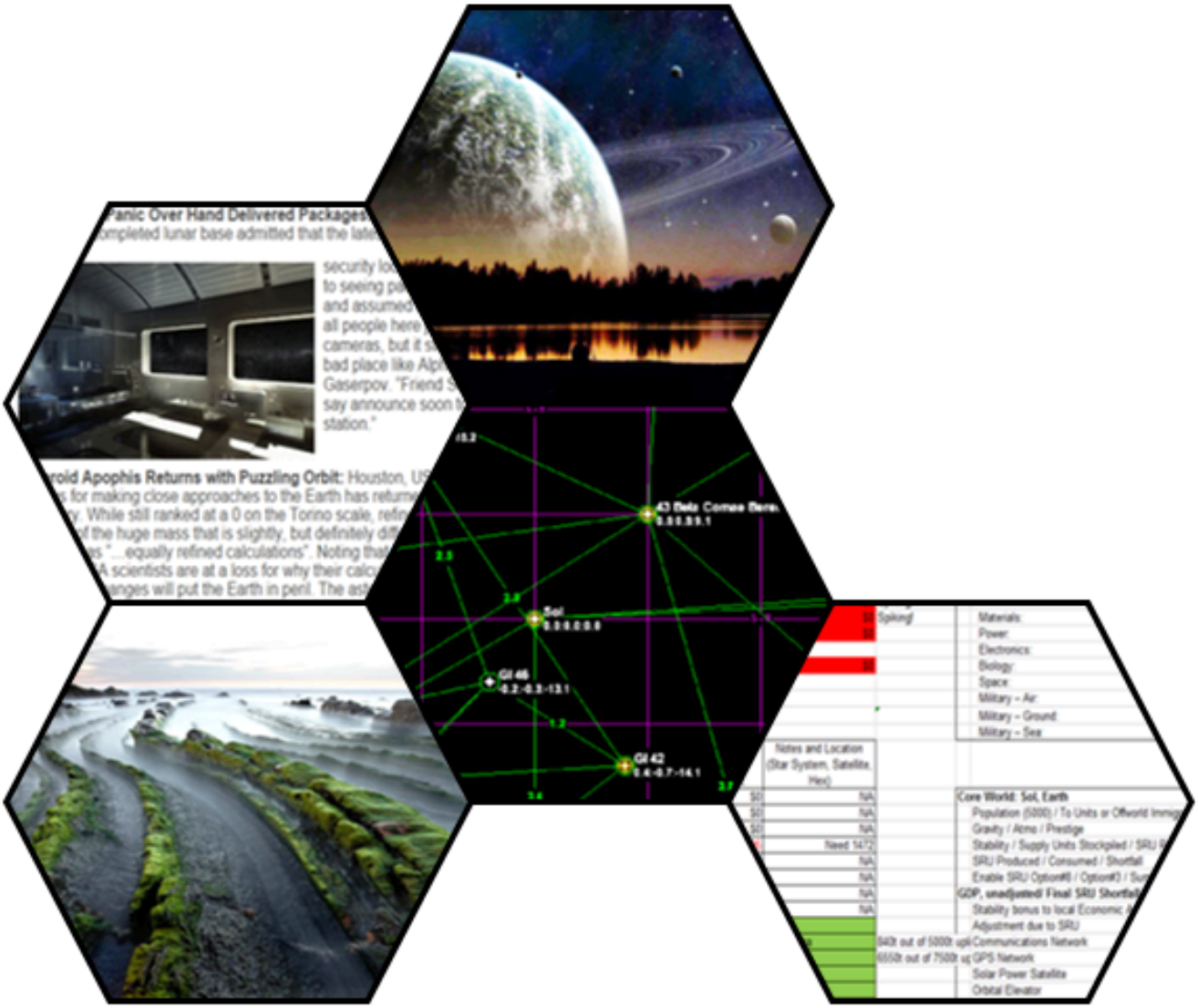
The Great Game



Empire Building in the 2300AD universe

Changes from Rules Version 20210215 to 20220213

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1. Game Overview

1.1. Introduction

This is a fan created PBEM science fiction strategic war game which will be moderated by a Director, a.k.a. the 'Referee', who in all matters will be considered to be omnipotent. Players will take on the roles of human nations in a universe based on the Game Designers' Workshop (GDW) 2300AD game universe * using the real state of the world as a starting point. Drawing inspiration from 'The Game', used by GDW to create the 2300AD game universe, a player could strive to conquer, colonise, build coalitions, and gain technology. Players are expected to at all times act with respect and honesty. As a sandbox style game, there are no levels, character classes, set endpoint or victory conditions; the goal is to survive, grow and have fun. The reality of history is our starting point; the feel of GDW's 2300AD game universe is our ideal; everything else is playability and fun.

We make no distinction in this game between the civilian and the military, between the public and the private. It does not matter if a certain armed spaceship is officially controlled by the military, the national government, a local government, a corporation, hired foreign mercenaries or a private individual, it is simply 'the player's'.

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1.2. Role of the Player

Players take the role of controlling one of the available player nations, including the government, media, military, intellectuals, and corporations. Players are the spirit of the nation itself, directing where goods and services are allocated; players are not just the national government spending tax money. Your direction can last for centuries, regardless of elections, revolutions and such. You are to lead your nation to the best of your ability, promoting its goals and interests, enriching its citizens, and attempting to leave its mark on history. Over the course of a Turn, representing five years of "in-game" time, you will submit a budget of your economic expenditures and detail what orders your nation will be undertaking. Players are expected to be familiar with the official rules, databases, maps, messages, etc; do not expect the Referee to be pleased to frequently restate just for you what is already written.

Always remember the enormous scope and scale of this game. If an action does not change the fate of a nation or shake the foundation of a world then it is at best just a throw-away reference to make a story sound better.

Use your initiative and imagination, do not expect things to get done for you, it will often be up to you to get things done and done right. Expect the Referee to throw in a few complications just to keep it interesting. We all have to find our niche and way to contribute to the game. What do you like to do? Find somewhere you can help and do it. Players commonly take responsibility for more than one role or nation and frequently switch as needed.

By necessity, much of the complexity of simulating real life has been abstracted by leaving most judgments up to the Referee. You can offer your opinion but in the end, it is important to accept the Referee's judgement otherwise we will never get anywhere. Arguing about the game, its rules, its realism, the capacities of its members and their life choices, etc. does not constitute playing the game, such things are at best a distraction and will be treated as such by the Referee. If you really want to improve the game then offer your services to the Referee to adopt a webpage, or be the acknowledged judge on issues relating to a certain rules section, or offer to conduct the affairs of a distant non-player nation for the purposes of a negotiation or a battle, etc.

If you have made a mistake in your orders then expect the Referee to intervene only if your actions break these rules, otherwise the Referee will try to carry out your orders as best as he understands, not what the Referee thinks is best for your nation. Your actions are your responsibility, regardless if the Referee thinks they are unwise. No 'my competent staff would have noticed and fixed the error for me' type argument is sufficient; you are your own competent staff, if you made a mistake then they made a mistake too. Show your mettle as a RPG player by constructing an in-game explanation of why it all happened the way it did and role-play to that explanation.

There can be no expectation that each nation and player will always receive a treatment that is balanced or fair; nations are not created equal, fate can be cruel, and apparently the Referee is human. Unless the Referee directs otherwise, this game will not be run for the benefit or detriment of any particular political, religious, cultural, etc. point of view. Do not expect your pet projects, priorities, peeves and cherished beliefs to always receive from the Referee the attention and uncritical success that you think they deserve. You may have strong ideas on what is a 'realistic action' or a 'good policy'; but as seen from the Referee's point of view a player is demanding to get into a time consuming and suspiciously self-serving discussion. If you were a typically harried Referee would not your response to such a haranguing be as simple as 'No, because I said so' or 'Fine, but I am going to make you suffer severely from various unintended consequences to keep this from becoming an exploit'? Choose your battles wisely.

1.3. Role of the Director

The Referee is omnipotent and has the right to do anything he sees fit to keep the game fun, playable and reasonable as he sees it. If a player wants to do something unusual and can convince the Referee to allow it, then it happens. If the player is just doing something to take advantage of a loophole or uncertainty in the rules then expect the Referee to at the very least forbid it. 'Because the rules say such-and-such' is just the beginning of a discussion, the word of the Referee is always the ending.

The Referee may be omnipotent but is not infallible, omniscient, has unlimited time to dedicate to the cause nor is he getting paid by you for this job. It is not the Referee's job to repeatedly restate what is already written somewhere on the website. If you find something you consider to be a mistake then write to the Referee beginning with a detailing of exactly what you think is wrong and ending with a comprehensive solution to completely fix that one problem; leave out the internet standard snippiness and indignations as it just wastes everybody's time. If a mistake has been made the Referee is not likely to back up and do a Turn over again; to do so could easily cause more problems than it solves. Expect the Referee to have reasons for doing what was done and to have little time or energy to fully explain why it happened that way, and even less to argue on why it must happen that way.

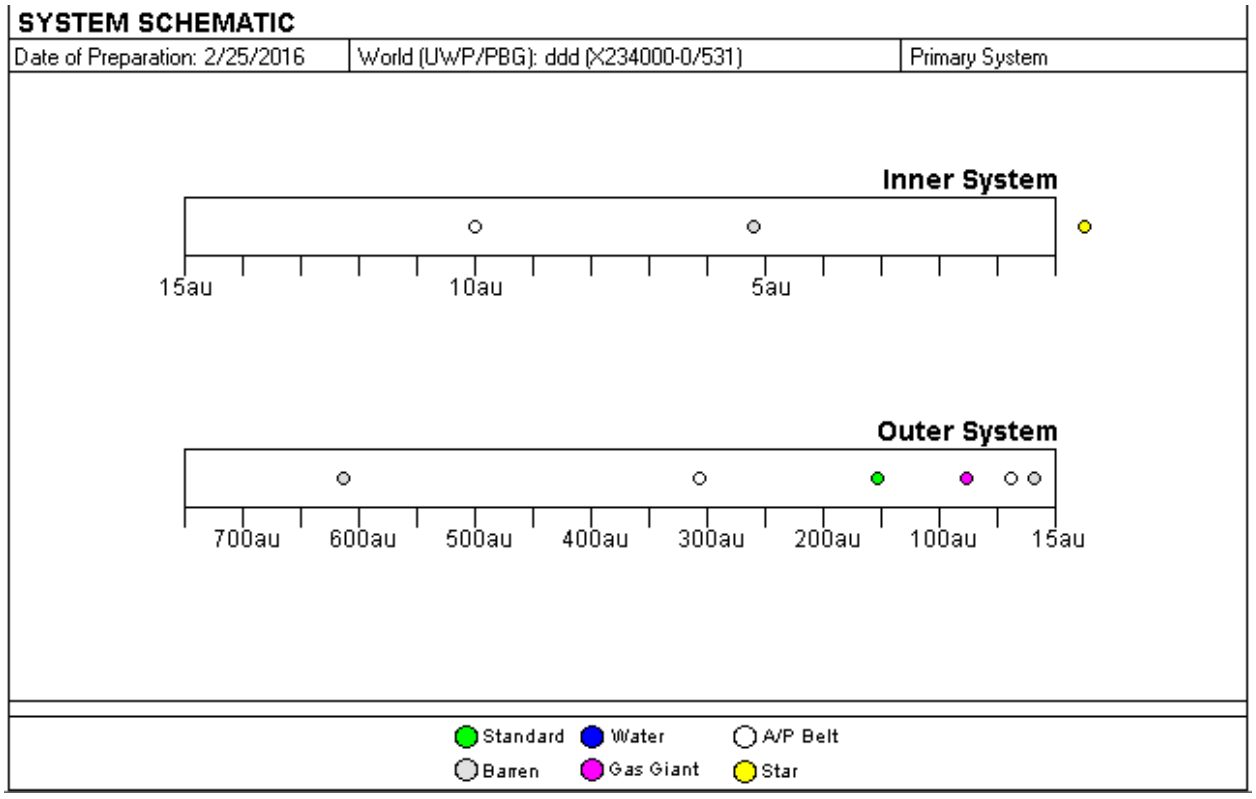
Much of the complexity of real life is left up to ad hoc judgement of the Referee to come up with something otherwise these rules would be far longer. So everything that you actually can or cannot do is limited only by your imagination and the approval of the Referee. The Referee will judge if a player's idea works, if it is allowed or if there are any additional conditions and procedures. If you have an idea, make a good argument to the Referee, and if you can convince the Referee that it is a good idea then it will happen.

1.4. Legal

2. World Creation

2.1. Star Systems

A Star System is a number of stars which orbit each other and all the Worlds which orbit those stars, as created using the Heaven & Earth software. The distance between Worlds is given in a number of AUs; short for Astronomical Unit, the average distance from the Earth to the Sun, 149 598 000 km.



2.2. Worlds

This game will use the Universal World Profile of Traveller to describe Worlds as generated by the Heaven & Earth software. A World is any large mass which is following its own unique orbit around another World or a Star. Each World has a hexadecimal rating for Size, *e.g. Earth has a Size code of 8, Luna is 2, the Asteroid Belt is 0, Jupiter is C*. For all calculations, Size S worlds are the same as Size 1, Size R worlds are the same as Size 0. Each World has a hexadecimal rating for Atmosphere type representing the density and breathability of the local atmosphere at the surface, *e.g. the Moon is a 0, Mars is a 1, Earth is a 6, and Venus is a C.* Each World has a hexadecimal rating for Hydrographics, representing amount of surface area covered in a liquid, *e.g. the Moon and Mars have a 0, Earth is a 7.*

Each World is rated by its habitability:

-**Hospitable**: World Size is between 2 - 9, and Atmosphere type is between 5 - 8, and Hydrographics code is between 1 - 9 ~~and at least one hex (see section 2.3) is type Land, Water, or Jungle~~. A human could survive, and even thrive, with only minimal equipment *e.g. Earth.*

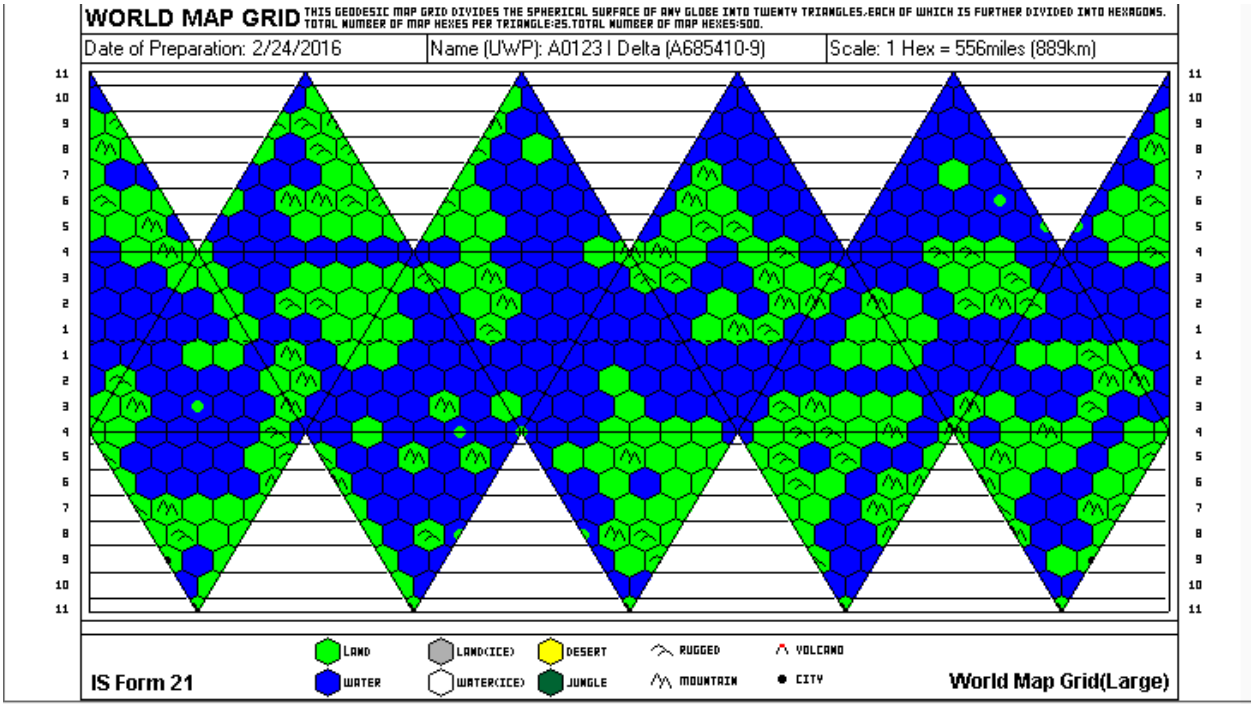
-**Inhospitable**: World Size is R, S, 0, 1, A, or Atmosphere type is 0, 1, 2, 3, 4, 9, A, D, E, F, or Hydrographics code is 0 or A~~, or has no hex (see section 2.3) that is type Land, Water, or Jungle~~, the the World is at least Inhospitable. An unprotected human would not survive for long but sufficient protection can easily be made *e.g. Luna or Mars.*

-**Intolerable**: World Size is B or C, or Atmosphere type is B or C. Even with extensive protection it would be difficult for humans to survive or even function *e.g. Venus or Jupiter.* Within the scope of the game, no unit or facility can ever go to the surface of an Intolerable World and is immediately destroyed if it tries.

