective terms for Starbases and Outposts. Outposts are a cutdown, simplified Starbase. They are not able to activate all types of complexes and have other restrictions.

While this is generally in a sector known to contain an ore deposit, it may be in orbit or even in space. The Create Outpost order also requires a complex to be built. The creating position needs to have the appropriate modules within its cargo.

Bases are rarely established in orbit or space due to lack of ores (found on world surface) but may have some function such as a trading post in the orbit of a stargate or for collecting antiparticles from stellar coronas in the inner orbital of a star system.

The position creating the outpost will also be relocated into the starport of the newly established outpost as part of the process.

Certain locations will prohibit either the creation of an outpost (such as when docked in another location) or the creation of the outpost due to a prohibition on the choice of establishing complex.

Complexes

Bases build complexes designed to fulfil a specific purpose. The quantity and type will depend on the role of the base.

- Complexes are constructed from generic modules.
- Complexes are fixed and cannot be moved.
- Salvaging complexes reclaims 60% of its construction modules (always mkl).
- Bases need 1 command for every 99 other complexes (round up) or suffer efficiency penalty.
- Bases in hostile environments (space or divergent worlds) require enclosing.
- Complexes require work hours (a few exceptions).
- Complexes can be active or deactivated.
- Deactivated complexes require 50 active workhours (if complex has workhour requirement).
- Work hours are provided by personnel.



- *Insufficient workhours result in efficiency penalty.*
- *Efficiency penalty is applied to the following complexes:*
 - » *Factories*
 - » *Resource*
 - » *Basic Training*
 - » *Mines*
 - » *Research*
 - » *Exchange*
 - » *Merchandising*
 - » *Shuttleports*
 - » *Teleports*
 - » *Terraforming*

Construction

Complexes are built using modules as part of the Build Complex order. Modules are futuristic building blocks that cover all the requirements needed to run a complex including fuel, housing and maintaining capabilities. They are normally shipped into newly established outposts.

Common Modules:

- *Basic Construction Module*
- *Industrial Construction Module*
- *Structural Module*
- *Transport Module*
- *Military Module*

Some complexes may require other items for their construction. See item data on Nexus for list of Complexes and module requirements.

Command Complexes

Command complexes co-ordinate operations within the base.

Requirement: 1 per 99 non-command complexes (round up), i.e. 1% of the total complexes.

Penalty: -10% efficiency per command complex shortage.

Command and Security dampen high energy damage from sources such as antimatter and nuclear attacks. Active dampening is reported on world reports though the source isn't. If dampening is disabled, the base will suffer increased damage from WoMD.

Enclosed Bases

Bases constructed in unbreathable environments need to be enclosed. When this is the case, two categories appear on the manifest: 'Enclosed' and 'Required.' This can be achieved through the construction of Dome and Cave complexes which have enclosed factors.

Domes provide 20,000mu of Enclosed Space

Caves provide 2,000mu of Enclosed Space

Certain complexes are suitable for hostile environments and as such these do not require enclosed factors.

Underground

Caves and related complexes provide underground factors measured in MUs.

Underground factors count against overall base mass when calculating sensor profile.

Incoming damage has a probability of being channelled into complexes providing underground factors.

$$\% \text{ Chance of hitting 'Cave' Complexes} = \frac{(\text{Underground Factors})}{(\text{Total Base Mass})} \times 100$$

Note that cave complexes have explosive damage. Explosive damage is applied to the base if the cave is destroyed (a cave in). (See opposite.)

Workhours

Employees normally provide 50 workhours per week, therefore typically, it requires 10 employees to operate a complex.

Other tasks require workhours. These include activating, deactivating and salvaging complexes. These accumulate as a deficit during the week and applied during maintenance.

Certain robotic devices and slaves also provide workhours. These alternative sources usually either have drawbacks to their use or are restricted technology and difficult to obtain.

Each week, the total workhours produced by personnel is compared to the complex workhour requirements plus work hours accumulated since last maintenance. If there are excess workhours, the base will run at 100% efficiency. If there is a deficit the base will work at the appropriate efficiency percentage, i.e. only having 75% of the required workhours will mean that the base runs at 75% efficiency.

If accumulated work hour deficit is greater than work hours generated, the base will operate at 0% efficiency and the net deficit will carry over.

Active/Closed Complexes

Complexes are active immediately upon construction. There may come times however when the complex is required to be closed. It may be the case that there is a personnel shortage, or that the complex is temporarily not required - such as a recruitment complex. Using the 'activate complex' order, indicating the total number of active complexes required (and not the change in number) will close the remaining complexes. Closed complexes still need to be maintained which requires 50 work hours per week - a single 'caretaker' employee.

Complexes Report

QTY	COMPLEX	INACTIVE	ACTIVE
1	Cave (1021)	0	1
1	Command Centre (1000)	0	1
1	Domes (1007)	0	1
14	Mine (1002)	0	14
1	Resource (1003)	0	1
3	Security (1012)	0	3
--			--
21			21

Only the Resource complex requires enclosing

Enclosed: 22000 mus

Required: 1000 mus

Underground: 2000 mus

Complex Type	Workhour Requirement	Hostile Environment Suitable
Command, Mine, Security, Hiport, Terraforming, Orbital Dock, Stella Corona Collector, Planetary Antimatter Collector	500	Yes
Factory, Platform Control, Merchandising, Resource, Shuttleport, Teleport, Basic Training, Recruitment, Maintenance, Recreation, Shipyard, Starbase Shield Exchange, Hospital, University,	500	No
Research	2500	No
Bunker, Dome, Cave, Ruin, Rubble, Dummy	0	Yes

A more drastic measure is to salvage a complex. The 'salvage complex' order salvages 60% of the modules from a complex at the base. It requires 250 work hours per complex salvaged. Note that this order cannot be run if the base is currently in combat.

Manifest

Manifests for bases follow a similar format to ships, with results for orders at the top, followed by sections dealing with areas of the base. Some reports will only be generated if the appropriate complexes are present in the base.

Orders

This gives the results of order processed during the week.

Week Update

This lists the various events that have happened during the week, including results for weekly checks such as merchandising, wages and research output.

Standing Orders Processing

As with orders this gives the results of the orders that have been set as standing orders. The specific orders can be found in the standing orders section below.

Production

The results of the weekly basic and mass production (in starbases) is shown along with the use of minerals and any appropriate results.

Capacity Report

This gives the capacity of the colony to do certain things during the week. These include shuttleport/teleport deliveries, recruitment, terraforming, troop training, merchandising complex sales and exchange transactions.

- *Shuttleport Capacity* – amount of MUs that can be picked up or delivered to positions in the same orbital quad per week. Potentially blocked by planetary shields if the target is not on the surface of the same world (base or affiliation needs to be on the Landing List of the Gate or Gate Controller).
- *Teleport Capacity* – as per shuttleports but can only be used to pick up though range is system wide range. Shuttleport capacity is used where possible. Potentially blocked by planetary shield (see Shuttleport Capacity).

Shipyard Report

This lists the outstanding list of ships being constructed and any issues.

Planetary Report

Lists planetary statistics.

Infrastructure Report (starbases only)

Lists population by species along with technology integrated into the world. Damaged or partially integrated technology is also listed.

Mineral/Mining Report

This shows which minerals can be mined by the starbase and unique details of the mineral vein. The ID is used when assigning mines to the deposit. The yield is the maximum yield per mine. The actual yield will decrease as more mines tap the same resource.

Production Report (starbases only)

This is a list of items still to be produced by basic production and lists all the mass production lines.

Market Report

This lists the items that are being bought or sold by the starbase along with the prices set by the governor for the use of complexes and ship patches. It also includes the market message.

Tech Report

This is a list of the blueprints, techs and principles owned by the starbase. There are three sections to this which are tooled tech, untooled tech and tooling tech. Only the tech that is tooled can be used for research and production.

Scan Report

Depending on sensors and optical depth, the starbase will attempt to scan everything in orbit of the world. It will also list all positions that are docked with the starbase.

Recon Report

Platforms that the starbase owns in orbit will scan the planet for landed positions and list them on this report. Success depends on the number of sensors and optical depth.

Space Combat Report

Lists all the offence and defence capabilities of the starbase.

Ground Combat Report

This lists the troops and military equipment at the starbase along with the factors for each type of item.

Enemy Report

This lists the positions and affiliations for which the starbase will actively initiate battle.

Special Resource Report

Lists the resources that are being exploited on the world, and the various parameters concerning them such as rates of exploitation and limits.

Standing Orders

There are various types of standing orders allowing for near automation of the starbase. The player designates if the order is normal or a standing order inside the order editor.

Example: A base has a post-production standing order to pick up valuable ores from off-world outposts. This will use teleporter capacity. There is also an end of week standing order to pick-up ores from all outposts. This ensures that any remaining transport capacity (shuttle or teleport) is not wasted.

Description

The description shown to visiting positions docking at the base. This can be changed using the Change Description order.

Security

This is based on the quantity of security factors supplied by the troops, negative factors due to slaves and indentured workers if appropriate along with security complexes.

Recruitment and Training of Personnel

Recruitment is only possible on worlds with a non-native population (contemporary technology).

Mercenary Recruitment

Mercenaries are basic troops, have their own weapons and some basic combat skills. They have little loyalty to the base that has recruited them and will therefore swap sides if the position surrenders.

Employee Recruitment

These work for a wage and like mercenaries have little loyalty to the base. They have absolutely no combat training and will swap sides if the position surrenders.

Slaves and Indentured Workers

Slave and indentured will only contribute work hours and negative security factors if affiliation profile supports their use. Irrespective of profile they have a minimal wage (subsistence cost):

- 0.1 stellars per slave
- 0.25 stellars per indentured

They require control factors to prevent them from escaping. Bases have a slave capacity. This is the quantity of slaves and indentured workers it can safely handle.

Prisoners of War (POWs) are a special item associated with a specific affiliation. POW's only contribute their workhours while the base's affiliation is both Hostile to the PoW affiliation and has the profile 'can use PoW's'.

Governments may be pro-slave/indenture use while others are opposed.

Merchandising reduction where government is opposed to slavery and indenture (50% maximum reduction):

$$\% \text{ Merchandising Reduction (max 50\%)} = (\text{Slaves} + \text{Indentured}) / (2 \times \text{Total Workforce})$$

Example: A starbase in an affiliation that allows the use of slaves has 1,000 employees and 1,000 slaves on a world with a government opposed to slavery. The weekly merchandising revenue will be reduced by 25% (=1000/2x2000).

Slaver/Indentured Loses

- Slaves die at a 0.15% rate per week if slave population greater than 2,000.
- Indentured workers convert to employees at a rate of 0.15% per week if indentured workforce greater than 2,000.
- 1% of the slave/indentured population will escape per week if security less than 100%.
- Up to 5% of the slave/indentured population will escape per week if security less than 50%.
- They have negative security impact if their use is allowed (affiliation profile). See security.

Orders

- *Free Slaves/Indentured Order*
- *Enslave Order - (converts prisoners to slaves)*
- *Indenture Order - (converts prisoners to indentured)*

Troop Training

Mercenaries can be trained into specific troop types. This requires training complexes. These complexes are both training camps and hi-tech surgeries. Each complex has a limit of 10 training programmes per week. This is set during weekly maintenance. The training program combines physical training, neural grafting of knowledge and even some augmentation surgery to impart years of training and 'false' experience within a week.

Each training program, e.g. 'Human Marines', has a specific tooled blueprint. To perform a training program, the starbase requires a blueprint of the technology to be used. Each blueprint allows the starbase to train up to 10 mercenaries of the specified race to the specified troop, e.g. the blueprint Human Marine can only be used to train human mercenaries into human marines, it cannot be used to train dewiek mercenaries nor can it be used to train human mercenaries into human soldiers.

The total number of troops that can be trained is limited by the quantity of blueprints, the quantity of training complexes and obviously the quantity of mercenaries of the appropriate race.

Each mercenary cost 10 stellars to train, although after being trained the troop is still only paid the standard weekly wage. Each type of troop is proficient in a certain field.

Soldiers

The basic trained troop, these ground-pounders are ideal for planetary defence forces. They are the most proficient troops when it comes to mid-range combat manoeuvres such as urban defence and assault.

Startroopers

These are trained in personal shuttle suits that can reach orbit. They can therefore assault a ground-based installation without the need of personnel carriers. They can also move from one side of the planet directly to the other without the need to move over land or use personnel carriers.

Crew

Crew are trained in the use of vehicles, large weaponry and all manner of ordnance and electronics, including security. This makes them ideal for running space weaponry as well as remote controlling tanks and mechanised infantry such as warbots. They have never been trained in the use of personal weaponry, so are only as good as basic marines in open conflict.



Marines

These specialise in close quarters combat such as within the hold of a ship or on an orbital platform. They are the most proficient at short range/hand-to-hand confrontations. They are also only second to crew when it comes to control of ordnance and space weaponry.

Scouts

The job of the scout is to evaluate the military capabilities of other positions. This could be done on positions in the starport although it is more usual for the scouts to be placed into ground-parties to perform the mission at another location.

Scouts also reduce the sensor profile of a ground party.

Guards

Guards are like crew but provide better crew-factors for security purposes only. This makes them ideal for taking care of slaves and other unsavoury jobs.

Veterans

Each time troops are involved in conflict, depending on the severity of the action, a number of troops will gain experience. Those that do will be converted into veterans of the same troop type as before. Veterans are effectively superior versions of the basic troop type.

Veteran mercenaries however have become unsuitable for specialised training, and as such cannot be trained into a specific troop type (this prevents players engaging in 'friendly' battles using mercenaries as cannon fodder to train the resulting veterans).

Retraining

Blueprints can also retrain trained troops at 10 times normal efficiency, converting them to another type. This cannot be used on veteran troops.

Per troop retrained:

- 10 stellar per trooped retrained
- 1 troop training complex capacity
- 1/10th normal blueprint cost (round up), i.e. a blueprint can retrain 100 troops.
- Species remains the same.

Defence

This section only covers hiding and shielding as they appertain to bases and worlds. For specifics on materiel and ordnance, see combat section.

Secrecy

Reliance on secrecy is not recommended as a substitute for defence. The options are however listed here for fullness:

- *Underground* - Use of caves and stealth complexes to reduce sensor profile. Each complex reduces the mass of the base when determining sensor

profile. Build excess complexes as the mass within the starport is included for calculating profile. The highest negative (best) profile that can be obtained is -99% while specialist sensor ships may achieve sensor powers exceeding 140%.

- *Asteroids* - These may have sensor profiles as low as -100% but again suffer the same issue as underground bases.
- *Restricted knowledge/access system* - These locations rely on the inability of enemies to reach the system.

Starbase Shields

Bases cannot use armour and must rely on shields to reduce incoming damage. Starbase shield complexes boost the shield factors and generators of the base and increase the shield depth.

Maximum bonus is when the base has at least 1 starbase shield per 9 non-starbase shield complexes (10% of the total complexes):

- x5 Shield Factors (from shield items)
- x5 Shield Generation (from shield generators)
- +200 Shield Depth

Charging starbase shields required 4 weeks to achieve maximum bonus.

Starbase shields cannot be switched off if the base is involved in combat.



Planetary Shields

When active they expand starbase shields to surround the entire world:

- All positions on the world surface improve shield depth to 300.
- +100 shield depth to base controlling Gate Platform.
- +50 shield depth to bases with planetary shields (may surpass 300).
- Landing is restricted*.
- Shuttleports and Teleports transferring items through the orbit are restricted*.
- Hiport construction restricted*.
- Surface positions cannot fire at orbiting targets.

*permissions governed by the Landing List established by the Gate Platform or its controlling base.

The planetary shields are only active when:

- An active Gate Platform is in orbit, with active deflector arrays at the start of the day (any such platform will have a [Gate X/X] designation where $X > 0$).
- Planetary Shields [Infrastructure] is installed on the world (minimum Stage 3).
- A base with starbase shields (switched on) is on the planet.
- The base controls the Gate Platform.
- Base and Gate Platform are in the same affiliation

Nexus lists [Affiliations able to land + Planetary shield]

Hazardous Environments

While bases are robust, some environments may cause damage to a base during maintenance.

Risk	Typical Weekly Damage
Minor	< 10
Moderate	< 50
Severe	<200
Critical	>200

Where there is a hazard, the type will normally be indicated in the orbital message.

Some hazards can be ignored if a specified tech is tooled into the base.

Types of Hazard	Countermeasure
Corrosive Atmosphere	Tooled Atmospheric Resistance (8710)
Radiation	Standard shields
Tectonic Quakes	Tooled Localised Seismic Dampening (8622)

Resources

A natural resource is a generic term that covers everything from geological commercial mineral reserves through to wild fruit.

Exploitation method:

- Mine Complexes – tap naturally occurring mineral deposits discovered through GPI'ing.
- Resource Complexes – tap sources discovered through investigations and special actions.
- Minerals discovered through investigations and special actions are NOT suitable for mining.
- Build appropriate complexes and assign to the resource using the Mine or Exploit Resource order along with the resource ID#.
- ID# is not restricted data. Issuing the correct ID# is sufficient irrespective of source.
- ID# discoveries are not recorded (use Nexus to manually record this information for future use and dissemination).

Parameters

All resources are classified by the parameters:

- Resource ID# -This is unique to the resource. This is needed to exploit the resource.
- Item Produced -This is the specific item number. It may be a unique item such as Venetian Jewellery or a more generic item such as Metals.
- Extraction Complex – Either Mine or Resource; the type of complex required to exploit the resource/ deposit.
- Yield - This is the maximum amount of the item that can be produced by a single complex during weekly maintenance. Where the individual item is greater than 1mu (such as granite slabs), the yield will represent a single unit. Yield is for the Origin sector of the resource.
- Drop Step - For every multiple of the drop step the amount of MUs per complex will decrease by 10%. While the number of complexes exploiting the resource is equal to or under the drop step, each complex will produce the yield in MUs each week. If the number of complexes present is twice the drop step, half will produce the yield each, the other half will produce 90% of the yield each. Amount produced is rounded off to the nearest unit after accounting for yield and 10%. Calculations use total complexes exploiting the resource, which may be spread over multiple bases (see Dispersion below).
- Stockpile/Quantity - This is the amount of resource remaining on the world. In the case of common ores, this may well be so big that it is classed as infinite. Infinite is classed as requiring more than 20 years to exhaust the stockpile using the current number of complexes. Assigning many complexes may change an infinite stockpile into a finite one.

- *Change* – Mineral resources normally have zero change. This means that eventually the resource will become exhausted. Biological resources in a fragile ecology will also have zero change. Most biological resources however are capable of being exploited up to a threshold. This is the weekly change. This will often be slightly larger than the yield multiplied by the drop step. Exploitation above this amount will decrease the quantity present. % change increases the stockpile as % of the current stockpile.
- *Dispersion* – Local yield is Yield at Origin sector multiplied by distance to the exploiting Base's sector multiplied by Dispersion %, i.e. a Dispersion of 50% will halve the yield for every intervening sector between the Origin sector and the Base sector. A Dispersion of 100% allows exploitation equally from all sectors on the world.

Mining

Manifests report localised deposits exploitable by Mining complexes. Only deposits of known minerals (both public and restricted) will be listed.

Resource

Manifest only detail resources exploitable through Resource complexes that are currently being exploited by the base. Terminating exploitation will remove the resource entry from the manifest.

Antimatter Production and Antiparticle Collectors

While listed in the resource section, antiparticles from which antimatter (used for weapons and as fuel for certain jump drives) is made require their own collection complexes.

Antiparticle Sources:

- *Cosmic Rays* – requires expensive hi-tech Antiparticle Collector Complexes.
- *Stellar Coronas* – requires Stellar Corona Collector Complexes in Bases located in Ring 1 of a star system. Collector complexes have variable antiparticle production dependent on the system's stellar type and the number of complexes. Particle collection efficiency per complex increases with quantity of collector complexes

Production

Related Items:

- *Antimatter* – 1mu – production requires 1 antiparticle and 100 production
- *Antimatter (AM) Fuel* – 1mu - production requires 25mu of antiparticles.

Factory complexes are responsible for the creation of items from raw materials. Production occurs during weekly maintenance and follows resource collection (mining etc). There are two types of production, basic production and mass production.

Only starbases perform production. If an outpost has factories they will be ignored. Production schedules will halt until the outpost is upgraded to starbase status.

Basic Production

- Only factories unassigned to mass production perform batch production.
- Items to be produced are assigned to a production queue.
- New production orders are added to the end of the queue.
- Only producible items may be added to the queue.
- Production is sequential though unproducible items will be skipped.
- Production lines may be suspended using the Alter Production order.
- As each order is completed it is removed from the Schedule.
- Blueprints are checked if necessary.
- Items may be partially finished due to lack of blueprints or raw minerals (carryover).
- Production per factory drops off with quantity of factories.

Factory Range	MUs produced per Factory
1-10	50
11-20	40
21-30	30
31-40	20
41+	10

Star type	G-Type	F-Type	A-Type	B-Type	O-Type
0+ Complexes	1	1.25	1.5	1.75	2
100+ Complexes	2	2.5	3	3.5	4
500+ Complexes	3	4.25	5.5	6.75	8
2000+ Complexes	4	7	10	13	16
5000+ Complexes	5	10	15	20	25

The output from Factories is measured in MUs (some items may require more MUs of production than their actual MUs). The output per factory is shown in the table below Example:

Total production for 40 factories would be 1400 MUs (= 10x50 + 10x40 + 10x30 + 10x20).

Factory output can be improved by using Strion. One MU of Strion will allow a factory to produce at 120% of normal efficiency and will automatically be used if available.

Mass Production

- Mass production is attempted after Basic Production has concluded.
- Factories are assigned to produce a single item (production line) using the Mass Produce order. The quantity is the total number of factories for the line.
- Production lines only limited by available factories.
- Factories tool for 4 weeks before they start producing (assigning more factories).
- Factories will attempt to produce the item each maintenance until untooled.
- Production lines are handled sequentially, i.e. priority given to the first production line etc.
- Production lines (priority) may be altered using the Alter Mass Production Queue order.
- Factories need untooling before they can be assigned to other production lines (assigning fewer factories).
- Untooling takes 2 weeks.
- Factories assigned to mass production (including tooling and untooling factories) do not contribute to basic production.
- Production is limited by availability of raw materials and blueprint capacity.
- Where an item is partly completed, production used will carryover to the following production.
- Strion is not used in Mass Production.
- Production per line is based on quantity of factories assigned to the line.

Number of Factories Assigned to Production Line	MUs produced per Factory
10	45
11-20	50
21-40	55
41+	50

Mineral Substitution

- Items may have Substitute Item and Quantity set.
- This is the amount of the Substitute Item that will be used during production if the required.
- Only checked if raw material is not present.
- The full chain of known Substitute Items will be checked if necessary.
- Substitution is checked automatically by both Basic and Mass production if required.

Example:

Metals - Substitute 0.5mu Light Alloys

Light Alloys - Substitute 0.5mu Thorlium Laced Alloys

Production of a Basic Module requires 40mu of Metals. The starbase does not have metals or light alloys but has Thorlium Laced Alloys. Substitution will use 10mu (=40x0.5x0.5) Thorlium Laced Alloys due to the double substitution.

Exchange

Exchange complexes are used to convert one item into another. The capacity is based on the quantity of exchange complexes and is set during maintenance. Exchange complexes have a standard output of 250 per week. Specific orders can use this capacity.

Process Basic Ores

- Converts 2mu of Basic Ores (Metals etc) into 1mu of Alloy (Light Alloys etc).
- Costs 1 point of exchange per mu of Alloys produced.
- Primarily an outpost order to reduce shipping mass.

Security

- 100% security represents owning player having 100% control of a base.

Security %	Level	Allowed Orders
100+	Secure	
76 - 99	Mainly	View Base Manifest order (while docked or same sector) will return a full list of items and complexes present at the base. The scans will only be reported Security % of the time. More secure items will be omitted from the scans as security increases.
51 - 75	Partial	Pickup/Deliver can be done by anyone. The Report will only report the position taking items Securityx2% of the time.
26-50	Insecure	'Subvert Base' order attempts to peacefully assert control of the base. The subverting position must have superior troop numbers.
0-25%	None	Pickup/Deliver/Scan does not report.

- 100% security prevents any outside influence on the base, except by agent action / ground assault
- Security under 100% allows other players to interact with the base, the level of interaction possible determined by the security level.
- Orders can be issued at the security level and below.

Security % is determined by security factors

- Troops provide 16 factors each
- Security Complexes provide 400 factors
- x2 total factors if 1 security complex per 9 non-security complex (10% security complexes).
- Outposts have a boost to security factors as do enclosed bases.
- Security complexes (and other non-lifeforms that provide security factors) provide no more than 50% of total security factors.

Example Security Report

Security Report			
10	Naplian Mercenary (552)		160
1	Security (1012)		400
Security Factors:	640	Security Complex Bonus:	+100%
Security:	116.9%		

Security complex can only provide 160 (= 50% of total factors).

320 Raw security factors (= 160 from mercenaries + 160 from security complexes)

640 Total security factors (= 320 x 2 from security complex bonus)

Slave and Indentured Workers Security

Slaves and Indentured Workers each have a negative impact on security factors, typically -2.5 and -1.5 respectively:

$$\text{Slave Magnitude} = |\sum \text{Slave security factors}| \times \text{Government Slave Security Factor}$$

$$\text{Negative Slave Factors} = \text{Slave Magnitude}^2 / 100,000 + \text{Slave Magnitude}$$

$$\text{Indentured Mag.} = |\sum \text{Indentured security factors}| \times \text{Gov. Indentured Security Factor}$$

$$\text{Negative Indentured Factors} = \text{Indentured Magnitude}^2 / 100,000 + \text{Indentured Magnitude}$$

These negative factors are removed from the security factors produced by a base's current troops/complexes. The factors are removed after the base factors have been increased due to outpost / security complex effects.

Security % Calculation

Up to 100% security:

$$\text{Security \%} = (\text{Security Factors}) / (\text{Total Complexes})$$

Over 100% security:

$$\text{Security \%} = 100 \times ((\text{Security Factors}) / (\text{Total Complexes} \times 100))$$

- Maximum security is 200%
- Total Complexes excludes complex types {Bunker, Dome, Cave, Dummy, Rubble}



Platforms

A platform is a heavy structure, often used as a defensive naval position. It can be established on the ground, in orbit or in open space.

As a base with planetary shields cannot mount offensive weaponry, a platform is often used to perform the role of aggressive defence.

Platforms are similar to starships in many ways; constructed from hulls, encased in armour and having internal space in which to mount weapons and support crew to run them.

Advantages:

- *First Strike - platforms fire on round zero as well as the normal four rounds (space bombers and fighters are active in rounds 0, 2 & 3).*
- *Can mount Deflectors.*
- *Can generate Planetary Shields (requires Planetary Shield infrastructure to be integrated and active on the world).*
- *Can dictate access through Planetary Shields (requires Gate status).*
- *Has integrated life support - no need for quarters, bunks etc.*
- *Does not have an integrity rating - no need for patches/maintenance.*
- *Does not require a blueprint to construct - any platform hulls can be delivered, increasing its internal size (maximum of 25,000 hulls).*
- *Standard platform hulls have 50mu internal capacity.*
- *Have integrated ISR fields.*
- *Can benefit from up to two layers of armour - same as heavy hulls.*
- *Can over mount armour - excess is burnt off faster during combat, but full thickness is maintained.*
- *Shields are more effective - damage wholly absorbed, i.e. no penetration, does not deplete shield factors.*
- *They have line of sight to all positions in the same location and if in orbit, to all locations on the surface.*
- *They provide armour to installed items, making them more resilient to incoming damage.*
- *Gate Platforms weapons ignore planetary shields [not coded]*

Drawbacks:

- *They cannot move under their own power - once constructed they are fixed to that location unless moved by a large enough ship (they can take however advantage of extra cargo space created by ship docks).*

- *If moved, they have 0% combat efficiency for 2 weeks and shields are discharged*
- *They cannot scrap hulls except through special actions.*
- *They cannot use AI's for crew factors.*
- *They require to be linked to a base with platform control complexes or suffer from reduced crew factors.*

Requirements

- *A platform requires platform hulls and nothing more (does not require bridges, engines, drives or quarters for the crew).*
- *Items delivered to it will require crew factors to work.*

Platform Limits

- *A platform requires to be linked to a base with platform control complexes to work at normal efficiency.*
- *Platforms require their controlling base to have a 1 platform control complex per 100 hulls.*
- *Where multiple platforms are controlled by a single base, the sum of the platform hulls is used to determine control complex requirement.*
- *Having insufficient platform control complexes increases the total crew factor requirements of the platform up to 5 times equating to an efficiency of 20% normal.*
- *Crew requirement of a platform reduce by factor of 2 in the system of the controlling starbase and no reduction elsewhere.*
- *A platform can use excess personnel to accommodate the crew factor shortfall.*
- *Hull increase (delivery) limited to 1,000 hulls per week.*
- *Platforms are restricted to 25,000 hulls*
- *A new platform uplink only takes effect after the next maintenance day of the platform.*

Construction

- *Create Platform order constructs the platform in same location (or orbit if issued by a base) and requires 10 platform hulls.*
- *Standard platform hulls are used or other type by substitution.*
- *Platforms can be constructed then transported to a location.*
- *Moved platforms have their shield discharged and combat capability offline for 2 weeks.*

Armour

- Armour depth based on weighted average armour output of all installed armour.
- Delivering item type 'armour' to platforms increases armour depth.
- Armour depth maximises out at two layers.
- The amount of armour plates required to achieve this will be dependent on the quantity of hulls present. Further armour plates can be delivered, this is called over-layering.
- Over-layered armour plates are more easily damaged during combat.

Damage

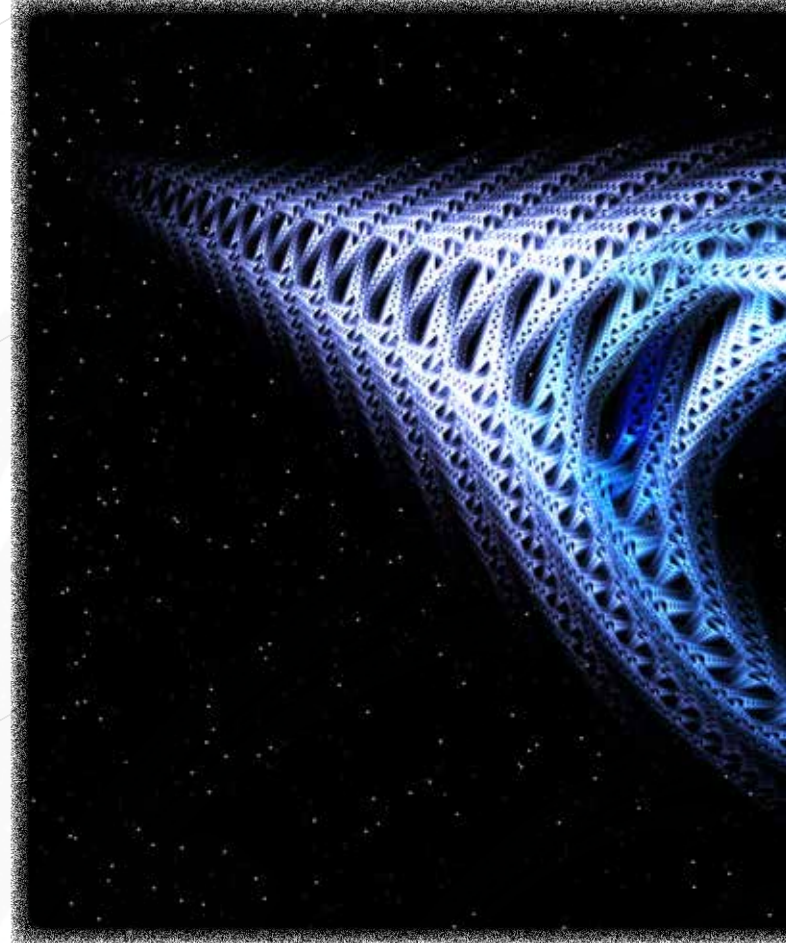
Unlike ships, platforms simply lose size as hulls are destroyed. They do not need repairing. The size of a platform is recalculated after a battle. During the battle, penetrating shots have a chance of hitting empty space based on the loss of items from the platform during the combat.