Each World is rated by its Farming and Mining potential, this is a measure of the World's natural productivity, from 0 (least productive) to 20 (richest). When a World is Surveyed (see section 7.2 -Enclave Settlement or section 9.2 -Survey Module), the Referee will roll 2D10 for Farming and Mining potentials and record these potentials in the Notes section for the World in the Heaven&Earth database. If the result of the roll for Minerals is a 20, the Referee will re-roll and also note the presence of a Tantalum Special Resource (see section 4.5.2) in one or several hexes. If the result of the roll for Farming is a 20, the Referee will re-roll and also note the presence of a Pai-Leng Special Resource (see section 4.5.1). Oil Special Resource (see section 4.5.1) will occur at the discretion of the Referee. Once surveyed, knowledge about the Farming and Mining potentials and Special Resources of a World will be publicly available and may not be distorted or withheld by players.

2.3. Hexagons

The surface of each World is mapped by hexagons, the size of which depends upon World Size, generated by and available for review with the Heaven and Earth software.



Hexes are identified first by row with a number and a letter for North or South hemispheres, '1N' or '1S" starting at the equator and increasing to '11N' at the North Pole or '11S' at the South Pole, then by column numbers ranging between 1 – 35, starting at the first hex on the far left side of the map, increasing to the right (East), even if partial. *E.g. The black dot marking a city in the above world map is in hex 9S1.* For all purposes, Worlds of size R or 0 are treated as having 1 surface hex, identified as 1N1. As the hexagonal division is the assumption in all our maps, calculations, and movement, it is a requirement that the borders of all Settlements follow the hexagonal borders of our maps, even though real borders never do. Ownership of a hex may not be shared except where specifically allowed, e.g. *the ground component of Outposts and Enclaves*, see section 7.8.1.

Hexes have a terrain type, which is identified by colour and symbol:

Land: Green
Water: Blue
Land(Ice): Grey
Water(Ice): White
Desert: Yellow
Jungle: Dark Green
Archipelago: Blue with green dot
Scattered Lakes: Green with a blue dot

Archipelago(Ice): White with a grey dot

Scattered Lakes(Ice): Grey with a white dot

Rugged: Symbol of two inverted U shapes

Mountain: Symbol of two inverted V shapes

Volcano: Symbol of one inverted V shape with a small red dot on top

City: Black dot. Not used in this game.

Every World and Star will also have one additional hex, the 'Orbit' hex, where every object in orbit about the World or Star is placed. The Orbit hex has indefinite size and shape and includes everything from LEO to Geosynchronous type orbits and the Lagrangian points.

The effective Farming and Mining potential of a particular hex is the World potential modified by the habitability of the World and terrain types of that hex according to the following tables. Final results of less than 0 are reset to 0, more than 20 are reset to 20. The effective Farming potential of an Inhospitable type World is always 0.

	Hospitable	Inhospitable
Farming	+0	NA
Mining	+0	-10

	Land	Water	Land (Ice)	Water (Ice)	Desert	Jungle	Archipe-lago	Scattered Lakes
Farming	+1	-2	-10	-10	-10	+2	+0	+1
Mining	+0	-5	-3	-5	-3	+0	-2	-1

	Archipe-lago(Ice)	Scattered Lakes(Ice)	Rugged	Mountain	Volcano
Farming	-10	-10	+0	-3	+2
Mining	-5	-3	+5	+3	+3

2.4. Subway Maps

For travel between the stars, a simplified view of the relationship between them will be used. Called a 'Subway Map', this will show the stars linked with nearby stars based on being within the 7.7ly range of StutterWarp Drives (see section 8.10.4) or the 11.6ly range of StutterWarp Drive Tuner Modules (see section7.9.1). The lengths of the line for the links and the relative position of the stars in a subway style map has no relation to a star's actual position in real, 3 dimensional, space.

2.5. Settlement List

All known Settlements and their statistics are described in the file Settlement_List spreadsheet. A nation's economic size was initially set to the International Monetary Fund published GDP PPP estimate, times five at the year of game start. The entries in the Settlement List are the official, final numbers for each Settlement, they will be publicly available and may not be concealed or distorted under any circumstances.

Settlement Name: Name of the Settlement.
Settlement ID#: A unique number to identify a Settlement.
Settlement Type: Whether it is a lonely Outpost, a small proto-colony known as an Enclave, a full-fledged Colony, a bustling Core, or an abandoned Deserted Settlement. See section 7.2.
Star System, World: Location of the Settlement.
Owner: Which entity owns the Settlement.
Nearest Core: Core Settlement belonging to the same owner based on lowest #of Star System links or AU and highest population. Important for determining what can be produced locally. If a player feels that the entry for Nearest Core needs to be updated then it is the responsibility of the player to inform the Referee.
#Links: The number of Links between a Colony and its Nearest Core.
Trade Code: Each Settlement is assigned a Trade Code. Trade Code is a simple description of the overall character of a Settlement and has an effect on its statistics.

- **Agricultural**: Farming and mining are the mainstays of life, the pace of life is slow.
- **Industrial**: Extensive industries.
- **Authoritarian Agricultural**: As Agricultural but more stable, less free, at a cost to growth.
- **Authoritarian Industrial**: As Industrial but more stable, less free at a cost to growth.
- **Isolated**: Difficult to reach, nothing much ever happens, e.g. small islands, enclaves, and outposts.
- **Non-Industrial**: Too low of a population to maintain an industrial base.
- **Poor**: Poverty, corruption, and violence-plagued.
- **Populous**: Teaming with people, usually an older society.
- **Rich**: Wealthy from production of Special Resource Units.
- **Rich, Industrial**: Wealthy and extensive industries.

Income: Median wealth of the inhabitants compared to the rest of humanity. Has an effect on the Settlement's character and statistics. Extremes of Authoritarian Score will affect this negatively.
Estimated Growth in Population next Turn: A projection of by how much the population will scale by in the next Turn.

Population: In the number of Population Units**.** See section 4.2
Estimated Growth in GDP next Turn: A projection of by how much the GDP will scale by in the next Turn.
5 Yr. GDP: In the number of $ per Turn. See section 3.3
Hexes: Number of hexes occupied by the Settlement, on the surface.
Authoritarian Score: See section 6.3
Stability: See section 6.4
Revolt?: If a widespread Revolt has broken out. See section 6.4
Prestige: See section 6.2
NPC Sum Base Combat: The sum Base Combat Strength of all Military Units on the surface. See section 8.8. For NPC Settlements only.
Military Rank: A general measure of military depth. See section 8.9
WMD Armed: An ability to consistently devastate large areas. See section 8.12
Econ Tech Level: See section 5.1 and 7.4. The average level of all Economic tech types.
Mil Tech Level: See section 5.1 and 7.4. The average of all Military tech types.
Special Resource Unit section: See section 4.5.

- **First Surveyed:** The Turn when the World is surveyed, or the game start date for Earth
- **Oil SRU Production**: How many Oil SRUs will be produced this Turn.
- **Pai-Leng SRU Production**: How many Pai-Leng SRUs will be produced this Turn.
- **Tantalum SRU Production**: How many Tantalum SRUs will be produced this Turn.
- **Oil SRU Demand**: How many Oil SRUs are required for a healthy economy.
- **Oil SRU Exclusive Purchase**: See section 4.5, option#5. Sum total has been exported.
- **Oil SRU Exclusive Sale**: See section 4.5, option#5. Sum total that has been imported.
- **Oil SRU Needed Imported from Open Market**: Oil SRU Demand minus Exclusive Purchase. The total Oil SRU Actually Imported from the Open Market, a reflection of what is available.
- **Oil SRU Consumed**: How many Oil SRUs are actually consumed by the Settlement.
- **Oil SRU Surplus**: Oil SRU which is actually imported from the Open Market minus what is Needed Imported from the Open Market. Positive values result in a small bonus to GDP growth.
- **Oil SRU Available for sale to Open Market**: The default action for the Referee is to take Oil SRU Production minus what has been sold to a different Settlement using Exclusive Purchase. If Settlement is on a world other than Earth, the Oil SRUs must have been brought to the Orbit hex.

Diplomacy section: See section 6.1. A list of the Relation Score between each Settlement and each Player Nation.

3. Turn orders

3.1. Communicating

Writing Any communication about your nation will be expected to be done on the RPOL forum for this game. To contact the Referee on the RPOL forum, address the 'Referee' character. Writing your communications between other players or public announcements using an In Character (IC) voice is strongly encouraged. Be sure to carefully note in all your communications just what exactly you are saying in your Out of Character (OoC) voice and what is being said in your In Character (IC) voice and exactly to whom, especially if you or the recipient are playing more than one role/nation. ~~On the RPOL site, this means being careful to always choose the correct character identity to post as.~~

~~*Example: Within a single thread you might see the following:*~~

~~*-Referee Mark S. to player John H.: The answer to your question on technology can be found in section 7.1 paragraph#1, sentence#2 of the rules*~~

~~*-President Mark S. of the USA to President John H. of Brazil: I hate you! Die scumbag!!!!!*~~

~~*-President Mark S. of India to President John H. of Brazil: We will crush the Americans together!*~~

~~*-Mark S to John H: Hey, are we on for pizza tonight?*~~

~~Do not assume that the Referee is going to be intimately familiar with some detail mentioned in the beginning of the conversation. It is possible that there will be subject matters in which the conversation has gone back and forth for a while, there may be many replies or are in different threads.~~

As most of this game is likely to be carried out by forums, be mindful that in some ways they are tremendously limited forms of communication because many important cues are missing which can make a message difficult to properly interpret. Always make an effort to be as clear, literal, comprehensive, and explicit as possible; avoid even using pronouns. Unless someone explicitly tells you what their mood is, do not just assume that you actually know what the mood of the writer is; enthusiastic can easily be mistaken for anger, wry can appear to be sarcastic, and so on; ~~you never can be sure~~. A hidden or double meaning, however obvious it might be to you, has a good chance that the recipient will not 'get it'. Sarcasm, veiled threats, hints, innuendo, statements or offers made in jest, jokes, hyperbole, slang, obscure cultural references, wordplay, etc. can make for an entertaining and witty post but frequently misfire as the recipient takes the statement literally or in some wrong way.

3.2. Writing Your Turn Orders

See the Example and Blank Orders in the Files section on the website of the game.

Each Turn in the game covers 5 years of in-game time. The Referee will set a deadline by which time all your Turn orders must be sent to the Referee. Extensions to the deadline are possible but not encouraged; consult your Referee in advance. Do not be surprised if the Referee interrupts the flow of the game for a special event or contacts you with further questions about your Turn.

Players are expected to fill in a shared Google Docs based form provided by the Referee with the orders for their nation for the current Turn. Permission to edit the form will be available for a set period of time and then downgraded to 'Comments only' after the deadline set by the Referee. If your orders are any less clear or comprehensive than what is listed below then the Referee will have to guess at what you intended to do, and it will be your own fault if the Referee guesses wrong.

-The movement of all Military Units (see section 8) are to be listed in the tab for your nations in the Unit List spreadsheet. In the columns labelled 'Moving to' put the Star System, Star, World and hex of the unit's final destination. Describe in your written orders any other action involving units, such as combat initiated, use of WMDs, use of what transport, if need be what path~~, any merge of Brigades into Divisions~~, etc.

-Record the construction of new facilities or changes in ownership of old facilities in the section on 'Other Notes' as well as the Facility List spreadsheet. Players are required to keep the entries for their own facilities properly updated.

-Consumption of Supply, Population, Food, Raw Material, Oil, Pai-Leng, and Tantalum Units (See section 4) by Settlement. Initial stockpile, number moved in/out, number produced, sum consumed by each Settlement. A number for the final stockpiled for each Settlement. Do the same for the Orbit hex. The default assumption by the Referee is that if there are Economic Units available in the World or Orbit hex, they will automatically be used as needed.

-The uplift and downlift of all units between the surface and orbit hex of a Settlement, see section 7.9.2. Show the movement does not exceed the available capacity.

-Anything which would affect the production or consumption of Oil SRUs next turn, see section 4.5.1, of a Settlement. Include the movement of any Oil SRUs to/from other Settlements to be consumed next turn

-Exactly what will be the effect on this Turn of any new or ongoing deals that have been made with other players or entities. The Referee is NOT responsible for knowing about, researching, understanding, or managing your agreements. The effects of ongoing deals made in previous Turns must be explicitly stated, the Referee will not be researching previous order sets to figure out what is happening. Expecting the Referee to use just the orders of your trading partner are also not acceptable, you have to explicitly state what happens in your orders. What happens if you fail to explicitly state all actions and inputs and outputs from a deal is at the discretion of the Referee but the default action is for any units in question to be destroyed. Preemptive orders for backup destinations, etc, will not be accepted.

-Any ongoing effects from previous Turns that you think may be relevant to your actions in the current Turn. Do NOT assume that the Referee will be intimately familiar with everything that you think is relevant from a previous Turn. If you did not think to remember some vital detail from the past then you cannot expect the Referee to remember it either.

-The specifics on what is being done with each PA (see section 3.4) including any special plans.

-In a few words try to sum up basically what you are doing so the Referee can get a quick understanding of why you are doing the things that you are e.g. *The reason why I am building up the rail network on Mars is so next Turn I can conquer the Brazilian territories there.*

~~-You can include some limited 'general orders' for the current Turn within your written orders if you wish, however, it should not be necessary as long as the Referee can get a timely response from you. The Referee does not want to see lists of "If situation X happens, then do action Y" type items for your orders.~~

-The Budget Spreadsheet for your nation is located in the Budget Files subfolder of the Files section of our website, a new tab for the new Turn will have been added. Update this tab with this Turn's budget purchases (see section 3.3) for your nation.

Do NOT include in your orders:

-Excessive detail in describing your actions. Should be no more or less than enough to give the Referee an idea of your basic plan *e.g. 'what' you are trying to do is damage Al Qaeda,* leave out the details on the 'how' *e.g. 'following high level Al Qaeda couriers to their walled compound and then assaulting that compound with a SEAL team inserted by stealth helicopters'* up to the capable hands of your competent staff.

-Any 'standing' or 'contingency' type orders i.e. "If event X happens, then do action Y", they will not be accepted.

-Any orders that have to do with the normal and routine functioning of a normal society, i.*e. the default assumption is that your military will train and patrol, your police will prosecute criminals, etc~~, without any need for you to mention it~~*.

-Assume that a lack of comment from the Referee means consent; it may just mean he does not see the issue as worthy of taking the time to argue or has not realised the full implications of what you are doing.

-Role-playing to your actions is encouraged where the rest of the players will see it *e.g. in the public forums*, but role-playing where only the Referee will see it is at best useless.