Fighter Bays

Fighters and bombers require fighter bays on platforms to launch as on bases and ships. Fighter bays add cargo capacity to the platform and fighters / bombers are listed in the general inventory for the platform.

Gate Platforms

- Gate platforms govern access to the world through planetary shields.
- Only platforms controlled by a starbase (not outpost) on the world they are orbiting can be gate platforms.
- The controlling starbase must have planetary shields active.
- Gate platform must be at least 3,000 platform hulls
- Gate ownership will transfer to platform with 1,500 more hulls (max increase per week is 1000 hulls).
- The gate owner will receive notifications about other platforms that increase in size.
- Gates in combat will not lose gate ownership during combat or for at least 1 week after combat has stopped (even if below 3,000 platform hulls).
- Platforms in combat cannot gain gate status. 1 week must elapse between combat and qualifying for gate status.
- Affiliations notified when added to the landing list of platforms.
- Orders:
 - » Add to Landing list
 - » Remove from landing list



Deflectors Arrays

Platforms automatically mount deflector arrays:

- Each charged deflector array added +50 to shield thickness of platform
- Quantity of Deflector Arrays = $\sqrt{((\text{Deflector Factors})/1,000)}$ (round up)
- Maximum quantity of Deflector Arrays = 8 (+400 shield thickness).
- 8 deflector arrays is achieved at 4,901 platform hulls ($71 = \sqrt{4,901 \times 10 / 1,000}$)
- Each platform hull provides 10 inherent deflector factors.
- Each deflector array charges from shield generators after shields are at maximum.
- Damage Required to Discharge an Array = Deflector factors.
- Damage to discharge a Deflector in 1 round = Deflector factors + shield recharge per round.
- Only one charged deflector array can be damaged in any one round. Any damage done to the array does not have to penetrate the shields.
- Platform shields and armour are only damaged after all deflector arrays are destroyed, though penetrating damage will still destroy hulls and internal items.
- Platforms will be suffixed by [current deflectors / max. deflectors] on scans e.g. PLATFORM Happy Times (3433) [4/8]
- Damage done to deflectors is calculated before any other armours/scintillators/shields are applied.



Ground Parties

A ground party is the term for a collection of items in one location under the control of one authority. They are normally formed for a specific short-term reason and the composition invariably reflects this. A ground party set-up to survey a planet for example will consist of an exploration module and some sensors for the finding and prospecting of mineral deposits. Some shuttles or ground vehicles should be present, to allow relocation of the ground party to new sites, and finally crew are needed to operate all the items.

A ground party set-up to attack a starbase on the other hand is unlikely to have much more than large amounts of ordnance and troops.

Ground parties can perform many of the tasks undertaken by ships; as such they share many orders, including transactions, exploration and surveying.

As well as wages, they have a standing charge of 100 stellars, paid at the same time as wages.

Life Support Restriction

They must have life support capacity provided by vehicles to support all the items that cannot move themselves or are not classed as troops. This important factor differentiates ground parties from Cargo Dumps.

Naval Weaponry Restriction

- Ground parties cannot utilise naval weapons, space bombers and space interceptors.
- They can use point defence, shields and other means of passively defending themselves.

Debris & Cargo Dumps

- Dumps and debris have very limited orders and cannot initiate any interaction.
- Any position can pick-up items from dumps and fields even if they are not owned by the same player or faction.
- When picking items up from these positions no security code is required, however when not used it is considered a hostile action and troops and officers will be converted to prisoners.
- They will not fight.

Debris

Debris fields are unordered groupings of items. They are produced when things explode and not all items are destroyed during the process.

Decay - A debris field will decay each week. By this it means items will be lost from the field until everything is gone.

Cargo Dumps

A cargo dump is an ordered debris field as such it does not decay. They are temporary positions sometimes used in preference to ground parties as they do not have capacity restrictions.

- Damage surpassing Deflector Array augmented defence will damage platforms.
- Recharging is applied to maximum of 1 Deflector Array per round (maximum of 4 per day).

Example: Consider attacks on a 6,000 hull platform with no shield generators, i.e. 8 deflectors, each able to suffer 60,000 damage before being discharged. In the case where the weapons used are low damaging, e.g. kinetic missiles:

4 ships attack inflicting 24,000 damage per round (e.g. 6,000 damage each using kinetic missiles). The platform will not suffer damage, but the first deflector array will deplete on the end of round 3 (over 60,000 damage). On round 4 the shields will be at +350 shield depth and depletion of the second array will commence.

If 10 ships attack the platform delivering 60,000 damage per round, a deflector array will deplete every round. The platform will not suffer damage and the shields will be at +200 shield depth at the end of round 4.

If Heavy Photon Batteries had been used (1,200 damage), at least 800 damage would have penetrated the +400 Deflector Array shield bonus.

In turns deflector are represent as:

| Deflectors: 3/8 Deflector Factors: 66000/110000 |

3 Deflectors out of 8 are currently active.

2 are fully charged at 110,000 deflector factors each.

1 has 66,000 out of 110,000 potential deflector factors.

When the 3rd deflector is 100% charged, charging moves onto the next array.

Moderation

Moderation is where the Game Master (human moderator) is required to access and possibly modify the game data. This centres around unique responses to player in-game activity such as exploring new worlds, interacting with their denizens and discovering new things. This is largely player driven moderation. Game driven moderation tends to revolve around new items introduced as part of mechanics updates.

Below is a list of common moderator activities:

- *Surface Exploration*
- *Investigations without Resources*
- *Investigations with Resources*
- *Special Action Enquiries*
- *Data Confirmation*
- *GM Notifications*
- *New Items as a result of Special Actions or Game Development*
- *Data Modification:*
 - » *Resources*
 - » *Positions*
 - » *Celestial Bodies (planets, stargates etc)*
 - » *Systems*
 - » *Items*
 - » *Squadrons*
 - » *Political Data*
 - » *Affiliations*

Surface Explorations

Explorations are simply a cursory examination of the general features associated with a type of planetary terrain on a celestial body. They contain some generic information about the world and about features common to the surface type of the world being explored.

While it is unrealistic to suggest that a grasslands sector bordering equatorial deserts in the centre of a continental plate formed from eons of oceanic sedimentation before uplifting are identical to grasslands neighbouring tundra and owing their soil deposition to spreading run-off from polar glaciers, we presume that they are sufficiently similar compared to the differences with grasslands of other worlds. Further, as this information has an associated cost, charging for multiple explorations of one sector type on a single world could easily become frustratingly expensive.

Understanding an Exploration

An exploration is a relatively brief piece of text in the format:

Surface Exploration/Name of Celestial Body/Sector Type

One or more paragraphs describing scenery and potentially interesting features.

Example:

Surface Exploration/Primus Adventor/Grasslands

The thick lush grass grows to heights of just under three metres. The stems are under half a centimetre thick and would break under a strong wind if the grass wasn't so tightly packed.

The density of the flora makes them both difficult to explore and even harder to find the various land animals that are heard.

Some avian creatures are noted. These tend to be small, feeding on the seed-heads of the wind pollinated grasses.

Rivers are common, winding through the vegetation and bringing the only break to the uninterrupted grass.

The text is very open insofar as any aspect of this can be followed up by investigation. Does the lush grass seem particularly interesting? It is certainly tall for grass. Is it just grass though and has no commercial properties? It mentions seed-heads. Are there grains to be exploited? What about the animals? What sort are present, are they edible, are they dangerous? Could they be domesticated? They are heard but do numbers to warrant their exploitation?

It also mentions rivers. What about these? Are they laden with silt, do they flood, is this responsible for the fertility of the grasslands? Are they deep and clear and what about the flora and fauna within them?

In other words, the exploration is simply a composite of potential avenues to explore.

The writing of the text is aimed at presenting the information in a straightforward manner. It is not meant to obfuscate. If the explorations reads quite bleakly there will be little the chance of discovering something a valuable resource.

Example:

Surface Exploration/Mu Ila/Craters

The pounded surface of this ancient rubble pile asteroid is composed of little more than common silicates. Dirty white patches are noted around the newest impacts hinting that the subsurface holds ice that eventually sublimates after eons exposed to cold space. Preliminary tests only detect water and methane ice.

Some sector types are less likely to yield resources than others. For example, ice on water (as in H₂O) worlds are likely to only contain dust and possibly a few semi-aquatic creatures presuming life exists. Even then, life can be presumed to be sparse and any resource is still likely to be poor.

Avenues and Resources

- *Results are written to present the information clearly and as soon as possible to the player based on their line of enquiry.*
- *While in theory it is always possible to find some new aspect of a surface exploration or subsequent investigation, the GM applies the theory of diminishing returns.*
- *Best resources will be discovered within one or two steps from the Surface Exploration.*

There is no benefit (beyond satisfying personal curiosity) in examining the unusually splayed filaments on the dorsal flange of the flea analogues that infest the lesser dappled weasel that shares the boltholes of the great ground hogs.

information regarding the formation of the world or its reveal in the case of rubble-pile asteroids, the existence of large interior voids.

Special Actions

Special Actions cover any request for the Game Master (and moderators) to undertake some task. These fall into the following categories:

- *Investigation*
- *Customised Scan*
- *New Research Avenue*
- *Adjudication*
- *Interaction with Non-Player-Characters*
- *Free Action*
- *Query*
- *Everything Else*

Investigation

This is a direct follow up to a statement in a surface exploration or a prior investigation. It can be anything from investigating the salt rich sediment along the beaches of an evaporating shallow sea to the migrating herds of hexapods discovered in the vast plains. While many will be geared towards determining if the object of the investigation can be exploited in some way by a base (using resource complexes) it can simply be satisfying curiosity, e.g. determining why a desert creature has vestigial gills.

Customised Scan

When exploring worlds, there are few commonly applied investigations that work in conjunction with Surface Exploration in maximising the amount of information available before specific investigations are made:

- *Orbital Scan - This will reveal information about appropriate aspects such as the upper atmosphere; details of a magnetosphere; minor satellites, both natural and artificial; but most importantly, any anomalies.*
- *Low Pass Scan - Reveals a broad overview of the world that will include details on easily detectable anomalies; populations if relevant; and general surface geological features of the world. If there is an abandoned civilisation, this will normally report it and if contained on a single continent or even sector, indicate where (or simply explain the presence of ruins on the map).*
- *Subsurface Scan - This is generally geared towards information regarding the geology of the world though may indicate the presence of a buried civilisation or localised anomaly. It may give some*

New Research Avenues

There are a lot of items in Phoenix that are not common knowledge. These have been added to the game as a result of game mechanic upgrades, the result of special actions or through player suggestions. In the latter two cases knowledge of the item will be given to specific individuals (added to their information archive). Players may submit special actions enquiring about new lines of research. They have to be specific and have a justification (underlying tech, in-game discovery). This is normally seeking to improve on an existing item or extend stellar cartography to the next level.

Where items are being improved it is very rare that items can be improved past mkIV. mkIV normally represents the break point beyond which production costs outweigh improvement.

Interaction with Non-Player-Characters (NPC's)

NPC's covers everything from the drunk ex-Republic officers in a shady part of an urban sector on Mobile Bay to the civilian government of a large planetary population. The specifics of a special action are limitless, anything from paying the drunk to reveal where he abandoned his spaceship to putting pressure on the government to support a specific affiliation's system claim. The special action should reference any appropriate skills or information to support the action. Exploration Skill Level of the officer of the position may be accounted for (especially in diplomatic situation).

Free Action

A free action is invariably at an invite from the game mechanics or in response to a previous action. They are called free actions because the standard special action fee is waived (like adjudication requests). Common ones include a request to start a GM permitted research project, e.g. Racial Design for a specific species or claiming free cave complexes as directed by an investigation.

Query

This is likely a question about the specific position. Typical things include 'why can't I build recruitment complexes?' or 'I have metals, why did my production fail?'

Queries are rarely charged unless the wording of the query is such that it fits more comfortably into another type of special action, e.g. 'are the GTT now tapping my deposits?' or 'can the civilian population increase the amount of basic modules they are selling on the export market?'

Data Checking

Occasionally a player needs to ask the GM to look at game data and determine if the data is correct. Typical things include 'why does the newly researched blueprint in this base have zero production output?' This might be something as simple as the GM giving a resource the default item such as metals or guilders instead of the one specified in the investigation.

After a game upgrade the occasional bug slips through. This can lead to results that are not consistent with the mechanics as described and require adjudication.

Where an issue does not directly involve a position or lacks urgency, the GM should be contacted through Nexus.

Everything Else

Whether the special action is charged for will depend on the wording and nature of action though if it is a quick bit of advice or a question about a previous special action results, then it is rarely charged for.

Submitting Special Actions

Special actions are submitted as per the order, filling in the text box. Be concise and keep the parameters of the special action to a single objective. The GM will moderate verbose and multi-objective and otherwise rambling special actions down to a specific objective. Also bear in mind time constraints (1 special action = 1 day).

Example:

Send the team through for forests herding all predators and prey, cage them all then determine how best to exploit all of them.

Result:

Investigation/Test Word/Forest/Fauna

The team set various traps and then do a little bush beating to collect specimens of the forest fauna. While avian and arboreal creatures are more adept at avoiding the traps, they manage to collect a few terrestrial creatures. The most common is a quadruped standing under a metre high. It is some form of forager judging by hits forelegs and adapted mouth parts. It is quite well camouflaged on account of its dappled hide. It can be exploited as Dappled Hog.

It is then up to the player as to whether they wish to investigate the less common creatures caught or set about chasing the arboreal or avian creatures.



Exploration & Exploitation

Exploration is an important part of Phoenix. It is used to search for new resources as well as determine where to build outposts. Resources can be classified under three headings. These are mineral based, special and planetary population.

Searching for Mineral Resources

Production of items requires minerals. Scanning a planet for mineral deposits is known as Geological Probability Indication (GPI). GPI'ing determines the likelihood of minerals of the type specified being present. Sensor power of the ship determines abundance error range (higher power = lower error).

Scanning options:

- *Planet Scan* – useful to determine which minerals are present.
- *Area Scan* – potential time saver using overlapping areas to narrow down deposits.
- *Sector Scan* – greatest accuracy.

GPI Scans

- *GPI scanning is normally conducted from orbit.*
- *Scan is limited to sector if landed.*
- *Select which ore type is being scanned for.*
- *Only known ores will be reported.*

Prospecting

GPI'ing only determines approximate yield. Prospecting is conducting in a sector for ore types and determines the properties of deposits that can be mined in the sector. Deposits of multiple ores may be reported:

- *Deposit ID# (required for issuing Mine order)*
- *Yield*

- *10% Drop*
- *Stockpile*
- *Dispersion*
- *Deep Core Survey*

Deposit ID#

Used when issuing the Mine order.

Yield

This is the yield when exploited in the sector currently being prospected.

10% Drop

Assigning more mines to exploit the deposit has diminishing returns.

Each group of mines beyond the 10% drop produced 10% less ore.

Examples:

Yield of 100MUs

10% drop of 15

Quantity Mines	Output Per Mine	Total mu ore produced per week
15	15@100	1500
30	15@100, 15@90	2850
45	15@100, 15@90, 15@80	4050

Yield of 150MUs

10% drop of 3

Quantity Mines	Output Per Mine	Total mu ore produced per week
15	3@150, 3@135, 3@120, 3@105, 3@90	1800
30	3@150, 3@135, 3@120, 3@105, 3@90, 3@75, 3@60, 3@45, 3@30, 3@15	2475
45	As above with 15@0	2475

Type	Common	Uncommon	Rare	Very Rare
Ores	Metals Basic Elements Hydrocarbons	Thorium Pulac Rare Earth Elements Strion Korondite Precious Metals Precious Gems.	Collidium Celesium Fibrillium Jacium	Gravatron Moxa Degenerate Matter Zionite
Excellent Yield	170+	80+	15+	3+
Good Yield	150+	50+	12+	1.5+
Poor Yield	100-	30-	5-	0.8-

Dispersion

Dispersion is the degree to which the deposit (ID#) can be exploited beyond the current sector measured between 0% (at sector only) to 100% (equally exploitable from anywhere on the world).

A dispersion of 50% means that a yield of 100 for example would be 50 in an adjacent sector, 25 in the one next to that and so on.

The sector being prospected may not be its peak yield.

Example:

Prospecting sector {2,2} reports ID# 1234 has a yield of 25mu and dispersion 50%.

Prospecting sector {2,3} reports ID# 1234 has a yield of 50mu.

Prospecting sector {2,4} reports ID# 1234 has a yield of 25mu.

The sector containing the peak yield for the deposit ID# is its source.

Stockpile

The total amount of ore in the deposit that can be exploited using the normal mining method. It is possible to modify this both by selecting an alternative mining method and modifying the deposit through the use of technology.

Deep Core Survey

This is the probability that a deep core deposit exists. These are accessed through deep core mining. Deep coring a deposit can only be conducted in the deposit source sector. This requires the exhaustive use of a Survey Rig.

Mining Method

Initial mining of a deposit is set to the Normal method. This can be changed.

[1] Normal: The standard methods of surface mining using the deposits stats as determined by prospecting. Exploitation is cautious and subtle.

[2] Strip Mining: The deposit is blasted to pieces with no regard to the location or environment.

- +50% yield
- +5/mine environmental effect
- +2/mine to excavation of deep core sites
- -25% deposit effective size (for every 100mu mined, the stockpile is reduced by 125mu)
- Mines are 100% visible rather than 10%

[3] Drift mining: The deposit vein is followed carefully to improve amount extracted.

- -10% Yield
- +25% deposit effective size (for every 100mu mined, the stockpile is reduced by 80mu)

[4] Open Cast: Generates a huge hole and mountains of slag with no regard for secrecy or the environment.

- +1/mines environmental effect

- +1/mines to excavation of deepcore
- +50% to 10% drop size
- +25% deposit effective size (for every 100mu mined, the stockpile is reduced by 80mu)
- Mines are 100% visible rather than 10%

Deep Core Mining

GPI'ing and Prospecting are concerned with mineral ores on or close to the surface. Ores may be associated with the deposit deep below the surface. Access to deposit is through Deep Core Mining.

The 'Deep Core Scan' order issued while in orbit generates a viability assessment for the world.

Individual sites may be checked through the 'Prospect' order for feasibility and 'Deep Core Deposit' order will determine values if deep core mining is possible.

Deep cored deposits can only be mined using the Normal method.

Factors determining effectiveness of deep coring on asteroids, moons and planets are:

- Officer's Prospecting Skill (Level)
- Quality of Survey Equipment (Survey Level)
- A normalised random factor per deposit (averaging 11 for planets, 18 moons, 28 for asteroids)

For maximum possible improvement use: +8 (Survey level + Prospecting level)

In addition, for moons and planets:

- Tectonic Activity of the celestial body (max 10 worlds, max 5 for moons)
- The weather conditions on the planet represented by the optical depth and gravity (max 2 for planets, 1 for moons).
- Sector terrain (+3 for broken, molten, mountains, +1 for sand, sea, shallows, craters, desert)

Typical World Modifiers:

Terrestrial Planet: $2+\sigma 11$

Inferno Planet: $10+\sigma 11$

Terrestrial Moon: $6+\sigma 18$

Inferno Moon: $0+\sigma 18$

Asteroid: $0+\sigma 28$

Where σX is the random factor (normal distribution of average X).

Survey Total=Officer Skill+Survey Rig Level+World Modifier

The survey total determines the probability of discovering subsurface deposits.

Survey Total	0	5	10	15	20	25	30
Subsurface Deposits	None	Unlikely	Possible	Moderate	Good	Excellent	Assured

This translates into probabilities of ores having none, one or more subsurface deposits based on type.

Common	Subsurface Deposits			
	1st	2nd	3rd	4th
Unlikely	50%			
Possible	80%			
Moderate	100%	60%		
Good	100%	100%		
Excellent	100%	100%	100%	
Assured	100%	100%	100%	100%

Uncommon	1st	2nd	3rd	4th
Unlikely	30%			
Possible	70%			
Moderate	100%	40%		
Good	100%	90%		
Excellent	100%	100%	70%	
Assured	100%	100%	100%	50%

Rare	1st	2nd	3rd	4th
Unlikely	20%			
Possible	80%			
Moderate	100%	60%		
Good	100%	100%		
Excellent	100%	100%	100%	
Assured	100%	100%	100%	100%

Very Rare	1st	2nd
Unlikely	5%	
Possible	10%	
Moderate	20%	
Good	40%	
Excellent	70%	
Assured	100%	50%

Example:

```
>TU 273: Prospect {1}
  Hydrocarbons (3) detected (Resource ID = 78579)
  Yield:                20.68
  10% Drop:             18
  Quantity:             117641
  Dispersion:           0%
  Deep Core Survey:     Moderate
```

As this is a moderate Common Ore deposit, there will be 1 subsurface deposit with a 60% chance of there being a second one.

Subsequent Deep Core Deposit confirms only a single deposit:

```
>TU 246: Deep Core Deposit {78579}
  Deep Coring Hydrocarbons (3) deposit (ID = 78579):
  Prospecting Skill: +4
  Survey Equipment Level: +4
  Deep Core Deposits:
  Hydrocarbons (3) detected (Sub ID = 1)
  Yield:                29.84
  10% Drop:             17
  Quantity:             Infinite
  Instability:          Stable
  Excavation:           90 mine weeks
  Survey Rig mkIV (2328) expended during deep core survey.
  Total TU cost for this action is 167
```

All that is required is to cross-reference the Deep Core Survey result (Moderate) from the prospect results against the type of ore to determine the probability and quantity of subsurface deposits.

Deep Core Deposit

When a deposit is deep cored via the 'Deep Core Deposit' Order the survey rig is exhausted and any subsurface deposits are discovered.



If the site is resurveyed later with a better survey total (prospect skill + survey rig level) more deposits may be found (no change to existing deposits).

Every deposit has an excavation time (in mine weeks) and assessed for instability (unstable deposits have events associated with them). Excavation is completed prior to actual exploitation of minerals. Excavation cost 1 structural module (lowest tech used first) per mine week and is done by mining the deposit as normal. Deep core deposits can only be exploited at the exact location of the original deposit.

Mining Events

All deep core deposits are assigned an instability rating. This rating will be used with mining events in the future. Events will be handled through the mission/notification system to allow random negative/positive effects to occur. Deposits that have a high instability will be buffed when the event system comes in, they are currently not affected by the instability rating.

Possible events:

- [1] Injuries
- [2] Loss of personnel
- [3] Collapse - adding an excavation value
- [4] Loss of mines
- [5] Lose/gain of yield/stockpile etc for certain requisites
- [6] Windfall associated ore/motherlode

Upgrading Deposits

Mining tech can be used to upgrade any existing deposits (including deep core). The tech will be exhausted on the deposit and the type of tech will determine the effects. The following stats can be modified:

- *Yield*
- *Stockpile*
- *10% Drop*
- *Dispersion*
- *Excavation*

Individual techniques are researched independently and will assume that with every improvement there will be a downside, for example a technique that gives +20% yield at a cost of -10% stockpile. The technique is applied via the 'Upgrade Deposit' Order.

As with subsurface deposits described above, all upgrades have an excavation time. This will be set at the time of upgrade (along with all other deposit value modifications). Exploitation will commence once the excavation time has been satisfied.

- *Very rare ores cannot be upgraded.*

Blueprint Upgrades

Blueprints give modest improvements in a chosen area but suffer from negatives in other areas. Note that these modifiers are based on the weighted average values for the type of mineral and not the specific mineral deposit itself.

Blueprint	Yield	Stockpile	10% Drop	Dispersion	Excavation Weeks
Localised Mineral Extraction (10016)	10%	-8%	-5%	-12%	300
Planetesimal Exploitation (7005)	-25%	5%	-	-	100
Geological Mapping (7029)	-5%	2%	-	20%	450
Hydrothermal Vein Mapping (7030)	-5%	-10%	15%	10%	250
Deep Core Sampling (7021)	-	2%	-10%	-20%	150
Volcano Analysis (7022)	2%	-	-10%	-15%	250
Fault Analysis (7010)	-	5%	-30%	10%	100

Example

>Date 51.3: Upgrade Deposit {7005} {21279} {0}

Upgrading Rare Earth Elements (22) deposit:

49.68 (-9.75) Yield

7187 (+50000) Stockpile

100 (+100) mine weeks excavation

Planetesimal Exploitation (7005) has been exhausted and removed from your position.

Thorium (20)	11556	17.204	9	6285/3
Rare Earth Elements (22) {100 m.w.}	21279	49.682	10	7187

Tech Upgrades

Techs give better results. Multiple techs can even be used in conjunction to offset most penalties.

Tech	Yield	Stockpile	10% Drop	Dispersion	Excavation Weeks
Specialist Mineral Extraction (8508)	-15%	30%	-	-	250
Mining (8650)	20%	10%	-20%	-	200
Excavation (8660)	-5%	5%	40%	15%	450
Seismology (8719)	-5%	10%	20%	15%	200
Hydrothermal Analysis (8722)	-10%	5%	20%	20%	100
Volcanology (8721)	20%	5%	-5%	-15%	200

Searching for Special Resources

Special resources are those that cannot be found through standard actions and require the position to perform special actions. These are always processed by a human moderator and as such have a fee per special action associated with them. Discovered special resources are given a unique identity number (ID#). Once this ID# has been discovered, it can be used by bases to exploit the special resources.

Conducting an expedition to discover special resources:

- Perform Surface Explorations in designated terrain type.
- Surface explorations do not normally reveal special resources.
- Investigate emphasised aspects within the Surface Exploration description.
- Abundant special resources are generally obvious.
- Follow up Investigations where appropriate with deeper ones.
- Follow up investigations normally have diminishing returns wrt Special Resources.

Special resources have the same parameters as mineral resources and use similar mechanics.

They generally also have a 'restock' value. This is the amount of increase in the 'stockpile' each week.

Restock may be fixed amount or % of existing stockpile.

Origin

Special Resource items may be classed as unique to a world or star system. Where this is the case the item has a variable value that increases with increasing distance from its origin. This is a primary source of wealth for starbases generating through planetary sales. Searching for these items is often the primary goal of exploration and investigations.

Example of a series of investigations

The player ordered the ship to land in a forested sector and issued a surface exploration order. From this the player then investigated the trees and the creatures present. These led to further areas that the player thought might be interesting. In the table below, the bold type is the title of the special action presented by the player (they may have put a note about how they intended to perform the investigation). The response written by the referee follows:

Surface Exploration of Forest The forests of Trath are dark cool and humid. The cries of many arboreal creatures can be heard far above in the canopy. There are localised stands of trees. Pine trees primarily forest upper slopes while deciduous trees, overlooking the many small streams, dominate the valleys.			
Investigate Trees The trees form ancient groves and although pines are sometimes found in a grove of deciduous trees, the soil chemistry is generally responsible for obvious suitability of each species. ID#:12467 Resource: Hydrocarbons (3) Yield: 120mu 10% Drop: 5 Abundance: 100000mu Restock: 100mu		Investigate Many Arboreal Creatures There are many species present although for the most part they appear to have no exploitable value. One species appears to dominate the valleys. This creature clings to branches, never descending to the ground.	
Investigate Pine Tree The pine trees growth to heights of a few tens of metres in height. Beyond their resource as wood, there is nothing specific about these trees. Most are pinecone bearing.	Investigate Deciduous Tree The deciduous trees require plenty of water and considerable amounts of light. There are many fruit trees present although it is found that the arboreal creatures tend to prefer to feast on a fruit that looks similar to a plum. The seeds from the fruit in general are largely voided through the intestinal tracts of the arboreal creatures. ID#:22211 Resource: Fruit (30000) Yield: 100mu 10% Drop: 30 Abundance: 50000mu Restock: 100mu	Investigate Clinging Creature The thick fur of these creatures proves to be the only part of the creature with commercial value. ID#:12241 Resource: Fur (30010) Yield: 40mu 10% Drop: 10 Abundance: 5000mu Restock: 10mu	
Investigate Pinecones The pinecones contain an interesting compound that can be exploited as a drug. ID#: 21347 Resource: Trath Pinecone (30225) Yield: 5mu 10% Drop: 1 Abundance: 200mu Restock: 1mu	Investigate Deciduous Plum Analogues These are the favoured food of the arboreal creatures and prove to be a firm favourite with the exploration team. ID#:148711 Resource: Trath Fruit (32170) Yield: 10mu 10% Drop: 2 Abundance: 500mu Restock: 5mu	Investigate Seeds The seeds are collected by the team and after a series of tests are found to have no commercial value	

There are still potential avenues to investigate. There are the streams to look at, possibly some soil samples to take. Further investigation into the other arboreal creatures though the resources further from the original exploration will probably be overall of less value.

Typical World Survey

Standard Investigations

As well as Surface Exploration and Investigation, there are other special actions that are routinely undertaken.

- *Surface Exploration* - This is conducted while landed on a world. The special action will explore the terrain. To keep things simple, it is assumed that all terrains of the same type are approximately the same.
- *Investigate XXXX* - where XXXX is a specific feature of either a previous exploration or investigation.

- *Subsurface Scan* - This again is conducted while landed and will reveal some aspect of the geological processes involved in the formation of the terrain. It also might reveal some minerals that are not revealed by standard GPI'ing.
- *Orbital Scan* - This is conducted while in orbit. It will generally reveal something about the region of space close to the world. It will detail rings if they are present as well as other anomalous features.
- *Low Pass Scan* - This is again conducted while in orbit. It will reveal some general aspects about the surface and where appropriate the atmosphere. It will also check for anomalies on the surface.
- *This is an example of the method used to survey a world. Following this will give a very good indication of what is to be exploited on the world.*
- *Planet Scan* - gives map showing various terrains to explore.
- *GPI World (all ores)* - reveals some basics of what can be exploited.
- *Orbital Scan* - always good to check for anomalies.
- *Low Pass Scan* - as above, may also reveal some important features.
- *GPI areas, rows or sectors for minerals.*
- *Land at each terrain type - then perform the following:*
- *Surface Exploration* - gives some idea what to investigate.
- *Subsurface Scan* - geological surveys can prove useful.
- *Investigate XXX* - where XXX is some interesting aspect as revealed by the previous special actions.
- *Prospect* - only if the sector has revealed itself to contain minerals in abundances worth exploiting.