With 5 year Turn lengths, any action is actually an accumulation of many smaller actions being done simultaneously over a long period of time. So all the written orders submitted with your Turn *e.g. all production, income collection, and expenditure, upgrades to units, non-combat movement of all units including supplies, Political Actions, and build orders, etc.,* will usually be assumed to be completed simultaneously and simultaneously with all the other players too, over the entire course of the turn, which includes the combat rounds that are processed later. However, five years for a Turn length is a long time frame for most human interactions and inevitably a lot of things can happen which can invalidate much of your orders; especially because all of our orders are to be executed simultaneously across competing players. If this happens, the Referee may contact the players and do whatever it takes to adjust. When players have conflicting orders the Referee will usually, in descending order of average Tech level, first conduct the movement of all units, then combat, and then the construction of all new facilities and units; but it will always be up to the judgement of the Referee as to how exactly a conflict of orders is resolved. Usually, any order which you give that could affect the published statistics of any nation the Referee will not allow to have any effect until the next Turn. *Example#1: In the 2155 Turn the UK gives orders to improve ~~the~~ relations with Spain, and is successful at this, but all other actions during the 2155 Turn will be judged using the original relations. Example#2: Midway through the 2280 Turn a war breaks out between Russia and Manchuria over the fate of the Central Asian Republic. As part of that conflict, France decides to deploy its fleet to blockade all traffic between Manchuria and it's extra-solar colonies. The loss of those colonies' income will not affect the Manchurian 2280 budget and budget choices until the 2285 Turn when the Referee may choose to impose an effect, even if both the war and blockade completely ended before the start of the 2285 turn*.

For questions about how your orders are to be carried out or to adapt to the actions that occurred mid Turn there is a private thread on the RPOL forum titled 'Follow-up Orders for <Nation>'. In this thread, the Referee may ask the player for additional details, such as the combat movement and orders of military units (see section 10) or the details on your expenditure of Response PAs (See section 3.4). Such follow-up type orders will ONLY be accepted if posted to the 'Follow-up orders and questions for <Nation>' thread, they will not be accepted if posted anywhere else.

There are many NPC entities with which a player nation may wish to make a deal with *e.g. Oil SRU from Libya*. Place your bid in the Bids on Deals with NPCs thread on the RPOL site, no secret deals will be allowed. Each new deal must be a new, separate msg on that thread and be titled "<Bidder name> to <NPC name>" e.g. *Indonesia to United Launch Alliance.* Bids are only accepted for taking effect the next turn. No deal can be of duration greater than 1 Turn. ~~Role-play is encouraged but bi~~Bids can only be in terms of Bidder name, target name, specific numbers of game recognized units or actions or $ offered and requested, *e.g. Indonesia to United Launch Alliance: $20 for use of 1 Rocket*. Payment is due the Turn before services are rendered. At the Referee's discretion, making a deal with an NPC may require succeeding in a Task of difficulty set by the Referee. A change of 20% per Turn of an NPC's total consumption or production of SRUs (see section 4.5) is available to be easily sold to or bought from another Settlement, more than that will be more difficult. At the end of the Turn the Referee will post to the same thread a summary of which bids have been accepted. After winning a bid the deal can only be reneged on or altered with the explicit permission of the Referee.

3.3. Your Budget Spreadsheet

See the Example Budget Spreadsheet in the Files section on the website of the game.

Each Turn will start with the Referee making available a link to a Google Sheets file containing your nation's budget that shows the results from the previous Turn and a new tab added that gives the figures for the next Turn (see section 4). See sections 4, 5, 6, 7, 8, and 9 for what can be purchased and their costs. Fill in the new tab with all your purchases for the Turn, be sure to include all numbers or choices in all the cells highlighted in green. Note expenditures and consumption as negative numbers, income as positive numbers. In the 'Notes or Location' cell, state the Settlement name where produced and, if different, the Star System - Star- World - Satellite - hex or Settlement Name-Surface/Orbit, where a unit or facility will be located. The place of production and place of final location separated by a slash mark *e.g. Russia Prime / Sol-Primary-Delta-Main-1N5 means the facility was constructed in Settlement Russia Prime but then shipped to hex 1N5 of Mars for final placement.* Be sure to also include orders in the appropriate sections of your written orders regarding the interface and Spaceship capacity needed to actually move the cargo. Only include the number of Political Action points (see section 6) being bought on the spreadsheet, not the specifics of the Political Actions these PApoints will support. The Referee will close your permissions to edit the budget spreadsheet file at the deadline for written orders.

Monetary values are in terms of billions of USD (US$B) worth of goods and services and are listed as '$'. As the mass of finished goods is often quite small compared to their inputs and the location of a 'service' can be meaningless, $ are not considered to have a definitive position or mass and may be transferred instantly anywhere, including to other nations. As $ are real goods and services, it can be given to other nations but cannot be deficit spent or stored between Turns.

Each Settlement will have several upkeeps to maintain themselves. Numbers in Red background represent shortfalls in key areas which could have serious consequences elsewhere. Negative events, such as a reduction in Stability or tech levels or unit Quality are very likely to happen should all such upkeeps not be paid in full. As a courtesy, the Referee fills the Upkeep with the minimum value, but the player can allocate any number desired, accepting that there will be negative consequences elsewhere. Outpost, Enclave, and Colony Settlements will require Supply Units, see section 7.8. For Core Settlements:

Economic Tech Upkeep: Is what it costs to maintain the Economic Tech levels (see section 5) of your nation. It covers everything from a doctor's pay to the replacement of a burned out light bulb. The population, GDP and economic tech levels of the Settlement are the most important factors.
Military Tech Upkeep: Is what it costs to maintain the Military Tech levels (see section 5) of your nation. The military tech levels and size of your nation's military are the most important factors.
Authoritarian Score Upkeep: See section 6.3.
Society Corruption Losses: Cost of crime, corruption, inefficiencies, etc.
Environment Degradation: High GDP, population, time, and Oil SRU use versus number of hexes occupied and Stability has a cost of pollution, overcrowding, and overdevelopment to life in the Settlement.
Settlement Size Upkeep: Controlling large numbers of hexes or Population in a Settlement requires extensive investment to maintain.
Economic Drag from Public Debt: Rapid increases in GDP requires extensive public investment that can weigh down an economy.
Price of Oil SRU/ Adjustment due to Oil SRU: The direct cost of Oil SRU consumption minus sale to the open market. See section 4.5

The Budget spreadsheets of player nations will be publicly available and are the official, final, record of a nation. This means no 'off the book' entries nor any lying about what an entry represents, though with explicit Referee permission an entry may be listed by a players in an obtuse way *e.g. If you made $ secretly selling bio-weapons to a terrorist organization it may, with Referee permission, be listed as 'weapons sales to NPC entities', but never a non-answer like 'See PA#4' nor a complete fabrication like 'profits from the sale of biodiesel reactors to 3rd world nations'.* In any deal between nations, list the amounts of $ that are added/subtracted in the Purchased section. To make things clear to the Referee on what happened in any deal that involves the transfer of units between nations, the selling nation has to first pay the entire purchase cost of the unit and list that on their budget spreadsheet.

3.4. Political Actions

Political Actions (PA's) are a vital component of the free-form part of the game and are a catch-all for attempting just about anything you can think of. If you want to do it but it hasn't been covered by the rest of the rules then it probably requires a PA. Usually, this means something big and important done by your spies, diplomats, Special Forces, bureaucrats, and police. PAs are often used to get things done that normally would not happen otherwise, including bending the published game rules or to allow things to happen that would normally be out of reach, or to break ties in a conflict. PAs may not be used to directly alter the actions of another Player Nation, the Referee will not be rewriting the orders of your rival *e.g. It is unacceptable for Russia to submit a PA to convince the player nation of Japan to accept a certain treaty, it is however acceptable for Russia to submit a PA involving a subversive campaign to destabilise the nation of Japan until the player for Japan decides to accept the treaty.* The use of PA does not mean success, it just means that your nation is trying harder than usual; the Referee will be the judge on the effectiveness.

The resource behind most PAs are 'PApoints', which costs $100 each and cannot be stored between Turns. PApoints are loosely defined as a standardised amount of influence, so the 1 PApoint that you allocate to as part of the PA to change Vanuatu would turn that tiny island nation upside down and inside out, would barely budge the much larger China if applied there. PApoints will actually consist of some combination of speeches, lobbying, voting, sanctions, threatening movement of troops, changes to laws, advertising campaigns, construction, research, bribery, espionage, actions by police or special forces, blackmail, holding hostages, etc., whatever works. When you construct the argument for why your PA's should succeed, base it around the form of the PApoints that you decide. The Referee may assign bonus PApoints, or take away some as a penalty, based on past actions *e.g. such as the prestige of holding extra-terrestrial colonies, making technological breakthroughs, winning/losing wars, looking bad in front of the world press, making deals, random events, etc*.

Political Actions are a Task (see section 3.5) and good role-play to your actions will be a significant factor in the Referee determining the success or failure of your actions. ~~When a Political Action is processed is at the discretion of the Referee, but the usual procedure is the Referee will not resolve the Political Action until the end of the turn~~ It is expected that the specifics of your PA's and results will only be seen by you and the Referee, but the Referee will publish a brief summary of each Political Action after the deadline for written orders has past and then publish a brief summary of the results at the end of the turn.

PAs will only be accepted if included in your written orders Doc. Keep your PA descriptions clear and concise, if the Referee cannot understand what you are trying to do then you cannot be surprised if things do not go well for your cause. A Political Action must include the following elements:

> #1 A unique title and identifying number: There can be a lot of PAs in this game; we need to keep things organised. *E.g. India PA#4 of the 2040 Turn*

#2 Goal: Help the Referee imagine what will happen if everything goes as you planned it, *e.g. get the EU to support my intervention in Pakistan with $, Supply Units, and Military Units,* specifically with regards to the mechanics and elements of the game. *i.e. The Referee does not care about how implementing your pet theory on immigration or gun control will make your nation a more just and equitable place. The Referee does care about whether you think implementing your pet theory on immigration or gun control will raise or lower a Settlement's Authoritarian Score.* Succeeding at the Task roll (see section 3.5) does not mean that the results will be exactly as the player has stated here, the actual results are at the discretion of the Referee.

#3 Action: What is to be done *e.g. Lobby the EU, point out that they will stabilise Pakistan, promote democracy, and control the Pakistani nukes (priority #1).* Just having a plan is not enough for a bonus to your action's chance of success as the Referee will measure your plan against what the Referee thinks any competent, loyal, professional staff would come up with.

#4 Background: The pertinent events *e.g. A serious revolt in Pakistan. Pakistani President barely controls his nukes, Al-Qaida controls the northern part of Pakistan.* If you did not think to mention some relevant fact then you cannot expect that the Referee will know about it either.

#5 Argument: Try to convince the Referee why this plan should work *e.g. EU has economic interests that will be damaged if Pakistan falls apart, and fears nuclear proliferation.* Specious and self-serving arguments will be treated as such.

#6 Assets ~~Resources devoted~~: PApoints or other resource *e.g. 2 PA points and Mechanised units #205, 195 and 53.* Some kind of significant investment of in-game recognized units is expected, just telling your people to work towards some goal is not acceptable. A puny investment, *i.e. something less than the value of 1 PApoint*, is likely to just irritate the Referee because of the amount of time needed to process each Political Action.

~~#7 Article for the History section (optional): You may also submit your own history articles (see section 3.6) for inclusion based on how you think your PA's will appear to be.~~

Every national effort is constrained by a web of previously existing treaties, business contracts, infrastructure networks, etc. This means everything is already spoken for and set, so any deal that a player negotiates with an NPC represents something far above and beyond any normal deal, is actually some kind of emergency/extraordinary effort that includes the ripping up of what was the usual pattern and hence is very limited. No 'it is obviously in an NPC's best interest so of course they would go along with my plan without costing my nation a PApoint' type of argument is sufficient. Even assuming everything goes flawlessly, NPCs have their own objectives, priorities, personalities, and plans for what they actually see as their own best interest. Any action or deal to influence a non-player organisation will have a duration of 1 Turn.

Political Actions are intended only for large, significant, long-lasting actions, not for the normal actions of a competent staff doing routine things with the usual resources. Think big, if it does not affect the statistics or actions of nations, meaning it costs at least tens of billions of dollars & takes years & affect many millions of lives*, i.e. would require at least 1 Political Action point;* then it is likely something best left to your competent and extensive staff to handle and is not worth mentioning. *Example: The Russian player is informed that there is a dramatic rise in terrorist activity in Siberia. For the Russian player to just to ask his intelligence agency to manufacture some evidence implicating Kazakhstan in being behind the terrorist activity to justify an invasion would not be a PA because it is the work of an afternoon to fake some documents and torture some poor souls into signing pre-written confessions. Not many would believe such evidence but it is something the Russian ambassador can use as a distraction during the inevitable UN Security Council session about the invasion. For the Russian state to actually fight the terrorists would not be a PA either, the state does that anyways as a matter of course. You should not bother even mentioning such minor actions as the above in your Turn orders because that sort of thing is in the constant daily fare for a nation and is handled by your extensive and competent staff. The Russian player could just ask his intelligence agency who, if any, outside force is behind this rebellion and the Referee would simply tell him 'It was Pakistan' because it is very difficult to keep hidden over a period of years the transfer of large amounts of money, weapons, subversives, and advisors. Even if the Russian intelligence agency does not know enough about the rebellion to be able to intercept all the bombs and the addresses of all the terrorists it at least would be obvious to the agency who, if anyone, is backing those terrorists. Yet if there are secret backers, and they have gone to extraordinary lengths to conceal their involvement (meaning Pakistan spent PA points on the concealment alone and has a good plan at least!), then it will be up to the judgement of the Referee if the Russian player is told, and told the truth. Something that would definitely require a PA is making more than the usual effort fighting the terrorists or fabricate enough convincing evidence that the world might not mind a Russian led invasion of Kazakhstan to change a regime that everyone believes supports terrorism.*

Players may present to the Referee an idea on a large project they wish to undertake. ~~Alliances and organizations may be made, but if they are to receive any consideration on the mechanics of the game for actions beyond being part of a common mailing list.~~ If you want some alliance or organisation, *e.g. NATO*, to have any effect on the mechanics of the game they are required to succeed every Turn in a Simple, Instant Task against the sum population of all nations in the alliance for maintenance, presumably as part of a Political Action submitted by one of the organisation's members. To get a bonus to productivity for one Settlement, the player should describe a project, and what they expect to invest in it, usually in terms of PA points for the project to succeed, how long the bonus will last, whether the bonus will affect just a given Settlement or the entire nation, etc. As a general guideline, you can expect that the cost/rewards of using PA points to grow your economy will be better than what it is for raising an Economic tech level (see section 5.2.1) but likely include some downside which may be temporary. The final numbers will be at the Referee's judgement based on the action and all the events surrounding it. See section 3.5 for guidelines on how the success or failure of your action is calculated.

Example: *Russian-Chinese Amur River Project of 2020. In a deal between Russia, China and Mongolia they have agreed there will be joint development of the Amur River (which makes up much of the border between the nations). Expenditures are for flood control, irrigation for farming development and hydroelectric power production. Total cost spread out over 10 Turns is 25 PA points. The benefit to the GDP of the three nations involved is unknown at this point but likely to include economic growth with little increase in oil dependence.*

3.5. Task Resolution

Often a player will want to influence the actions of non-player characters, or to significantly alter their own Settlements, or to influence some game events, and these are called 'Tasks'. The determination of success or failure of a Task will be entirely up to the discretion of the Referee but it will likely use the procedure in Quick Combat (see section 10.11). ~~Write a good story to convince the Referee, the better the story you tell, the better the result may be.~~ Attempting to significantly alter one of the statistics on the budget spreadsheet of a Settlement will usually result in a change of around 5% in most statistics of ~~an average sized nation~~ the Settlement. Depending upon the Referee's opinion of the action there will likely also be some unforeseen consequences as well, *i.e. if the Referee believes that another PC or NPC has a vested interest in the outcome of the action, that PC or NPC may be given a chance to respond or interfere in the action.*

The Total Political Strength of each side will usually be based on the following formulas. On the budget spreadsheets for each nation is a tab labelled 'Calculator' which can be used to estimate the odds column which the Referee will likely use in this 'combat'.

Total Political Strength for the 'attacking' nation = (number of PApoints allocated) X (Prestige of Attacker)^2 + (modifier at the discretion of the Referee for Player Assets) , where 'Prestige of Attacker' is equal to the Prestige of the player Settlement with the highest Population ~~highest Prestige of all of the owning player's Settlements. If attempting to influence your own Settlements then 'Prestige of Attacker' = Authoritarian Score.~~

For the 'defending' side Total Political Strength is at the discretion of the Referee, some examples:

~~*-100 X (Task Difficulty level of the action) - Change # of Quick Combat rounds (see section 10.11). Make a nation WMD Armed.*~~

-200 X (Task Difficulty level of the action) - To get an answer on a mysterious event. Survey a World without Survey modules or an Enclave present.