Non-Standard Special Actions

Action may not fall into the basic special actions such as investigation, e.g. speaking to natives found on the planet or attempting to force natives into slavery. These special actions are dealt with in the same way as investigations. The player should write their intent. The referee will then read the special action, take into consideration parameters appropriate to the situation and give a response.

When writing special actions use the following guidelines:

- *All special actions should have a single goal.*
- *Keep special actions brief.*
- *Avoid any ambiguity.*
- *Never attempt to circumvent standard actions.*

This is an example of a player attempting to round up a few peaceful and pacifistic natives on a backward world and force them into slavery.

Special Action

Using the troops from the ship, surround one of the small camps of natives and use overwhelming firepower to force them into the ship and make them slaves.

Results

The 300 troops surround a small camp of around 50 natives. A quick and brutal display of firepower reduces a few protestors to charcoal and the rest of the natives to pliant captives. These are herded into the ship under close scrutiny where they are stripped, deloused and made ready for their new lives as slaves.

The player writing the above special action may have already discovered that the natives were peaceful and without adequate weaponry so felt confident to pull-off the action with little or no problems. Had the natives been hunter-gatherers or slightly better defended, the referee may well have given a very different result.

NB-While Phoenix does not attempt to enforce morals on players; overly extreme actions will generally be toned down or glossed over. Phrases such as 'brutal things were done to the slaves' will be used.

This is a game and therefore should not be offensive to players.

Special Action Fulfilment

A special action result may require the player to fulfil a requirement.

Example:

Having talked with some natives, they offer all their worldly wealth in precious gems for a single batch of personal communicators. A one-off special action will exchange 1mu consumer goods for 50MUs precious gems.

Example:

Cave systems extend for many kilometres through the mountains. These can be sealed from the environments and used as a basis for an outpost. The one-off exhaustive use of a special mineral extraction tech by an outpost in this sector will produce 200 cave complexes.

Terminology

The following terms have specific consideration:

- *One-off:* The special action can only be performed once. Subsequent attempts at the same action under the same conditions will result in failure. This is sometimes tied to a location or a position, i.e. in the above cave system example, each base in a mountains sector can make a single use of the special action.
- *Exhaustive:* This means that the item specified is deleted. The action presumed that the use of the item is such that it can never be recovered afterwards. The result does not guarantee that the cost is worthwhile.

Items

All item details exist on Nexus. Players have access to data on common items and items they know about in-game.

Items have common parameters and item specific parameters.

Common parameters include:

- *Name – advanced versions of items will often have a suffix mkX where X is mark of an item. Some items may be named in a manner to group them alphabetically such as 'species' 'troop type', e.g. Human Soldier; Human Mercenary.*
- *Number - Where an item number of preceded by a #, this represents an officer. In this case the item number is unique to the position and may change when the item is transferred. See item type: Officer for more details.*
- *Item Type – represents their primary role within the game. A list of types can be found in the appendices.*
- *Mass - This is the amount of cargo space required for the item. Unless otherwise specified it is also the amount of production required to produce the item if it can be produced, its size for determining which items are hit and the amount of damage normally required to destroy the item.*

Raw Materials

Items without a list of required materials cannot be produced, e.g. ores, fruit, people etc.

Production cost is normally but not necessarily the same as the item's mass.

Low tech items may require less production than their mass, e.g. Rock Structural Modules.

High tech may have significantly higher production than their mass, e.g. Stargate Keys.

Blueprints

Restricted production requires a blueprint.

Blueprints have a weekly production limit. Blueprint production limit for the same item stack.

In the case of training troops, the production limit is the quantity of mercenaries that can be trained.

Only tooled blueprints count towards these totals.

Restricted Knowledge

Where items are not common knowledge, knowledge is gained through owning the item, having knowledge of it transferred, researching it or discovering it through special actions.

Complex Items

Complex items have unique data associated with individual items. Officers for example have skills.

Fixed Items

These items cannot be removed from their current location. If the current location is destroyed (such as items fixed into a ship), the item is destroyed.

Area, Defence and Armour

Area and Defence has a default value equal to the mass of the item. Area represents the probability of the item being assigned damage based on ratio total area of the item against total area of all items present. Defence is a measure of how much damage is required to destroy an individual item. Armour reduces incoming damage before determining if the damage destroys an item.

Substitution

Used to replace the default item under specific circumstances.

- *Automatically using superior items during ship building and refits.*
- *Use alloys during production when insufficient ores available.*
- *Determining item contribution limit in infrastructure upgrades.*

Example: If Metals (1) can only contribute 400 infrastructure points to a current project and 300 points worth of metals have already been integrated, Light Alloys (4) can only contribute a further 100 industry infrastructure points.

Antimatter

Antimatter can be utilised either in manufacturing or as a fuel.

Antimatter is produced (refined) from Antiparticles (1mu) and Jacium Laced Alloys (1mu).

Antiparticles are produced by Collector complexes. Antiparticles are too unstable for direct use and are highly explosive.

Antimatter Fuel

Antimatter Fuel is used by special jump engines, enabling them to reduce jump time when fuel is used as per the engine's tech manual. 1mu Antimatter Fuel requires 25mu of Antiparticles.

Antiparticle Collector Complexes

Collector complexes require are expensive to build. Each complex captures 10 Antiparticle per week. Local anomalies may modify capture rate.

Other Parameters:

Security Factors	how many security factors the item will contribute.
Crew Factors	required for maintaining ship efficiency.
Explosive	damage inflicted on position if destroyed.
Output	used in a variety of situations determined by item type.
Cargo (space/type)	internal space and its use
Movement	raw TU cost for moving (vehicles and people)
Infrastructure	quantity and type of infrastructure points.
GM Restricted	research requires GM sanction.
Ammo	list of compatible ammo and quantity fired per round
Research Bonus	quantity of rows shifted during research conversion step.
Control Factors	contribution to total control factors at the specified spread.
Attacks	quantity of attacks per round.
Ground Splash	modifier to damage against adjacent items during damage resolution phase.
Blast Radius	percentage of excess damage carried over to another item during damage resolution phase (before area depletion).
AR (armour resistance) Factor	maximum reduction applied to incoming damage prior to determining item's potential destruction.
Unfocused	item will ignore Target Type (disable etc) Combat Option.
Damage	amount of damage a successful hit will deliver.
Accuracy	added to targeting total to determine probability of hitting a target
PD Stealth	percentage chance that the ammo will bypass Point Defence resolution.
Installed Area Modifier	a multiplier to item area that is only applied when the item is stalled.
Hard Points	weapon's quantity of hard points. Ships have a hard point limit based on quantity and type of hull.
Preferred Spread	used in ground combat. Items contribute half control factors per step difference with preferred spread.
Indirect Fire	weapon system does not need line of sight to fire.
Nuke	if dampening is not functioning, incoming damage from item is increased by two magnitudes.
Boarding Only	item only activated during boarding (not for standard ground combat).
Combat Range	determines whether the item will be included in combat based on location of position.
Combat Type	some weapons are only deployed in defensive or offensive situations.
Origin	links item to a specific location. Used for research, production and trade value as appropriate.

Stellar Corona Collector

These reactors capture antiparticles using stellar energy. Capture efficiency increases with quantity of complexes and the stellar temperature (class).

Complex construction limited to bases in the innermost orbital of a star system.

Example: A space station with 150 stellar corona collectors in orbital 1 around a F-type star will produce 375(=150x2.5) particles.

[See Table Page 44](#)

Research

- Principles, Techs and Blueprints are produced through research complexes.
- Starting a research project costs 10,000 stellars
- Changes to existing project (altering conversion/ quantity assigned complexes) are free.
- During weekly maintenance, research complexes add research points to a project.
- Each complex adds 100 points to the project.
- Points are converted into mass when total reaches NEXT CONVERSION.
- Conversion mass is based on accumulated points, bonuses and a random factor.
- Project is completed when MASS equals mass of item.
- When complete, finished item is added to tooled tech inventory.
- Some projects can only be initiated by the Game Master and require a special action to start.

Initiating Research

Set Research Project order

- *Blueprint:* Item number. Can be item of Type Blueprint, Tech or Principle.
- *Laboratories:* Quantity assigned. Automatically drops to quantity available.
- *Next Discovery:* Quantity at which points are converted to mass.

When setting Next Discovery, consult the conversion table. Worst Case Points indicate that lowest amount of points required to achieve the rest.

Example: Setting Next Discovery to 8800 points assures that at least 30MUs will be accrued at the point of conversion (worst case), although on average 60MUs will be accrued..

Average Points	Worst Case Points	Conversion Result
18000	26900	100 mus of research complete.
15400	23700	90 mus of research complete.
13000	20700	80 mus of research complete.
10800	18000	70 mus of research complete.
8800	15400	60 mus of research complete.
7100	13000	50 mus of research complete.
5500	10800	40 mus of research complete.
4100	8800	30 mus of research complete.
2900	7100	20 mus of research complete.
1900	5500	10 mus of research complete.
1400	4800	No change to the project
1200	4100	Stalled - Required new equipment, 500 stellars
900	3500	Stalled - Required new equipment, 1000 stellars
600	2900	Stalled - Required new equipment, 2000 stellars
350	2400	Stalled - Required new equipment, 4000 stellars
200	2000	Wrong avenue - 10 mus research is destroyed.
100	1500	Wrong avenue - 25 mus research is destroyed.
0	1200	Disaster - 50 mus research is destroyed.
-	800	Disaster - 100 mus research destroyed.

Conversion Bonuses and Penalties

Modifications are applied after research point conversion. These modify the conversion result, either moving up (bonus) or down the table (penalty) by rows equal to the magnitude.

Best result irrespective of bonuses is 100mu.

Situation	Modifier
Copy Existing Tooled Item	+2
Missing Required Principle	-3 per Principle TL
Missing Required Tech	-7 per Tech TL
Have Appropriate Scientist/ Scientists	+ Best Single Bonus
Have Appropriate University	+ Best Single Bonus

Example: A base has tooled Photon Cannons mkII blueprint, Photon Weaponry mkII and is also researching Photon Cannons mkII. As Photon Cannons mkII has the requirement Photon Weaponry mkII, there is no conversion penalty. As the base has a tooled Photon Cannons mkII it is granted +2 conversion bonus. Setting Next Discovery to 13,000 points will now on average generate 100mu.

Technology	Tooling Time
Principle	26 weeks
Tech	5 weeks
Blueprint	1 week

NB. Untooling is not possible during combat.

Principles, Techs & Blueprints

- *Principles are underlying fields of research. Advanced Principles will be founded on lower order principles. Research into a principle requires the presence of all underlying principles.*
- *Techs are refined fields and normally based on one or more principles. Higher order techs will be based on more advanced principles.*
- *Blueprints are needed to build advanced items. Blueprints for items with similar properties will generally be researched from a single tech.*

Scientist Creation

At the time of completion there is a check to determine if one of the employees that worked at the research complex is upgraded to scientist. The speciality of the scientist will be the project target and the chance of producing a scientist is directly proportional to the size of the project undertaken. The scientist bonus is very rarely above +1.

Universities

The research bonus is granted to research using same mechanics as scientists. An investigation can be issued (special action) to determine if it is possible to construct a university in a unique location to benefit research from the local environment. This might be due to an unusual radiation profile of a gas giant enhancing research in wave technology for example.

The special action will give details of what is required to build the university.

Only one university can be constructed to benefit from the phenomena.

Tooling Technology

Only active Principles, Techs and Blueprints can be used either for research or production. Activating them requires tooling. Tooled technology cannot be removed from the base - although it can still be destroyed. Tooling technology has a fixed time period (untooling is immediate) during which it cannot be removed but is not active.

Blueprint 100mu

Blueprints represent both data and physical machines employed by factories to produce the associated item. Assigning more factories to producing an item than the total production limit for the sum of blueprints will automatically truncate production.

Prototypes and Single Use

Prototype blueprints have a possibility of being exhausted each time they are used to produce an item. Single Use blueprints are for ships over 200 hulls. When a ship is completed, one will be exhausted.

Higher mk's of blueprints will either:

- *Have a lower production limit (typically half the previous mk).*
- *Maintain production limit but the production cost of the item will increase (typically double previous mk).*

There are exceptions to this rule. Certain blueprints allow the construction of a single item per blueprint. Having multiple blueprints in all cases allows the starbase to build the limit multiplied by the quantity present.

Training Limits

- *Limit is the weekly quantity of mercenaries upgradable to the specified trained troop using Train Troop order.*
- *Converting other trained troops to specified trained troop is at 1/10th cost using Retrain Troop order.*
- *Training blueprints are species specific.*
- *Veteran mercenaries cannot be trained.*
- *Veteran troops cannot be retrained.*

Shipbuilding Limit

- *Ship blueprints include a list of parameters, including hull type, size, armour and installed items. During construction this list is used to build the ship.*
- *Limited to assembling 20 hulls per week per blueprint towards the specified ship design.*
- *Limit allows for multiple ships of the same design can be worked on simultaneously.*
- *Shipyards and ship size limit total quantity of hulls assembled (see shipbuilding).*



Tech 1000mu

This covers the specific application of principles within a field. Higher order versions of the same tech are often based on the lower order techs combined with another principle. A minimum of 10 steps must be taken in to complete research of techs.

Stellar Cartography

- *Unspecified number of stellar cartography projects (levels) associated with it.*
- *Levels researched sequentially.*
- *In all cases, if the Stellar Cartography item number is known, use 'Start Research Project' order.*
- *If item number unknown, research is started through special action (levels above the first are free special actions).*
- *Investigating a tooled stellar cartography require special actions. Investigation will add navigation data to newly discovered systems and information on the next level of stellar cartography.*
- *Further investigation may be used to examine a feature of the system (e.g. looking for anomalies) or in response to plot lines.*

The primary reason for researching stellar cartography is to determine if there are any uncharted systems in the local region of space and once detected, researching the navigational data required to reach them.

Level one is a blind research project, i.e. the outcome is never known until completed. It is always 1,000mu. The following levels Stellar Cartography differs from normal technology in that the mass of a tech is related to the size of the mapping project. This is based on the navigational distance which will be further increased if there is not a direct jump link.

Investigating a completed stellar cartography project will add any navigational data associated with project along with indicating the size and outcome of completing the next level of stellar cartography for the system.

Principle 5000mu

Principles cover a wide range of aspects within the field. The mass covers not only data but everything needed for research and development such as linear accelerators, nuclear plants, firing ranges, computer simulations, artificial intelligence simulators, laboratories, even torture chambers and whatever else will be needed. Without principles, developing tech is very difficult although not impossible for tech based on the lower order principles.

Known principles have been placed into a tree showing their order of magnitude and what they are dependent on. There may be other principles waiting to be discovered that are not commonly known about.

As can be seen on the conversion table, due to the limit of 100MUs per week, it takes a minimum of one year to complete any principle.

New Fields of Research

Sometimes a new field of research will be desired. This can fall into one of two types. The first and most common is to research technology that is known to exist but the knowledge of the specific technology is restricted and unknown to the position wanting to start the project, i.e. its principle/tech/blueprint number, is not listed in the data archive. An example might be Photon Guns mkIII. They are known to exist in the game, but the blueprints not classed as common knowledge. Providing that the blueprint item number is known or can be guessed, research can be initiated (if not GM or location restricted). Guessing can prove an expensive mistake as starting an incorrect project will incur the 10,000 stellar initiation fee.

While it is possible to trade for the information and have another political transfer the knowledge enabling research to begin, it is also possible to have the scientists work on existing knowledge to initiate research.

Example: The owner of a starbase wishes to research Photon Guns mkIII. He has a stockpile of Photon Guns mkIII that he has traded from another faction. He also has Light Photon Guns mkIII blueprint that he captured from another faction's base. He presents these two technologies as the basis for initiating research into Photon Guns mkIII even though he does not have a copy of Photon Weaponry Tech mkIII.

Successful Example: After efforts, the base has developed Photon Weapons Tech mkIII at a base along with a stockpile of Photon Cannons mkII. The owner of the base uses this as a basis for initiating research into Photon Cannons mkIII.

Where research is more of a speculative venture, then there will generally be a hint from investigations that such a field is viable. Even in these circumstances all efforts should be made to ensure that tech likely to be needed in supporting the new research is present. If some but not all the necessary technology is present the Moderator might respond as to the missing technology and allow a future free action to complete once the technology is present.

Failed Example: We want to start research into a new ship, the Slaver based on DTR Freighters at our IND Pirate Base. There isn't a tooled copy of the DTR Freighters at the starbase so we are prepared to research at a -7 penalty.

In all cases, where technology is required to initiate research, it must be present at the base initiating research and be tooled. This is because subspace communication is closer to the pony express than the internet and invariably the supporting tech also comprises equipment needed for the research.

Failed Example: We want to start research into a new ship, the Slaver based on DTR Freighters at our IND Pirate Base. There isn't a tooled copy of the DTR Freighters at the starbase but there is at IND Hidden so we are prepared to research at a -7 penalty.

Commerce

Starbases may assign items to sell to the world's civilian population (Planetary Market) for stellars using the 'Sell to Local Population' order. The process is completed for all starbases in the game following the first daily run of the week (normally between Monday and Tuesday's run).

Three Commerce Item Types: Trade Goods, Drugs and Life.

Worlds have demands (MAX INCOME) for each Commerce types.

Worlds also VALUE/MU representing mark-up of local value of items.

Demand is how many stellars the population will spend on Commerce types.

Demand for each Commerce type is split equally into four categories:

- Low Value – items of value less than the world's LOW VAL
- Medium Value – items between LOW VAL and HIGH VAL
- High Value – items of value more world's HIGH VAL
- Generic - items of any value.

Each starbase on the world has an equal share of the demand for each Commerce type.

Where a starbase has insufficient items on the Planetary Market to satisfy their share of a demand category, the shortfall will be shared between other starbases on the world, e.g. if a starbase does not have any Low Value Drugs on its Planetary Market, then stellars will be used to buy Low Value Drugs from the other Starbases on the world.

Each merchandising complex at the starbase allows 300 stellars of Commerce Item Types to be sold to each category, i.e. total demand for all three Commerce Types/1200.

Items are sold based on relative proportion to overall quantity (not mass) of items.

Order of Trade

- » Generic
- » Low Value
- » Medium Value
- » High Value

The process is iterative, repeating the allocation of stellars to sales. Stellars not spent in Generic Trade are carried over to the following week (carryover cannot exceed Demand).

Example: A starbase has High Value and some Low Value Drugs. The Drugs Demand is 10,000 stellars. The total value of the drugs on the Planetary Market is 8,000 High Value Drugs and 2,000 Low Value

Merchandising

Starbases operate as commerce broker for the civilian population, generating stellars through fees. Income from merchandising is generated on maintenance day.

Example:

Merchandising	Maximum	Drop/X Complex
Global	150	3
Local	450	25

Where X is a number usually 10, though may be more depending on the development stage of the planet's infrastructure.

- Local merchandising is generated for each starbase on the world without interference from other starbases.
- Local merchandising is calculated using the quantity of active merchandising complexes in the starbase.
- Global income is determined in almost the same way, using the sum of active merchandising complexes in all starbases on the world controlled by the account.
- Efficiency of the starbase affects income.
- Starbases controlled by different accounts have no impact on income.

Determining Stellar Income

Income from local merchandising is equal to the number of active merchandising complexes being run by the base split into groups equal to the drop step, i.e. having a drop step of 10 and 28 merchandising complexes breaks down into two groups of 10 and a third of 8. The first group is paid equal to the local maximum per complex, in the second group, the maximum minus the drop and the third group, equal to the second group again minus the drop.

In the above example income from local merchandising:

10 @ 450 stellars

10 @ 425 stellars

8 @ 400 stellars

Total: 12,750 stellars (=4500+4250+4000)

If there was another starbase owned by the same player with 14 merchandising complexes (total 42 complexes), the income from global merchandising would be:

10 @ 150 stellars

10 @ 147 stellars

10 @ 144 stellars

10 @ 141 stellars

2 @ 139 stellars

Total (for the world): 6,098 stellars (= 1500+1470+1440+1410+278)

Total (for this base): 4,065 stellars (=6098 x 28/42)

Drugs (quantity ratio 1:4). The generic category is dealt with first and completely satisfied (2,500 stellars), 500 worth of High Value Drugs, 2,000 worth of Low Value Drugs (due to quantity ratio). Nothing is sold via Low and Medium Value. The High Value category is fully satisfied (2,500 stellars). The Low Value Category was undersold by 2,500 stellars due to assignment to Generic Trade and the starbase still has 5,000 stellars worth of High Value Drugs on its Planetary Market despite only reaping half the demand.

Unique Commercial Items

Unique Commercial items (item type Trade, Life, Drugs) have a system (and possibly planet) of origin in the galaxy. Their local value increases with distance from origin. The modifier follows the general rules:

- Same systems (if planet set and different planet) x3
- Different System x8
- Different Periphery x12-16
- This may be overridden by the Trade Matrix (a system-system lookup table).

Commercial items may also have a species associated with them.

- Value is x1 on world without species.
- Value increases proportionally to x2 at 100% species.

NB. Most items are flagged as racial type 'Sentient', this means that they do not have a specific race and will never generate a bonus, even if sold to a world with a 'Sentient' population.

Example: **Selling Tree Frogs to Capella**

Eridanian Tree Frogs:

Value (at origin): 1.6

Race: Human

Origin: Eridani, Solo

Capella:

HIGH VAL: 6.2

Trade Good Demand: 40,000 stellars - breaks down as:

1,000 High

1,000 Medium

1,000 Low

1,000 Generic

Capella LOCAL VALUE/MU: 1.3

Distance Multiplier: x12

Population (100% Human): x2

Sell price: 49.92 (=1.6 x 12 x 2 x 1.3) stellars / mu for tree frogs.

As 49.92 > 6.2 sold into the higher trade good category.

Presuming only Tree Frogs being sold (for the purposes of the example):

- Generic Value Trade Goods sales: 20(=1000/49.92) Tree Frogs
- High Value Trade Goods sales: 20(=1000/49.92) Tree Frogs



Shipbuilding

Shipbuilding requires shipyard complexes, appropriate materials for the ship construction and a tooled blueprint for the ship design.

'Use Best' option – there is an initial check during assembly to determine if high mk items for hulls and armour. If these are present, the construction will begin using the highest mk items present and the hulls and armour will be removed from the base.

If the internal items are present they will also be removed at this time.

Assembly

Total hull assembly = 4 x active shipyards.

Hull assembly of a single ship design
= 20 hulls per appropriate blueprint.

Maximum hull assembly of a single ship
= 2 x $\sqrt{\text{Ship Size}}$

Ships of the same design can be assembled simultaneously.

e.g. a maximum 20 hulls can be assembled on a single 100 hull ship ($=2\sqrt{100}$).

e.g. if 2 blueprints for the same 100 hull design are present and there are many shipyards, two ships will be assembled simultaneously due to the single ship assembly limit.

e.g. a 400 hull ship will require a minimum of 10 weeks ($=400/(2\sqrt{400})$) providing 2 appropriate blueprint and 10 shipyards are present.

One Use Blueprints

Ships over 200 hulls require a blueprint to be exhausted at the point of completion. The appropriate blueprint is removed from the base manifest at the time assembly completes.

Construction List

Issuing the build ship order adds the new ship to the bottom of the list. Each ship will be attempted in list order. If a ship cannot be constructed for any reason, the next one on the line will be attempted. Prioritising a ship will move it to the top of the list.

Construction will continue each maintenance until the ship has been completed.

Once complete there will be an entry on the maintenance report. This will include the ship's number and its security code (required to deliver crew and other items to the ship should it have been built for another player).

Incorporating Items

Along with hulls and armour, a ship will require the installation of the items listed on the blueprint. At the time of adding a ship to the construction list, a check will be done on the items present in the base and all the items listed will be removed from the starbase. If there are insufficient items present, then all that can be taken will be. A list of missing items will be displayed on the starbase report and then stored. At the final stages of construction a second check will be made, incorporating any items that were not present at the beginning.

Ship Design Overview

Either the online ship editor or the off-line ship editor can be used to design a ship. Design requires selecting a number of basic parameters.

- Size (quantity of hulls)
- Hull Type (heavy, normal, light, xlight)
- Hull Material (metal, organic, crystal)
- Race (not needed for ships under 76 hulls)
- Armour

Together these determine the strength and durability of the ship as well as how much internal space is available for installing items and ultimately the purpose of the ship.

These parameters (except armour) however are limited by the technology available at the starbase that will be responsible for the research of the blueprint that will be required to construct the ship. Without a supporting tech research into a new blueprint cannot be initiated.

If the design is not supported by an existing tech at the base where research is to be conducted, then either the starbase owner needs to procure a suitable existing tech or initiate research into a new tech that will support the ship design.

Design Limits

Ship	Size	Size	Material	Design Race
1-25	Small	Not Applicable	Not Applicable	Not Applicable
26-50	Small	Metal/Organic/Crystal	Not Applicable	Not Applicable
51-75	Medium	Metal/Organic/Crystal	Xlight/Light/Standard/Heavy	Not Applicable
75-100	Medium	Metal/Organic/Crystal	Xlight/Light/Standard/Heavy	Advanced
101-150	Large	Metal/Organic/Crystal	Xlight/Light/Standard/Heavy	Advanced
151-200	Huge	Metal/Organic/Crystal	Xlight/Light/Standard/Heavy	State of the Art
201-250	Titanic	Metal/Organic/Crystal	Xlight/Light/Standard/Heavy	State of the Art
251-300	Galactic	Meta-Metallurgy/Bio-tech/Lattice Integration	Xlight/Light/Standard/Heavy	Cutting Edge
301-350	Cosmic	Meta-Metallurgy/Bio-tech/Lattice Integration	Xlight/Light/Standard/Heavy	Cutting Edge
351-400	Giga	Meta-Metallurgy/Bio-tech/Lattice Integration	Xlight/Light/Standard/Heavy	Cutting Edge

Example: EEM Warships - 75Hm is a shipbuilding tech that allows design and researching into new blueprints that can be 51-75 heavy, metal hulls.

Example: If the player did not have a copy of EEM Warships - 75Hm, but did have the three principles; Medium Ships, Material Utilisation Metallic and Heavy Structural Design, it would be possible to either research EEM Warships - 75Hm, or if designed create a new tech with the parameters - 75Hm.

The advantage to researching EEM Warships - 75Hm is that any other blueprints that are supported by the tech can then be researched. The disadvantage is that other owners of EEM Warships - 75Hm, once they find out about the Rake blueprint can research that.

Many affiliations have a warship tech that is - 100HmHu (51-100 Heavy Metal hulls for HUman use). This ensures that they have a monopoly on their own warship blueprints.

Example: DTR Warships - 100HmHu supports various Nebulon blueprints. Each design while incorporating different internal items and have different armour has 100 heavy metal hulls.

The IMP Warships - 100HmHu supports various Ship o' the Line blueprints. Again these are built using 100 heavy metal hulls and in some cases the designs are almost identical to Nebulons. However a Nebulon blueprint will not be supported by the IMP Warship - 100HmHu tech and the appropriate research penalty will be applied should an attempt to research it be undertaken

Research

Once a ship design has been created on Nexus position editor the starbase with the appropriate supporting tech can use a special action to start research.

To do this, indicate the name of the design and its number on the nexus position editor into the special action. Indicate which tech it is based on, how many research complexes will be assigned to the project and the conversion of research points to mass.

The referee will import all the statistics into the game as well as check certain details such as conflict of name or some glaring error that would make its research a waste of time. After acceptance, the GM will also issue the research order as per the standard research rules.

Each ship blueprint has a limit similar to production limits of item blueprints. This is normally 20 hulls. This is combined with shipyards and size of the ship to determine how many hulls of a ship are constructed in a week.

Starships over 200 Hulls

200 hulls is that threshold where unlimited use of a blueprint finally comes to an impasse and each ship needs unique attention. Even the techs supporting the ships get larger on account of dealing with the practicalities of ships that push physical laws to the boundaries.

Tech

Max Hull Size	Tech Mass (MUs)
250	2000mu
300	3000mu
350	4000mu
400	5000mu

Blueprints

Each ship requires the exhaustive use of a blueprint. The blueprint is exhausted when the ship construction is completed.

Ship Size (hulls)	Blueprint Size (MUs)
225	100
250	200
275	300
300	400
325	500
350	600
375	700
400	800

Hard Points

Hard points areas of a ship's hull are designed to mount weapons. They are reinforced and connected to the main energy and sensor grids that are integrated at the time of construction. The quantity of hulls (its surface area) and type of hull determine the quantity of hard point on a ship.

All defence systems including point defence launchers do not require hard points to mount.

- *Heavy Hull* - 2 per point of surface area
- *Normal Hull* - 1 per point of surface area
- *Light Hull* - 1 per 5 points of surface area
- *Xlight Hull* - 1 per 10 points of surface area

All weapons require 1 hard point except:

- *Torpedo Launchers* - 10
- *Guns* - 2
- *Cannons* - 5
- *Batteries* - 50
- *Heavy Batteries* - 150

The Position Editor (on Nexus) can be used to determine the surface area of a ship for differing quantity of hulls and type.

In the example overleaf, a ship is being designed with 100 normal hulls. It has a surface area of 122.6 and therefore 123 (rounded off) hard points, meaning that it can install 24 photon cannons or 61 photon guns.

Templates

Templates, generated using the Position Editor add a huge amount of flexibility to ship design. When used in shipbuilding they allow for the shipyards to ignore the internal components specified by the ship blueprint, replacing them at the time of construction with those listed on the template.

Note that when building using templates, the hulls and armour of the construction remain based on the original blueprint. If, however the template has higher mk hulls and/or armour (though has to be the same type, i.e. light and metal, heavy and crystal etc) it will use the template specifications providing that Use Best option is set to No.

Example: The base is attempting to build a Warhammer design ship but wants to incorporate different weapon systems as defined by the template WARHAMMER Variant 2 WITH mkII Hulls (4321). As well as differing in internal components to the blueprint the template for the Variant 2 also differs in that it is based on mkII heavy hulls.

```
>Date 15.1: Build Ship (1234) (5678) (Priority - No) (Use Best - No) (4321)
Building Warhammer (1235) for position 5678.
Ship's internals will be fitted from template: WARHAMMER Variant 2 WITH mkII Hulls (4321).
- 75 Heavy Hull mkII (81)
- 165 Ablative Armour Plates (460).
```

If however the template had specified the use of Heavy Organic Hulls, the order would have ignored the parameter, instead attempting to use Heavy hulls.

Use of Templates also has the advantage in that it adds items to the cargo (providing that they are in the base). This allows for the inclusion of ammo and personnel - everything needed to make the ship completely ready to go.

Researching Ship Blueprints from Templates

The Position Editor include the capability to define hull and armour items so as to allow for design ships from which to research new blueprints. Providing that the base has the underlying tech a special action to start research into a new ship design blueprint can be submitted simply quoting the template number and underlying tech.

Example:

Special Action:

Initiate research into the Battleaxe ship design based on the Battleaxe (8765) template. This is supported by EEM Warships - 75Hm(9719) tech tooled up at the base. Assign 50 research complexes with a conversion at 10k.