-300 X (Task Difficulty level of the action) - Arrange for an event to make another nation look bad. Hazardous

-500 X (Task Difficulty level of the action) - Convince the Referee to temporarily ignore/alter a minor game rule. Incorporate an unoccupied hex into a Core Settlement.

-If the defender is a Settlement: (Population Units +1000, or GDP +1000, or #of Hexes X 5000, or Referee's discretion, of Defending side) X (Task Difficulty level of the action) X (Prestige of defender - Relations score + Stability Score of the Settlement + 20)^2 / 50 000~~, if attempting to influence one of your own Settlements: Relations = Stability level of the Settlement.~~

Where Task Difficulty level is based on the decision by the Referee as to the difficulty of the action being attempted: Simple: 0.1; Routine: 0.5; Difficult: 1; Formidable: 2; Impossible: 5

Example:

-Convince a Settlement ~~nation~~ to do something they likely would have done anyways – Simple

-Reduce the Military Rank of the nation (see section 8.9) - Routine

-Somewhat reduce the loss due to Society Corruption - Difficult, against GDP

-Foment or suppress the chance of a rebellion getting started – Difficult, against Population

-Temporarily increase the Prestige or Stability Score of a Settlement– Difficult, against Population

-Change the Authoritarian Score of a Settlement – Formidable, against Population

-Convince a Settlement ~~nation~~ to do something they would be fairly unhappy with – Formidable

-Convince a Settlement ~~nation~~ to do something against their core interests e.g. ~~Reduce the Stability of a another player's Settlement, or~~ in 2015 getting North Korea to give up its WMDs – Impossible

Particularly hasty actions may be rolled on odds columns shifted to the left, well-prepared actions may be moved to the right. Usually, only one roll in this 'combat' will be made by the Referee, results will be interpreted by the Referee. The Referee will determine the outcomes depending on current relations, recent events, action requested, the details of your request, supporting actions taken, random chance; etc. The Referee rolling an unmodified result of '1' is almost always a failure, a '10' may be an unusual success. Succeeding at the Task roll does not mean that the results will be exactly as the player has intended, the actual results are at the discretion of the Referee. ~~Success at odds better than 5:1 may result in some multiple of the normal effect, failure at odds worse than 1:5 may result in something opposite to what was intended.~~ The % Damage to the Defender may be interpreted as the % of the project that has been completed, the % Damage to the Attacker will be % chance of a roll by the Referee for a Mishap to occur. If a Mishap occurs, the Referee will roll 2D6 and consult the table below; failure at particularly hasty or Hazardous actions *e.g. being caught attempting to blame some other character for what you did*, and the Referee will instead roll 3D6. The time it takes for a Task to be completed is at the discretion of the Referee, most Tasks will be completed at the end of the Turn, Tasks labelled 'Instant' will be resolved immediately.

Throw	**Consequences**	***Examples of Consequences***
2-6	Superficial Damage	*-1 Relations, a delay of 1 Turn*
7-10	Minor Mishap	*-3 Prestige Score, a delay of 3 Turns*
11-14	Major Mishap	*-2 Stability Score, -5 Prestige Score*

15+	Total Mishap	*A Revolt breaks out*

Example: In the 1955 Turn China attempted to quickly transform through rapid industrialization and collectivization from an agrarian economy into a communist society in one great leap forward. Allocating a large portion of China's available budget to buy 12 PAs to argue for a significant increase to GDP and Authoritarian Score. China, still recovering from the revolution, has a Prestige Score of 12 and Relations Score of 15 with Settlement China Prime. Settlement China Prime has an Authoritarian Score of 17, and a Stability of 4 with 160 000 Pop units (800 million people). ~~Settlement China Prime at that time has (800 000 000 people / 5 000 people per Pop unit) = 160 000 Pop units~~ The Chinese Republic gets an attack strength of 12 X (12)^2 = 1 728. The Referee decides this massive, sudden transformation is an Formidable level task, making the defending strength be (160 000 +1000) X 2 X (12 – 15 + 4 + 20)^2 / 100 000 = 82432 = 824) for odds of (1 728 / 824 = 2.097 = rounded down to) 2:1 odds. For his excellent role-playing of a nation in the midst of revolutionary fever the Chinese player is given 1 column shift to the right by the Referee, making the odds 3:1. The Referee rolls for results and gets a 3. Consulting the table in section 10.6 the Referee finds that the result is 20% damage to the 'attacker', 40% damage to the 'defender'. The Referee rolls a 1D10 and gets a '2', so a mishap occurs, the Referee then rolls 2D6 on the Mishap table and gets an '11'. China is going to get about 40% of the proposed benefits of the original plan, but a wave of devastating problems will plague the nation next Turn as the Referee decides to impose a penalty on the Stability Score of China.

~~Articles~~

~~Storytelling is an important part of this game. The Referee will write Articles which will be posted in the History section of the website based on how events in the game are shaping up and the Referee's perception of how your actions affected it. These Articles may take the format of newspaper articles, log entries, secret reports, internal memos, cartoons, etc, anything that could be expected to be publically available~~

~~Articles are based on the current game universe situation and are used to inspire a good story. Articles are only intended to be the highlights of the few things which the Referee thinks will be useful to set the mood of a Turn, written from the point of view of someone who was there. Articles are not intended to be an unbiased, complete, truthful, and comprehensive description of everything that has occurred. If the importance of actions in an article rises to the level of affecting the statistics and actions of your nation then the Referee will inform you separately.~~

~~Players are encouraged to write their own articles and submit them to the Referee. The Referee will expect something more creative than 'central authority announces a big new program, all citizens rejoice at the new program's amazing effectiveness' type article. Your article can be any format which provides the same amount of entertainment and information in the same amount of space as Referee created articles. The Referee has the right to reject or modify your submitted articles as he sees fit.~~

3.6. Making Purchases Mid-Turn

Situations may arise mid-Turn that you find require a change to the purchases made on your budget spreadsheet. You may buy anything mid-Turn with permission of the Referee, but the cost of the purchase is increased by 50% to reflect the hasty nature of such an action and will have to be balanced by the removal of an equal amount on your budget spreadsheet. Exactly when the new purchase is completed within the sequencing of the Turn is up to the discretion of the Referee, new Military units may be treated as having 'Reserve' status (see section 8.6) for some period of time.

3.7. War Footing

There may be times of crisis when the player may decide the usual civilian economy of a ~~nation~~ Settlement needs to be refocused to some extraordinary effort. Inform the Referee, successfully complete a Routine, Instant difficulty level Task ~~he agrees~~ then a ~~nation~~ Settlement is put on War Footing and:

-An immediate increase in effective Authoritarian score (see section 6.3) of +5 for the purpose of budget calculations for the duration of the War Footing. This will significantly change the amount of $ available and thus budget purchases, with Referee approval, may be altered.

-New Military units (see section 8.1) and Upgrades to the Quality Level of existing Military units (see section 8.6) will be completed at a time of the Referee's discretion, until then they will have Reserve Quality level.

~~-May upgrade the Quality level of Military units before additional combat occurs.~~

-Not charged the 50% extra cost for mid Turn purchases (see section 3.6) if the unit or PA is relevant to the crisis.

-Due to war exhaustion, starting on the next Turn a penalty of -2 is applied to the Authoritarian score for purposes of available $ in the budget calculation. An additional -2 is applied for each additional Turn that the War Footing continues. This penalty is removed at a rate of 1 per Turn after the ~~player declares the~~ War Footing is cancelled ~~to be over~~.

-The Player must inform the Referee when the War Footing status for a Settlement is cancelled.

3.8. Response PAs

Players may try to take advantage of events as they evolve through the course of the Turn by submitting new PAs, called a Response PA. Response PAs must be submitted to the Follow-up thread of your nation on RPOL during a War Round. Response PAs must be written in the same #, Goal, Action, Background, Argument, Resources format as regular PAs. A Response PA cannot use regular PApoints and instead use Response PApoints which are purchased ahead of time in your regular budget spreadsheet and cost $125 each.

3.9. Turn Sequence

1. The Referee decides on the latest price of SRU, FU, and MU, and which players get bonus/penalty Response PA points.
2. The Referee will make all updates to the tab of the Settlement_List file for the current Turn based on events from the previous Turns.
3. The Referee will make all updates to the tab of each player nation's budget spreadsheet for this Turn based on events from the previous Turns.
4. The Referee will publish a due date for all player written orders and their updated Budget files.
5. Players will submit written orders and updated Budget files.
6. Referee will publish a brief summary of player actions.
7. Any mid-Turn player actions or combat is conducted, including additional movement of units, based on their updates to the Unit List file.
8. Referee publishes an End of Turn Warning announcement that the Turn is ending.
9. The Referee will release the results of all remaining Political Actions by players from their written orders, state what bids with NPCs have been won, and publish a brief summary of the results of player actions.
10. Players may update the Facility List file with any changes.
11. End of the Turn.

4. Economics

4.1. Supply Units

Supply Units (SU) are consumed to maintain facilities and military units and can include a wide array of parts, consumables and even specialist personnel. Supply Units are not intended to be absolutely everything that a unit needs to continue, but they are intended to be everything that has significant mass. Due to the high cost of getting things to orbit we can assume that every effort has been made to make Facilities and Military Units as light, long lasting, rugged, self-sufficient, and self-repairing as possible, but all things eventually need outside supply to carry on. For simplicity, Supply Units can be stored indefinitely between Turns at any Settlement (see section 7) type except 'Deserted' and are treated as generic and interchangeable, your competent staff will ensure that the right parts actually end up in the right location. Unless there are special conditions noted, any friendly hex of a Core Settlement can be used as an infinite source of Supply Units; provided of course they are paid for. Supply Units must be brought to the surface of the same World or Orbit hex as the unit or facility needing them begins their Turn, the moving of the Supply Units to the appropriate hex within a World is done automatically. Supply Units have a mass of 5 000 Tonnes each and cost $1 each. Production of Supply Units require the local Materials, Power, Electronics, Space and Biology tech level all to be at least 5.5 to produce.

4.2. Population Units

One Population Unit is 5 000 people. For simplicity, Population Units are interchangeable and can only survive between Turns within a Colony or Core type Settlement (see section 7), or 1 only per Enclave Module at an Enclave type Settlement. Each Population Unit has a mass of 5 000 Tonnes, this includes some life support, minimal baggage, and tools to start a new life in a new world. Population Units must be brought to the surface of the same World or Orbit hex as the unit or facility needing them begins their Turn, the moving of the Population Units to the appropriate hex within a World is done automatically. Each Population Unit of a Colony type Settlement consumes 1 Food Unit (see section 4.3) per Turn. Population Units which do not receive their required Food Unit are destroyed. The default action by the Referee is that if Food Units are available on the same World, then Population Units will consume them as needed.

4.3. Food Units

Food Units (FU) are generic organic products to feed humans. Food Units cannot be stored between Turns and are treated as generic and interchangeable, your competent staff will ensure that the right foods will actually end up in the right people to eat. Unless there are special conditions noted, any friendly hex of a Core Settlement can be used as an infinite source of Food Units; provided of course they are paid for. Food Units must be brought to the surface of the same World or Orbit hex as the Population unit needing them begins their Turn, the moving of Food Units within a World to the appropriate hex is done automatically. The default assumption is that a Food Unit is sold and immediately consumed when brought to the surface of a Core Settlement. The value of a Food Unit starts at $1 each at game start but will change with time. One Food Unit has a mass of 20 000 Tonnes.

4.4. Raw Material Units

Raw Material Units (RMU) are generic resources for industry, they are assumed to have been refined enough to be easily transportable *e.g. the wood has been milled, metals are in low-grade ingots, oil has been through a refinery.* Raw Material Units cannot be stored between Turns and are treated as generic and interchangeable, your competent staff will ensure that the right minerals actually end up in the right location for consumption. Raw Material Units must be brought to the surface of the same World or Orbit hex as the facilities needing them begin their Turn, the moving of Raw Material Units within a World to the appropriate hex is done automatically. Unless there are special conditions noted, any friendly hex of a Core Settlement can be treated as an infinite source of Raw Material Units. The default assumption is that a Raw Material Unit is sold and immediately consumed when brought to the surface of a Core Settlement. The value of a Raw Material Unit starts at $1 each at game start but will change with time. One Raw Materials Unit has a mass of 20 000 Tonnes.

4.5. Special Resource Units

On some Worlds, certain ‘Special Resource Units’, or ‘SRU’, may be found and harvested. What they are, what they can do for you and what they are worth is up to the Referee. See the budget spreadsheets of player nations or the file called Settlement List spreadsheet for a listing of all the SRU demand and production statistics on every Settlement. The default action by the Referee for a Settlement is that any SRU production will be as much as normally possible without extra effort, all will be immediately sold on the open market at the prevailing market rate, all that is needed to be consumed will be attempted to be bought from the open market at the prevailing market rate.

4.5.1. Oil Special Resource Unit

The busy life on a comfortable Core type Settlement requires a tremendous amount of energy, this is represented by the Special Resource Unit of Oil, this includes all forms of non-renewable energy such as hydrocarbon gases and liquids, coal, and fission of heavy elements. Oil Units cannot be stored between Turns and are treated as generic and interchangeable; your competent staff will ensure that the right fuels actually end up in the right location. Oil Units must be brought to the surface of the same World or Orbit hex as the Core Settlement needing them begins their Turn. The moving of Oil Units within a World to the appropriate hex is done automatically. 1 Oil SRU = approximately 1/10000th of the Earth's energy production in 1985AD. At game start, the prevailing market rate is $1 per Oil SRU.

Oil SRU is critical to the running of any Core Settlement, so much so that you can expect the Stability (see section 6.1) and GDP Growth of the Settlement to significantly rise and fall with shortages or surpluses of Oil SRU. We will not be tracking the 'from where' and 'to' of each and every Oil SRU, but any new shortfall will have to come from somewhere. The default assumption by the Referee is that your nation will buy as much as needed if possible from the open market, the value in the cell labelled 'Final Oil SRU Shortfall' on your budget spreadsheet is how much a shortfall in supply a Core Settlement you will have to make up or else suffer negative consequences. Oil SRU consumption by a Core Settlement creates a certain amount of pollution, and means a small penalty to Stability Score which is balanced by the Biology Infrastructure tech level of the Settlement. The amount of Oil consumption penalty to Stability Score is less for Oil SRU consumption converted to Alternative Infrastructure (see section 4.5.4 option#4).

4.5.2. Tantalum Special Resource Unit

An isomer of the extremely rare element Tantalum-180 is a critical component in the construction of Stutterwarp FTL drives (see section 8.10.3) that allow Spaceships to cross the gulf between stars. Deposits of Tantalum SRU will only exist on a very few worlds, which will be listed in the Notes section of the world. Tantalum Units cannot be stored between Turns, are treated as generic and interchangeable. Tantalum Units must be brought to the surface of the same World or Orbit hex as the facilities needing them begins their Turn. The moving of Tantalum Units within a World to the appropriate hex is done automatically. The actual amount of Tantalum used in a drive is very small, so while a Tantalum Special Resource Unit must be moved like any other unit, they have 0 mass.

4.5.3. Pai-Leng Special Resource Unit

Named for a fungus-like substance with excellent antibacterial properties first discovered deep beneath the ice of the frigid world of Dukou. This Special Resource unit also includes any small, valuable, non-renewable, physical objects that are likely to generate a great deal of scientific or cultural interest back on a Core Settlement, such as contact with primitive alien sophonents or unusually talented individuals or abandoned artefacts of advanced alien civilizations, etc. Player input on a good story of what the source of a Pai-Leng Unit is encouraged. Pai-Leng Units cannot be stored between Turns, and are treated as generic and interchangeable. A unit of Pai-Leng at a Settlement may be used as a free Political Action point towards a Task of attempting to increase the Prestige of that Settlement, or if brought to the surface of a Core Settlement it adds $50 to the income of the Settlement next Turn, either action consumes the unit. Pai-Leng Units must be brought to the surface of the same World or Orbit hex as the Settlement consuming them, the moving of Pai-Leng Units within a World to the appropriate Settlement is done automatically.

4.5.4. Altering Special Resource Unit Demand or Production

At the beginning of every turn, the Base SRU production of a Settlement will be reduced by 5% (round fractions down). There are 8 different player options for changing SRU demand or production of a Core type Settlement:

#1 - **Infrastructure**: Represents exploration of new fields and investing in known fields to permanently increase production starting the next Turn *e.g. extra mining, refining and transportation networks*. For a Core Settlement, it is a Routine level Task, with 1 PApoint ~~will~~ increasing the Base SRU production starting next Turn by (~~Referee roll 1D10 +~~ Number of Hexes of the Settlement + World Size -1 for every 5 full Turns after the World is surveyed + Referee's judgement of your plan) X (1 for Oil, 0.2 for Pai-Leng, or 0.1 for Tantalum), roundup to nearest integer. For a Colony Settlement, see Mining and Asteroid Mining facilities in section 7.8.

#2 **- Aggressive Production**: Implementing various methods which yield a +50% production of SRUs in the next Turn. e.*g. for increasing Oil SRU production by using water injection or setting fires to liquefy and restore pressure.* The downside is it results in a lot of unrecoverable products, resulting in an additional 5% reduction to SRU production next Turn. Choose the 'Yes' option in cell labelled 'Enable Option #2' on your budget spreadsheet.

#3 - **Conservation**: Option only available for Oil SRU. This represents various efforts to reduce the consumption of SRU ~~for a given task~~. It is a Difficult level Task, which requires ~~A general guideline is~~ 1 - 3 PApoints per 20 Oil SRU in consumption of a Settlement permanently reduced starting the next Turn, depending upon the Referee's judgement of your plan. *Example: Sustainable agriculture, carpooling, renewable energy, better home insulation, and mass transit.*

#4 - **Alternative Infrastructure**: Option only available for Oil SRU. This represents various efforts to replace overall economic dependence on Oil with something else. It is a Routine level task which ~~A general guideline is a nation~~ can permanently reduce the Oil SRU consumption of a Settlement starting next Turn at a cost of 1 - 3 PApoints per Oil 20 SRU replaced the next Turn depending upon the Referee's judgement of your plan *E.g. Fusion / fission / hydrogen / biofuels / hydroelectric power generation, etc*. This has some kind of a significant downside *e.g. the electricity to separate the hydrogen from the water had to come from somewhere, radioactive waste, the crops grown for the biodiesel means less food for people to eat etc* and will permanently reduce the Stability Score of the Settlement.

#5 - **Exclusive Purchase**: A nation can reduce the amount of an SRU they have to buy on the open market if they make a deal with another nation to sell to them directly at whatever terms the buyer and seller can agree to. The SRUs will arrive next Turn, never in the current Turn. See section 3.2 about making deals with NPCs. The Referee must be informed about the details of deals before the end of the current Turn, otherwise they will not be allowed to have an impact on the flow of SRUs for the next Turn.

#6 - **Military Compulsion**: Forcing a Settlement, including those not your own but you currently occupy at the beginning of the Turn with at least one Military Unit, to produce at gunpoint. Cost is the prevailing market rate and you get the SRU this Turn. For Oil SRU, add the total number of SRUs received this way to cell labelled 'Sum#6' on your budget spreadsheet. Expect the occupied Settlement to seethe at this, Relations Score will receive a penalty. *Example: As when the US militarily occupied Iraq in the 2000 Turn, in the 2005 Turn the USA could have forcibly redirected the Iraqi oil production*.

#7 - **Paying Extra (aka 'The Golden Rule'):** Option only available for Oil SRU. For the right price, somebody will sell it to you. Choose the 'Yes' option in cell labelled 'Enable Option #7' on your budget spreadsheet, which will multiply the cost of Oil SRU which needs to be bought on the open market by X5 on your budget spreadsheet and the entire Oil SRU shortfall amount for that Settlement will immediately be eliminated. The shortfall will be added to the amount of Oil SRU Demand that the Settlement needs to have the next Turn *i.e no 'new' oil is created*. You can also expect a reduction to the Prestige rating (see section 6.2) of the Settlement by 1-5 for the massive disruption to international supply chains, but you have the gold, so you get to make the rules.

#8 - **Going Without:** The default position. If a Settlement is short Oil SRUs then you can expect GDP and GDP growth to be reduced by an amount roughly proportional to the fraction needed that they are short.

4.6. Summary of Economic Units

	Cost	Mass	Notes
Supply	$1	5 000	Econ tech all≥5.5
Population	N/A	5 000	5 000 people
Food	$1 (at start)	20 000	Feeds 1 Pop/Turn
Raw Material	$1 (at start)	20 000	
Oil Special Resource	$1 (at start)	20 000	

Tantalum Special Resource	$100 (at start)	0
Pai-Leng Special Resource	$50 (at start)	1000

5. Technology

5.1. Tech Level Overview

Tech levels are based on Traveller 5 tech levels, very roughly tech level 5.0 is the 1930s, 6.0 is the 1950s, 7.0 is the 1980s, 8.0 is the 2000s, 9.0 is early stellar, 10.0 is easy access to the stars, and 12.0 is the canon setting of the 2300AD game universe. Tech level is a reflection of what can be mass produced and what is commonly employed in the field, not the limit of what is known and equipment available in only a few labs.

There are 9 technology categories, with significant overlap between categories; these represent broad areas of human understanding and implementation of that understanding. Electronics, Power, Materials, Space, and Biology, and are considered "Economic" technologies, which relate to the level of economic advancement of a nation. Military - Ground, Military - Air, Military-Sea, and Military - Space relate to how effective your armed forces are in those relevant areas. For player nations see their budget spreadsheets, for NPCs see the file called Settlement_List spreadsheet for a listing of all the Economic technology stats on every Settlement.

5.2. Upgrading the Tech Levels

A nation may purchase upgrades to the Tech Levels of a Settlement, this new upgraded Tech level does not in any way affect the performance of a Settlement's economy, facilities or units until the next Turn. Upgrading to a new tech level may not be spread out among multiple turns, may not be shared between nations, and may only be done in increments of 0.1.

5.2.1. Upgrading Economic Tech Level

Each Core Settlement has their own Economic tech levels. Upgrading an Economic tech level of a Core Settlement includes upgrading the tech of all infrastructure networks, new hardware and teaching new methods to your population, and all of your facilities. In the Turn following, the Core Settlement will also receive a 1% one-time boost to GDP growth per 0.1 tech level gained. Upgrading to a new Economic tech level for a particular category has a cost in $ of:

(GDP, unadjusted) X (Target level)^2 X (Authoritarian Score of the Settlement +5)^2 X (# of decimal increases +1)^2 / (10 000 000), rounded up to the nearest integer Where '# of decimal increases' is the number of 0.1 increases in the tech level; so an increase of 0.1 would be 1 for 0.2 would be 2, for 0.3 would be 3, etc.

To advance beyond the current highest tech level known to humanity has an additional cost. This cost may be reduced by Research Modules (see Section 7.9.1). The nation may only research a level 0.1 higher and will receive an extra 1% one-time boost to GDP growth of that Core Settlement in the Turn following the upgrade. The extra cost in $ is equal to:

(Target level)^2 X (Authoritarian Score of the Settlement + 5)^2 / (50 + Total number of dedicated Research Modules), rounded up to the nearest integer

5.2.2. Upgrading Military Tech Level

Each nation has their own Military tech levels. Upgrading the Military tech level of a nation (Military-Ground, Military-Air, Military-Sea, and Military-Space) includes upgrading all the existing military units, the infrastructure of your defence manufacturing sector and of the support network of your military. Upgrading to a new Military tech level for a particular category has a cost in $ of:

(Number of Supply Units needed for Maintenance of all the nation's Military Units this Turn + 5) X (Target level)^2 X (# of decimal increases +1)^2 / (500 X (Military Rank, see section 8.9)), rounded up to the nearest integer Where '# of decimal increases' is the number of 0.1 increases in the tech level; i.e. an increase of 0.1 would be 1 for 0.2 would be 2, for 0.3 would be 3, etc.

To advance beyond the current highest tech level known to humanity has an additional cost. This cost may be reduced by dedicated Research Modules (see Section 7.9.1) owned by the nation. A nation may only research a level 0.1 higher and will receive an extra 1% one-time boost to GDP growth of all of its Core Settlements in the Turn following the upgrade. The extra cost in $ is equal to:

(Target level)^2 X 250 / (50 + Number of dedicated Research Modules), rounded up to the nearest integer

6. Politics

6.1. Relations Score

The Relations score is between 0 (worst) to +20 (best) and is an overall measure of the influence a ~~player~~ nation has over a Settlement. This includes not just current events but long held perceptions, trade, cultural similarities, occupation, and history. Relations Score is not a measure of how much the inhabitants of a Settlement ~~they~~ like you; they could hate you, but if you control their lives then the Relations score is going to be high. See the file ~~called~~ Settlement_List_spreadsheet for a listing of all the Relation Score stats between player nations and every Settlement. Random events will alter the Relations Score of a Settlement over time.

Examples from circa 1985 AD:

0: Would rather die than obey you (Israel-PLO)

2: Open war (India-Pakistan)

5: Uneasy ceasefire (North Korea - South Korea)

7: Diplomatic conflict (USA - Iran)

10: Peaceful coexistence. Default between everyone

12: Mutual interests (Spain-France)

15: Significant mutual interests, multiple trade and military agreements (USA - Canada)

17: Immense mutual interests, economic and defence links vital to both parties, common history and cultural values (Sweden-Norway-Finland-Denmark)

20: They mostly do what you tell them to do (USSR - Warsaw Pact nations)

6.2. Prestige Score

Prestige is an overall measure of how respected and admired a Settlement is. The scale is between 0 (Pariah) to +20 (Superpower). High Prestige Scores likely represent things like greater civic pride and easier negotiations for better terms with other nations. Low Prestige Scores likely represent widespread condemnation, the imposition of economic sanctions, lack of confidence by investors, etc. Like the Relations Score, the Prestige Score can affect the chances of convincing an NPC nation to do something. For player nations, see their budget spreadsheets or the file called Settlement_List_spreadsheet for a listing of all the Prestige Scores on every Settlement. Prestige is based on the size of the Settlement's, Stability Score, and SRU production, but can go up or down each Turn at the judgement of the Referee based on 'impressive' actions, such as founding extrasolar colonies, or first to reach key milestones in human achievement, winning/losing wars, being caught in a lie or being seen as instrumental in an important event. For most actions, the change to Prestige scores will fade by about 25% each Turn back to a baseline number as people forget; however if the action was truly historic e.g. first FTL, then the change may be permanent. Random events will alter the Prestige Score of a Settlement over time.

6.3. Authoritarian Score

Authoritarian Score is a measure of how much control the establishment tries to have over the nation. The score is roughly the sum of the Traveller UWP codes for Government Type and Law Level, so it varies between 0 (Family ties only, no formal laws) to 20 (totalitarian communist). Whether this control is exerted through taxes, regulation, ownership of corporations, and so on is irrelevant to the game. This is not the same as the division between the public (government) and private (civilian) portion of the GDP; we make no distinction in this game. Random events will alter the Authoritarian Score of a Settlement over time.

Lower Authoritarian Scores generally represent nations which support laissez-faire policies and let their nation take its course. Lower Authoritarian Scores means higher economic growth rates, and cheaper cost to improve tech level, but less $ available for purchases. Players of nations with low Authoritarian Scores may find they face resistance to their orders or budget purchase choices, particularly if they upset long established patterns. Example*: The United States starts the game with an authoritarian score of 9 and enjoys many of the benefits of that, but in the 2015 Turn when the player made a very strong attempt to reduce the deficit upkeep so the Referee decided to impose a penalty on the Stability Score (see section 6.4) of the USA.*

Higher Authoritarian Score means the establishment is deeply invested in many aspects of society and its effective reach is far greater. Higher Authoritarian Scores means lower economic growth rates, and greater cost to improve tech level, but more $ available for purchases. Players of nations with high Authoritarian Scores are less likely to rebel, but the consequences are much more severe if they do as the people take advantage of any perceived weakness as an opportunity to rebel. *Example: In the 1980 Turn, disappointed with the slow growth under the Communist system, China began to experiment with reforms, introducing some private forms of production in agriculture and industry. The Authoritarian Score is lowered from 19 to 17 and for a while all seemed to go well as production improves, until one day university students, fed up with rising government corruption and impatient for a faster pace of reform, begin filling a place called 'Tiananmen Square'…*

6.4. Stability Score and Revolt

Each Settlement is rated by its Stability Score. Stability Score is a measure of how much all the parts of a Settlement are in harmony with each other, i.e. *how law-abiding, calm and obedient everything is to the local ~~the inhabitants are to their central~~ authority, including ~~and how much damage there is to~~ the local ecology,* and it varies between 0 (paralysis, chaos, desolation) to 20 (everything is under control ~~obedient to your will~~). ~~A food riot is still a riot and can lead to a full blown civil war, whether the food riot was caused by foreign provocateurs, mismanagement, loss of arable land due to increasing desertification, or some mix of all of those factors.~~ Random events will alter the Stability Score of a Settlement over time.

Stability can go up or down each Turn at the judgement of the Referee, for most actions the change to Stability scores will fade by about 25% each Turn back to a baseline number as people adjust to the new situation; however, if the action was truly historic e.g. absorbing another Settlement, then the change may be permanent. Random events may slowly alter the Stability Score of a Settlement over time. Being a 'Petro-state' causes a lot of problems, so having Oil SRU production exceed what is consumed by more than 50% will reduce the Stability Score of a Settlement. Open spaces and the comforts of a high Biology technology level can bring many benefits, but the hectic lifestyle and mass industrialization behind Oil SRU consumption has many downsides, all of which can have an effect on the harmony of Core type Settlement. Biology tech level and number of hexes will increase the Stability Score of a Core Settlement per Turn but is balanced by a decrease due to high population, GDP, and Oil SRU consumption. Exercising the Alternative Infrastructure option, see section 4.5.4, will still result in a small decrease to Stability Score.

The Stability Score of a Settlement affects the economic output of a Settlement as the table below; this is applied to the Base Production of any $, Food, Raw Material, or Special Resource Units produced. Expect Settlements with a low Stability Score to not necessarily obey all the orders from their owner; very commonly military units will start fighting amongst themselves as they are in the grip of one faction or another. The chance of a Revolt breaking out is linked to the Stability Score of the Settlement. A Revolt roll only covers the creation of division-sized insurgent forces; not the protests, riots, terrorism, and the 'winning of hearts and minds', etc that come with lower Stability Scores. For each Settlement, the Referee rolls a 1D10 each Turn, adds the modifiers to the roll, and consults the following chart:

Stability/Revolt Roll (1D10 + modifiers)

Stability Level		Revolt	Econ Output	*Example, circa 2015*
0	Anarchy	0+	*-100%*	*Yemen*
1		1+	*-80%*	
2	Very Unstable	3+	*-60%*	*Syria*
3		5+	*-40%*	
4	Unstable	6+	*-20%*	*Iraq*
5		8+	*-10%*	
6-7		9+		
8-9	Stable	11+	*+5%*	*Russia*
10-12		12+	*+10%*	
13-14	Very Stable	13+	*+15%*	*Denmark*
15-17		14+	*+20%*	
18-20	Extremely Stable	15+	*+25%*	*North Korea*

Revolt Modifiers

Mod	Condition
+3 or -3	Successful Task ~~PAs successfully used~~ to foment or suppress a revolt
~~+5~~	~~Units from a revolt in a previous Turn still present.~~
~~+3~~	~~Foreign units hostile to the owner present in any hex of the Settlement.~~
~~0 to -4~~	~~-(Authoritarian Score of the Settlement) / 5, rounded down~~
0 to -5	(Relations Score of the Settlement with the owner - 20) / 4 rounded down

If the total is equal to or greater than the Revolt number then an insurgency has broken out.

The characteristics of the insurgency are at the discretion of the Referee but will usually be:

~~-The physical size of the Insurgency will usually be all of a Colony or 1/5 of a Core Settlement. The fraction of original Population, GDP, and stores of Supply Units will be proportional to the area of the Insurgency.~~

-The Sum Base Combat Strength will usually be the sum of:

-20% of the original forces in the Settlement will switch sides

-(# of Population Units of the area in revolt) X (Authoritarian Score of the Settlement)^2 / 20000

-For purposes of combat, have a Military Rank (see section 8.9) of 1 greater than the Settlement, or 4, whichever is lowest.