[Markets](#)
[Position Editor](#)
[Base Editor](#)

Export

Import

Copy

Delete

Hull:	<input type="text" value="100"/>	<input type="text" value="Heavy Hull (80)"/>
Armour:	<input type="text" value="200"/>	<input type="text" value="200"/>
		<input type="text" value="Armour Plate (450)"/>

● Stats

Acc Penalty	-0.0
Armour Depth	80.0 AR
Combat Speed	+0.0 g
Crew Factors	610 (0)
Dodge	0.0 (0.0) g
Hard Points	122 / 199
ISR Speed	No ISR drive
Landing Time	None
Manoeuvre Speed	0.0 g
Orbit Time	None
Profile (+to hit)	+2.9
Scan Power	0%
Scan Profile	+99.4 %
Scint Cover	0.0
Sensor Power	0.0
Shield Depth	0.0
Shield Factor	0.0
Shield Recharge	0.0 / r
Surface Area	99.7
Takeoff Time	None
Targeting Bonus	+0.0 (0.0)

Hardpoints

Surface Area

Cancel

Apply

Affiliations and Politics

Affiliations are a collection of assets that adhere to a profile based on location, species and or history.

Assets flying the flag of the affiliation may be owned by players or the affiliation and can be controlled by disparate players.

Differences between player and affiliation owned assets:

- *Only affiliation owned assets pay affiliation tax.*
- *Some affiliation profiles prevent affiliation owned assets flying specific Flags of Convenience (FoC).*
- *Affiliation owned assets can be removed from current player through a successful political issue.*
- *Player owned assets can fly any FoC.*
- *Player owned assets can be transferred to anyone.*
- *Affiliation owned assets can only be transferred outside of the affiliation through a successful political issue.*

Affiliations have diplomatic attitudes to other affiliations. Resulting mutual attitude determines degree of aid and aggression that can occur between affiliations (see Affiliation Relations).

Affiliations may claim systems and determine policies within a system that they claim allowing them to dictate specific enemies within the system and define exclusion zones.

Game Controlled Affiliations

A few affiliations are completely controlled by the game (i.e. the Game Master). These affiliations have their own profiles and normally have assets. They cannot be joined by players and interaction with the affiliation is normally through special actions.

Flags of Convenience

Flags of convenience are a substitution flag raised by a position in situations when using its own affiliation identifier would be inconvenient. While flying these flags the positions are constrained to the profile of the appropriate affiliation. There are 4 Flag of Convenience affiliations:

Affiliation	Cost to Raise Flag (stellars)
Pirate (PIR)	0
Mercenary (MRC)	2000
Privateer (PRV)	5000
Freelancer (FRE)	5000

Positions other than ships require a special action to raise a FoC.

These costs reflect the relative dangers of the transition. Converting back to the affiliation flag is via the standard re-register ship order.

Flag of Convenience Restrictions

Each Flag of Convenience has a profile associated with it and is otherwise treated as a standard affiliation with respect to mutual attitudes with other affiliations.

Freelancer (FRE)

This is for those that simply want to trade and run freighter operations.

FRE positions cannot use the following orders:

- *Cloak*
- *Create Agent*
- *Create GP*
- *Create Outpost (this action can only be completed through a special action requiring GM oversight).*
- *Create Platform*
- *Deploy WoMD*
- *Detailed Scan*
- *Drop Operative*
- *Embark position*
- *Flag of Convenience {FRE} while a position is embarked.*
- *Hire Agent*
- *Orbital Drop*
- *Scan Location*
- *Scan Sector*
- *Scout Location*
- *Subvert Base*

Abuse

FRE are law-abiding as such there is potential for abuse with FRE. Where it comes to light that there has been an abuse, the GM will moderate and take appropriate action up to and including deleting positions.

FRE and Relations

FRE differs from the other Flags of Convenience in that the affiliation is considered friendly to all affiliations that are friendly to the FRE. This means that any affiliation that is friendly to the FRE can defend them. This is the only Flag of Convenience that has this capability. Amongst GM controlled factions, Halo Execution Fleet (HEF), the Yank Kastorian (KAS) and Civilian (CIV) are friendly to FRE.

Privateer (PRV)

This is low level rogue (Han Solo), operating on the fringes of legality. They can use enemy lists allowing them to hunt Darkspace and Borderlands either on behalf of their true affiliation or as mercenaries.

They may however also be used as trading ships as are FRE. As they cannot operate enemy lists in Developing and Core systems, there are quite a lot of systems where they are not considered a threat though again they may be put on system enemy lists or exclusion zones to prevent them doing actions that are considered abuse by FRE.

Privateers can land hostile GP's into other faction's bases outside Core and Developing systems but of course there is the risk that PRV are on the base's enemy list and auto-board list. This GP can be PRV though can be any other faction (basically smuggling in a small rebel team as per the many popular sci-fi films).

Abuse is as for FRE but applied in Core and Developing systems.

Mercenaries (MRC)

MRCs are useful for mounting operations in systems claimed by other factions without the need to raise relations hostility level. They are also good for dealing with individual ships that are hiding behind flags of convenience.

Example: A GBW fleet flying the FRE FoC disperses to various systems. The faction contesting the system can of course hunt them down in Darkspace but cannot touch them in more developed space. They have the option of using raising the MRC flag of convenience on squadrons and then pursuing and attacking the FRE ships in all but Core system. They post the individual ships and add the affiliation posted list to the enemy list of the MRC ships. This allows them to fine grain control of which FRE ships they attack rather than a blanket attack on all FRE ships.

While PRV ships could be used instead of MRC, MRC flagged ships gives greater scope to pursue the FRE ships into all but Core systems.

MRCs can also drop hostile GP's into all but a Core system base. Again this could be a MRC or any affiliation. This is because factions operating MRCs do so outside of their own territory and as such are likely to treat all MRCs in their territory as hostile.

Abuse is as for FRE but applied in Core systems.

Pirate (PIR)

There are absolutely no restrictions on what pirates can do. They can operate anywhere, attack anywhere and ship in GP's anywhere. On the downside as people running the PIR flag of convenience tend to do so outside their own territory, most factions have a standard policy to shoot all pirates on sight.

Relations and System Claims

System claims and affiliation relations make dangers transparent to players who may be outside the command loop of an affiliation or not aware of animosity aimed at their faction. The data is reflected on system maps, indicating if a system is a potential danger zone and if factions found within the system can attack while they are there.

Setting the relationship attitude towards other affiliations determines:

- Potential level of mutual aggression
- Where conflict can occur
- Mutual capability of defending and supporting

An affiliation claiming a star system:

- Receives all system income.
- Set charters and exclusion zones which may include enemy lists*
- Monitor base construction through registration.
- Can declare a system common (public) knowledge (as a free special action but only if the system can be reached from an existing common knowledge system).

**Initiating combat still requires individual positions to add enemy lists.*

System Level

Wages paid to bases in the system combined with support for the affiliation's system claim determine the system level.

The system level determines the level of hostility between affiliations required before combat is possible.

System Level	System Wages (stellars)	System Claim	Relations required to initiate combat
Core	50k	50k	War
Developing	20k	20k	Hostile
Borderland	0	10k	Antagonistic
Darkspace	0	Unclaimed	Neutral
Contested	0	Disputed Claim	Neutral

System Claims

- Bases can claim systems for a single affiliation (or everyone) – this is supporting the affiliation's claim.
- Base must be landed.
- Support can be for any amount up to the quantity trained troops in the base.

- Support for a claim is measured is rounded down to the nearest 1,000.
- A successful claim needs a minimum of 10,000 support.
- Bases supporting a claim are listed on the jump map for the system on Nexus (even if they are not contributing to a successful claim).
- Supporting a claim makes the base detectable and reachable using the Move to Base order.

To contest a system claim:

- Supporting bases need to double the current claim (or 50k more than the current claim - whichever is smaller).

Effect while contested:

- The system becomes contested for 4 weeks.
- Contested system have no restrictions on combat due to mutual attitude (as per darkspace).
- The contested system remains bound by original claimant for purposes of asset sale restrictions and registering outposts.

Ending Contest:

- At the end of the 4 weeks, the system is claimed by the affiliation with the most support.
- Immediately restored to original claimant if contesting affiliation's support no longer qualifies, i.e. has less than double original claimants or less than 50k.

Civilian Claims

Government may contribute to supporting a claim. The amount is set by the planetary infrastructure stage and type of government. This will normally support the affiliation of the world's capital base but may be different due to in-game politics. Where it is different, special actions may be used to interact with representatives of the civilian government, attempting to modify their support. Each situation is unique and is handled on a case by case scenario.

Affiliation Relations

State	Permissions	Lowest Maintenance Cost
War	Can attack the affiliation* in any location	10k
Hostile	Can attack the affiliation* in Developing/Borderlands/Darkspace	5k
Antagonistic	Can attack the affiliation* in Borderlands/Darkspace	2k
Neutral	Can attack the affiliation* in Darkspace	0
Friendly	Cannot attack the affiliation anywhere but can defend (if mutual)	1k
Allied	Cannot attack the affiliation anywhere but can support and defend (if mutual)	2k

* - and their allies

Affiliations' attitude to other affiliations is set by the affiliation leaders using the Nexus interface. The speed and degree of change is determined by the affiliation profile. The overall state of relations between two affiliations is the most aggressive attitude of the two.

Example: If the attitude of affiliation QTL is War towards affiliation GBW, they will be in a state of war irrespective of the GBW's attitude towards QTL.

Example: If the attitude of affiliation QTL is Friendly towards affiliation GBW but GBW is Antagonistic towards QTL; they will be in a state of Antagonism.

Attitudes other than neutral have a cost associated with them, paid from the affiliation wealth. Only the affiliation maintaining the attitude pays the fee.

Maintenance cost

Where more than one affiliation is set to the same attitude the cost follows the formula:

Maintenance Cost = Lowest Maintenance Cost x (Qty(Qty+1))/2

Example: Being hostile to 5 affiliations 75k(=5k(5x6/2))

Affiliations may be friendly to 3 affiliations and allied to 2 affiliations for free. Net amount is used when calculating maintenance cost.

Example: An affiliation is friendly to 4 affiliations and allied to 4. Maintenance cost is 7k stellars (=1k+2k(2x3/2)).

Charters & System Enemy Lists

Charters created by an affiliation can be assigned to claimed systems. The same charter can be assigned to multiple systems. The charter contains information that can be accessed through the system map on Nexus. The charter should contain information about expectations of visitors within the system and may have an associated System Enemy List.

- The system enemy will be set by the systems owner, the list sets the affiliations that are declared enemies inside a system. The system enemy list allows enemies to be declared regardless of the affiliations relations.

- *Those on the system enemy list can attack the system owner, the owner's allies and any bases claiming for the system owner.*
- *Those on the system enemy list can be attacked by the owner and the owner's allies while within the system.*
- *Charters can be used to create exclusion zones that can be assigned to a portion of a system, e.g. an orbital, a group of orbital quads etc. The charter will have different enemy lists to the system enemy list.*

Registered Outpost

Bases can be registered through Nexus with the affiliation owning the system.

- *This registration can be rejected or allowed by the owning affiliation.*
- *Registered outposts are visible to the system owner and show on Nexus.*
- *The registration can be revoked by the system owning affiliation.*
- *The right to attack registered bases is determined by the owning affiliations profile (but is superseded by affiliations' mutual attitude).*
- *Registration of outposts is maintained through system owner change. The new owners may revoke registrations.*
- *Registered positions have 30% greater contribution to system income.*
- *Registration of a base is not revoked if affiliation of base changes.*

Posted Lists

Posted Lists are a way for affiliations to have other people pursue ships. The posted list of an affiliation does not give any permission to attack anywhere (this constrained by attacking affiliation) however it does provide a convenient way to have others attack specific ships and gives permission to attack a ship in the posting affiliation's space.

- *Only ships can be posted*
- *Cost to post is 100 stellars per hull (minimum 1000 Stellars) – this is the bounty.*
- *Bounty is shared between all positions targeting the posted ship at the time it is destroyed.*
- *Cost of reregistering is increased by the bounty. Reregistering removes the ship from the posted list.*
- *Posted ships can be attacked in the posting affiliation's claimed space, system enemy lists and via affiliation's mutual attitude.*

Reciprocated profile options default to the least restrictive option of the two interacting affiliations.

Example: A ship from an affiliation that will only use WoMD in space will use them against a base on a populated world if the base's affiliation has the profile option permitting their use on populated worlds.

Example: CIV (NPC faction used to represent civilians) reciprocates Friendly to Neutral (or better). To defend CIV positions an affiliation need only set their attitude to friendly as CIV automatically reciprocate.



Profile Options

Profile	Options (default option in bold)	Reciprocated
Relations change time	5 days /0 days	X
Maximum single change in relations	1 step /6 steps	X
Can always attack positions in	Cannot carry enemy lists Nowhere Darkspace/Contested systems Darkspace/Contested/Borderland systems Darkspace/Contested/Borderland/Developing systems Darkspace/Contested/Borderland/Developing/Core systems	X X X X
Cannot drop relations below neutral	No /Yes	
Can use Posted Lists of	Own affiliation Own and allied affiliations Own, allied and friendly affiliations Any posted list	
Can own systems	Yes /No	
Affiliation and allies can attack registered Bases	No /Yes	X
Time to revoke base registration	10 days /0 days	X
Can attack friends	Never Via System Charters only Via Exclusion Zone Charters only Via Exclusion Zone and Systems Charters	X X X
Can attack allies	Never Via System Charters only Via Exclusion Zone Charters only Via Exclusion Zone and Systems Charters	X X X
Can use pirate ships	Yes /No	
Can use mercenary ships	Yes /No	
Can use privateer ships	Yes /No	
Can use Free Trader ships	Yes /No	
Player owned positions can use their affiliation flag	Yes /No	
Can use WoMD	On Populated Worlds On Dead Worlds In Space Nowhere	X X X X
Can develop WoMD	Yes /No	
Can ally with affiliations that use WoMD	Yes /No	
Can use slaves	Yes /No	
Can use indentured workers	Yes /No	
Can use PoW workers	Yes /No	
No cost to have relations to the affiliation*	Yes /No	

Profile	Options (default option in bold)	Reciprocated
Can attack own affiliation	Yes/ No	
Sub affiliations (PRV/MRC/etc) can use parent affiliation knowledge	Yes/ No	
Relations required to buy positions in our space	Any Neutral Friendly/Allied Allied Never	
Reciprocates friendly relations if neutral *	Yes/ No	

*NPC Only

System Income Index

System Income = Wages Component + Merchandising Uplift + Trade Uplift +/- Government Modifier

System Income rounds down to the nearest 10,000 stellars.

Wages Contribution

A 6% of wages paid to bases in a system contributes towards system income. This contribution is modified by the System Income index. All profile options are relative from base owner to system owner, taking the least favourable value unless otherwise stated.

Situation or Profile Options	Wages Income Modifier
Can always attack positions: Darkspace/Contested systems	+20%
Relations change time: 5 days	+10%
Maximum single change in relations: 1 step	+10%
Registered position	+10%
System Owner Profile Affiliation and allies can attack registered Bases: No & Time to revoke base registration: 10 days	+20% to registered residents (stacks with above)
Affiliation Profile of Base Can own systems: No	+20%
Position friendly to system owner	+10%
Position neutral or worse to system owner	+30%
Can use WoMD: Yes	-10%
Can use WoMD: On Populated Worlds	-20%
Contributing to system claim	+10%
Use Slaves: No	+20%
Use Indentured Workers: No	+10%

Maximum Wages Income Modifier = +170%

Example: A base has a wage bill of 10,000 stellars and a wages income modifier of 30%, it therefore contributes 900 stellars (=10000x0.06x1.3) towards the system income.

Total System Income

- Wages Component = Sum of individual base incomes
- All worlds with planetary populations and a starbase contribute merchant & trade uplifts and government modifiers to system income.
- Merchandising Uplift = 3% x (Potential Global

Income + Qty of Starbases on world x Potential Local Merchandising Income)

- Trade Uplift = 3% x Potential Sales (Trade Goods + Drugs + Life) – where Trade Uplift cannot be greater than Wages Income for bases on the world.
- Government Modifier = determined by the government profile established on the world

Direct calculation up to 50,000 income.

Capped at 80,000 income.

Logarithmic increase (diminishing returns) in income between 50,000 and 80,000 income.

Hysteresis function compares weekly totals and only changes if there is a change greater than 2,500 stellars between weeks.

Example: A system has 2 starbases on a single world and numerous outposts scattered across the systems. World has global max 150, local max 450, global drop 3, local drop 28 and drop step of 10. Sales for life, drugs and trade are 120,000, 38,000 and 125,000.

Total wage component for the system = 9,300 stellars (=6% of total wages modified by individual income modifiers)

Total wages component for the single world = 7,800 stellars

Potential Local merchandising = 1,153 (= 3% x 38420)

Potential Global merchandising = 1,148 (= 3% x 38250)

Merchandising Uplift = 3,454 (=1,148 + 2 x 1,153)

Sales Uplift = 8,490 (= 3% x (120,000 + 38,000 + 125,000))

Sales Uplift is reduced to 7,800 due to being greater than wages component for the world.

Government Modifier = 0.

Total = 20,554(=9,300 + 3,454 + 7,800 + 0)


System Income = 20,000 stellars (rounds down to nearest 10,000).

The Peripheries

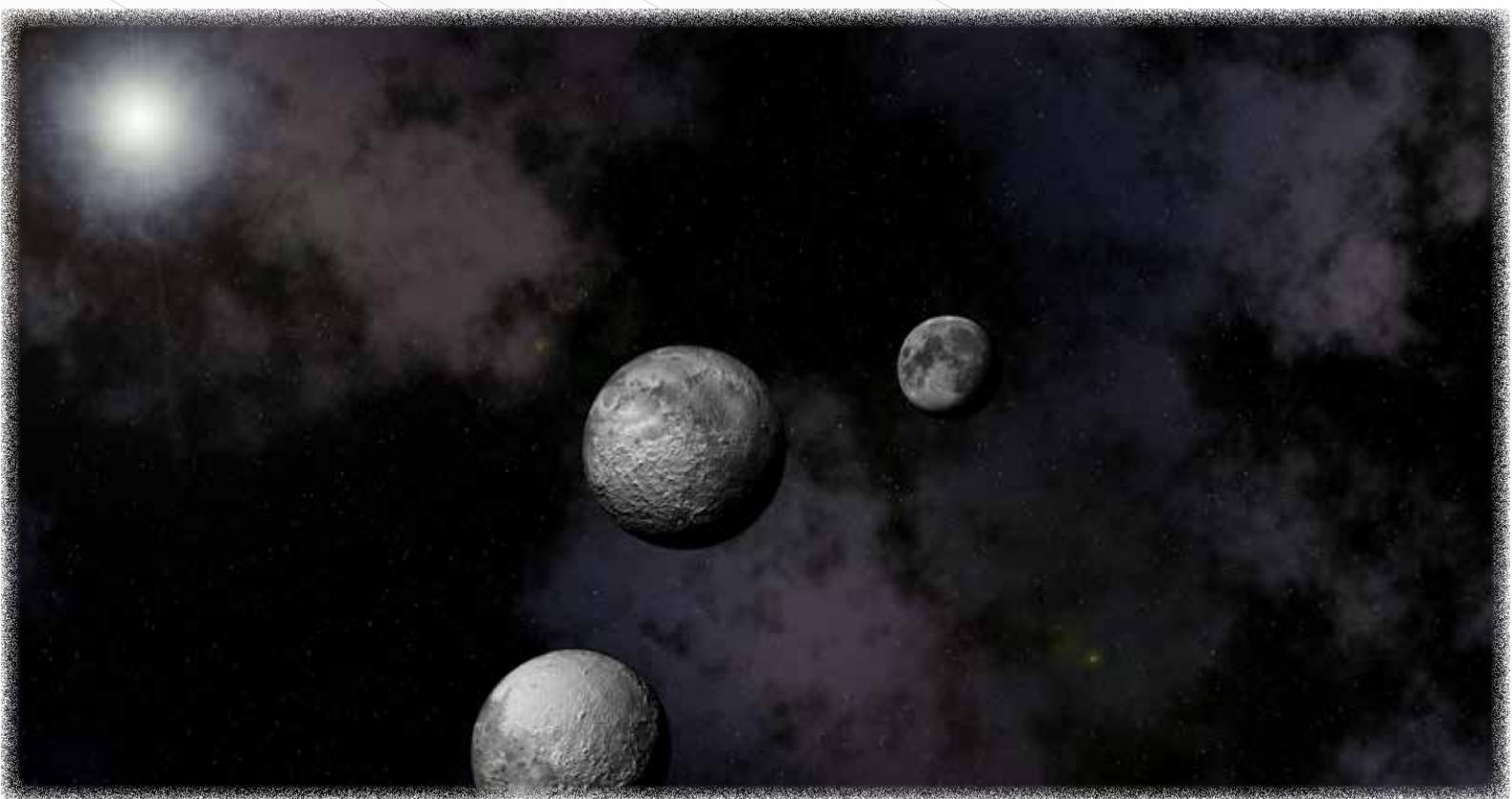
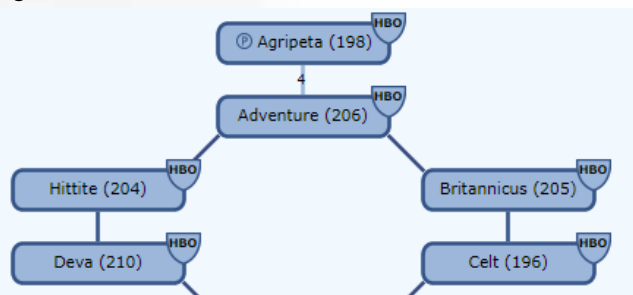
The Phoenix universe is composed of star clusters called Peripheries on account of their location, i.e. Beyond to the Stellar Empire.

Periphery maps only include the tiny percentage of stars reachable by starships even though the physical space occupied by a Periphery accounts for magnitudes more actual stars.

All starting players begin the game in the Halo Periphery as this is a relatively safe region of space due to Game Moderation.

Only known star systems are shown on the Periphery maps. Systems marked with a  are public knowledge.

Navigation routes between known are shown as a line. If a number is shown on the line, it represents a greater distance between the adjoining systems (see Stellar Navigation).



Star Systems

A primary star always exists at the centre of the system. Around this, the system is broken down into 4 quadrants and 15 rings known as orbitals. The maps illustrate relative location rather than physical distance, representing relative travel times for ships moving from one location to another. Most habitable worlds are generally within orbitals 2-5 around typical G class stars.

As the map represents navigation through ISR drives (micro-jumps) rather than reaction drives, the location of celestial bodies are effectively fixed (in the same way a mobile phone number remains the same irrespective of location of the phone).

Stellar Class

Each star has a stellar class based on the ancient Hertzsprung-Russell definition:

- *O - blue stars (1 million solar masses)*
- *B - light blue stars*
- *A - blue/white stars*
- *F - white stars*
- *G - yellow stars*
- *K - orange stars*
- *M - red stars*
- *N - deep red stars (1 thousandth of a solar mass)*

While this likely has some impact on the worlds within the system such that blue stars are unlikely to be old enough to have any terrestrial worlds and deep red stars are likely too cold to have terrestrial worlds, for the most part its real value is for the production of antimatter. Hotter stars are better for production of antimatter.

Worlds

World is the generic name for any celestial body that has a planetary map and includes everything for asteroids up to and including gas giants.

Maps wrap east-west for convenience and consistency. While most terrestrial worlds will have polar ice (top and bottom of the map), divergent worlds with high axial tilt may have deserts at one pole and ice at the other while more unusual worlds may be tide-locked.

Worlds with a population normally have an economy that a starbase can use to generate income (stellars) and sell various goods for more stellars.

Colonisation of a world consists of integrating items and people into the world's infrastructure. As the population grows, buying capability and merchandising increase.

It is possible to terraform a world, changing its temperature, atmospheric composition, and the classification of individual sectors normally for the benefit of starbases present.



Gas Giants

These are large planetary bodies that are enveloped in a thick cloud layer. They come in many forms from hot Jupiters and small brown dwarfs to ice giants. There may be a solid surface though this is too deep within the atmosphere to be explored directly. Ships 'landing' on a gas giant are actually at a depth equivalent to approximately 1 Bar pressure (though atmospheric content determines the optical depth).

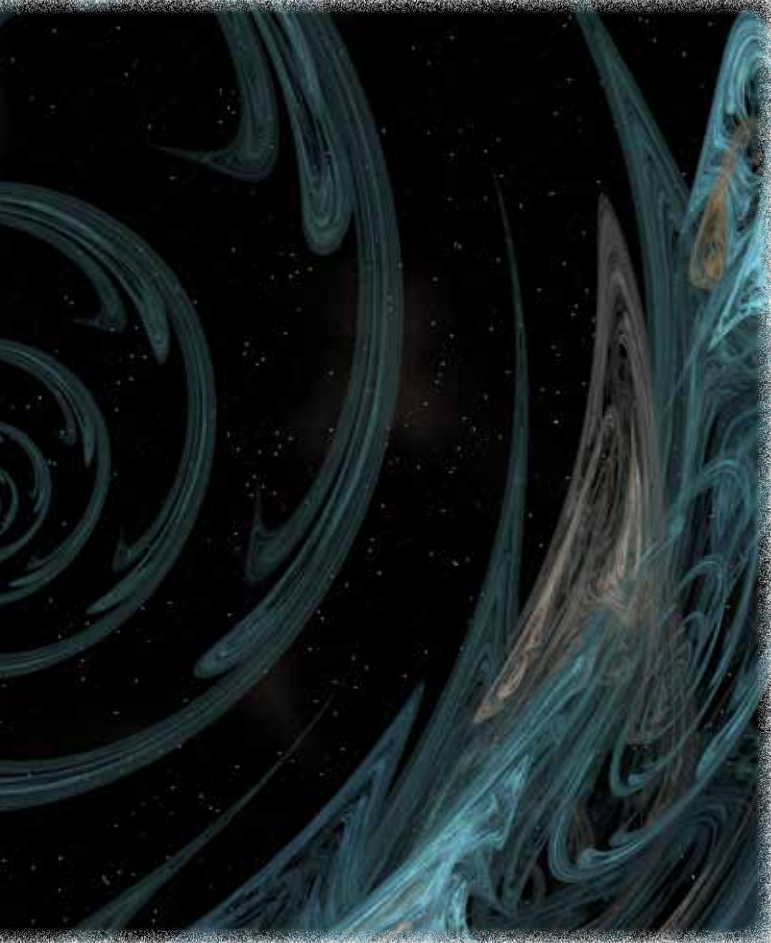
If the world has resources or minerals that can be exploited, outposts can be built on the 'surface.' These cloud bases are effectively the same as standard outposts.

Planets

Planets vary considerably from rocky lifeless rocks to garden worlds. Highly active worlds (large amounts of molten rock, high temperature and seismic activity) tend to have the best mineral deposits both in terms of quantity and quality but are unsuitable for colonisation.

Moons

Moons are satellites of other celestial bodies. While they are often smaller than planets in terms of sectors, they are in many ways similar and can be treated in the same manner for purposes of moving between worlds.



Nebulas

Nebulas are clouds of gas that are dense enough to pose a navigational hazard to ships. Entering the orbital quad they are located in has a probability of the ship suffering an integrity loss multiplied by the Integrity Modifier of the ship.

Orbital probes can be used to determine the probability and degree of integrity loss from an adjacent nebula.

Asteroid Belt

A belt is simply a collection of tiny asteroids that are sufficiently numerous in a region of space to pose a navigational hazard to ships passing through the orbital quad. Entering an orbital quad containing a belt has a probability of striking an asteroid and suffering damage. Ships automatically attempt to avoid collisions. Success is based on the Dodge rating of the ship.

Safely entering the belt from an adjacent orbital quad using a special action (use reaction drives) is possible. This is not possible if a nebula also occupies the destination location.

Orbital probes can be used to determine the probability and degree of damage from an adjacent nebula.

Asteroids

A typical system will have hundreds of thousands if not millions of asteroids. All but a few are chunks of ice and dust and of no interest (and as such are simply not reported anywhere). Only ones detected with potential become part of the information database. From this point on it is treated just as any other world and will show up on system maps and can be used in move to planet orders. These asteroids are also large enough to build bases on and normally have at least one ore that can be mined.

Wormholes

Wormholes link two regions of space. A ship entering one end will automatically exit the other. A wormhole always has an origin point, considered the fixed end of the wormhole. The other end however may move between locations.

Risk

Ships using wormholes may suffer integrity loss. The loss is modified by the ship's Integrity Modifier.

Stargates

Stargates are artificial subspace structures built using advanced technology. They connect locations by linking gates together. Ships entering a stargate must have the appropriate key (or visa) installed. Visas are one-use keys.

Safe Navigation

There are two methods of developing safe routes through an asteroid belt. In both cases though this is only possible where the belt does not coincide with the presence of a nebula.

Navigational Buoys

Buoys represent a series of beacons that have been trail-blazed through an asteroid belt and linked to two fixed locations on either side of the belt. They are created through special actions (one special action on either side of the belt) by exhausting a platform and 10 sensors each time. The second special action should also request that the second buoy is linked to the first.

Map Safe Route

Mapping a safe route through an orbital quad containing a belt requires the exhaustive use of Belt Analysis as a special action by a base within the system (tooled Stellar Cartography is also required but not exhausted). This will generate a navigation code that is used along with the Enter Belt order (anyone knowing the code can use it). The route will also have a minimum officer Dodge skill required to use the route (normally) based on the % chance of a collision for the belt:

% collision	Minimum Dodge Skill
<5%	No skill
5-19	1
20-34	2
35-49	3
50+	4

Infrastructure

Infrastructure is the all-inclusive term describing world economies, populations, colonisation, terraforming, and associated features and statistics.

Infrastructure statistics are derived from the size and species of the population, technological upgrades, government, and environment. All these areas can be modified and developed using Integrate, Audit and Terraforming orders.

Key features of infrastructure are:

- *Colonisation Stage* – represents the progression from a small settlement on a wild world to planetwide civilisation.
- *Population* – determines size of economy.
- *Dominant Species* – may restrict the establishment of specific governments. Determines relative contribution of terrain types to economy. Determines suitability of environment.
- *Technological Upgrades* – modify economy. May have optimal stage below which the modification is reduced.
- *Government* – modifies statistics such as the economy, security, system claim and use of slaves. Some governments are aligned to affiliations.
- *Capital* – a base that can update the infrastructure of a world and establish new governments.
- *Environment* – modifies the cost of Technological Upgrades and the Life category of Commerce.
- *Unique Cultural Modifier* – infrastructure modification that are outside direct player control. They reflect how a world differs from generic versions.

Populated Worlds

Newly discovered worlds are classed as Divergent, even if they have a large native population providing that its native population is not recognised as one of the common advanced sentient species.

Advanced Sentient Species are:

- *Sentient* – a catchall term for many advanced species that are too few to warrant their own classification.
- *Aquaphid* – sentient aquatic species. Species tend to be cephalopod analogues on account of tool usage.
- *Dewiek* – an uplifted canine analogue species from indeterminate origin
- *Falconian* – uplifted avian analogue species. The primary species originated on Acropolis.
- *Felini* – an uplifted feline analogue species originating from Leonis
- *Flagritz* – ancient space faring species with a history of enslaving other sentient species.