~~-Be a Military Rank 4 (see section 8.9) nation.~~

~~-Have a Prestige Score of 10, a Relations Score of 5 with the original parent nation, a 10 Relations score with other nations.~~

-If the Revolt happens to a Core Settlement and the Referee decides against playing out the combat in any way, then the Settlement will simply have a 25% penalty to GDP next Turn.

-Change the Relations Score of the Settlement with the owning nation by an amount which gets worse with higher Authoritarian Score. Change the Stability Score of the Settlement by an amount which becomes more unpredictable with higher Authoritarian Score.

~~6.5. Client States~~

~~If your nation achieves a sufficiently high Relations Score with another Settlement that does not belong to you they become your Client State. This requires a minimum of Relations score of 20 with that Settlement, as well as 5 more relations than any other nation. Client State status is not the same as a formal disbandment and merger of the settlement into one of your settlements, nor does it allow the player to write the orders for the client settlement, but with well done role-play the Referee may consider player suggestions about what the client settlement does.. Client States grant you one free PApoint per total $5 000 of 5yr. GDP per Turn of all of your clients states budget's together, rounded down *e.g. If in the 2065 Turn Egypt and Thailand were the client states of France, and had a current total GDP/Turn $8432, then France would get 1 extra PApoint.*~~

7. Settlements

7.1. Settlements Overview

Settlements are classified as an Outpost, an Enclave, a Colony, Core, and Deserted type depending upon their number of Population Units and type of facilities present. A 'facility' is not just one building, or even one industry, it is an entire slice of an economy which includes almost everything that supports and depends upon it that is not specifically covered by another facility mentioned on the list. This includes everything needed to build, repair, maintain or construct the facility *e.g. A "Farming" facility includes not just farms and food processing factories but the school where the farmer sends his children and the hospital where the farmer goes for his wounds*; making facilities much bigger and more expensive than the name alone might suggest. The actual structures of a facility will be assumed to be spread throughout a hex as needed. It is the owner's responsibility to record the construction of new facilities or changes in ownership of old facilities for your nation in the Facility List spreadsheet. The hex location of a facility will be publicly available and may not be distorted or withheld by players; though knowing the location of a facility exactly enough to target it with weapons may take additional effort (see section 10.10).

Ownership of a facility may not be shared between nations. At the Referee's discretion a player may explicitly order that a portion of the numerical benefits of a facility be shared between nations, *e.g. Uplift by a Rockets facility, the unlimited support of a Military Base, or Power from a Fusion facility*~~, including serving as a prerequisite for other facilities~~. Facilities whose benefit cannot be divided numerically *e.g. GPS Networks, Research Modules*, the benefit cannot be shared. Ownership of facilities may be transferred between two nations, but there is no tech upgrade for the buying nation. To keep the book-keeping simple, in any deal that involves the transfer of a facility between nations the original owner must show on its budget spreadsheet that it has paid for the entire construction cost of the facility.

The hexes controlled by a Settlement must be contiguous. There is no sharing of a World surface hex between Settlements except for Outpost or Enclave Settlements (see section 7.2). Some Core Settlements, such as many of those on Earth, may start the game sharing a hex with another Settlement, but they will still be listed in the Settlement_List file as owning 1 hex. The player must inform the Referee in their initial, written orders of the intention to change control of a specific System ID&World&hex or Settlement to that of another Settlement; once that notice is given:

-Surface hexes occupied by another Settlement, except for the last one, and any Ground or Interface type facilities on those hexes may become permanently part of an adjacent Settlement if at the end of a Turn there are only Military Units (see section 8) belonging to your nation in that hex. Expect that a portion of the GDP and Population of the losing Settlement will go to the gaining Settlement; expect the Stability Score of the gaining Settlement to go down by 1 - 5 points. The last surface hex of another Settlement, and control of all of its Orbital type facilities, may become permanently part of your adjacent Settlement only at the discretion of the Referee.

-A Settlement, and all of its Orbital type facilities, may become permanently controlled by a nation if only your nation has a Relations Score of 20 with that Settlement, the Stability Score of the Settlement is currently 0 - 5, and the successful completion of a Formidable level Task.

-Unoccupied surface hexes of a World are permanently added to an adjacent Colony type Settlement if a new facility is successfully built there and there are no military units in that hex belonging to another nation at the end of the turn.

-Unoccupied surface hexes of a World are permanently added to an adjacent Core type Settlement if there are no military units in that hex belonging to another nation at the end of the turn and at the successful completion of a Task.

-A hex may be voluntarily abandoned. A Core Settlement will lose a portion of its GDP, SRU production, and population proportional to the size lost; the Referee may create a new npc Settlement out of the abandoned hexes. A Colony loses the facilities in the lost hexes, and the Referee typically counts these facilities destroyed unless the hex is immediately taken up by another Settlement.

-A Settlement may be voluntarily abandoned. The Settlement becomes an NPC, and changes type to 'Deserted' if all Population Units are withdrawn first.

-The ownership of a Settlement, and all of its Orbital type facilities, will become permanently lost to the owning nation if it has a Relations Score is 0-5, at the discretion of the Referee. The Settlement will become a new nation and have, at the discretion of the Referee, 50-100% of all military units in the Settlement will defect to the new nation.

Facilities each have certain minimum requirements to continue operating. See section 7.6, 7.7, 7.8, and 7.9. The owner of a facility that does not have these minimum requirements must inform the Referee, the Referee will then choose which facilities are in 'Idled' state. Idled facilities have 0 Combat Strength, do not consume or produce or do anything, and may not serve as the prerequisite for anything.

7.2. Settlement Types

There are 5 different types of Settlements:

Deserted: Any Settlement that has lost all of its Population Units or hexes. Any hex and facility there is free for the taking. You must inform the Referee if one of your Settlements has become Deserted.

Outpost: The smallest, consists solely of one or more Orbital Terminal facilities and each has an installed Outpost Module. See section 7.9.1. You must inform the Referee that you have started an Outpost.

Enclave: An existing Outpost type Settlement is upgraded to a small, proto-colony by installing an Enclave Module on each Orbital Terminal facility. See section 7.9.1. All original Outpost Modules are absorbed into the Enclave and no longer exist. You must inform the Referee that you have upgraded the Outpost Settlement to an Enclave. The habitability type of the World where the Settlement is located must be Hospitable or Inhospitable. The Settlement requires a negligible portion of a hex on the World's surface, which may be shared with another Settlement, the Enclave owner must specify this hex at time of construction. The Enclave is changed to be Deserted and all Enclave Modules destroyed if at any time the hex owner withdraws permission. After 5 full Turns after construction an Enclave is counted as having Surveyed a World (see section 2.2), at which time the Farming, Mineral, and Special Resource potentials of the World are revealed to all players. An Enclave Settlement produces 1 Pai-Leng in the Orbit hex every 5th Turn of the game *i.e. a game start date of 1985 then an Enclave Settlement would produce a Pai-Leng on turn 2005 (the 5th turn), 2030 (the 10th turn), 2055 (the 15th turn), etc.*; no more than 1 Enclave Settlement belonging to the same nation located in the same World may generate a Pai-Leng Unit this way.

Colony: To start a Colony, inform the Referee, specify one unoccupied hex on a World, and the World must first have been Surveyed. All existing Enclave Modules in the same hex are absorbed into the Colony and no longer exist. The Population Unit of the Enclave Settlement is added to that of the Colony; the cost and mass of the Enclave Modules may be converted into Interface or Ground type facilities of the owner's choice in the same hex whose total cost and mass is equal to or less than that of the Enclave Modules, any excess is lost, see section 7.9.2 and 7.9.3. World Size may not be 0 or R. A Colony may not cover more than (25, 50 or 100) / World Size surface hexes without access to the appropriate number of Railway, Airfilm or Maglev type Ground facilities, see section 7.9.3. A Colony requires a Communication Net Orbital facility for every 500 Population Units, and a GPS Net Orbital facility for every (50 / World Size) hexes it covers, see section 7.9.3. A Colony may not have more than (100, 250, 500, 1 000 / World Size) facilities in a surface hex without access to the appropriate number of Road, Railway, Airfilm or Maglev type Ground facilities, see section 7.9.3. A Colony requires 1 Power Net facility for every (250 / World Size) non-Power category Ground facilities in the same hex, round fractions down. The Orbit hex of the Colony Settlement's World must have at least 1 Orbital Colony for every 20 other Orbital facilities, see section 7.9.1.

Core: Core Settlements are places which have accumulated sufficient wealth, population, and industry that their economies are now so complex it cannot be accurately represented by our Ground type facility construction rules (see section 7.9.3). A Settlement becomes a Core Settlement at Referee's discretion, usually when its population exceeds 2 500 Population Units. Except for Military Bases, we will not detail the Ground type facilities that are found on a Core Settlement. For the purposes of combat, all hexes will be assumed to have Roads and Railways. Interface and Orbital facilities will be detailed the same as Colonies. The Orbit hex of the Core Settlement's World must have at least 1 Orbital Colony for every 20 other Orbital facilities, rounded down. Core Settlements are represented simply by a few statistics, like Population, GDP and growth rates. To a Core Settlement, the things which affect GDP growth rates are, in order of importance: Stability Score, Oil SRU availability, new hex acquisition or loss, Authoritarian Score, Prestige, and Population Growth Rate. The GDP, SRU production, and Population of a Core Settlement are treated as being equally distributed between the settlement's surface hexes.

7.3. Facility Construction

Facilities can only be manufactured on the surface hexes of a friendly Core Settlement or a Heavy Industry facility, and must then be transported and placed in their final destination hex. Facilities can only be placed in a hex of a Settlement, the lone exception is a Military Base facility. It is assumed that as much local materials as possible will be used in the final construction *e.g. fused local soils for making walls and road beds etc.* to lighten the load that needs to be shipped and that the actual final mass of a constructed facility is much greater. Facilities must be produced, moved and placed (assigned to a specific Star System/World/Hex) all in the same Turn. On the Turn when a facility is being placed, the facility may not produce any income, RMU, FU, military units or facilities, aid in research, or survey a World, nor do they consume Supply Units, but are otherwise considered functional e.g*. they can move units between surface and orbit, produce Power and can serve as the local prerequisite for another facility*. There may be multiple facilities of the same type placed in the same hex. Once placed, a facility may not be moved. The final destination hex must have sufficient Labour (see section 7.7), Power (see section 7.8), and Local Prerequisites (see section 7.9) to maintain and construct the facility and all others *i.e. a facility cannot be built in an 'Idled' state ~~nor when other facilities are in an 'Idled' state~~.*

Record the construction of new facilities or changes in ownership of old facilities in the Facility List spreadsheet; players are required to keep the entries for their own facilities properly updated. The Referee will never allow any deception about the existence of a facility in a hex, such information will be published to all players; though knowing the exact location of a facility well enough to target it with weapons may take additional effort (see section 10.11).

If the orders to construct a facility somehow fail *e.g. the hex is taken by another nation, a deal for transportation of the mass falls through, the move is illegal for some reason, etc.*, then the facility will be considered to be destroyed, its mass and $ wasted. No preemptive orders on a backup location will be accepted.

The base cost and minimum tech level needed to build a facility are listed in section 7.9. The appropriate tech level of the Settlement where the facility is constructed (see section 7.4) must be at least equal to the listed minimum tech level needed to produce the facility locally at base cost. For an Orbital facility, the appropriate tech type is Space and Electronics. For an Interface Craft facility, the appropriate tech type is Space and Materials. For a Ground facility, the appropriate tech type is Material and Power. Listed in the budget spreadsheet are the maximum tech levels that are known to humanity at that time for each category; for each 0.1 the local tech level is below the minimum tech level but not higher than the maximum known to humanity, the facility may be built but add 50% to the base cost, roundup to nearest integer. *E.g. In 2040, China wants to build an Orbital Terminal. At the time China's Space tech level was 8.2, and Electronics tech level was 8.0, the maximum tech level known to humanity at this time is 8.6 in both categories. If the maximum Electronics tech level known to humanity was 8.4, then the Orbital Terminal could not be built by anyone. Final cost is ($200 base cost) + $200 X 50% X (8.5 minimum Space tech level needed to build - 8.2 China's Space tech level) X10 + $200 X 50% X (8.5 minimum Electronics tech level needed to build - 8.0 China's Electronics tech level) X10. = $1000.*

7.4. Settlement Tech level

The Tech level of a Settlement is representative of what products can be locally manufactured, not the tech level of commonly used or of available products. The Tech levels of a Core Settlement are listed in their budget spreadsheet. The Tech levels of what a Colony can produce are much lower because the high cost of shipping anything to another World means that only the barest and most rugged essentials would be found in a Colony. The tech level in any category for a Colony type Settlement to produce Military Units, Facilities or Supply Units is:

> (Tech level of the nearest Core Settlement of the same Owning Nation in the same category) - 5 - 1 per 5 Star System links to the same Core Settlement + 0.1 / 0.5 / 1.0 cumulative if there are at least 10 / 100 / 1000 Population Units in the Colony + 0.1 / 0.5 / 1.0 cumulative if there are at least 1 / 5 / 25 Heavy Industry facilities in the Colony +0.5 if there is at least 1 University facility. Where 'nearest Core Settlement' and 'number of Star System links' is the path with the lowest number of Star System links of length 2.3 or less, 3.5 or less if bridged by a friendly Drive Tuner Module, ties go to a Core Settlement of the same player with the largest GDP. *e.g. In 2280, the American colony of DM+2 3312-King-New Columbia is 8 Star System links away from America's Tiranne Core Settlement as opposed to 9 links away from Sol-Earth-USA, so Tiranne's tech level is used. Tiranne has a Space tech level of 11.2, New Columbia is a Colony with 142 Population Units and 0 Heavy Industry or University facilities, thus New Columbia will have a Space tech level of 11.2 - 5 - 1 for being 5 - 9 links away from Trianne + 0.1 for having at least 10 Pop + 0.5 for having at least 100 Pop = 6.*

7.5. Maintenance

Due to the high cost of getting mass into orbit we can assume that every effort has been made to make Facilities as long lasting, rugged, self-sufficient, and self-repairing as possible. Eventually though, everything needs outside help.

Facilities consume a number of Supply Units per Turn on the surface of their World or the Orbit hex as per the following tables. *Example: An OT and a Solar Array type Orbital facilities are owned by Iran in Earth's Orbit hex. Even though normally facilities on a Core Settlement have 0 maintenance cost, because part of an Orbital Terminal is in the Orbit hex, the total maintenance cost is (2 Iranian facilities in Earth Orbit hex / 5, rounded up =) 1, which must be made available in the Orbit hex. If the same OT and arrays are part of the Iranian Colony type Settlement on Luna, the maintenance cost on the surface is (2 facilities) X (0 Base Maintenance) = 0 SU, with an additional (2 facilities X 1 To the Orbit Hex =) 2 SU ~~(2 facilities) X (Base Maintenance 1 + 1 Inhospitable =) 4 SU, with an additional (2 facilities / 5, rounded up =) 1 SU~~ consumed in Luna's Orbit hex.* The default action by the Referee is that if Supply Units are available in the same World surface/Orbit hex, they will be consumed by Facilities as needed.

Outpost Settlement	Base Maintenance Cost/Turn	To the Orbit Hex
OT Facility	0	1

Enclave Settlement	Base Maintenance Cost/Turn	To the Orbit Hex
OT Facility	0	2

Colony Settlement	Base Maintenance Cost/Turn	Inhospitable World	Water, Water(Ice), Scattered Lakes(Ice), Archipelago(Ice) hex	Volcano hex	To the Orbit Hex
Ground Facility	1	+1	+1	+1	NA
Interface Facility	1	+1	+1	+1	NA
Orbital Facility	0	NA	NA	NA	1

Core Settlement	Base Maintenance Cost/Turn	Inhospitable World	To the Orbit Hex
Ground Facility	NA	+0	NA
Interface Facility	NA	+0	NA
Orbital Facility	NA	NA	1 for every 5 facilities, rounded up

If a Settlement has inadequate amounts of Supply Units then the owner must tell the Referee, who will choose which facilities in that Settlement are to be 'Idled'.

7.6. Labour

Facilities require Population Units to function and those Populations Units require Food Units as per the following tables. Only a small portion of a Population Unit will actually be directly involved in the activity expected based on the facility name, the rest are involved in various support roles and industries. *E.g. The Population Units that were brought to the American colony Tirania along with a new "Farming" facility includes not just the farmers but the farmer's family, the school teachers and doctors in the farming community and the families of those teachers and doctors too.* Population Units are treated as being interchangeable and are not assigned to a specific facility or to a specific hex. The labour for Orbital type facilities may be part of the pool of Population Units on the surface or in an Orbital Colony (see section 7.9.1) in the World's Orbit hex.

Outpost Settlement	Population Units Needed	Food Units Needed
OT Facility	No	NA

Enclave Settlement	Population Units Needed	Food Units Needed
OT Facility	1 / Each	No

Colony Settlement	Population Units needed	Food Units Needed
Any Facility	2 / Each	Yes

Core Settlement	Population Units needed	Food Units Needed
Any Facility	NA	NA

If a Settlement has inadequate numbers of Population Units then the owner must tell the Referee, the Referee will choose which facilities in that Settlement are to be 'Idled'.

7.7. Power

Power is used by facilities and is an expression of the application or generation of energy, whether the energy is in the form of electrical, mechanical, chemical, or otherwise is irrelevant. If a Settlement has an inadequate amount of Power then the owner must tell the Referee, the Referee will choose which facilities in that Settlement are to be 'Idled'.

-The total amount of Power produced by Orbital facilities (see section 7.9.1) for friendly Orbital facilities must at least equal the amount of Power that needs to be consumed by those Orbital facilities.

-For a Colony Settlement only: The total amount of Power produced by Ground and Interface facilities (see section 7.9.2 and 7.9.3) for friendly Ground and Interface facilities must at least equal the amount of Power consumed by those Ground and Interface facilities. One Power Net facility (see section 7.9.3) is required to supply power from or through a surface hex that is different from the hex where the Power was generated.

-For a Core Settlement only: The Power requirement for the Ground and Interface type facilities of a Core Settlement is waived; presumably there is always enough excess capacity somewhere in the grid to service the needs of a few new facilities.

7.8. Facility Tables

Type: The kind of facility it is.

Base Cost: Cost in $ each.

Tech: The appropriate tech level of the Settlement must be at least equal to the listed tech level to produce the facility locally at unmodified base cost.

Local Prerequisite: Some facilities require the existence of additional conditions locally which are listed in the 'Local prerequisite' column in order to function. If a Settlement cannot meet these local requirements then the owner must tell the Referee, the Referee will choose which facilities in that Settlement are to be 'Idled'. Note that the facilities which are to serve as Local Prerequisites can be built during the Turn they are needed.

Power: Amount of Power created (positive value) or consumed (negative value).

Mass: The mass in metric Tonnes that would need to be shipped to transport the facility from the World where it was built to another World where the facility is being placed. For Ground and Interface facilities the mass of the facility must be moved to a surface hex, for Orbital facilities the mass of the facility must be moved to the Orbit hex of the world.

7.8.1. Orbital Facility

All Orbital facilities are located in the Orbit hex.

Type	Base Cost	Tech	Local prerequisite	Power	Mass
Orbital Defence	100	9.5	Colony or Core	0	5 000
Listening Post	25	8.0	Colony or Core	0	2 000
Orbital Terminal	200	8.5	-	+1	5 000
-Research Module	25	8.0	OT	-0.5	2 000
-Weaponry Module	50	9.5	OT	-0.5	2 000
-Outpost Module	50	8.5	OT, Portion of a surface hex	-0.5	5 000
-Enclave Module	200	8.8	OT, Outpost Module, Portion of a surface hex	-1	25 000
-Drive Tuner Module	400	11.0	OT, 5 Tantalum SRU	-1	50 000
Orbital Colony	500	9.5	Colony or Core, 5 Population Units	-3	750 000

~~Orbital Barracks~~	~~50~~	~~9.0~~	~~Colony or Core~~	~~0~~	~~25 000~~
Communications Net	25	6.5	Colony or Core	0	250
GPS Net	50	8.3	Colony or Core	0	750
Spy Net	75	7.0	Colony or Core	0	500
Missile Defence	150	8.8	Colony or Core, GPS Network	0	2 000
Asteroid Mining	100	8.5	Colony or Core, Designated Size 0 or R World	-1	15 000
Industry					
Naval Shipyard	200	9.0	Colony or Core	-1	30 000
Orbital Factory	300	8.5	Colony or Core, 10 Raw Material Units/Turn	-2	20 000
Power					
Fusion Array	500	9.5	Colony or Core	+10	15 000
Fission Array	250	7.0	Colony or Core	+3	15 000
Solar Array	150	7.0	Colony or Core	+2	15 000
Solar Power Satellite	1 000	9.5	Colony or Core	*Special	250 000

Orbital Defence (ODI): An independent, armed and armoured space station including fields of mines and other fortifications. Has a Base Combat strength of 20/80 (20 Beam, 0/60 Missile~~, and 5 Orbital Bombardment~~). Has 'M' for hull type, Experienced Quality level, treated as an immobile Space Unit for all combat purposes. If the Materials tech level of the Settlement is 10.0 or greater, then Base Combat Strength becomes 60/100 (20 Beam, 0/40 Missile, 40 Fighter~~, and 5 Orbital Bombardment~~).

Listening Post (LP): A Listening Post is an unmanned network of small, extremely difficult to detect, passive sensors installations and drones scattered about a Star System to gather intelligence and relay that data back to friendly forces for analysis. See section 10.10, this facility is treated as having Stealth ability. May be used to monitor a Star System different from the Settlement of this facility's location, exactly which Star System must be specified at the time of construction and cannot later be changed. The difference in the number of Star Systems on our Subway Star Maps between the hosting Settlement and the Star System being monitored can be at most equal to (Nearest Core Settlement Space tech level – 8.0), round fractions down.

Orbital Terminal (OT): A generic orbiting station which contains sufficient structures to conduct any cargo handling, maintain and command Spaceships. This includes the communication arrays, supply dumps, navigation markers, courier networks, etc. scattered around nearby Worlds and Star Systems. Counts as a Friendly Site for Spaceship type Military Units, see Section 7.1. Required for the transfer of cargo between Interface Facilities and Starships, or payment of income. ~~An OT has defences giving it a Base Combat Strength of 1 (Beam weapons), Armour of U, Quality level of 'Experienced', treated as an immobile Space unit for all combat purposes.~~ Each OT can be improved upon by adding upto 5 Modules, these Modules do not count as a separate facility in any way and once attached to an OT can never be moved, only upgraded or destroyed. Modules cannot be stored between Turns, and are destroyed at the end of a Turn if not attached to an OT. Each Scram Aircraft, Sky Hook, Catapult, or Deadfall facility must be attached to an OT and count as 1 Module against the limit of 5 Modules per OT, each Beanstalk facility counts as 5 Modules.

Research Module (Rm): Labs and scientific apparatus, includes exploratory missions to the surrounding region. At the time of construction, the owner must dedicate this module to a particular category of technology. Once per Turn the module will reduce the cost of cutting-edge research of that one technology category of either the owner or an ally, see section 5.2.1 and 5.2.2. Up to 5 Research Modules in the same Star System may be dedicated to the same technology category.

Weaponry Module (Wm): Anti-ship weaponry and other defensive structures. Each Weaponry Module has Armour of U, Quality level of 'Experienced', treated as an immobile Space unit for all combat purposes. If the Settlement Materials tech level is less than 10.0 this module adds 5/35 (5 Beam and 0/30 Missile) to the Base Combat Strength of the station, if Settlement Materials tech level of the owner is 10.0 or greater then this module adds 25/40 (5 Beam, 0/15 Missile, and 20 Fighter) to the Base Combat Strength of the station. This module is destroyed if the OT it is attached to is captured.

Outpost Module (Out): Extra structures and personal for the self-sufficiency of an OT, includes some interface craft and ground structures. Required for Outpost type Settlements. If the habitability type of the World is Hospitable or Inhospitable then an Outpost requires a negligible portion of a hex on the World's surface, which may be shared with another Settlement, the owner must specify this hex at time of construction.

Enclave Module (Enc): A small proto-colony of several thousand individuals, includes enough food, power, and interface facilities to service their needs. An Enclave is useful for establishing a presence on a World, to conduct trade or judge the suitability of the World for future colonisation. Required for Enclave type Settlements.

Drive Tuner Module (Tun): A system involving space stations located in deep space which have a complex device that allows a Spaceship to safely switch on and off of its StutterWarp Drive in mid-journey outside of a gravity well, and StutterWarp equipped tugs to pull the Spaceships the rest of the distance. Construction consumes 5 Tantalum SRU. At the time of construction the owning player notifies the Referee to create a link on the Star System Subway map (see section 2.4) to a Star System up to 11.6ly distant. Unlike ordinary links, the link created by this Module can only be used at the permission of the owning player. Use the Stellar_Distance tab of the Calculator sheet, choose a column of the starting star, select the filter Icon-->Filter by condition-->Is less than or equal to-->11.6 to display only those Star Systems for which links are possible. Friendly Spaceships equipped with StutterWarp modules may traverse this link between entering the Orbit hex of Worlds of at least Size 1. The link which is bridged may not be changed later on. This facility may move an unlimited number of Spaceships in a Turn or Quick Combat Round, but only 1 Spaceship per War Round.

Orbital Colony (OC): A large structure, such as a Stanford Torus or an O'Neill Cylinder space colony, for the long term habitation of a large number of people. Generates 5 Food Units per Turn. 5 Population Units required for Orbital Colony facility, which may be used to fulfil the Labour requirements for other Orbital facilities. One Orbital Colony facility is required for every 20 non-'Orbital Colony' Orbital Facilities (rounded down) that the owning nation has in the same Orbit hex. This facility adds a 0.5% bonus to the GDP of one Core Settlement, the bonus is cumulative with multiple facilities.

~~**Orbital Barracks** (OB): The housing and support infrastructure needed to hold and maintain 1 non-Spaceship type Military Unit in the Orbit hex between Turns, otherwise the unit must land. Counts as a Friendly Site for non-Spaceship type Military Units, see section 8.1.~~

Communications Net (CN): A network of satellites and ground stations for a global communications and weather monitoring net. One Communications Net facility required for every (Population Units / 500, round fractions down) in a Colony Settlement. Each facility can provide a combat advantage for battles occurring in the entire World. See section 10, Combat rules. This facility adds a 1% bonus to the GDP of one Core Settlement, this bonus is not cumulative with multiple facilities.

GPS Net (GN): A network of satellites and ground stations for precise global positioning. One GPS Net facility required for every (50 / World Size, round fractions down) surface hexes in a Colony Settlement. Each facility can provide a combat advantage for battles occurring in the entire World. See section 10, combat rules. This facility adds a 1% bonus to the GDP of one Core Settlement, this bonus is not cumulative with multiple facilities.

Spy Net (SN): A network of satellites and ground stations for the monitoring and coordination of military forces on the surface. Each facility can provide a combat advantage for battles, see section 10 Combat rules.

Missile Defence (MD): Any system of intercepting large numbers of missiles before they reach a Settlement. Each facility is counted as having Experienced Quality level, hull type 'U', and is treated as an immobile Space unit for all combat purposes. Has a Base Combat Strength of 0 but a Base Combat Strength of 50 if it is a Defender in a combat where the Attacker includes ICBMs, Spaceship Missiles, Orbital Bombardment, or Fighters, which are targeted against anything on the surface of the World or Orbit hex. See section 10. Combat rules.

Asteroid Mining (AM-<location>,< SRU type, if applicable>): A nearby Size 0 or R World can be mined. Includes structures for the basic refining of the collected resources into Raw Materials Units for ease of shipping. The Size 0 or R World being mined must be specified at the time of construction and cannot be changed later. The difference in Orbital Distances between the hosting Settlement and the Size 0 or R World can be no greater than (Settlement Space tech level – 7.0) AU. Asteroid Mining facilities of different owners may mine the same World, but this facility is rendered 'Idled' if the asteroids being mined or its orbit hex is occupied only by forces hostile to this facility's owner. Each Asteroid Mining facility has a Base Production each Turn in the Orbit hex of the facility's hosting World:

> Raw Material Units = (Nearest Core Settlement Material tech level) x (Effective Mining potential of the Size 0 or R World after modifiers -1 for every 5 Turns after the World is surveyed) / (5 + Current number of Asteroid Mining facilities in the Size 0 or R World from all nations)$^{0.5}$, round fractions down
>
> Or, if available on the World and specified at the time of construction: An increase in Base SRU production of one type of SRU by (5 -1 for every 5 Turns after the World is surveyed ~~+ Referee's judgement of your plan)~~ X (25 for Oil, 5 for Pai-Leng, or 2 for Tantalum) / (25 + Current total number of Asteroid Mining facilities in the Size 0 or R World from all nations)$^{0.5}$, round fractions down.

Naval Shipyard (Nav): With the Modules available in the same Orbit hex, a Naval Shipyard can assemble Spaceships. One Naval Shipyard facility in the same hex must be allocated per 10 000 tonnes of Spaceship mass, round fractions up. This facility may modify or repair the Damaged status of any number of Spaceships per Turn but only repair the Damaged status of 1 Spaceship per War Round (see section 10.7).

Orbital Factory (OF): More expensive to build than ground based industries but can make products which are in high demand. This facility generates 1 Pai-Leng units in the Orbit hex every 5th Turn of the game *i.e. a game start date of 1985 then an Orbital Industry would produce a Pai-Leng on turn 2005 (the 5th turn), 2030 (the 10th turn), 2055 (the 15th turn), etc.* If provided with exactly 10 Raw Material Units in a Turn then this facility will build 10 Supply Units in the same Orbit hex.

Fusion Array (FA): The ultimate in energy production for facilities in the Orbit hex. Uses the energy released when lighter elements are forced to fuse together into heavier ones.

Fission Array (FisA): Harvesting the energy released by the controlled decay of unstable heavy elements for facilities in the Orbit hex. Cost includes the containment of the highly radioactive waste products.

Solar Array (SA): Large sheets of photovoltaic cells for turning the light of a star into usable energy for facilities in the Orbit hex.

Solar Power Satellite (SPS): A massive piece of orbital engineering, a Solar Power Satellite is a huge array for the collection of vast amounts of solar energy. Often this takes the form of large mirrors to heat and light sections of the ground below or microwave transmitters and receivers to beam power to the surface. For a Colony type Settlement, this facility produces 50 Power for facilities on the surface only, this Power is not available to facilities in the Orbit hex. For one Core Settlement, this facility adds a 1% bonus to the local Economic Activity; this bonus is cumulative with multiple facilities up to a maximum of +10%.

7.8.2. Interface Facility

All Interface facilities must be located in a surface hex of a Settlement. Any World which has Size 0 or S or R does not require interface craft to move cargo to or from the Orbit hex and the surface. Interface facilities are listed with a number for Base uplift and Base Downlift. Base Uplift is a measure of the amount of cargo that the facility can move from the surface to the Orbit hex per Turn. Base Downlift is a measure of the amount of cargo that the facility can move from the Orbit hex to the surface per Turn. Any given item of cargo can be moved by multiple interface facilities in the same Settlement/hex but must be moved entirely within a single Turn and the burden cannot be shared by other Settlement/hex pairs. Uplift or Downlift in Tonnes of a Interface facility per Turn is equal to:

> (Base Uplift or Downlift the Interface facility) X (Space tec level of nearest Core Settlement of the same Owner - 5)^2 / (World Size), round fractions down *e.g. In 2280 the American colony of DM+2 3312-King-New Columbia is 8 Star System links away from America's Tiranne Core Settlement as opposed to 9 links away from Sol-Earth-USA, so Tiranne's tech level is used. Tiranne has a Space tech level of 11.2, King is a size A world, thus a Catapult on New Columbia will have an uplift of (200 000) (11.2 - 5)^2 / (10) = 768 000 tonnes*

Type	Base Cost	Tech	Local prerequisite	Power	Mass	Base Uplift	Base Downlift
Catapult	500	9.5	Colony or Core, 1 space of an OT	-3	50 000	200 000 *	NA
Spaceport	50	5.0	Colony or Core	-1	20 000	NA	NA
Rocket	100	5.0	Colony or Core, 1 space of a Spaceport	0	10 000	1 000	1 000
Scram Aircraft	300	9.0	Colony or Core, Atmosphere 4 - 9, 1 space of an OT and Spaceport	0	20 000	3 500	7 500
Rocket Plane	200	10.0	Colony or Core, 1 space of an OT	0	20 000	2 000	2 500

Sky Hook	50 X World Size	11.0	Colony or Core, 1 space of an OT and Spaceport	0	100 000	25 000	NA
Beanstalk	1 000 X World Size	12.0	Colony or Core, 5 spaces of an OT and Spaceport	+5 X World Size	1 000 000 000	750 000	750 000
Deadfall	100	7.0	Colony or Core, 1 space of an OT and Spaceport	0	10 000	0	(2 000 X Atmosphere) or (20 000 / World Size)

Catapult (CP): A large, usually a linear electromagnetic, accelerator for hurtling robust products up to the Orbit hex at great speed. Can move cargo from the surface up to the Orbit hex of any other World in the same Star System at no extra cost. The local OT serves as the 'catch' facility in orbit. Because of the hyper accelerations involved, a Catapult can only move Food Units (and even then, I hope you like your tomatoes pureed!), Raw Material Units, Oil, and Tantalum Special Resource Units.