- *Hive* – various sentient invertebrates with exoskeletons. More than a dozen species are known
- *Human* – the species originating from Sol.
- *Kastorian* – species genetically pre-disposed to heavy handed law and order.
- *Krell* – a few species sharing common traits including tribalism and a tolerance for extreme environments.
- *Naplian* – recently uplifted natives that have strong cultural ties to their heritage. Many species are known and tend to band together for political rather than biological motives.
- *Mohache* – a unified naplian species that has retained its cultural heritage despite uplifting. Originated from Tranquillity.
- *Wimbles* – sentient herbivores with strong tendencies towards pacifism.

Divergent Environment – bases require to be enclosed, i.e. needing domes and caves.

Terrestrial Environment – bases do not require domes or caves.

Terrestrial status is granted if the environment is compatible with the dominant advanced species and can be achieved through Audit World by the capital base as a standard action.

Example: A world is discovered with a million natives. It is classed as divergent, but an audit world indicates that it is compatible with krell. A base is established and 100,000 krell are integrated along with Basic Colonisation, establishing the base as the capital. The base issues the order to Audit World, that automatically updates the world to terrestrial status.

A special action can be used to update to terrestrial action providing that the dominant advanced population numbers at least 10,000.

Example: Audit World determines that a moon is terrestrial for Mohache. 10,000 mohache are integrated via an outpost and a special action is issued requesting that the world is updated to terrestrial status.

NB Unique exceptions exist that may grant or deny terrestrial status.

Civilian populations

A population is defined as intelligent life only if it contributes or has the potential to contribute to the economy of the world that is accessible to starbases. A world with zero population may still have intelligent life (native or otherwise). These are normally only encountered through explorations or investigations.

Were a percentage of a population is classed as native, they do not contribute to the economy except possibly through a cultural modifier. They are suitable for uplifting to one of the advanced sentient species at which point they will contribute as normal. This may alter or cancel the unique cultural modification.

As the economy accessible to starbases is only derived from the contributing population, the true population is normally higher. It is from this undocumented population that colonists and personnel are procured.

Colonisation

A world's merchandising and commerce can be increased by integrating people and infrastructure through bases. There are five stages of development from fledgling colony to mature economy. Each stage represents a milestone resulting in large upgrades to merchandising and commerce.

Population is the minimum quantity of non-native people contributing to the economy.

Integration of Required Technology must be completed. Each stage technology is significantly larger than the previous one (see Infrastructure). The stage will drop if requirements are no longer being met.

Merchandising numbers represent the maximum amount of stellars per merchandising complex (see Merchandising).

Trade is the trade category potential income through planetary sales (see Commerce). Drugs sales are derived from Trade and Life demands and are a function of the government and species.

Trade and merchandising values are modified through governments, unique cultural modifiers and integrated technologies.

Minimum world diameter is the sector width of the world.

Colonisation Stage	Minimum Population	Required Technology	Base Local Merchandising	Base Global Merchandising	Base Trade*	Minimum World Diameter
1	100,000	Basic Colonisation	150*	40*	12,000	1
2	1,000,000	Advanced Colonisation	350*	120*	25,000	1
3	5,000,000	Developing World	450	150	70,000	4
4	20,000,000	Emerging Economy	450	150	250,000	16
5	100,000,000	Worldwide Infrastructure	450	150	500,000	31

*increases with population (see Determining Merchandising and Commerce Values)

Example: A moon with a diameter of 15 sectors is limited to Colonisation Stage 3.

Determining Merchandising and Commerce Values

Stage	Economy Parameter	Formula (k = 1,000, M = 1,000,000)	Maximum
1	Global Merchandising	$40 + 60 \times (\text{population} - 100k)/1M$	115
	Local Merchandising	$150 + 200 \times (\text{population} - 100k)/1M$	330
	Trade MAX INCOME	$12k + 15k \times (\text{population} - 100k)/1M$	24,000
2	Global Merchandising	$120 + 30 \times (\text{population} - 1M)/5M$	140
	Local Merchandising	$350 + 50 \times (\text{population} - 1M)/5M$	400
	Trade MAX INCOME	$25k + 50k \times (\text{population} - 1M)/5M$	65,000
3	Trade MAX INCOME	$70k + 200k \times (\text{population} - 5M)/20M$	240,000
4	Trade MAX INCOME	$250k + 250k \times (\text{population} - 25M)/100M$	450,000
5	Trade MAX INCOME	$500k + 120k \times (\text{population} - 100M)/100M$	900,000

If a population changes, the above values will normally require an Audit World to update.

As colonisation stage increases, Trade and Drugs VALUE/MU will decrease (Life VALUE/MU is based on the environment).

Commerce Statistic	Colonisation Stage				
	1	2	3	4	5
Trade VALUE/MU	2.00	1.50	1.00	0.85	0.75
Drugs VALUE/MU	1.00	0.75	0.50	0.25	0.00

VALUE/MU parameters may be modified by infrastructure tech upgrades (see Integrating Techs).

Obtaining Colonists

While it may be possible to strike deals with other players for colonists, four methods of obtaining colonists directly exist:

- *Export Markets* - quantity and price based on stage and integrated technology. Species and relative quantity (where more than one are available) reflects the sentient population diversity.
- *Political Influence* - used to obtain colonists from a world at stage 2 and above.
- *Resource Complexes* - investigations may reveal sources of colonists or civilians reflecting the local situation.
- *Special Action* - normally issued in response to an event or investigation to gain people as a one-off event.

World Suitability

The cost of colonisation is significantly influenced by the species that make up the dominant sentient population and the world's environment. The suitability of a world for colonisation can be determined through the Audit World order. The order can be used to test the compatibility of any sentient species.

O optical depth is a measure of atmospheric density. This is combined with the atmospheric components to determine whether more penalties apply.

Example: A world with a thin atmosphere will have a penalty to Life Value/MU for oxygen even if the relative abundance is compatible with the dominant sentient species.

World Status indicates whether bases on the world need to be enclosed (divergent) or open (terrestrial).

A world is divergent if:

- Any component of the atmosphere is classed as Toxic (reported on the Audit).
- An environment category has an infrastructure increase greater than 20.
- A combined infrastructure increase is greater than 50.

The two columns 'Calculated' and 'Actual' account for the possibility that the world is currently not set at its potential (calculated). This may be due to ongoing development of the planetary infrastructure. The world's capital base may issue a request to update the infrastructure to calculated values as part of the Audit World order. On worlds without a capital a special action can be used to request an update to calculated values.

Environment	Value	Infrastructure Increase	Life Value/mu
Gravity (g)	0.91 (Normal)	0%	-0.09
Temperature (k)	351 (High)	18%	-0.56
Tectonic (%)	9 (Normal)	0%	-0.04
Radiation (%)	0 (Normal)	0%	0
Atmosphere: Normal (18.07)			
Oxygen	15%	3.19%	-0.42
Nitrogen	85%	0%	0
World Status: Divergent. Needs Domes			
Merchandising	Calculated	Actual	
Life Max Income:	51430 (0)	51430	
Life Value/mu:	0.985	0.985	

Value is the measure of the environmental category in appropriate units followed by the compatibility indicator for the dominant sentient species.

Infrastructure Increase occurs where an environment Value diverges from the optimum compatibility for the dominant sentient species. Infrastructure Increases are cumulative though max out at 100%. This penalty is applied to the quantity of infrastructure items required to complete an integration.

Life Value/mu represents the quality of the world from an investors point of view. The perfect garden world has a value of 2.1.

Colonisation Stages

There is a time requirement for each Colonisation Stage. A world cannot upgrade to the next Colonisation Stage during this period. From Initial Colonisation to Established World takes a minimum of 7 years.

Colonisation Stage	Time Requirement	Minimum Age of Colony
1	1 year	-
2	1 year	1 year
3	2 years	2 years
4	3 years	4 years
5	-	7 years

A base successfully integrating the next Colonisation Stage is promoted to world Capital (see Integrating Technology).

Capital Status

Capital base benefits:

- *Update world to calculated values.*
- *Unaffiliated Government support towards Capital's system claim (automatic).*
- *Request an affiliated government (that at least friendly to the Capital affiliation) support a specific system claim (special action).*
- *Raise militia from the civilian population.*
- *Establish a new government.*

Technology Integration

Integrating technology to modify the infrastructure of a world is achieved through the following steps:

- *Select the infrastructure to integrate.*
- *Use Audit Base order with the appropriate upgrade selected to determine requirements.*
- *Integrate the appropriate tech and infrastructure items to satisfy the requirements.*
- *Issue Audit Base order with the appropriate upgrade selected to complete integration.*
- *Issue Audit World to update parameters such as merchandising and commerce.*

Infrastructure upgrades have the following requirements:

- *Tech item – this must be tooled in the base before being integrated.*
- *Infrastructure points* – items provide infrastructure points for a specific category (amount and type detailed in tech manual.*
- *In the case of Colonisation Stage upgrades, minimum population, and time-period since last upgrade.*

**Unless otherwise stated, upgrades cost 160,000 infrastructure points (modified by environmental infrastructure for the world), distributed into one or more Infrastructure Categories.*

Infrastructure Categories:

- *Advanced*
- *Agricultural*
- *Basic*
- *Industrial*
- *Military*
- *Structural*
- *Transport*

Specialist Items

Items geared towards an extreme type of environment contribute double infrastructure points when integrated. Extreme environments are those outside the optimal range for the dominant species forming the population. Qualifying items are identified with an asterisk in Audit Base reports. Environment types:

- *High Gravity*
- *Low Gravity*
- *High Temperature*
- *Low Temperature*
- *Dense Atmosphere*
- *Thin Atmosphere*
- *Hostile Atmosphere (any component is classed as toxic)*
- *High Tectonic Activity*

Example: Heat Shields (3103) contributes 40 structural infrastructure points when integrated. On a High Temperature world, they contribute 80 points.

Each item has a maximum percentage points they can contribute to the integration. Higher mk versions are grouped, counting towards to the same percentage.

Example: Light tank may account for 10% of the military infrastructure requirement. If the base has multiple mk's of Light Tank, any can be integrated but the total contribution from integrated Light Tanks is capped at 10%.

The distribution of the points between the Infrastructure Categories reflects the upgrade. The Audit Base order reports the requirements for each category.

Example: Unmodified point requirements of three common upgrades:

- *Industry: 20k Basic, 80k Industry, 40k Structural, 20k Transport*
- *Transport: 40k Industry, 40k Structural, 80k Transport*
- *Agriculture: 80k Agriculture, 40k Structural, 40k Transport*

Infrastructure Upgrades

Upgrades can be broken down into the following categories:

- *Colonisation Stage*
- *Economy Modifications*
- *Environment Modification*
- *Emigration*
- *Other*

Stage Upgrades

Colonisation Stage	Upgrade Title	Tech Required	Infrastructure Points*
1	Initial Colonisation	Basic Colonisation Support Tech (8652)	10,000
2	Stage 2 Colony	Advanced Colonisation Support Tech (8655)	40,000
3	Stage 3 Developing World	Infrastructure Development Tech (8656)	80,000
4	Stage 4 Emerging Economy	Emerging Economic Infrastructure (8657)	160,000
5	Stage 5 Established World	Worldwide Infrastructure (8658)	320,000

* for Colonisation Stage upgrades, points for in all 7 infrastructure categories, i.e. for Stage 4, 160,000 points are needed in Advanced, Agricultural, Basic etc.

Economic Upgrades

The following list covers common economic upgrades. Some produce additional modifications such as improving import or export markets or adjusting crime or smuggling on the world.

Economic Upgrade	Optimal Stage	Trade VALUE/MU	Drugs VALUE/MU	Local Drop	Global Maximum	Local Maximum	Drop Step
Industry	2	+0.1					
Agriculture	2	+0.1					
Transport	2	+0.1					
Administration	3	+0.05		-1			
Health	3	+0.05		-1			
Mining	3	+0.05		-1			
Economics	3	+0.05		-1	+10	-50	+1
Tourism	3	+0.05	+0.1		-10	-50	
Security	4	+0.03					
Education	4	+0.03			+10	-50	+1
Urbanisation	4	+0.03			+10	-50	+1
Pharmatech	4		+0.2		+15	-50	
Military	5	+0.02					+1
Media	5	+0.02					+1
Naval	5	+0.02					+1
Biomech	5		+0.1				

Optimal stage is the stage at which full bonus is gained. Bonus is halved for each stage below optimum stage.

Environmental Upgrades

These upgrades are designed to mitigate or cancel negative effects of sub-optimal environmental conditions. Upgrades dealing with terraforming are in the terraforming section.

Upgrade	Effect
Applied Gravitational Fields	Reduce infrastructure penalty by 5% and life demand penalty by 0.4 attributed to gravity.
Localised Seismic Dampening	as above but with tectonics by 5% and 0.4
Ecology	as above but with temperature by 5% and 0.4
Oxygen Tolerance	as above but with oxygen component of the atmosphere by 5% and 0.4
Planetary Restoration	Once integrated may be exhausted (removed from infrastructure) to counter some or all cultural penalties that has resulted from the use of WoMD.
Sub-zero Support	Reduce infrastructure penalty by 5% and life demand penalty by 0.4 attributed to temperature when temperature is below the optimum range.

Emigration Upgrades

These upgrades are designed to increase the quantity of colonists available on the world export market. These people are taken from the component of the population that does not contribute to the economy.

Upgrade (MUs)	Colonist price modifier	Colonists per week available on Export Market			Infrastructure Points
		Stage 3	Stage 4	Stage 5	
Off-world Promotion (1,000mu)	-1	5,000	5,000	5,000	80k Advanced, 40k Basic, 40k Transport
Emigration Services (3,000mu)	+0.2	20,000	40,000	40,000	40k Advanced, 40k Structural, 80k Transport
Colonisation Training (4,000mu)	+0.3	15,000	30,000	60,000	50k Agriculture, 20k Basic, 20k Industry, 30k Military, 40k Structural, 40k Transport
Cloning (5,000mu)	+0.5	20,000	40,000	80,000	100k Advanced, 100k Agriculture, 40k Basic, 40k Industry, 40k Structural

Example: A Colonisation Stage 4 world with Off-World Promotion and Emigration Services integrated will have an extra 45,000 colonists for sale each week. As the standard price for colonists is 2 stellars, the new price is 1.2 stellars.

Other Upgrades

Upgrade	Notes	Decay	Infrastructure Points
Planetary Shields	Cannot be integrated below Colonisation Stage 3.	4,000	60k Advanced, 20k Basic, 80k Military, 40k Structural
Strion Upgrade	Gives strion bonus (+10%) to first 100 mass production factories, if strion is available at the starbase.	1,000	80k Advanced, 40k Industry
University Upgrade	Allows Principles and Techs integrated into the planetary universities to be used by all starbases on the world as though tooled up in the starbase.	1,000	100k Advanced, 40k Basic, 20k Industry, 40k Structural
Native Uplifting	Automates the uplifting of sentient natives to an appropriate species (see uplifting natives).	1,000	90k Advanced, 40k Basic, 50k Structural

Example: Integration of Transport upgrade is selected. Audit Base {Transport} {} is issued, generating a report.

Infrastructure cost increase = 20.99%

Audit of items suitable for Transport(8642) civilian infrastructure improvement.

Required technology - Transport(8642) - present - needs integrating.

48396 Industry infrastructure required.

Max Qty	Industry Item	Value	Max%	Contribution
-----	-----	----	----	-----
48396	Basic Elements (2)	0.1	10	4840
16132	Complex Compounds (5)	0.3	10	4840
72594	Hydrocarbons (3)	0.1	15	7259
82	Industrial Module (400)	20	100	1640
48396	Metals (1)	0.1	10	4840
2420	Rare Earth Elements (22)	1	5	2420

48396 Structural infrastructure required.

Max Qty	Structural Item	Value	Max%	Contribution
-----	-----	----	----	-----
968	Rock Structural Module (430)	50	100	48400
2420	Structural Module (420)	20	100	48400
10	Structural Module mkII (421)	20	100	200

96792 Transport infrastructure required.

Max Qty	Transport Item	Value	Max%	Contribution
-----	-----	----	----	-----
121	Shuttle (803)	40	5	4840
69	Transport Module (415)	20	100	1380
2042	Transport Module mkII (416)	20	100	40840

The report indicates that there is a 20.99% increase in each infrastructure category. Each category reports the modified quantity of points that require integrating followed by a list of appropriate items present in the base and the maximum amount (or the amount present) that can be integrated, satisfying the requirement. The decision as to which items to integrate lies with the player. In the above report the player chooses to use Structural Modules to satisfy the Structural infrastructure requirement as the Rock Structural Modules are intended to build cave complexes for the base.

Damage and Decay of Integrated Techs

- Upgrades with a decay rate suffer weekly attrition in points equal to the rate of decay.
- Decay occurs after Weekly Adjustments.
- Decay only occurs on completed Infrastructure Upgrades (not on Upgrades classed as integrating).
- Random items integrated into the Upgrade are selected for decay until the weekly decay has been satisfied.
- Item's infrastructure point value is used (not MUs or Defence).
- If any Infrastructure Category drops below 50% required points, Upgrade is returned to integrating status and benefits are lost.
- Integration of items will off-set decay and provided no category falls below 50% the upgrade will remain complete.
- If completed status is lost, the Upgrade will be treated as an integrating upgrade for the purpose of completing integration (needs each category returning to 100%).
- Damage follows the same process, but damage mechanic is substituted for item infrastructure points.
- Integrated Tech items are immune to decay.

Governments

A government reflects the culture of the dominant population or the overwhelming influence of the capital base.

- Colonisation Stage 1 (Initial Colonisation) defaults to Ad Hoc.
- Only the capital base can establish a new government.
- Governments modify infrastructure, provide militia and may support system claims.
- Establishing a new government may take an extended period.
- Governments may have one or more of the following requirements:
 - » Seconded Control Factors
 - » Minimum Colonisation Stage
 - » Integration of specific Infrastructure Upgrades
 - » Percentage population of a specific Sentient Species
 - » Limited to an affiliation capital
 - » Specified civilians integrated into the population

Establishing Governments

Political order 'List Governments' reports available government choices. The details include modifications the government will make to infrastructure statistics of the world at Colonisation Stages and criteria for establishment.

Establishing a government requires the presence of an active political position at the capital base issuing the order. Where a government is restricted to an affiliation, the political must be in the affiliation though the capital base does not need to be.

Example: A GTT capital base may issue the Establish Government {Imperial Territories} {33334} where Imperial Territories is a government restricted to the IMP and {33334} is the item number of IMP Political currently within the GTT capital base.

The Audit World order can test the effect of a government on infrastructure. If the order is issued with a government filled in, the report will be generated in Testing mode.

Example: A world has recently integrated people and Infrastructure Development, achieving Colonisation Stage 3. Currently the world has an Ad Hoc government. Audit World {} {Capitalist} {} is issued to determine the potential changes to infrastructure.

Merchandising	Pre-Gov	Actual
-----	-----	-----
Global Max:	150	145
Global Drop:	3	3
Local Max:	450	440
Local Drop:	31	31
Drop Step:	10	10
Life Max Income:	43225(16000)	38903
Life Value/mu:	1.144	1.144
Drug Max Income:	0	13280
Drug Value/mu:	0.8	1.1
Trade Max Income:	179140	170183
Trade Value/mu:	1.2	1.2

Government Modifiers:

Government:	Capitalist (Testing)

Global Max:	155
Global Drop:	3
Local Max:	465
Local Drop:	31
Drop Step:	10
Life Max Income:	34234
Life Value/mu:	0.844
Drugs Max Income:	5187
Drugs Value/mu:	0.8
Trade Max Income:	182944
Trade Value/mu:	1.5

Pre-Gov lists the raw infrastructure values of the world based on environment and infrastructure upgrades. Actual lists the raw values modified by the current Ad Hoc government and Government Modifiers list how the raw infrastructure values will be modified under a Capitalist government.

The new government will be established on Weekly Maintenance Day of the capital base following the Weeks to Establish period (providing the establishment criteria still holds).

Civilian Requirements

Governments require specialist civilians integrated into the population before they can be established.

Example: A Port government requires a Capitalist.

Specialist civilians are subclasses of the Civilian item.

Naplian Capitalist (45204)	
Name	Naplian Capitalist
Number	45204
Type	Civilian
Mus	1 mus
Production	1
Race	Naplian
Subtype	Capitalist
Lifeform	1
Wages	4000
Tech level	1
Move Rate	100 tus
Move Type	Ground
Tech Manual	Naplian Capitalist required for establishing specific governments or colonising planets.
Infrastructure Type	None
Infra Environment Type	None

Governments associated with a specific species normally require the civilian to be of the same species. Specialist civilians appear on world export markets. The frequency is based on the Infrastructure Stage of the world and the type reflect the current government and Infrastructure Upgrades on the world. They can also be obtained through the 'Use Political Influence' order.

If no readily available source of specialist civilian can be found, special actions issued at the most reasonable location will indicate the best course of action to find one (which may simply offer one for a stellar fee).

Specialist civilians normally have high wages which ends when they are integrated into a population. Civilians cannot be picked up or otherwise removed from a world once integrated.

Control through Secondment

Along with required techs and civilians (listed on the government profile), establishing a government also requires troops to be seconded into the population through the Integrate People order. Seconded troops' control factors count towards satisfying the Control requirement for establishing a government.

Seconding costs 30 stellars per troop.

Control requirement is increased by the Resistance to Change of the existing government.

Example: Anarchy has a 15,000 Resistance to Change. Establishing a Port government (1,000 Control) therefore requires 16,000 Control factors to be contributed from integrated troops.

Example Government:

Port (30)		Aff:0				
Control Needed:	1000 factors					
Resistance to Change:	5000 factors					
Weeks to Establish:	0					
System Income Mod:	0 stellars					
Militia:	1 per 5000 Civilians					
Security Modifier:	5%					
Can use Slaves:	No	Security Mod: x1				
Can use Indentured:	No	Security Mod: x1.3				
Stage	1	2	3	4	5	
Claim Support	0	1000	5000	10000	15000	
% Life>Drugs	10	10	10	10	10	
% Life>Trade	10	10	10	10	10	
Trade Mult	0.1	0.1	0.1	0.1	0.1	
Life Mult	-0.1	-0.1	-0.1	-0.1	-0.1	
Required Tech Upgrades						

Basic Colonisation Support						
Qty	Required Civilians					
---	-----					
1	Capitalist					

Seconded Troops

- Access to affiliation troops is automatically granted to all members of the affiliation seconding the troops.
- Access to the affiliation's seconded troops can be granted to other affiliations by the any base on the world.
- Accessible troops count towards government establishment Control.
- Accessible troops can be mustered.
- Seconded troops suffer decay at a rate of 0.02% per week (approximately 10% per year they remain seconded).

Example: A WFT base on a world grants the FFT access to their seconded troops. The FFT own the recently captured capital base. They can now count the accessible WFT along with their own seconded troops when attempting to replace the current capitalist government with FFT Territories government.

Muster

Reclaiming seconded troops requires the Muster (base) order and takes approximately 50 days to complete modified by the government muster modifier (if it has one) and further reduced by 5 days for each of the following Infrastructure Upgrades:

- Transport
- Military
- Security
- Naval

Mustered troops will be added to the mustering base on the first Position Maintenance Adjustment following the completion of the muster period.

Seconded troops can support other affiliations to support the establishment of a government providing access has been granted by the seconding affiliation.

Mustering is initiated by any base on the world with access to the seconded troops. Mustering will cease if the controlling affiliation changes.

Features

A government may have some of the following features:

- *System Income Modifier* – bonus is capped at world income.
- *Militia* – potential available when attempting to raise a militia. Calculation is based on the dominant population.
- *Security Modifier* – 5% and below is poor. 25% is high. Modifies the amount of positive security factors generated by personnel and determines prevalence of Non-Player-Controlled (NPC) pirates and smugglers in the system.
- *Can use Slaves/Indentured* – whether bases can use them to generate work hours and a modifier to items negative security factors (negative security factors always count).
- *Stage Modifiers* – these may start at Colonisation Stage 1 or 3 for governments designed to administrate larger populations.
- *Claim Support* – will normally be the same as the capital base.
- $\%[\text{Commerce Type}] > [\text{Commerce Type}]$ – modification of percentage of MAX WEEKLY from one category to another. Adjustments are made as part of Audit World.
- $[\text{Commerce Type}] \text{ Mult}$ – modifier to VALUE/MU
- *Global/Local Max* – modifier to appropriate merchandising values.

Uplifting Natives

A native population is considered below contemporary levels of technology though sufficiently sentient to warrant uplifting, i.e. being educated in contemporary technology and culture. No moral weighting on the merits of uplifting versus remote observation are made though the uplifting process may invoke or remove a Unique Cultural Modifier.

The process of uplifting is two stage. Investigations are issued to encounter representatives of the natives and overcome any impediments to uplifting. Once concluded this is followed by completing Native Uplift Infrastructure Upgrade to modify the population on a weekly basis.

Investigation will reveal:

- *Raw rate of uplifting* (measured as a percentage of the native population per week). Typically, 0.02%.
- *Destination sentient species* (closest match based on description of the natives). Naplians are often generated as a by-product of uplifting.

- *Potentially allow player to influence the above parameters.*

Example: For a native population with Iron Age level infrastructure and a willingness to embrace contemporary levels of technology and similarities to Felini, a weekly raw uplift of 0.02% is typical, i.e. around 6,000 natives uplifted to felini on a world with 30 million. Around 1,500 natives are also uplifted to naplians

Example: A more advanced culture such as Earth circa 2020 might have a much higher uplift %, possibly as high 0.1%.

Example: A large native population consists of multiple species one of which is like wimbles. A player could direct uplifting to favour the wimble natives (wimbles as the destination sentient species) or elect for even uplifting (sentient as the destination species) or even opt for naplians.

Initiate Uplifting

Native Uplifting (8789) Infrastructure Integration has a weekly decay rate. Weekly uplifting only occurs while integrated. Notifications of uplifting are issued. Raw uplift value is modified by Integrated Infrastructure upgrades:

$\text{Uplift} = \text{Raw Uplift} \times \text{total modifier (where modifier min is 1)}.$

Infrastructure Upgrade	Modifier
Agriculture	+0.5
Industry	+0.5
Urbanisation	+0.5
Transport	+0.5
Administration	+1
Education	+1
Health	+1
Biomech	-0.5
Economics	-0.5
Pharmatech	-0.5
Security	-0.5
Tourism	-0.5

Example: A world with a raw uplift of 0.02% has Agriculture, Industry & Health. This results in an uplift of 0.04% ($=0.02 \times 2$)

Example: A world with a raw uplift of 0.02% has Agriculture, Industry & Security. This results in an uplift of 0.02% as the total modifier is below 1.

Colonisation stage of the world also plays a role in exposing natives to contemporary levels of technology.

Colonisation Stage	Minimum Uplifts
Stage 0	0
Stage 1: Initial Colonisation	100
Stage 2: Advanced Colony	1,000
Stage 3: Developing	5,000
Stage 4: Emerging Economy	20,000
Stage 5: Established World	50,000

Terraforming

Terraforming changes to a world are made weekly. Only bases with an active terraforming complex receive terraforming reports.

Costs for terraforming atmosphere and temperature are a function of world diameter. Terraforming sectors (changing from one sector type to another) is a function of the difference between the current and target sector type and local temperature.

Terraforming Complexes

Terraforming complexes generate 100 terraforming points weekly (unspent points are lost).

1 point is used to:

- Integrate 1mu of atmospheric terraforming plants (such as vines, chokeweed, terraforming bacteria)
- Programming and releasing 1mu terraforming nanite units
- Integrate 1mu of surface terraforming items (alien plantlife, items with specific infrastructure values etc).
- Convert 1mu rare earth elements to Atmospheric Coolants
- Convert 1mu rare earth elements to Synthetic Greenhouse Gases
- Produce 1mu Terraforming Bacteria
- Convert 1mu hydrocarbons to Alien Plantlife
- Produce 1 water (added to Surface Water – see Sector Terraforming)

Example: A terraforming complex can produce and integrate 50mu of terraforming bacteria per week.

Atmospheric Terraforming

A planetary atmosphere is essentially columns of gas above each sector. Factors such as relative molecular weight, gravity, planetary curvature, chemistry, magnetospheres, and temperature are ignored.

Mechanics are based on using 1,000mu of a given terraforming item per sector as the optimum amount. This very crude model keeps the mechanics relatively simple.

Each column of gas is considered to have an Atmospheric Volume (AV) equal to 1,000 x Optical Depth.

Each gas component therefore contributes AV per sector proportional to its atmospheric %.

Example: Each sector will have 20,000AV on a world with 20 optical depth. A near terrestrial world (78% N2/20% O2/2% halides) will therefore have 15,600AV of N2, 4,000AV of O2 and 400AV halides per sector.

The area of the world is used when making atmospheric terraforming calculations.

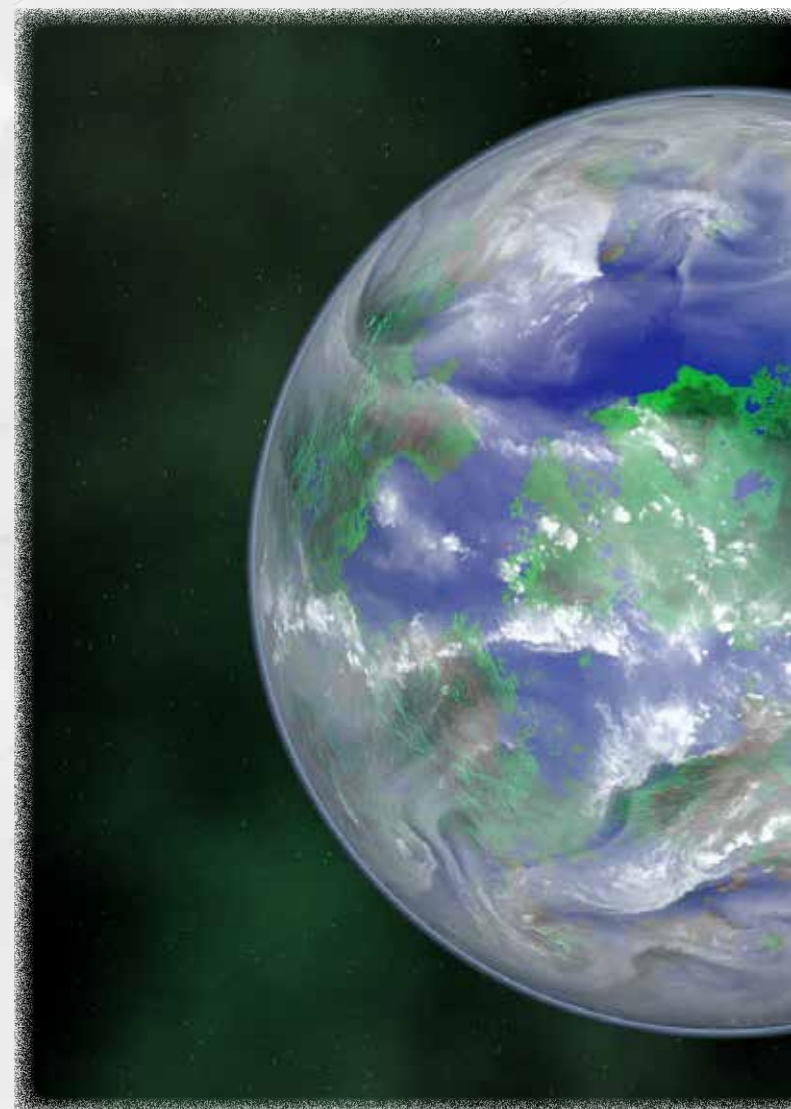
Example: The above world is a moon, 16x12. It has 3,072,000AV of N2, 768,000AV of O2 and 76,800AV of halides.

Atmospheric terraforming modifies the amount of AV for a specific atmospheric component, recalculates the relative abundance of each component and determining the new optical depth. The process is isothermal, i.e. no change in planetary temperature. Temperature terraforming is adiabatic, i.e. there is no change in optical depth.

Changes to AV of a gas component is done either through:

- Scrubbing – removing AV of a specific gas component.
- Liberating – adding AV of a specific gas component.

Example: To make the above world terrestrial requires the scrubbing of nearly all 76,800AV halides.



Atmospheric Terraforming Substances

Terraforming Bacteria

- Crudely reshape common atmospheres.
- Only work on worlds that already have an atmosphere (minimum 5 optical depth).
- Work within temperature range 180 – 400.
- Decay rate 2% in optimal conditions.
- Intolerant to radiation.
- Limited 1,000mu per sector, representing their natural optimum density.
- Efficiency increases with fresh water. Sector limit increase:
 - » +5,000 Shallows, i.e. Shallow sectors can sustain 6,000mu
 - » +1,000mu Sea
 - » +500 Ice

Plants

- Standard Flora (Alien Plantlife, Arctic Flora and Desert Flora) can substitute for terraforming bacteria with a ratio based on temperature.

Temperature	Arctic	Plantlife	Desert
220<269.99	3	1	1
270<279.99	2	2	1
280<299.99	1	4	1
300<309.99	1	2	2
310<360	1	1	3

- Unique plants identified through investigations may be substituted for terraforming bacteria (a special action will determine their terraforming bacteria ratio for a specific world).

Terraforming Suitability	Terraforming Bacteria ratio
Highly Unsuitable	0
Good Terraforming Compatibility	4
Excellent Terraforming Compatibility	10

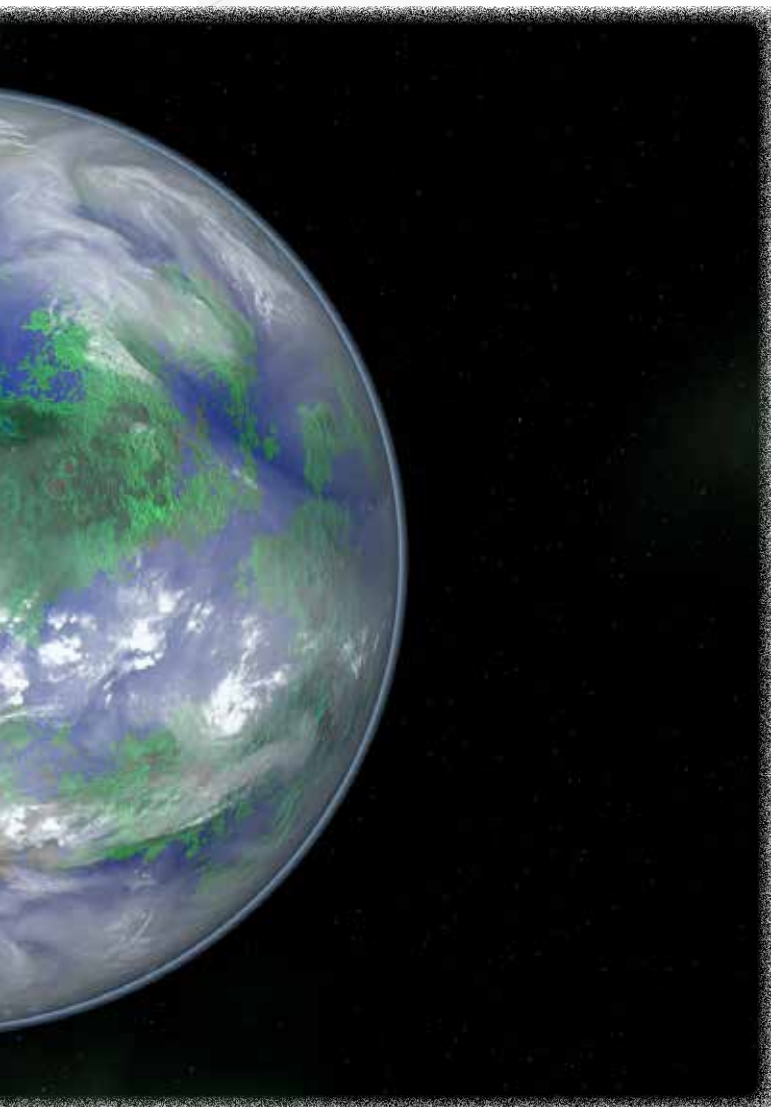
- Choke weed - rumoured to have potentially devastating effects on a world.

Nanites

- Nanites are built in the form of modules (mkl 40mu).
- Integration sets module to Liberate or Scrub designated gas component.
- May also be set to Counter existing Nanites.
- No maximum per sector but lose effectiveness above 25 modules/sector.
- Sequence of processing: Counter>Liberate>Scrub
- Optimum Liberation produces 4AV/module/week up 25 modules/sector (up to 100AV/week).
 - » Inverse square fall of, i.e. 200AV/week (x2) requires 100 modules/sector (x22)
- Scrubbing is same as Liberation but removes AV.
- 1%/week decay rate (for temperature < 300k and no radiation and no molten rock).
- Counter nanites remove their quantity each week.
 - » Counter nanites are removed when no longer countering.
 - » Only necessary when balancing gases, i.e. achieving optimum amount of O2.
 - » 5%/week decay rate.

Vines

- Liberate gases, primarily nitrogen and oxygen.
- Optimum amount is 1,000mu/sector.
- Optimum use creates a thin but breathable atmosphere within a year (optical depth of 5).
- Up to 2,000mu/sector can be used.
- Amounts above optimum liberate toxic gases (sulphurous compounds, methane and carbon dioxide).



- Vines are inert (stop working) in >5% CO2 atmospheres.
- Sulphurous compounds and ammonia cause decay.
- Halides (in amounts high enough to register) kill all vines.

Example: 35x35 Water World (70% sea sectors) can have 2,000mu terraforming bacteria per sea sector equating to 2,082,500mu bacteria for the entire world. Maintaining optimum terraforming rate (at 2% decay) requires 41,650mu terraforming bacteria integrating weekly (833 terraforming complexes).

Example: Integrating 100,000mu plantlife onto a world with a temperature between 280 and 300 counts as seeding 400,000mu terraforming bacteria.

Example: Scrubbing the 76,800mu of halides (16x12 moon) at optimum (100AV/week) will take 768 weeks (14 years) and will require 4,800 nanite modules assigned to scrubbing halides. Attempting to do it in 2 years (approximately 1/7 time will require 50 times as many modules). *not accounting for decay.*

Example: An aquatic plant Aquus Botlis is identified as having terraforming properties. A special action is conducted to determine its use on the water world Polonis. The results determine that it is highly compatible and has the value 8 (meaning 1mu of Aquus Botlis is worth 8 terraforming bacteria when integrated on Polonis). When tested for compatibility with a desert world it is found incompatible (0).

The examples consider raw numbers rather than the practice of continually adding to a terraforming project, assigning modules as and when they are built. Terraforming asteroids and small moons are cheaper than full planets. The drawback is that Colonisation Stage is capped.

Temperature Terraforming

World temperature can be increased using greenhouse gases or decreased using coolants.

The rate of change is based on the amounts of the appropriate chemical (greenhouse gas or coolant).

The mk of the chemical determines the maximum Equilibrium Shift (maximum change from the world's original temperature).

Temperature will revert to original temperature if temperature terraforming halts without first completing Temperature Stabilisation Infrastructure Upgrade. The upgrade sets the origin temperature to current temperature.

Temperature change method options:

- Small Equilibrium Shifts using low mk chemicals and multiple Temperature Stabilisations
- Using chemicals with high equilibrium shifts and fewer Temperature Stabilisations infrastructure upgrades.

Chemical decay is based on radiation and tectonic activity (volcanoes and cryo-volcanoes) with a minim decay of 1%.

- Terrain max decay contribution: 5% (primarily molten rock though seas and plants contribute)
- Tectonic Activity: +1% decay per 20 points tectonic activity
- Radiation: +1% decay per 3 points radiation
- A typical garden world can expect decay below 2%.

Maximum Rate of change

	Weekly	Yearly
Terrestrial	0.1 degrees	5 degrees
Divergent	0.5 degrees	25 degrees

Temperature altering Compounds

Mk(tech level)	Equilibrium Shift	Output/mu
I	30	10
II	55	5
III	75	3
IV	90	1

A net output of 1,000 per sector is required to achieve the maximum rate of change.



Chemicals are only active within their Equilibrium Shift.

Example: A world has a true temperature of 370 and an origin temperature of 335. Temperature has increased by 35 degrees. MkI chemicals are no longer effective (outside Equilibrium Shift). Total outputs for mkII - mkIV chemicals integrated determine rate and direction of temperature change.

Natural Restoring Forces

There is always a naturally restoring force, returning a world to its origin. The size of the output is proportional to the size of the world and equates to -100 Output/sector. This is equal to just over 2.5 degree/year (0.1 degree/week). Achieving maximum temperature therefore requires output of 1,100/sector.

Determining Net Outputs and Change

Achieving maximum change in temperature requires 1,100 output per sector per week resulting in 0.5 (divergent)/0.1(terrestrial) change in temperature.

$$\begin{aligned} & \text{Divergent Weekly Temperature} \\ & = (\text{Net chemical output/sector})/2,000 \end{aligned}$$

$$\begin{aligned} & \text{Terrestrial Weekly Temperature} \\ & = (\text{Net chemical output/sector})/10,000 \end{aligned}$$



Example: A 36x35 world has an origin temperature of 285 and a current temperature of 287 and is classed as terrestrial.

It has the following compounds:

70,000 Synthetic Greenhouse Gases mkI - Total Output 700,000

60,000 Synthetic Greenhouse Gases mkII - Total output 300,000

As it is within the 30 degrees of its origin, all count.

Grand Total Output = 1,000,000

Total Sectors 1,260 (=36x35)

Output/Sector = 1,000,000/1,260 = 794

Net Output/Sector = 694

Change = 0.07/week (=694/10,000) or 3.6 degrees/year (while it is classed as Terrestrial).

Stabilising Temperature

Activating a completed Temperature Stabilisation Infrastructure upgrade:

Removes all temperature terraforming compounds.

Sets the world origin temperature to current temperature.

Removes the Temperature Stabilisation Infrastructure upgrade.

Prevents further Stabilising of Temperature for a year.

Sector Terraforming

The terrain type of a sector can be changed by integrating the infrastructure items and plants into the sector. The amount and type of infrastructure items depends on the target terrain type and world terraforming index. Where the target sector type requires water, this is criteria is achieved from adjacent sectors and background water levels of the world.

Example: The report lists the Infrastructure components required to terraform the sector from Jungle into Grasslands.

Trans(port), Struct(ural), Agri(culture), Basic, Adv(anced) Colonisation, Ind(ustry), Mil(itary), Pl(a)nts, Water

Grasslands largely require items that provide Agricultural Infrastructure points. The lack of a plants requirement is due to the sector already having sufficient plants suitable for repurposing.

Terraforming Index

World terraforming index is the multiplier to all sector terraforming costs:

- *A world consisting of mono-rock surface has the lowest terraforming index (1).*
- *Terraforming index increases with terrain type diversity.*
- *Urban and cultivated terrains significantly increase terraforming index.*
- *Vegetation terrains increase terraforming index.*
- *Sectors on smaller worlds contribute more to the overall terraforming index.*

	Trans	Struc	Agri	Basic	Adv	Ind	Mil	Plnts	Water
Grassland	0	0	15621	0	2734	0	0	0	0
Deposited	0	0	0	0	0	0	0	0	34000
Needed	0	0	15621	0	2734	0	0	0	0

- A newly discovered 35x35 garden world without a population will have a typical terraforming index of around 5.
- A water-world will have a typical terraforming index of 2.

Example: A 4x4 rock world with 4 urban sectors will have a higher world terraforming index than a 30x30 rock world with 4 urban sectors.

Example: When issuing the order to analyse a sector, the report includes the Terraforming Index value.

>TU 300: Terraform Sector Analysis {8} {0}

Surveying Sector: {8,8}
 Current Terrain: Jungle
 Target Terrain: Grassland
 Terraforming Index: 5.9

Infrastructure Penalty

The world infrastructure penalty applies to all infrastructure costs.

Example:

Environment	Value		Inf Increase	Life Value/mu
Gravity	1.4	(High)	10%	-0.4
Temperature	331	(High325)	3%	-0.29
Tectonic	6	(Normal)	0%	-0.01
Radiation	1	(Normal)	0%	-0
Env Damage	-1	(Normal)	0%	-0
ATMOSPHERE: Normal (15)				
Nitrogen	93%		0%	-0
Oxygen	7%		4.61%	-0.61
WORLD STATUS: Terrestrial. Does not need domes.				
Infrastructure cost increase = 17.61%				

Integrated Techs

Infrastructure component costs are reduced by completed Infrastructure Upgrades.

Infrastructure Upgrade	Component	Cost Multi
Agriculture	Plants	x1/2
	Agriculture	x2/3
Economics	Advanced	x2/3
Industry	Industry	x2/3
Military	Military	x2/3
Mining	Structural	x2/3
Transport	Transport	x2/3
Urbanisation	Basic	x2/3

Temperature

Where the local temperature (latitude) of a sector is outside the optimal temperature range for the target

terrain, terraforming will incur an extra cost (Advanced Colonisation Infrastructure component).

Local temperature forms part of the report.

Example:

World Temp:331K Latitude:3 Local Temp:319K

319 kelvins (46 celsius) is on the hot side for grasslands (terrain currently jungle) and is the source of the 2,734 Advanced Colonisation Infrastructure component above.

An ice world may have an equator suitable for vegetation while a desert world may have habitable poles.

Military

Where there is an existing large structural component in a sector (based on its pre-terraformed sector type) there will be a need for demolitions (Military Colonisation Infrastructure component).

Plants

Alien Plantlife can be generated through terraforming complexes and is often freely available on other worlds with biospheres. Terraforming bacteria (and a few others) are unsuitable. Only plants suitable for terraforming sectors will be included in the report.

Completion of Horticulture Infrastructure Upgrade reduces the cost by 10,000 plants (shown as +10,000 deposited plants).

Deposited plants with an infrastructure component value count towards both categories.

Water

Water is sourced from the sector, adjacent sectors, and 'free' surface water.

Completion of Irrigation Infrastructure Upgrade provides a minimum of 25,000 water available.

Terraforming complexes can increase surface water using 'Terraform Synthesis' order.

If there is insufficient water on the world either as adjacent, irrigation and surface water it is possible to add more water to the world through special actions. These are likely to take the form of finding a suitable comet and herding it to the world. This will generate surface and orbital water.

Orbital water can be converted to surface water through special actions (though may be integrated into mechanics in the future).

Water Source Amount	Adjacent Sectors	Surface
	34000	0

Combat

Combat consists of Ground and Naval although the two may occur simultaneously and positions may actively be involved in both.

The difference is largely based on range of weapon systems and mechanics that deal with capturing positions when in proximity (dealt with in the Ground section).

Individual battles occur following each day's main turn run; before special actions are processed. Combat is broken down into an initial round of combat for platforms followed by 4 rounds for all participants.

Each position has modifiable parameters, detailing favoured combat actions. These include flee parameters, preferred targeting instructions and who to attack.

Battle data at the end of the day's combat is stored. If positions remain in the location of the battle at the end of the following day, combat will continue. Positions involved the battle may change over days as they enter or leave the location.

Triggering Battles

Potential conflicts are triggered by any action that results in a position (not necessarily the active position) detecting an enemy position however in all cases an active position must be involved. Examples:

- *Ship entering orbit with a hostile platform (passive position triggers battle).*
- *Ground party running the Ground Assault Starbase order (active position triggers battle).*
- *Ship issues Board Position order (active ship triggers battle).*

The aggressor must detect the potential target to initiate a battle. A stealthy ship may scan a platform that would attack it, but a battle will only be triggered if the platform scans the stealthy ship. The aggressor must also be able to hold the enemy position for combat (see escaping combat).

Fixed Facility Triggers

Changing standing orders do not cause an enemy list check. Some position types have the 'Trigger Battle' order. This will run list checks against all scanned positions to determine whether a battle is triggered.

Change in Circumstances

Battle triggers will only be checked when an action is undertaken. Political changes such as relations changing from neutral to war will not trigger a battle between two positions at the same location. One position is required to actively detect the other e.g. perform a scan.

An ongoing battle will stop once no viable targets are present; this may be the result of a political change in relations.

Lists

There are five lists directly associated with initiating and being actively involved in combat:

- *Enemy*
- *Ground Enemy*
- *Auto Board*
- *Support*
- *Defend*

Each is designed to fulfil a specific role and use of these will determine the type of combat initiated and the nature of the position's involvement. These lists can only be used if a Naval Officer is present on the position.

There are additional lists that are indirectly associated with combat but use the same listing mechanics:

- *Do Not Target*
- *Landing Permission*

Each list can consist of positions or groups of positions:

- *Individual positions*
- *Entire Affiliations*
- *Affiliation Posted Lists*
- *Everybody*

A * following any entry on an enemy, support and defend list indicates that currently the entry is inactive. The most common reason for this is mutual attitude between two affiliations.

Example: A ship has affiliation BTW on the enemy list while in a Core system. Their affiliations are mutually neutral. The entry will read BTW indicating that the listing is inactive. Should the ship move to Darkspace, the * will be removed.*

'Everybody' is superseded by other mechanics and therefore may still be rendered partially or completely inactive due to circumstance, i.e. having Everybody on the enemy list will not cause a position to open fire on allies unless profiles or charters allow.

Target List

This list is generated from the other lists before each round of combat. It is a list of positions present in the combat that can be targeted. If this list is empty, the position will attempt to leave combat.

Order of Targeting

Where targeting list consists of multiple targets, the order of preference is as follows:

- *Returning fire*
- *Potential target is on position's enemy list*

- Potential target is on position's affiliation posted list
- Potential target's Affiliation is on position's enemy list
- Potential target is on another posted list
- Defending Own Affiliation Position
- Defending Friendly Affiliation Position
- Supporting Own Affiliation Position
- Supporting Position from Allied Affiliation
- Defending Own Affiliation
- Defending Friendly Affiliation
- Supporting Own Affiliation
- Supporting Allied Affiliation

Note that the targeting algorithm also limits the quantity of positions that will individually target a single position where possible. Where there are multiple targets on a list of the same weighting, targeting will be approximately equally assigned.

Example: Two fleets clash. The ships in each fleet has the other affiliation on their enemy list and no targeting preferences set. All ships have the full enemy fleet on their enemy target lists. As these have equal weightings (4 on the list above), the two fleets evenly split which ships target enemy ships

Combat report includes a breakdown of the target lists generated for each position.

ENEMY TARGETS	SUPPORT TARGETS	DEFEND TARGETS
AFF Xxx	AFF Yyy*	None
Position Zzz		

* indicated entry is derived from supporting or defending another affiliation (not your own).

Enemy

The only way to trigger a naval battle is to have an active enemy list. This is a list of enemies who will be attacked immediately if detected.

Ground Enemy

These are the same as enemy lists though only apply to the starport (when on a base) and the sector the position is landed in. Using ordnance with planetary range capability from beyond the same sector as the target requires the use of Enemy List. The 'ground assault starbase' order will automatically add the designated target to both enemy list and ground enemy lists.

Auto Board

This is only used actively by ships, i.e. not triggered by passive scans. When triggered the active ship will attempt to board the target. This only occurs if a naval battle is not triggered.

The 'Boarding Options' Order limits which ships are auto boarded (by hull size and hull type) and whether to use boarding craft or raid the target.

Support List

Defend List

- Limited to:
 - » Position's affiliation
 - » Allied affiliation
 - » Individual positions belonging to the above

A support list is applied at the start of combat. If a supported position is present, its target list is added to the supporting position's target list. If an affiliation is being supported, only Affiliations appearing on individual positions' enemy list are added to the support target list.

Example: A position is supporting the MGT. MGT positions will have their enemy lists checked and affiliations appearing on the lists will be added to the positions target list. Individual positions on MGT ship's enemy lists will not be added to the position's target list.

This addition does not chain to positions supporting the supporting position.

Example: A BTW ship is supporting a MGT ship that has DTM positions on its target list (generated from the MGT's enemy list and positions present). The BTW has a clear enemy list. It will therefore add the DTM to its target list but anyone supporting the BTW ship will not add the DTM positions to their target list.

Defend List

- Limited to:
 - » Position's affiliation
 - » Allied affiliations
 - » Friendly affiliations
 - » Individual positions belonging to the above

Where a specific position is being defended, individual positions attacking the defended position are carried over to target list. Where an affiliation is being defended, affiliations (not individual positions) attacking positions belonging to the defended affiliation are carried over to the target lists of the defending positions.

Example: A starbase is being defended by a DMT ship. It is being targeted by 10 ships of a TWD fleet of 100 in a battle location. The 10 TWD ships will be added to the target list of the defending DMT ship.

Example: The affiliation of the attacked starbase is being defended. The affiliation will be added to the target list of DMT ship. This will mean that the DMT ship now has 100 potential targets.

As the lists are generated before the start of combat it is possible for a defending platform to open fire on round zero before attacking ships attack.

Do Not Target List

This list allows a position or affiliation to be removed from target lists. It might be used to avoid firing at a base that has been captured while the ground troops move in. It might be used to list enemy ships that will be boarded.

Landing Permissions

While this list will not modify the target list in any way, preventing positions landing in a starport or on a world may result in a position ending its turn in orbit and thereby increasing the chance of an enemy list triggering combat.

On Patrol

While on patrol the ship will check support and defend after enemy lists as part of its scan routine. The ship will stop for any combat which includes positions they are either supporting or defending even if the enemy check fails to identify a target.

Flee Checks

Following the detection of an enemy, a flee check is conducted if required. Combat will not occur if the flee attempt is successful. If combat does not occur the active position resumes processing its orders.

A position will attempt to flee combat if it has elected to do so, or if it is incapable of combat. The fleeing position must have a positive combat speed and its combat speed (not flee speed – flee speed is only tested during combat) must be greater than the combat speed of the fastest hostile position (after accounting for enemy tractor factors). If the speed test fails, cargo will be dumped if the option has been set to make (see Dump Cargo below).

Where multiple positions are attempting to prevent a ship from fleeing, the flee check is conducted against all positions and if multiple attacking positions can prevent the ship from fleeing, the slowest is selected to prevent it fleeing and targets it (and will not be involved in further flee checks). This mechanic leaves faster positions free to attempt to prevent other positions from fleeing.

Flee Speed is the speed of a fleeing ship once combat starts. This is calculated from double the thrust output for the fleeing position. A position with flee option set may be stopped for combat but have sufficient fleet speed to escape combat at the end of round 1.

Example: A fast ship is stopped for combat by a platform with just sufficient tractor beams to reduce its combat speed to zero. The platform fires on the manoeuvring ship during round zero (ships cannot flee on round zero) and round one. The ship survives these and as it has double its thrust output during combat due to fleeing, it still has a positive flee speed and is able to leave combat at the end of the round.



Combat Speed

ISR drives do not function in combat (though do deliver some pre-combat damage due to colliding fields). Combat speed of the ship is determined by reaction drives; thrust engines and combat engines (but not landing engines).

Tractor Beams

The total output of reaction drives, combat engines and rocket boosters of the fleeing ship is reduced by the modified tractor beam output of opposing positions before determining flee speed. The modifier is the of the Integrity Mod for the opposed position. Platforms and bases capable of using naval weapons have an effective Integrity Mod of 0.5. As flee checks are calculated between individual positions, only the tractor beams of the individual positions are considered i.e. not the total tractor beams from multiple positions.

Example: A Light Hull ship has an Integrity Mod of 2, while a Heavy Hull is 0.5. Tractor beams fired at the Light Hull have double output, while those fired at the Heavy Hull have half output.

Dump Cargo

The chance of escaping combat using a chaff cloud is based on the relative mass being ejected to the surface area of the ship. A factor of 20 is sufficient to guarantee success and less mass gives proportional probability of escaping. Living items, Guilders and Antimatter Fuel are not dumped when executing this action.

Example: A barge has a surface area of 90, therefore ejecting 1,800MUs of cargo is sufficient for them to escape. If insufficient mass is available, the chance of escaping using the chaff cloud is based linearly on the ratio of amount of chaff to amount needed. In the case of the barge for example, having 450MUs of cargo to dump gives the ship a 25% chance of escaping.

Designating a target

A position will fire on targets up to its Maximum Targets setting. If the resulting target list has more entries, preference will be sorted as per combat options selection. These include options to engage certain hull sizes and types, position types (bases, ships etc). Weighting to individual positions is adjusted based on quantity of positions present.

Example: A pirate has an entire affiliation on its enemy list and encounters an enemy squad of 30 capital ships and 2 freighters. As it has the combat option to referentially target freighters and a Maximum Targets setting of 3, it will fire on the two freighters and one of the capital ships.

Screen Ship

If a designated target is being screened, the designated target is changed to the screening position.

Example: In the above example, if the two freighters are being screened, the pirate will end up firing on three capital ships.

Screening ship:

- *must at least as fast as the screened ship.*
- *speed is reduced to that of the screened ship.*
- *does not intercept boarding actions against screened ship.*
- *will only intercept one position attacking the screened ship.*
- *will not intercept attacks directed at a screened ship undertaking boarding actions.*
- *is required to remain in combat. If no valid targets exist and the target is not engaged, the screening ship will leave combat and once left will not re-enter even if the target is later engaged. All other combat considerations need accounting for, such as naval officer, not fleeing etc to ensure the screening ship remains in combat.*
- *can only screen one specific ship which is set using the screen ship (can be removed using target of '0').*
- *can screen the same position as other screening ships.*

Blockading Celestial Bodies

Blockading a celestial body (gas giants, planets, moons, asteroids, wormholes and stargates) from the orbital quad treats the sensor range as orbital rather than the orbital quad. This does not count for positions moving between linked orbits.

Ground Skirmishes

When a ground party (Active GP) attempts to move through a sector containing a hostile ground party (Passive GP), a skirmish will occur, consisting of a round mutual fire. If this results in the destruction of the Passive GP, the Active GP will continue its movement. If the Passive GP survives, the Active GPs turn is stopped, and a full battle will be held at the end of the run as per normal combat mechanics.

Boarding

Boarding occurs during turn processing as opposed to standard combat at the end of the run. There are two types of boarding action, for control of the target position (ship or platform), or simply to try to grab the cargo. The latter is termed Raiding:

Raiding is a lower casualty version of boarding that steals the cargo rather than the ship.

A pre-prepared set of orders can be given to a freshly boarded ship. Creating a set of orders achieved through 'Start Boarding Orders' and 'End Boarding Orders'. Boarding orders can be cleared by issuing start and end boarding orders with no intervening orders.

Example: A pirate operating in Corewards wants all ships captured through boarding to move to orbital quad Alpha 15 before jumping to Rurgan (328). The following set of orders are issued by the pirate ship. This set of orders will be issued by any ship successfully pirated.

- *Start Boarding Orders {}*
- *Move to Quad {1}{15}*
- *Jump {328}*
- *End Boarding Orders {}*

Raiding

Raiding attempts to steal the cargo of a boarding target rather than taking the ship.

- *Casualties suffered by the boarder are halved.*
- *If at least 25% control is gained, cargo is captured.*
- *If 100% control is gained, all cargo is captured (capped by the boarder's cargo capacity).*
- *A 'Raiding Craft' has 1,000mu of return cargo space.*
- *Items such as crew/ammo/fighters/fuel cannot be captured.*

Boarding Craft

Boarding craft are installed in ships, to perform the active part of boarding. A slow ship can board a faster vessel if its installed boarding craft is fast enough (see tech manual: approach speed). The boarding craft is only lost if it is destroyed through boarding, all damage between boarding attempts is repaired. Only one boarding craft will be used at a time. The first boarding craft available is used and any raided cargo that does not fit on the original ship is lost.

Combat Restrictions

Positions in Ground Combat:

- *Other positions can only deliver / have things picked up from them*
- *Hiports are disabled if control is < 100%*
- *The following orders will be disabled on all bases in ground combat (in a control battle):*
- *Untool Tech*
- *Scrap complex*
- *Scrap Item*
- *Sack Personnel*
- *Deliver*
- *Deliver item type*
- *Change Spread*
- *GPs in ground combat cannot jettison items*
- *Ships and GPs can pick-up from the base if they are docked in starport.*

Combat Delivers/Pickups (Space Combat)

Positions will open fire for one round on any position attempting to transact with their target. This round of combat will occur before the transaction is completed.

Example: A base is being targeted by a pirate ship. A freighter attempts a delivery to the base. The pirate ship will automatically open fire for one round against the freighter at the time of delivery.

Initiating a transaction while cloaked will not trigger a salvo. Immediately consecutive transactions are also exempt if conducted with the same position and uninterrupted with other types of orders.

Bases cannot transact with positions that are in space combat.

Starbase Shields

These can only be turned off through a special action submitted by the controlling political position. Without significant justification the action is likely to fail.

Naval Combat

Ground parties cannot use weapons with space range. Bases cannot use space range weapons (including space bombers) if Starbase Shields are active. If they use space range weaponry (i.e. Starbase Shield Effect: Shields Off), all incoming damage is primarily directed at this weaponry.

Positions on the surface of a world are classed as fixed location. Fixed positions will only use line of sight weapons against mobile positions when their use is mutual.

Pre-Combat ISR Stress

All ships involved in a battle use their ISR engines to target actively hostile ships before a battle and on subsequent days if the battle continues.

- *Attacks occur pre-combat rounds on each day of battle.*
- *The attacks are evenly divided between all hostile ships.*
- *Ships that are not aggressive do not take ISR stress.*
- *The damage from the attacks is reduced by armour and shields.*
- *Penetrating damage is further modified by the Integrity Modifier of the targeted ship.*
- *ISR Drive tech manuals specify combat statistics.*

Weapon Types

Beam Weapons

- *They do not require ammunition.*
- *Larger versions deliver higher damage but lower damage to weapon mass ratio.*
- *Require line of sight.*
- *Damage is reduced by both planetary atmospheres and scintillator fields.*
- *Unaffected by point defence.*

Launchers

- Use ammo listed on the launcher tech manual.
- Launchers designed for either missiles or torpedoes.
- Torpedoes are larger.
- Torpedo accuracy reduced by speed differential between targetter and target (-12 accuracy at 1g difference) where target is faster than targetter.
- Do not require line of sight.
- Ammo preference is set using Weapon Load Out order.
- Damage unaffected by planetary atmospheres or scintillator fields.
- Ammo may be neutralised by point defence.
- Point defence efficiency increases with salvo size.
- Partial salvos may be fired if target is destroyed mid-round.

Rail Weapons

- Use ammo listed on the weapon's tech manual.
- Larger versions use larger amounts of ammo and deliver higher damage but lower damage to weapon mass ratio.
- Damage unaffected by planetary atmospheres or scintillator fields.
- Do not require line of sight.
- Low accuracy.
- Unaffected by point defence.

Space Fighters (bombers)

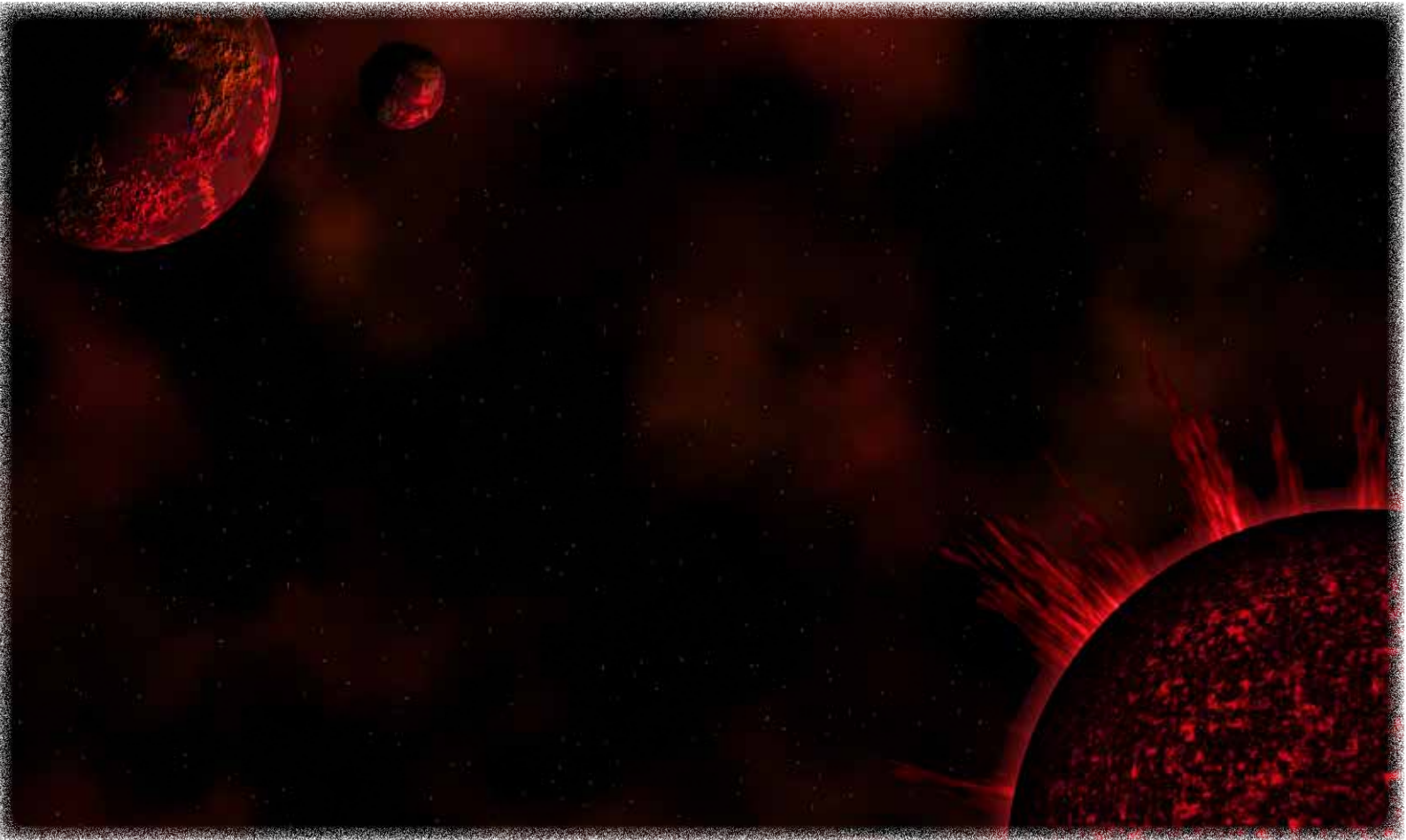
- Operational quantity determined by fighter bay capacity (combined with interceptors).
- Fighters (bombers) only engage rounds 2 & 3 (and round 0 when launched from platforms).
- Destroyed by interceptors and point defence.
- Damage unaffected by planetary atmospheres or scintillator fields.
- Do not require line of sight.

Interceptors

- Operational with active Starbase Shields.
- Operational quantity determined by fighter bay capacity (combined with fighters).
- Engage enemy fighters and interceptors each round of combat.
- Destroyed by interceptors.
- Do not require line of sight.

Tractor Beams

- Hits cause reduction in combat speed; tractor factors are negatively applied to thrust factors before speed calculations.
- Damage unaffected by planetary atmospheres or scintillator fields.
- Unaffected by point defence.
- Require line of sight.



Weapon Statistics

Accuracy

Total accuracy =

- +Base accuracy (if not targeting item type)
- +Weapon Accuracy
- +Ammo Accuracy (if applicable)
- +Targeting Computer Bonus
- +Officer Bonus
- +Target Profile
 - » -Speed Modifier (after sensor compensation)
 - » -Inertial Damper (if target has one)
 - » -Torpedo speed differential (if applicable)
 - » -item size modifier (if targeting item type)

Total accuracy determines % hits based on normal distribution:

Total Accuracy	% Hits	Total Accuracy	% Hits
≥0	0	8	50
1	0.5	9	62
2	2	10	74
3	5	11	84
4	9	12	91
5	16	13	95
6	26	14	98
7	37	15+	100

Example: Firing 50 photon cannons with a total accuracy of 11 will result in approximately 42(=50x0.84) hits.

Damage

Each successful hit delivers the weapon or ammo damage as specified on the tech manual. This is modified and the resulting (penetrating) damage is applied to the structure and items of the target.

Damage is subjected to Attenuation Layers in the following order:

- Optical Depth
- Deflector Arrays
- Scintillators
- Shields
- Armour

Each Attenuation Layer that applies reduces weapon damage by approximately half of the Attenuation Layer depth x Armour Factor of the weapon.

Example: Beam weapons with a damage of 100 are fired at a target on the surface of a world with an optical depth of 20. After passing through the atmosphere the weapons will have an average damage of 90 (=between 80 and 100). If the beam weapons had an armour factor of 0.5, the optical depth would be 10 (=20 x 0.5) and the average damage would be 95 (=between 90 and 100).

Individual weapon damage is subjected to attenuation. Low damaging weapons rarely penetrate highly attenuating layers even though the total damage from a large barrage is high.

Layers are dealt with sequentially: Atmosphere, Deflector Arrays*, Scintillator, Shields, Armour. Some weapon types ignore specific layers.

**Deflector Arrays are used to modify how damage interacts with the following layers (see Deflector Arrays).*

Damage Penetrating Layer = Pre-layer Damage –
 $fn(\text{Layer Thickness Value} \times \text{Armour Factor})$

Where fn() is a random number between zero and 1 applied the layer thickness. This random number is generated using standard deviation, i.e. on average the layer thickness will be half the value but could be anything from zero to the value.

Armour Factor

Armour Factor of a weapon is the multiplier to the Attenuation Layer Depth.

Weakly penetrating weapons designed to damage weakly armoured targets have an Armour Factor greater than 1.

Penetrating weapons have Armour Factor less than 1.

Damaging Attenuation Layers

Damage attenuation due to shields, deflector fields and armour is applied to the attenuation layer (potentially damaging it or reducing factors).

- If Armour factor < 1, absorbed damage is applied to the layer.
- If Armour Factor >1, absorbed damage / Armour Factor is applied to the layer.

Example: 100 damage is absorbed by armour. Weapon Armour Factor of 2. 50 (=100 /2) damage is applied to the armour.

Example: 100 damage is absorbed by shields. Weapon Armour Factor of 2. Shield factors are decreased by 50 (=100 /2).

Damage Assignment to Items

Damage is applied to a single item. Item damage is selected by total area of the item compared to the overall area of the entire position.

Example: A ground party consists of 1000mu 50 shuttles (=1,000 area – same as mass) and 100 crew (=100 area). There is 90% chance that the first damage will be applied to a shuttle.

Damage Reduction

Before damage is applied, it is first reduced by up to the Damage Reduction for the item. Damage reduction represents items abilities to ignore small amounts of damage.

Example: A Veteran Soldier has a Damage Reduction of 2. Damage assigned is first reduced by on average 1 point. If the incoming damage was only 1 point, it would mean that the damage is cancelled with no further affect.

If the damage applied to the item (after damage reduction) is lower than the defence of the item:

If damage > item defence:

Carryover damage may Splash onto other items or be lost.

Target Spread	Basic Chance of Splash Damage
Disperse	20
Open	40
Normal	60
Close	80
Packed	100

- *Splash Damage is applied to another random item (weighted by total area).*
- *This continues until all damage is accounted for (either all assigned or being lost due to a miss).*
- *Ships and platforms are Packed Spread.*
- *Bases have a Spread determined by construction of complexes and the 'Set Targe Spread' order. The current spread is detailed on the manifest.*
- *Ground Parties in combat with a base use the Spread of the base otherwise they are Disperse Spread.*

Example: A missile delivers 50 damage (after attenuation). It is randomly applied to metal, destroying 1mu. 49 damage carries over (missile blast radius = 1). The target Spread is Normal meaning that there is a 80%(=60%+20 Missile Ground Splash) of this damage being applied to another item.

Example: All penetrating damage from a Nuclear Missile (Blast Radius: 1, Ground Splash:60) is applied to items where the Spread of the target is anything other than Disperse.

Damage Report

Each round of combat will consist of a detail of the weapons fired and a breakdown of the damage.

Example:

Round 3: 21 Space Bombers

- 21 hits - 787 (160) [1050] damage

The damage breakdown is as follows:

penetrating damage - 787

(damage absorbed by shields) - 160

[total damage delivered] - 1050

103 damage - not shown, is the amount absorbed by scintillators (if affected) and armour

As damage is dealt with per weapon low damage weapons may be absorbed by armour and shields resulting in little penetrating damage despite high total damage.

Example:

Round 1: 70 Light Photon Guns

- 70 Hits - 6 (1244) [1750] damage

Only 6 damage penetrated all defences and is applied to items within the position.

Heavy Hull and Platform Item Defence Modifier

x3 defence value for internal items (installed & cargo) on heavy hull ships and platforms. Further increased up to x4 with maximum officer defence modifier skill.

Example: A penetrating hit delivers 150 damage to a Photon Gun installed in a Heavy Hull. Photon Guns have 150(=50x3) defence. The weapon will be destroyed with no damage carry over. If an officer is on board with 4 ranks in Defence Modifier, the Photon Gun has 200(=50x4) defence, equating to 75% chance of destroying the weapon and no damage carryover.

WoMD - Nuclear and Antimatter Weapons

Weapons of Mass Destruction are damped by an ISR field generated from the following sources:

- *Ship ISR Drives*
- *Base Command and Security Complexes (does not apply to positions in the starport)*
- *Infrastructure Stage 1 (applied to all positions on the surface of the world)*

Undamped WoMD deal 100 times their normal damage (calculated as 100 times the normal quantity of hits).

Example: A damped AM Missile delivers 1 hit of 500 damage. An undamped AM Missile delivers 100 hits of 500 damage.

Use of Nuclear (WoMD) Weapons

Affiliation profile setting will determine if WoMD will be launched in a battle.

The profile settings are:

- *Nowhere*
- *Space*
- *Dead Worlds (include stargates, wormholes and other celestial bodies along with their surrounding orbit)*
- *Populated Worlds (worlds and their orbits with registered sentient/native populations of at least 100,000 people)*
- *Anywhere*

There are ramifications for using WoMD on a populated world. The most common result is a Unique Cultural Modifier such as 'Warzone Disruption - Nuclear' and increasing planetary radiation. These can normally be removed through integrating Planetary Restoration (see Infrastructure) though a serious bombardment may require two or even multiple integrations spread over time to completely eradicate the penalty.

Targeting Option

Target Preference	Accuracy Modifier	Items Targeted
Structure	0	Bases: Complexes Platforms & Ships: Armour & Hulls
Disable	-1	Shields, Shield Generators, Scintillators, Engines (Thrust and Combat), Sensors & Targeting Computers
Weapons	-3	Launchers, Energy, Kinetics & Tractors Does not include fighter bays
Life	-9	Any Item with Life Flag Does not include A.I.'s

When used there is an accuracy penalty applied to each weapon capable of a focused attack. This is in addition to losing the target size bonus.

- *Successful hits route damage into targeted items.*
- *Excess damage is applied as per normal damage distribution.*

Where an attack missed, there is a second hit-check by the weapon without the targeting penalty but size is now included but base accuracy is no longer included (i.e. it may have hit if the penalty was not accounted for), representing missing the intended area but still potentially hitting the target. Should this succeed the damage is applied as per normal distribution.

Defence

Hull Type	Max Armour Output*	Maximum Armour Depth (mkl)		
		Ablative	Plate	Light
Heavy	x2	120	80	60
Normal	x1	60	40	30
Light	x0.25	15	10	7.5
XLIGHT	x0.125	7.5	5	3.75

Ship Armour

Ship hull type and surface area determines maximum quantity of armour items (see Shipbuilding). Armour item and quantity determine Armour Attenuation Layer Depth.

*Armour Output – multiplier to armour item output used in ship design.

Armour	Benefits	Drawbacks
Ablative	High Depth	Easily Damaged
Plate	High Defence	
Light	Low MU (combat speed/dodge)	Low Depth
Korondite/Stealth	Reduces Sensor Profile	Easily Damaged Low Depth

Platform Armour

Platforms can benefit from a maximum quantity of armour equal to surface area x 2. As armour is delivered to platforms, their Armour Depth is calculated from the weighted average of the sum of the outputs measured against total platform hulls.

- *Excess armour does not increase Depth above weighted average.*

- *Having excess armour keeps depth at maximum when armour is destroyed.*
- *Excess armour is more easily destroyed.*

Example: A platform with 100 platform hulls can mount 216 armour items (surface area 108). If it has 216 Ablative armour, its Depth is 120. If it has 108 Ablative and 108 Plate, the Depth is 100. If 54 Ablative and 162 Plate the Depth is 90. Even if it has 400 Ablative and 400 Plates, its Depth is still 100.

Shields

Shields are fields surrounding the position, reducing incoming damage and has the following properties:

- *Maximum Shield Factors (the total output of all Shield items).*
- *Current Shield Factors (damage absorbed by shields reduces current factors).*
- *Shield Depth (a function of Current Shield Factors and position surface area).*
- *Recharge (the sum of Shield Generator items' output).*

Further

- Factors, Recharge and Depth are modified by Active Starbase Shields and Planetary Shields.
- Platform hulls have inherent shielding (+10% effective cargo as shields).

Shield Depth

- Shield Depth is the Attenuation Layer Depth (maximum weapon damage reduction).
- Depth is inversely proportional to surface area.
- Depth is logarithmically proportional to Factors, i.e. doubling Factors does not double Depth.
- Damage done to shields are shown on battle reports in (shield bracket).

Shield Generators

- Increase Shield Factors by the total output each round position is active.
- Do not increase Shield Factors beyond Maximum.

Starbase Shields

- Bases (starbase and outposts) can construct starbase shield complexes.
- Augment the Factors and Recharge by up to a factor of 5.
- Augment Shield Depth by up to 200.
- Maximum augmentation when 1 in 10 complexes is a Starbase Shield complex.
- Current augmentation is shown when Starbase Shields are active, e.g. Starbase Shield Effect: x3.4
- Active Starbase Shields prevents the use of Space Range weaponry, including Bombers (but not Interceptors).

Planetary Shields

Planetary shields are generated by the presence of a Gate Platform in orbit combined with Planetary Shield Infrastructure Upgrade. They envelope the entire world. Planetary shields prevent anyone from landing* (and building hiports) unless they are on the Landing List** of the 'gate' platform.

**Including orbital drop or shuttle port in/out*

***Landing List: A list that either the Gate Platform or controlling Starbase sets up to give access to planet*

Planetary Shields are only active when:

- Planetary Shields [Infrastructure Upgrade] is completed.
- A Starbase with active Starbase Shield on the world
- A Gate Platform is in orbit with active Deflector Arrays (as indicated by its Gate designation).
- The affiliation of the Gate Platform and the Starbase are the same.



Effects:

- All positions on surface have at least 300 shield depth.
- Every surface starbase (after the first) with active starbase shields gains up to +50 to the shield depth.
- Nothing on the surface can fire at anything in orbit.

Deflectors Arrays

Platforms automatically mount Deflector Arrays; an outmost layer of defence consisting of sequential enveloping protective fields that stack with Shield Depth.

- Each charged Deflector Array increases Shield Depth by +50.
- Maximum Number of Deflector Arrays = $\sqrt{\text{deflector factors}/1000}$ rounded up.
- Number of Deflector Arrays capped at 8 (see table below).
- Each platform hull provides 10 inherent deflector factors per Deflector Array.
- Deflector Arrays charge from shield generators after shields are at maximum.
- Damage reduction due to Scintillators is also absorbed by Deflector Arrays.
- A Deflector Array is discharged by absorbing damage equal to Deflector factors plus Shield Recharge.
- Damage absorbed is not affected by Weapon Factor, i.e. full weapon damage is always applied.
- Only the outermost Deflector Array can be



damaged (and therefore discharged) in any one round.

- Platform shields and armour are only damaged after all Deflector Arrays are discharged.
- Platforms will be proceeded by [x/y] on scans to represent the charged/maximum Deflector Arrays.

Deflector Arrays	Minimum Platform Size (Hulls)
1	1
2	101
3	401
4	901
5	1601
6	2501
7	3601
8	4901

Example: A platform with 4 charged Deflector Arrays (+200 shield depth) has a total Shield Depth of 320, further increased to 350 by Scintillators. A weapon delivers 400 damage of which 250 (in this instance) is absorbed by the outer Deflector Array, reducing deflector factors. The outer Deflector Array's Factors are reduced by 250 (damage absorbed). 100 is then attenuated further by 80 (in this instance) from the armour layer. 20 damage is then randomly assigned to an item within the platform.

Example: A platform of 8,000 hulls has a Shield Recharge of 10,000. Discharging a Deflector Array requires it to absorb more than 90,000 (=8,000 x 10 + 10,000) damage in a single round. Even if 200,000 damage is delivered, only the outermost Deflector Array will be discharged at the end of the round and shields and armour will only begin taking damage in the round following the discharging of the last Deflector Array.

Example: Heavy Photon Batteries penetrate the Deflector Array enhanced Shield Depth with sufficient damage to also penetrate the armour layer. While the Armour cannot be damaged through damage absorption there is still a chance that penetrating damage will hit an armour item based on random damage allocation.

Scintillators

Scintillators work by sustaining highly reflective material in a stationary field around the position, dispersing energy (though this will be absorbed by Deflector Arrays while they are charged).

- Only effective against Beam Weapons
- Never depleted except through destruction of the Scintillators.
- Depth calculated follows the similar mechanic as Shield Depth (total output determines depth).

Point Defence

Point Defence (PD) counters incoming Missiles, Torpedoes and Bombers. It can never be used offensively.

Two types:

Beam Weapons

- Do not require ammunition.
- Used before ammunition requiring point defence.
- Low accuracy.
- Weak (effective against targets with low Defence).
- Fire multiple shots, i.e. one PD could counter multiple missiles.

Rockets

- Launchers require ammunition.
- Used only if Beam Weapon PD fails.
- High accuracy.
- Powerful (normally destroy target).
- Low rate of fire.

Interceptors

- Interceptors are launched from fighter bays.
- Loss of fighter bays through damage in combat will reduce the active interceptors in combat.
- Only engage enemy Interceptors and Bombers with Range: Space, e.g. Space Interceptors, Space Bombers, Space Fighters.
- Engage enemy all 4 rounds.
- 4 times more likely to target enemy Interceptor (where target area is equal).
- Engage all enemy bombers not just incoming, i.e. cover friendly ships being attacked.

Example: 100 Space Interceptors are launched. There are 10 enemy Space Interceptors and 10 Space Bombers. As Space Bombers have

an area of 40 compared with 10 for the Space Interceptor, each Space Interceptor has an equal chance of targeting either enemy Bomber or Interceptor in the first round. Due to the difference in defence however, 6 enemy Interceptors are destroyed but only 3 Bombers are destroyed, skewing the chances of targeting Bombers in subsequent rounds.

Leaving Combat Zones

A ship leaving a combat zone (where a battle was held on the previous day) will be subject to a mini battle if an active enemy position is present at the location.

- Mini battles are processed during the main run.
- Notifications are generated informing players of the event.
- Mini battles rarely inflict serious damage.
- If successful (ship not destroyed or otherwise incapacitated), it continues to process its orders.
- Mini battles can take the form of:
 - Escaping Combat
 - Opportunity Fire.

Escaping Combat Mini-Battles

Occur if leaving ship is still being targeted by positions from the previous day.

All targeting positions will open fire for a few rounds based on the relative fleeing speeds of the leaving ship to the combat speed of the targeting position.

Targetter Combat Speed/Flee Speed	Rounds of Fire
2 or more	4
1.5 – 2	3
1 – 1.5	2
1 or less	1

Example: Fleeing ship has fleeing speed of 3g and attacker has combat speed of 1g results in 1 round of combat.

Example: Fixed locations (speed zero) only get 1 round of combat.

Example: A leaving ship is being targeted by 5 ships. All five will engage the leaving ship in an Escaping mini battle.

- Ships will only engage in a single mini battle (first one that includes them).
- Bases and Platforms will engage in mini battles up to their targets (splitting weapons appropriately).
- Leaving ships do not increase their dodge by manoeuvring.
- Ships that flee as part of space combat are not in a battle and therefore not subject to Escaping Combat mini battles (This includes dump cargo and flee). They may however be subject to Opportunity Fire on the next day (see below).

Opportunity Fire Mini Battles

If a ship enters a location, either a battle zone or a location with an enemy ship, it may become involved in an Opportunity Fire mini battle.

These are skirmishes between an arriving ship and a withdrawing ship, engaging in a brief combat at maximum range and only occur between ships that have not been involved in an Escaping Combat mini battle.

The arriving ship is given the 'Entering Combat' flag that distinguishes it from those positions present on the previous day and will attempt to initially target the fastest untargeted enemy position present. If all potential enemy targets are already targeted, it will target an enemy based on least number of targeting positions.

Example: A ship arriving at a battle location with 3 enemy ships and 5 allied ships. First enemy ship is untargeted, the second is targeted by 2 allied ships and the third by 3 allied ships. The arriving ship will attempt to target the first enemy ship but isn't fast enough. It is fast enough to target either the second or third. It targets the second as this only have 2 positions targeting it.

- Leaving ship only engaged if not in Escaping Combat mini battle.
- Leaving ship has been targeted by arriving ship.
- Both positions mutually fire for 1 round of combat (always a 1 on 1 combat).
- Quantity of weapons fired based on relative speeds up to a maximum of 50% where arriving position significantly faster than leaving position.
- Where speeds are equal, 25% of weapons are fired.
- Engaging positions flagged as partaking in a mini battle.

Example: In the above scenario, a sixth allied ship arrives and is just fast enough to target the first ship. The first ship leaves the location. The two ships engage in an Opportunity Fire mini battle, both firing for one round, both ships firing 25% of their weapons.

General Combat Considerations

Clearing lists on its own is rarely sufficient to remove a position from combat; a position must move away if there is an enemy present and position is being targeted.

If position has support, defend lists, shield position or return fire it will be likely be drawn back into battle unless it moves away.

Initiating transactions with a targeted position will incur combat transaction attacks (unless initiating position is cloaked).

Even if a position clears all lists (and targets), if it doesn't move away, it may be pulled into combat due to others targeting it from the previous day. In this case a ship will try to flee but may return fire depending on flee and retarget settings.

Ship Destruction

No hulls or armour will survive an integrity breakdown, but no cargo will be lost.

Ships will only be blown up when all hulls and internal items (not armour) are destroyed (this is not accounted for on the pre combat ISR checks).

If a ship is destroyed it only receives a battle report if there are other ships present from the same squadron/affiliation/player.

Base Damage

Destroyed complexes are converted into either rubble or ruins. Destroyed ruins convert into rubble. Rubble continues to absorb damage but decays (removed from base) naturally over time.

Bases with only rubble, ruins (or no complexes) and no troops convert to derelict and are removed from both player control and combat.

Post Combat Stress

Where a combat lasts for 4 rounds (5 rounds if a platform is involved) all participating ships suffer integrity loss equal to a standard weekly drop (see Integrity). This loss is suffered each day of the battle.

Ground Combat

Work on the basis that ground defence is a deterrent; a base should have ordnance and troops to make attacking it sufficiently costly.

If the value of a base (use 'Value of Base' order) is significantly more than the projected cost of raising a ground force, transporting it to the location and securing a win, it needs more defence.

While optimum type and quantity of ordnance and troops for defending a base is likely to remain a point of debate, a reasonable rule of thumb is value to ground factors.

The total value does not take into consideration of market tolerance of the items, location and political importance of the base and tactical advantage capture of the base will gain.

Value / Ground Factors	Level of Defence Investment
20 and below	Excellent
20-50	Good
50-100	Average
100-200	Lacking
200 and above	Poor

Example: Empirical data suggests it generally costs in the ballpark of 20 stellars per defending control factor to capture a base. A base has 20,000 control factors (at its current spread) and has a value of 20,000,000 stellars. A Value/Ground Factors of 1,000 indicates a poor level of defence investment.

Example:

	CURRENT	PACKED	CLOSE	NORMAL	OPEN	DISPERSE
GROUND FACTORS	7000	7000	8000	13000	6500	3250

The above base has 7,384 ground factors (at its current spread). As such it is fair to say that the cost of taking this base will be in the region of 140,000 stellars.

Tradable Goods	193
Troops	30000
Employees	8800
Ore	0
Tech	0
Hulls	0
Ordnance	50000
Other Items	490000
Total Value	528993

The level of defence investment is 76(=52,8993/7000) equating to Average. Changing the base's spread to Normal (13,000 factors) will improve its defence investment to Good.

Ground Combat Range

Ground ordnance falls into one of the following categories:

- *Planet – surface to surface ordnance. Requires detection of target – normally achieved by supporting other positions (such as orbital positions). Weapons firing through shields (including ground fighters and artillery) are subject to interference targeting penalty based on damage inflicted on shields.*
- *Sector – Weapons with sector range are also effective at short range. This range generally includes tanks and larger vehicles. They can be used to bombard targets rather than attempt to capture them.*
- *Short – Weapons limited to short range include those used by troops and warbots.*

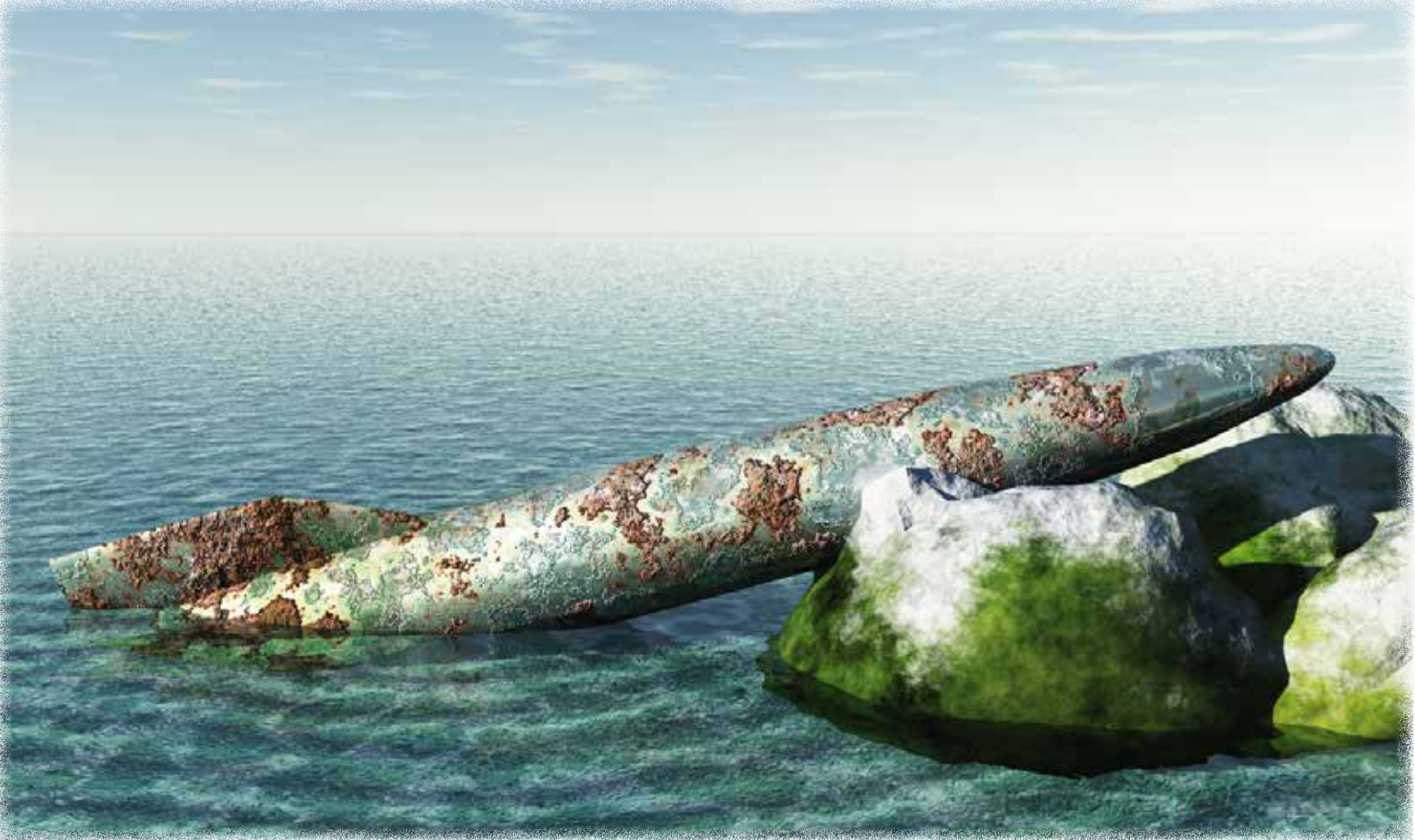
Short-Range Combat

Short-range combat occurs when one position attempts to take control of another position (boarding or ground assault).

Capturing a base requires at least one assaulting position to enter the starport to usurp Control.

Positions attempting to gain control of the target are flagged as attackers.

The target of the Control contest and positions aiding it are flagged as defenders.



While Control is being contested, combat continues, and damage is sustained.

The defenders start short range combat with 100% control of the target.

Control changes following each round of combat is determined by comparing Control Factors for the positions involved in Short Range Combat, i.e. forces contributing to damage from longer ranges do not contribute their control factors.

As Control Factors are contributed by ordnance and troops, destroying, and killing them reduces a position's Control Factors.

Control Factors provided by ordnance (vehicles) cannot exceed Control Factors provided by troops.

Troops provide the highest Control Factors to mass, i.e. they are better at capturing rather than destroying targets.

The relative amount of cover within the short-range battle is its Spread. This is the spread of the Control Target.

- *Packed – lots of cover but ordnance and troops are jammed in tight.*
- *Close*
- *Normal – range at which soldiers are most effective.*
- *Open*
- *Disperse – lots of open spaces but damage splash is normally lost.*

Troops (and some ordnance) have preferred (optimum) spreads. Their control factor contribution is halved for each threat step from optimum. Note that their damage output is unaffected (though damage will be affected by factors such as spread, blast radius and ground splash as per the mechanics in Naval – Weapon Statistics).

SHORT RANGE GROUND UNITS

					PREF	DMG	FACTORS
1000	Anti-Personnel Device (820)				None	1000	0
500	Hive Marine (570)				Packed	1000	4000
2000	Hive Soldier (571)				Normal	8000	8000
1000	Light Tank (821)				Normal	20000	4000
1000	Robotic Defence Bunker (840)				None	30000	0
						-----	-----
						60000	16000
		CURRENT	PACKED	CLOSE	NORMAL	OPEN	DISPERSE
GROUND FACTORS		7000	7000	8000	13000	6500	3250

Combat Tactic	Control Factors (%)	Casualties* (%)	Damage Dealt (%)	Uses
Normal	100	100	100	Default Option
Retreat	0	100	0	Give up control of base without losing troops (prisoners), see Capturing a Position.
Give Ground	50	50	50	When one side has vastly superior control factors to reduce damage sustained. Also used to prolong battle.
Defensive	75	75	75	As Give Ground
Assault Position	150	200	100	To achieve quick victory by maximising control factors.
Storm Position	200	400	100	As above but only done where increased casualties is not an issue.
Boarding	100	800	100	When attempted to gain control of a ship or platform.

Example: A soldier will contribute 4 Control Factors when in a Normal Spread, 2 in Close and Open Spreads and 1 in Packed and Disperse Spreads. The soldier will always have a damage of 8.

Example: In the above manifest, the current spread is Packed. While total factors are 16,000, soldiers and light tanks only contribute 3,000(=12,000 x 0.5 x 0.5) factors at packed spread resulting in 7,000 current factors. If the base changes its spread to normal (by building or destroying complexes or using modules with the Set Spread Type order), it will increase to 13,000 factors.

Control contests are slightly weighted in favour of the defender due to a random factor. This is only significant if the two forces are evenly matched.

Ground Combat Tactic

If positions (both attackers and defenders) may opt for a combat tactic other than normal. Doing so modifies their control factors but has repercussions in terms of how much damage they will inflict on the enemy and in turn sustain.

*Casualties is the modifier to % chance of incoming attacks hitting military items (see below).

Loss of control

At the start of any ground battle the defender has 100% control of the position. Change of control per round depends on the control factors of the attackers compared to the defenders.

$$\text{Maximum \% Control Gain Achievable by Attacker} = (100 \times \text{Attacker MUs}) / \text{Resistance}$$

Resistance is the lower of:

- Total Complex MUs.
- 10 x Sum (Defending Ordnance and Troops MUs)

A base with zero defence still takes time to establish control:

- Resistance = 4,000 x Command + 2,000 x Security + 0.1 x Sum (Other Complex Mass)

Example: A base with 20 complexes (20,000mu) and 4,000mu defensive ordnance and troops will have a resistance of 20,000 (as 20,000 is lower than 4,000 x 10). An attacker (consisting of 1,000MUs of troops military items) can only gain 5% (=1000/20000) control of the base per round.

Example: A mining base consisting of a few troops has 1 command, 3 security and 80 mines. Following the death of the troops in the opening round, the base has a resistance of 18,000(=4,000 + 3 x 2,000 + 80 x 0.1 x 1,000). 4,000 troops will gain approximately 22% (=100 x 4,000 / 18,000) per round, i.e. probably capture it in a day.

Maximum gain of control where there is a defending force is limited to 10% per round when a base is the control target; 25% for GPs and boarding. Where the odds (attacking control factors to defending control factors) favour the attacker, this is further modified by the odds and the current degree of control by the defender.

Control Loss = Potential Control Loss x Control Factor Ratio Modifier

It is harder for the attacker to gain control while the defender still holds at least 75% control.

Where Control Factor Ratio Modifier:

Defender More than 75% Control = $100 \times (\text{Attacker Control} - \text{Defender Control}) / (\text{Attacker Control} + \text{Defender Control})$

Defender Less than 75% Control = $100 \times ((\text{Attacker Control} - \text{Defender Control}) / (\text{Attacker Control} + \text{Defender Control}))^2$

Odds (in favour of attacker)	Defender more than 75% control	Defender less than 75% control
2:1	11%	33%
3:1	25%	50%
4:1	36%	60%
6:1	51%	71%
10:1	66%	81%
20:1	80%	90%
Overwhelming (over 100:1)	98%	100%

Example: Attacker has 2:1 odds and overwhelmingly more mass compared with the base resistance. The base still has more than 75% control. The attacking ground party will gain approximately 1.1% (=10% x 11%) control per round. If the base drops below 75% control, this will increase to 3.3% (=10% x 33%) providing the odds remain the same.

Example: If the attackers can gain potentially 6% control in a round at the start of short range combat and the odds of the battle are 10:1 in favour of the attacker they are likely to take approximately 4% (=6% x 66%) control each round.

A base is still operational while under attack. Its efficiency is reduced based on its current % control. The attacker does not gain production capacity or use of the base facilities until it has been captured.

Targeting and Damage

Unlike naval combat where each weapon uses accuracy to determine if it hits, short range weapons hit military items (troops and ordnance) based on the spread of the control target. Weapons that miss military will be treated as collateral damage applied to non-military items.

% Chance hitting Defending Military = $2 / (\text{Spread Modifier})$

Spread	Spread Modifier	% Chance Hitting Defending Military
Packed	1	2
Close	0.8	2.5
Normal	0.6	3.3
Open	0.4	5
Disperse	0.2	10

Example: A base has a packed spread. Only 2% of the incoming hits from short range weapons will hit military (damage troops and ordnance) items. The remaining 98% will be treated as collateral damage.

It is possible for a base to be between spreads, i.e. a base can end up somewhere between open and disperse due to building complexes while having a target spread of open and an initial spread of disperse. Misses apply their damage to non-military items. Before being applied, the damage is subjected to blast radius.

Any damage remaining (both when military and non-military items are destroyed) is again subject to blast radius decrease in damage.

In the case of damage to military items, the damage is applied to another military item.

In the case of damage to non-military items, the damage is subject to splash damage mechanics to determine if another item is affected by the remaining damage (or the remaining damage lost).

In both cases, the process continues until there is no more remaining damage.

Chance of hitting attacking military items is also subject to the spread of the control target. Initially the benefit is small, but increases as the attacker gains control, i.e. breaking through defences and taking the fighting to streets and complexes.

Once the defender has dropped below 75% control, both attackers and defenders have the same % chance of hitting military items. Note that defenders do not apply misses to collateral damage of their own base.

While Defender Control % > 75

$$\begin{aligned} \text{\% Chance hitting Attacking Military} = \\ 2 / (\text{Spread Modifier}) \times ((\text{Defender \% Control} - 75)^2 / 62.5)^* \\ \text{\textit{*where modifier has a minimum of 1}} \end{aligned}$$

Example: A base has packed spread and 100% control. Defender's military have 20% (=2 x (252/62.5)) chance of hitting attacker's military items.

Example: A base has disperse spread and 90% control. Defender's military have 64% (=2/0.2 x (152/62.5)) chance of hitting attacker's military items.

The table below gives the % chance of defending military hitting attacking military items for different spreads and control while the defender still has high levels of control:

Defender Control	% Chance of Hitting Attacking Military				
	Packed	Close	Normal	Open	Disperse
100%	20	25	33	50	100
95%	13	16	21	32	64
90%	7	9	12	18	36
85%	3	4	5	8	16
80%	2	2.5	3.3	5	10

Example: A ground party attacking a disperse base initially suffers 100% hits to its military while the base in turn suffers 10% hits to its military. The remaining 90% is applied as collateral damage to non-military items.

Note that the % chance of hitting military is modified by position's Tactic (casualty).

Example: Storming (400% casualties) a Packed base will result in 80% (=4x20) of the defending bases military hitting attacking military. The base only suffers 2% hits to its military. The remaining 98% is applied as collateral.

Modification to % chance of hitting military cannot increase above 100%

Example: Storming (400% casualties) an Open base with 95% control (32% chance of hitting military) will result in 100% (as 4 x 32 is greater than 100) chance of defending military hitting attacking military. The base suffers 5% (open spread) hits to its military.

Specialist Ordnance

Items may have one or more specialist settings that will restrict when they are operational. Even non-operational military items count as military for determining hits against military items.

- **Minefields** - Items such as Anti-Personnel Devices (vehicles of subtype Mine), are only operational while the defender has at least 80% control.
- **Defensive** - Items that have the combat type Offensive or Defensive are only operational while the position is Attacking or Defending as appropriate.
- **Boarding Only** - Items flagged as boarding only are only operational during boarding combats.
- **Capturing a Position**

In each round of a battle there is a chance that the position may fall to the attackers based on the current defender's control. This can happen when all the defenders are killed, but it still takes time to control the installation.

The raw chance that a position (bases, ships, GPs and platforms) is captured is based on its control:

$$\text{Raw chance of Capture} = (100 - \text{current control})^3 / 10000$$

Current Control Level	Raw Chance of Losing Position
90%	0.1%
80%	0.8%
70%	2.7%
60%	6.4%
50%	12.5%
40%	21.6%
30%	34.3%
20%	51.2%
10%	72.9%
0%	100%

For bases this is further modified by the size of the base (quantity of complexes) and security (security below 50 is treated as 50):

$$\text{Modifier} = 100 / (\text{Security} + \text{Complexes Coefficient} - 50)$$

Complexes		100	200	500	1000	2000	5000	10000
Security Coefficient		40	56.6	89.4	126	179	283	400
Security %	<=50	2.5	1.77	1.12	0.79	0.56	0.35	0.25
	75	1.54	1.23	0.87	0.66	0.49	0.32	0.235
	100	1.11	0.94	0.72	0.57	0.44	0.3	0.222
	125	0.87	0.76	0.61	0.5	0.39	0.28	0.211
	150	0.71	0.64	0.53	0.44	0.36	0.26	0.2
	175	0.61	0.55	0.47	0.4	0.33	0.25	0.19
	200	0.53	0.48	0.42	0.36	0.3	0.23	0.182

Where:

$$\text{Complex Coefficient} = 4 \times \sqrt{\text{Complexes}}$$

Table below showing modifiers to raw change of capture for quantity of complexes against security:

Example: A base with 2,000 complexes, 100% security and currently with 40% control has 9.5% ($= 0.44 \times 21.6\%$) of being captured at the end of the combat round.

When control of the position is lost the following happens:

- The remaining mobile defenders retreat into a Ground Party. This GP will be placed in combat with attackers.
- 10-20% of the retreating vehicles and troops are captured.
- All captured troops, officers and politicals captured are converted to prisoners
- All enemy lists, pending orders, standing orders, authorisations and space combat targets are cleared.
- The captured position is transferred to the player of attacking position with the most control factors. It is flagged as player owned.
- The captured position's new control is set to 100 - control i.e. if captured while having 36% control it will now have 64% control.
- The battle continues, with the retreating forces attacking the new defenders at the Starbase the next day.

Defence Considerations

Control factors from vehicles is capped at the control factors of the troops (as per the current spread of the base).

Soldiers do the most damage

While they have only half the control factors of marines and startroopers they deliver the most damage. They will deliver this damage irrespective of spread though generate most control factors at Normal Spread.

Marines have high control but deliver little damage

Marines have double the control factors of soldiers and a packed spread means the defenders only take 2% damage. They are good when combined with high damaging ordnance.

Startroopers

When combined with an open spread they have excellent control compared to an attacking force consisting of mercenaries. The main drawback is the amount of hits against an open spread by an attacking force. The work best where there is sufficient numbers of weather the increased hits against the defending force.

Trained troops have Damage Reduction

Damage reduction is good when it comes to dealing with militia and mercenaries which normally deliver little damage.

Militia

Unpaid troops, especially in large amounts act to soak hits (due to damage carryover being lost instead of being applied to another item).

Do not rely on Vehicles

While the base may feel impregnable with tens of thousands of tanks, do not rely on them. A determined attacking force of troops can wrestle control of the base. They will capture some of these vehicles, not only ousting the defending troops but then also employing them to superior effect (unless the base changes tactics to Retreat before the enemy takes control).

Warbots

Their negative control factors are deducted from total control factors. They are useful for delivering damage to an attacking force but only sensible when they will not compromise the total control factors. They are also only used in offense and therefore their negative factors do not compromise a base (but also don't deliver damage in defense).

Anti-personnel Devices

APDs are only active while the retain at least 80% control. They can be devastating due to the control modifier to %chance of hitting defender. They are worth building providing the attackers will not find it easy to gain maximum control per round.

Bunkers

Items with defence capacity divert damage that would hit life items into the bunker and also benefit from Damage Reduction.

Bunkers do not work in short range combat as they are designed to intercept damage against life forms from long range bombardments. As such they only work in long range and orbital bombardments.

Boarding

Boarding is used to capture Ships and Platforms. A position can perform multiple boarding attempts and a position can have multiple boarding attempts made against it. Boarding is done as an order (active) and during the run (not during combat) or by a base in response to an enemy ship landing in its starport (passive).

Active Boarding

This is initiated by using the 'Board Position' Order or in response to detecting a position on the Auto Board list. The target position must be detected, and the boarder faster than the target or target is stationary before it can be boarded. Tractor beams are used as in standard enemy checks to reduce opponent's speed. The check differs from standard flee checks as the target's flee speed rather than combat speed is used. Boarding therefore normally requires a fast ship with sensors and at least one tractor beam. The boarding ship is subjected to space weapons fire from the target and all defending positions before progressing to boarding. This does not count as standard Space Combat and does not trigger an Enemy list check in the location.

While enemy lists are not checked as part of initiating a boarding action, they are checked when entering a new location. Consequently, a position may be stopped for battle before running a 'Board Position' order or activating its auto board list.

If positions are present at the location with standing orders (lists) to defend the position about to be boarded, they will also open fire during the approach for a single round.

Example: A pirate cloaks into an orbit with a platform with all pirates on its enemy list. It initiates a boarding action against a freighter belonging to a neutral third affiliation. As the platform is neither defending, nor supporting the freighter, the boarding action will proceed as no enemy lists are checked and the platform didn't detect the pirate.

Example: A freighter is in a squadron with defending escorts. A pirate attempting to board the freighter is fired on by the ship about to be boarded and the defending escorts. The freighter fires for four rounds (presuming it has weapons) and hits deliver double weapon damage. The escorts fire for one round with no accuracy or damage modifier.

Active boarding composes 4 steps (all undertaken as part of the Board Position order):

- *Detection – the location is scanned for the target. Failure to detect the position ends the boarding attempt. More attempts can be attempted.*
- *Chase – the target attempts to flee (and may use dump cargo if the option has been set). Target's flee speed needs to be beaten (tractor beams are also used). Stationary targets are automatically caught.*

- *Approach (landed and docked targets ignore this step) – during which the boarding position is subjected to 4 rounds of naval weaponry fire from the defender. All attacks hit (+20 ACC) and weapon damage is doubled. Defending positions also subject the boarder to 1 round of fire (no damage or accuracy modifier).*
- *Control Contest – if the boarder has not been destroyed, a control battle is conducted for the target (see short-range combat).*

Boarding Parties

The forces sent to attempt boarding are set in advance using the 'Set Boarding Party' standing order detailed. Once set they are detailed in the boarding party report section of the manifest. Boarding attempts without setting a boarding party will fail. All bases should set a boarding party to initiate passive boarding of undesirable ships landing in the starport. The order allows the setting of items that are not currently on the position or in amounts larger than are currently present for greater flexibility.

Example: A pirate ship includes veteran marines in the boarding party despite having none to ensure that any promoted marines will not be left behind in subsequent boarding actions.

The allocated boarding party is only used in when the position is attempting to board another position. In defence all items capable of being involved in boarding

actions are counted. While everything in the position can be added to the boarding party, this runs the risk of everything being killed, leaving the boarding position vulnerable.

Example: A pirate ship has a mixed crew of humans and naplians. The boarding party is set to only include naplians. If over the course of multiple disastrous boarding actions all the naplians are killed, the pirate still has humans to run and defend the ship.

Example: A ship has a mixture of marines, soldiers and crew. The boarding party is set to only include marines for the same reason as the above example.

Only items suitable for boarding actions may be added to the boarding party. Attempts to add unsuitable items to a boarding party using the 'Set Boarding Party' order will fail.

Example: A boarding party report is shown below detailing troops available to fill the boarding party roster and the maximum (MAX) units that will be sent if available.

Boarding Report					
Any ship size will be auto boarded.					
Any ship hull type will be auto boarded.					
BOARDING PARTY					
QTY	UNITS	MAX	DMG	FACTORS	
965	Human Marine (506)	1000	1930	7720	
0	Human Veteran Marine (512)	100	0	0	
			-----	-----	
			1930	7720	

Control

The control battle is the same as a standard ground battle with the following parameters:

- Maximum control gain is limited to 25% per round.
- The defender suffers no damage if control remains at 100%.
- If the target is not captured in 4 rounds the attacker disengages and a reboard is required.
- Reboards are subjected to approach weapons fire from the defender.
- Reboards also start with defenders having 100% control.
- Reboards repopulate the boarding party if possible.
- Defenders have a x8 to hit modifier, i.e. 16% multiplied up by control % factor (see Short-Range Combat – Targeting and Damage and table below).
- Each boarding attempt (on the same day) increases the defenders to hit modifier by +1%.
- A position successfully captured cannot be boarded again in the same day.
- A position can be boarded by a boarding party up to surface area x 10.

- Where a boarding party exceeds maximum boarders and consists of multiple items, the amount of each item will be reduced proportionally to the maximum boarding party.

Defender's Control	% chance of defenders hitting
100	100
95	100
90	58
85	26
80	16

Example: After the first round of combat, the boarder has gained 8% control. The boarder hits with 2% of their weapons, i.e. 2 out of every 100 troops hits an enemy. The defender hits with 58% (= $[90-75]2/62.5\%$) of their attacks. Boarding actions should therefore aim to achieve at least 20% control in the first round, reducing incoming attacks to the minimum 16%.

Example: The first boarding attempt failed and a second one is attempted with 10% control gained on the first round. The defender hits with 59% (= $1 + [90-75]2/62.5\%$) with a minimum of 17% hits once they have lost at least 20% control.

Boarding Craft (2310)

Name	Boarding Craft
Number	2310
Type	Boarding Craft
Mus	500 mus
Production	500
Race	Sentient
Subtype	None
Area Modifier	3
Tech level	1
Raw Materials	12 Heavy Hull (80) 60 Ablative Armour Plate (460) 11 Combat Engine (164) 1 Cargo Net (2300) 4 Life Support Pods (2305) 1 Tractor Beam (340) 5 Gatling Laser (215)
Tech Manual	The boarding craft is a very basic form of transport that is used to allow troops to board or raid other ships. Approach Speed: 7.0 g Cargo: 500mu Troop Support: 100 Armour: 120

Example: After the tenth boarding attempt by multiple positions against the target (such as a large platform), defenders will hit with at least 26% of their attacks while the boarder will still only be hitting with 2%.

Example: A 100 heavy hull ship has a surface area of 100. It can be boarded by parties up to 1,000 units (troops, warbots etc). A boarding party consisting of 1,500 marines and 500 soldiers (twice maximum boarder size) is reduced to 750 marines and 250 soldiers.

Capturing a Position

'Start Boarding Orders' is a standing order that generates a list of orders that will be run by a position following its capture through boarding. Orders issued between 'Start' and 'End Boarding Orders' are listed on the ships manifest.

Example: The successfully boarded ship will issue orders to pick up veteran crew, set combat option to drop cargo and flee then move to a rendezvous point on the edge of a system.

Boarding Craft

An installed boarding craft will be used if selected to board the target in place of ship. The same process steps are followed using the boarding craft. The other restriction is that the boarding party is limited to the capacity of the boarding craft. The primary advantages are:

- No risk to the actual ship from the target's weaponry during the approach.
- The speed of the boarding craft is used rather than that of the parent ship.

Example: Standard boarding craft is 500mu in size (the amount of install space required) and has an approach speed of 7.0g. It can take 100 troops and if used to raid will capture up to 500mu cargo. The ship on which the boarding craft is installed also needs at least 500mu cargo space to receive captured loot.

Boarding Report

Any ship size will be auto boarded.
Any ship hull type will be auto boarded.

Orders transfered to newly captured positions:

1. Pickup {111} {607} {10} {} {No}
2. Set Combat Options {0} {1} {0} {No} {No}
3. Move to System Quad {25} {4} {15}

Raiding

While raiding is like boarding, the intention is to capture the cargo rather than control the ship. The process is the same as standard boarding with the exception that:

- Casualties suffered are 50% of standard boarding attempts (defenders have x4 instead of x8 to hit modifier).
- The maximum cargo taken is determined by the available cargo on the ship or boarding craft.
- If 100% control is achieved, all cargo that can be taken is captured.
- The basic 'Raiding Craft' has 1,000mu of return cargo space.
- Certain item such as crew/ammo/fighters/fuel cannot be looted.

Boarding Options

These allows a ship to set preferences when using Auto Board. This includes:

Raiding – see Raiding below

Use of Boarding Craft – this will take the first Boarding Craft

Reboard – in case the target failed to be captured during the first attempt, multiple attempts will be conducted provided the boarder still has TU's and sufficient troops. Sufficient troops is the % of troops available from the inventory against the overall size of the boarding party, e.g. if the designated party comprises 200 troops, a 50% reboard means that reboarding will only be attempted if the formed boarding party has least 100 troops. Setting reboard to 100% will cause attempts to reboard to fail if the entire boarding designated boarding party cannot be fulfilled. Setting reboard to 0% will mean that reboarding will continue providing a troop is available to send. As the % is the overall boarding party size, it allows some part of the party roster to go unfulfilled providing the % is satisfied.

Example: A boarding party is set to 100 marines and 100 soldiers with a reboard of 50%. Providing that the sum of marines and soldiers comes to at least 100, reboarding will be attempted. If however the party consisted of 150 marines and 50 soldiers and there were only 20 marines but 100 soldiers, the reboard would fail as the boarding party would be 70(=20+50) would be sent, less than 50% of the designated boarding party.

>TU 230: Raid Ship {763} {Use Breaching Pod - Yes}
Using Boarding Craft (2310) to raid target.
Scanned:
IND SHIP NEW BARGE (763) - {50 Light Hulls} - Attacking
Barge Class Freighter [G] {No Armour}
Attempting to raid IND SHIP New Barge (763).
Approaching target:

Post Battle Summary

Ship hulls were undamaged in combat.

Raid IND New Barge (763)

Round 1: Battle is 20:1 in favour of Attacker
Defender lost 20.32% control [79.68%]
Round 2: Battle is 25:1 in favour of Attacker
Defender lost 21.22% control [58.45%]
Round 3: Battle is 100:3 in favour of Attacker
Defender lost 23.52% control [34.94%]
Round 4: Battle is 100:3 in favour of Attacker
Defender lost 23.46% control [11.48%]

Attacking IND New Barge (763)

Round 1: 100 Marines - 2 [200] damage
Round 2: 100 Marines - 4 [200] damage
Round 3: 100 Marines - 0 [200] damage
Round 4: 100 Marines - 4 [200] damage

Incoming Fire from IND New Barge (763)

Round 1: 5 Marines - 0 [10] damage
Round 2: 4 Marines - 2 [8] damage
Round 3: 3 Marines - 0 [6] damage
Round 4: 3 Marines - 0 [6] damage

Post Battle Summary

Raid loot:
500 Precious Metals (25)

Raid Successful.

Insufficient space discarding:
235 Precious Metals (25)
Total TU cost for this action is 50

Redoing combat

Control returns to 100% when fail

Control and deaths – only kill when control drops below 100%

Passive Boarding

A position landing at a hostile base is automatically boarded by the base if it has set the option to board and has a ground party.

Base Auto Boarding

When a Ship lands in a hostile base it can either be automatically boarded or blasted with the full ground force of the base (or both) depending on how the base governor sets his options. The options for boarding are set through the 'Boarding Options' order and are displayed on the 'Boarding Party Report' for a base. The default for a base is to attempt to board a Ship that lands and then blow it up if the boarding fails. A large base should have enough tanks etc. to destroy a landed Ship and the Ship will not be able to respond with space weapons due to the close range.

Note: Until a boarding party is set all bases will effectively skip boarding attempts and the ship will then be blasted in ground combat (this is to prevent landing ships with lots of troops as a means of killing troops). Also boarding parties should be large (1000 marines will most likely capture a Ship with 100 marines) but making them too large will open the base to massive losses. For instance Ships landing with a 1000 soldiers will be very difficult to board and it may be better to lose a small force and then leave it rather than boarding with a large number which are all destroyed.

Escaping with Boarded Ships

Successful boarding action counts as combat for the purposes of setting the 'can leave combat' flag. This means that on the very next day after the boarding action both the boarding ship and the boarded ship can leave without being subject to the standard pinning mechanics. This only lasts for the very next day.

Promotion and Veterans

In both boarding and standard short range combat the number of troops promoted from the surviving troops is 10%- 30% of the casualties. Veterans are essentially bought with the blood of normal troops, this makes their effective cost ~ 50 stellars (as you have to lose 5 troops at 10 stellars each to obtain one). Their advantage is that they are roughly twice as effective as a basic troop of the same type and so after a year they pay for themselves.

Defending against Boarding

When deciding on weaponry to mount on a ship that is likely to be subjected to boarding, the first consideration is that the ship will be delivering double damage for four rounds against the would-be boarder. This makes lighter weapons (higher damage to mass ratio) a serious consideration even when the boarding ship is heavy hulled. HESH(293) rounds are reasonable and there are quite a few more effective restricted knowledge ammo's to research or trade for.

As well as the opening volleys against the boarding ship, the one other tactic in defending against boarding is to ensure that there are troops on the ship. A ship is a packed environment and as such Veteran Marines are best at maintaining control of the ship. These have both the best control factors at packed spread but also benefit from damage reduction. As the attackers invariably inflict low damages (as boarding is limited to 1mu items such as troops), DR is highly effective. Soldiers are good at inflicting damage against the boarding party though the trade-off is in control factors. It effectively comes down to how much the ship is worth compared to the wages required to defend it and the probability of being boarded.

A skirmish ship for example, designed to enter enemy territory and drop missiles on enemy outposts is likely suffer multiple boarding attempts on the next day before it can cloak out of orbit and escape battle because boarding attempts are initiated during the run and therefore can be attempted before the ship moves away. As such these ships are best manned by a lot of troops. Using (if available) veteran marines will give the best control factors and thereby require the boarder to field a large force or potentially not gain any control (and therefore deliver no damage) while still being subject to damage. Soldiers however are still effective at dealing damage though against a large boarding force of marines may still fall relatively quickly.

Scouting

Scouting is used by a ground party to gauge the military defences of a target. From this, cost to capture may be evaluated. This is used in conjunction with a detailed scan and tactical location to determine whether an assault should be the made.

In simple terms, providing the attacker has equal military mass to defending military mass it has the potential of gaining 10% control per round (as it is normally the lower of complexes and troops and there seems no point sending an inferior attacking force). The actual control gained (proportion of the 10%) comes down to attacking control factors to defending control factors.

As hits against the attacker significantly increase while the defender has at least 90% control, gaining the first 10% is paramount. Gaining 20% control is also good if cost effective.

Achieving 10% by the end of the first day requires 2.5% per round and the latter 5% per round. Looking at the odds table attaining for control factor ratio modifier, attaining 2.5% (=25%x10%)/round requires 3:1 ratio, while attaining 5%(=50%x10%)/round requires 6:1 ratio.

Somewhere in the middle with 4:1 ratio ensures that the first 10% control is gained within the first day after accounting for losses presuming normal assault tactic. Tactics such as Assault and Storm may result in heavy casualties when attacking open and disperse spreads unless high odds (attacker to defender control factors) are achieved.

Example: Scout party consisted of 50 scouts of a small starbase consisting of a few hundred complexes.

```
Scout Accuracy: +-20% (215 Scout Factors)
Scouting PRV STARBASE Draxus Alpha (58721):
Spread: Packed
Control Factors: 27183    Damage: 352015
XLight Vehicles: 7       Light Vehicles: 12038
Medium Vehicles: 0       Heavy Vehicles: 0
Turrets: 3114
Troops: 1144Basics
      58 Crew
      1957Marines
      2124Soldiers
```

A detailed scan is also conducted.

4:1 control factor ratio requires 120,000 control factors (= 4 x 27183).

From the scout report the defenders have:

15,000 Light vehicles and turrets tend to be 20MU each = 300,000MU

Troops = 5,500MUs

Even though resistance from complexes is lower (285,000), the military stills needs to be overcome so using this as the benchmark is necessary.

The attacker should therefore have military mass of at least 300,000mu.

If half the attacking control factors is from ordnance, this means 60,000 control from troops.

This is packed so 60,000 control factors = 8,000 marines (for best factors)

292,000mu in ordnance = 14,600 light tanks.

60,000 control factors in ordnance = 15,000 light tanks (so approximately the same).

This does not account for losses and it can be expected that 4,000 hits initially will kill a few hundred troops (due to relative tank to troop mass) and possibly as many as 2,000 tanks (20% of 15,000 vehicle hits, each with a 50% chance of taking out a tank).

Taking 20,000 tanks and 20,000 troops (say 5,000 soldiers or mercs) is therefore not unreasonable.

The cost of training and moving these troops is arguably 400,000 stellars and the tanks cost 500,000 so give or take a million stellars (if the assault is a disaster and everything is lost).

How much is the base worth?

300 complexes (from the detailed scan) each worth around 1,000 stellars each and around 100,000 in other items (after removing military). A basic estimate and not accounting for tech and valuable merchandise is therefore 600,000 stellars.

```
>TU 150: Detailed Scan {58721}
Scanned:
PRV STARBASE DRAXUS ALPHA (58721) - {15-15} 767 kMus - Hiport
Aff: PRV
LifeForms: 52845
Security Lvl: Secure
COMPLEXES:
3 Basic Training (1018)
10 Bunker (1006)
4 Command Centre (1000)
35 Factory (1001)
1 Hiport (1016)
5 Maintenance (1014)
100Merchandising (1024)
35 Mine (1002)
1 Recreation (1023)
5 Research (1005)
3 Security (1012)
8 Shipyard (1013)
45 Shuttle Port (1015)
30 Starbase Shield (1026)
Total TU cost for this action is 50
```


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