Spaceport (S): A required fuel, supply base, and cargo-handling facility for at most 5 total of Rockets and Scram Aircraft facilities located on the surface of a World. Will count as a Friendly Site for Spaceships which can land there. With the Modules available in the same World hex, a Spaceport can assemble Spaceships that can reach orbit, as per section 9, one Spaceport facility in the same hex must be allocated per 10 000 tonnes of Spaceship mass, round fractions up. This facility may modify or repair the Damaged status of any number of landed Spaceships per Turn but can only modify or repair the Damaged status of 1 landed Spaceship per War Round (see section 10.7). Has 5 spaces for other interface facilities.

Rocket (R): Any one of several launch systems which in some way use rockets capable of reaching orbit. A no-frills journey, but has sufficient range to take cargo between the surface of a World to the Orbit hex of any satellite of that same World *e.g. Earth* ← → *Luna*. Requires 1 space of a Spaceport facility on the surface.

Scram Aircraft (Sc): A system of hypersonic aircraft, which with the assistance of rockets, are capable of reaching orbit. As Scram Aircraft fly, they are much safer and more efficient at bringing cargo from orbit. Requires Atmosphere be 4 – 9, 1 space of a Spaceport facility on the surface, and 1 Module space of an OT facility in the Orbit hex. Has sufficient range to take cargo between the surface of a World to the Orbit hex of any satellite of that same World *e.g. Earth* ← → *Luna*.

Rocket Plane (RP): A system of reusable high-performance landers, such as a ROTAN type craft, capable of repeated, independent landings and taking off anywhere in a World without the assistance of a Spaceport. Requires 1 Module space of an OT facility in the Orbit hex. Has sufficient range to take cargo between the surface of a World to the Orbit hex of any satellite of that same World *e.g. Earth* ← → *Luna*.

Skyhook (Sk): A long tether is suspended from a passing asteroid to dangle its tip from orbit, along with hypersonic aircraft to catch the tip while it is in the upper atmosphere and uses the momentum of the asteroid to drag cargo from the surface into the Orbit hex of a World. Requires 1 space of a Spaceport facility on the surface, and 1 Module space of an OT facility in the Orbit hex.

Beanstalk (BN): A pinnacle of human achievement, a Beanstalk, or 'Orbital Elevator', similar to a Skyhook in principle, is an enormous cable of carbon nanotubes that runs capsules filled with cargo between the surface of a World and a tether in the Orbit hex. Requires 5 spaces of a Spaceport facility on the surface, and 5 Module spaces of an OT facility in the Orbit hex. Will generate (5 x World Size) in Power for the surface using braking from gravic potential energy. For one Core Settlement, the existence of this facility adds a 2% bonus to the local Economic Activity of the Settlement; this bonus is cumulative with multiple facilities to a maximum of +10%. Facility must be located in the 1NXX or 1SXX hex row of the World map.

Deadfall (D): Any mostly disposable system using some combination of small rockets, gliders, balloons, airbags, ablative foam armouring and parachutes for a controlled drop of products from orbit down to the surface. Includes some Interface capacity to get whatever equipment is needed into orbit so it can be used for the next trip down. Requires 1 space of a Spaceport facility on the surface, and 1 Module space of an OT facility in the Orbit hex. Base downlift depends on the Atmosphere or World Size, your Settlement will automatically use whichever yields the best result.

7.8.3. Ground Facility

All Ground facilities must be located in a surface hex of a Colony Settlement, except for Military Base facilities.

Type	Base Cost	Tech	Power	Local prerequisite	Mass
Power					
Fusion Plant	400	9.0	+10	Colony or Core	10 000
Fission Plant	150	6.0	+3	Colony or Core	20 000
Renewable Plant	150	6.0	+2	Colony or Core	15 000
Fossil Fuel Plant	100	5.0	+2	Colony or Core, Atmosphere 4 - 9, Oil Unit	10 000
Power Net	100	5.0	0	Colony or Core	5 000
Industry					
Heavy Industry	500	5.0	-5	Colony or Core, 1 Transport facility, Power Net, 50 Raw Material Units / Turn	250 000
Transport					

Road Net	100	4.0	0	Colony or Core	5 000
Railway Net	100	5.0	0	Colony or Core	5 000
Airfilm Net	100	8.0	-1	Colony or Core, Power Net	10 000
Maglev Net	100	10.0	-1	Colony or Core, Power Net	10 000
Airship Net	100	5.0	-1	Colony or Core	15 000
Resource					
Mining	100	4.0	-1	Colony or Core	10 000
Farming	100	4.0	0	Colony or Core, Hospitable World	10 000
Hydroponics	150	6.0	-1	Colony or Core	15 000
Terraform	100	7.0	-1	Colony or Core	30 000
Other					
Military Base	100	5.0	0	Colony or Core	20 000
University	400	6.0	-1	Colony or Core	50 000

Fusion Plant (FP): Uses the energy released when lighter elements are forced to fuse together into heavier ones. The ultimate in energy production for facilities on the surface.

Fission Plant (FisP): Harvesting the energy released by the controlled decay of unstable heavy elements to produce power for facilities on the surface.

Renewable Plant (RwP): Using wind, geothermal, hydrogen, solar, etc. to produce power for facilities on the surface.

Fossil Fuel Plant (FfP): Burns non-renewable resources to produce energy for facilities on the surface. Requires the Atmosphere type of the World be between 4 - 9 and 1 Oil Unit per Turn.

Power Net (PN): A power distribution network linking all facilities in the hex. 1 Power Net facility is required for every full (250 / World Size, round fractions down) set of non-Power category Ground facilities in the same hex, *e.g. A colony on a size 8 World can have 24 Farming and 6 Mining facilities in a hex without the need for a Power Net*. One is required to supply power from or through a surface hex that is different from the hex where the power was generated.

Heavy Industry (HI): An extensive collection of industries; more diverse than just one product line or one factory but is rather a nexus for a whole range of manufacturing and services. If provided with 50 Raw Material Units per Turn then this facility will generate $50 and, if all other local requirements are met including $, may also build locally a choice of either one non-Spaceship type Military Unit or one Facility or 10 Modules of any type or 50 Supply Units per Turn. The hex where this facility is located must have at least 1 Transport category Ground Facility and 1 Power Net in that hex.

Road Net (Rd): Is any network of small transport vehicles and the prepared surfaces they may need to travel on linking all parts of a hex; this can include small watercraft and their ports or small aircraft and their airstrips. 1 Road Net facility is required for every full (100 / World Size, round fractions down) set of non-'Transport' category Ground facilities in the same hex, *e.g. A colony on a size 6 World can have 4 Farming and 11 Mining facilities in a hex without the need for a Road Net*. Can move an unlimited number of units of any kind in a Turn or War Round.

Railway Net (Rl): Any fixed network of heavier transport vehicles; this can include larger watercraft and ports. A Colony may have at most (25 / World Size), round fractions down, hexes without at least 1 Railway Net facility in them. One Railway Net facility is required for every full (250 / World Size, round fractions down) set of non-Transport category Ground facilities in the same hex. Can move an unlimited number of units of any kind in a Turn, but only 1 per War Round.

Airfilm Net (Af): A train network upgraded to ride on a thin high-pressure film of air instead of wheels, or any high-speed rail network. A Colony may have at most (50 / World Size, round fractions down) hexes without at least 1 Airfilm Net facility in them. One Airfilm Net facility is required for every full (500 / World Size, round fractions down) set of non-Transport category Ground facilities in the same hex. Can move an unlimited number of units of any kind in a Turn, but only 1 per War Round.

Maglev Net (Mn): Any ultra-high speed train network where the cars are suspended off the rails with a strong magnetic field, or 'tube-trains' where the trains move along partially evacuated tubes. Requires at least 1 Power Net be present in the same hex. A Colony may have at most (100 / World Size, round fractions down) hexes without at least 1 Maglev Net facility in them. One Maglev Net facility is required for every full (1000 / World Size, round fractions down) set of non-Transport category Ground facilities in the same hex. Can move an unlimited number of units of any kind in a Turn, but only 1 per War Round.

Airship Net (As): Fleets of large cargo airships or other large, long ranged cargo vessels. This facility can move an unlimited number of units of any kind in a Turn, but only 1 per War Round, between this and another hex anywhere in the same World designated at the time of construction, as long as there is a clear, uncontested path to it.

Mining (M-<SRU type>): Covers the collection of naturally occurring resources, including renewable ones *e.g. drilling for petroleum, logging.* Includes structures for the basic refining of the collected resources into Raw Material or Special Resource Units *e.g. wood has been milled, metals are in low-grade ingots* for ease of shipping. Each Mining facility has a Base Production each Turn on the surface of:

> Raw Material Units = ((Nearest Core Settlement Material tech level) X (Effective Mining potential of the hex after modifiers + World Size - 1 for every 5 Turns after the World is surveyed) / (25 + Current number of Mining facilities in the hex))$^{0.5}$, round fractions down

Or, if available on the World and specified at the time of construction: An increase in Base SRU production of one type of SRU by ((World Size - 1 for every 5 Turns after the World is surveyed ~~+ Referee's judgement of your plan~~) X (25 for Oil, 5 for Pai-Leng, or 2 for Tantalum) / (25 + Current number of Mining facilities in the hex))$^{0.5}$, round fractions down.

Farming (F): The growing or collection and processing of food for humans, including fishing. May only function on a Hospitable type World. Each Farming facility has a Base Production each Turn on the surface of:

Food Units = ((Nearest Core Settlement Biology tech level) X (Effective Farming potential of the hex after modifiers + World Size) / (25 + Current number of Farming facilities in the hex))$^{0.5}$, round fractions down.

Hydroponics (Fh): The growing of food in nutrient solutions without soil and often with artificial light sources; this includes any techniques for the intensive creating food in an artificial environments such as aeroponics (Zero–G farming), carniculture (in-vitro meat), and aquaculture. Each Hydroponics facility has a Base Production each Turn on the surface of:

Food Units = (Nearest Core Settlement Biology tech level) x 5, round fractions down.

Terraform (Tf): Melting of glaciers, altering the atmosphere, building canals to a large water source, sterilising local life forms that are based on dextro-amino acids, etc, etc. A Terraform facility will increase the Farming potential of the hex it is located in by (10 / World Size, round fractions down) but to no more than 20. No more than (Settlement Biology tech level, round fractions down) number of Terraform facilities may be deployed in any one hex.

Military Base (Mil): A collection of military complexes, including long-term housing, training and maintenance facilities, *e.g. In the 1985 Turn the USA has one Military Base facility in Europe, hex 6N14 of Earth. It is actually made up of many separate barracks, runways, supply dumps, listening posts and support spread throughout the other hexes of Western Europe, but are all considered to be just helping extend the reach of units around hex 6N14 (see section 8.10) and are not considered to be separate Military Base Facilities.* This facility counts as a Friendly Site for Ground, Air, and Naval Military units. A Military Base is the only kind of Ground facility that can be located outside of a Settlement, requires a negligible portion of a hex on the World's surface, which may be shared with another Settlement. ~~A Military Base includes some fortifications and air defence, if attacked it can muster the equivalent of 1 unit of Reserve Quality Infantry, this unit exists only for purposes of defence and can never move, the facility is destroyed when this unit is.~~

University (U): A large research and education establishment. This facility generates 1 Pai-Leng unit in the surface hex of the Colony every 5th Turn of the game *i.e. a game start date of 1985 then an Orbital Industry would produce a Pai-Leng on turn 2005 (the 5th turn), 2030 (the 10th turn), 2055 (the 15th turn), etc.* ~~Produces 1 Pai-Leng SRU every Turn in a surface hex of the Colony.~~

8. Armed Forces

8.1. Armed Forces Overview

Armed forces are about units, and it needs to be understood that a 'unit' in this game is not just one vehicle or group of men; it is an entire slice of a military force which would be found in the field alongside the combat formations. So an "Armoured Division" unit includes not just tanks and the combat soldiers but all of the 'mortar company' 'SAM company', 'auxiliary', 'support', 'reserve', 'logistics', 'command', 'communications', 'training', 'maintenance', etc., sub-units that you find on along with the fighting arm of a force in the field. Similarly, a 'Squadron' is more than just 18 fighter craft parked on the tarmac, it is also all the control towers, repair shops, security guards, radios, and spoons in the cafeteria that make up a military unit. The actual weapon systems being used are only a small part of what makes up a military unit and its combat effectiveness; over the years a squadron that started out with P-40 Warhawks in WWII may have been upgraded to flying F-35s today but the Unit still remains. Even if the fighting arm of the squadron is decimated in battle, with appropriate replacements the squardon can quickly be brought back to full strength. Minor, smaller, independent units *e.g. commadoes, police, independent brigades, and militia* are always considered to exist but have an insufficient impact on the elements of the game to be worth recording. The hex location of a unit will be publicly available and may not be concealed by players; though knowing the exact location of a unit well enough to target it with weapons may take additional effort (see section 10.11).

On a nation's budget spreadsheet there will be a number listed in the column for the Military tech types, each military unit will have the same tech level as appropriate to the category listed in the nation's spreadsheet. This is because a military unit is much more than a single gun/aircraft/ship hull that may have been designed and built decades ago or be the latest foreign bought hi-tech goodie.

Military Units may not be shared between nations. The ownership of Military Units may be transferred between two nations but there is no tech upgrade for the buying nation. In the transfer, if the Quality Level (see section 8.7) of the Military Unit is better than Reserve, it is made worse by one Level *e.g. Veteran becomes Experienced*. In any deal that involves the transfer of a Military Unit between nations, to keep the bookkeeping simple, the original owner must show on its budget spreadsheet that it has paid for the entire construction cost of the Military Unit.

Military Units may be disbanded at any time. The mass, Tantalum, and $ value of the unit is lost, no refund. The Population Units of the unit is added to a Settlement if the disbandment occurs there.

Military Units need to stay close to Settlements that can support them, called a 'Friendly Site' or a 'Friendly Settlement'. A 'Friendly Site' is an OT~~, or Orbital Barracks~~, or Military Base facility or hex of a Core Settlement that is either owned by the same nation or by a nation that allows its use. A 'Friendly Settlement' is any Settlement that is either owned by the same nation or by a nation that allows its use. This is important for construction, movement, and repair, see sections 8 and 10.

8.2. Representing Game Units

Each unit belonging to a Player Nation will have the following description in the Unit List Spreadsheet, which is publicly available and may not ever be distorted or withheld by players:

Unit ID: A unique 4 digit identifying number assigned by the Referee for each unit of the same nation.

Unit type: Type of the unit.

Unit Quality: The Quality level of the unit, as per section 8.6 of the rules.

Current Location: The current Solar system-Star-World-Satellite-hex of the unit and the location the unit is moving towards. Worlds of size R or 0 are treated as having 1 surface hex, 11N1. Satellites are Worlds for all purposes in the game.

~~**Inhospitable World?**: Whether or not the environment at the current location of a unit is an Inhospitable type World, as per section 2.2 of the rules. Field must be kept updated by the owner.~~

Location Moving to: Where the unit is moving to. Field must be kept updated by the owner.

Note(1-3): Anything else about the unit. Field may be edited by the owner. Spaceships must list here all the modules that comprise the ship. *Eg. Tallyrand: 30/3/4/0 116L3FP10SW10B1M1F1CCC10C1OA.* Indicate the breakdown of weapon types on a Spaceship (see section 9.1) by Basics Combat Strength of Beam/Missile/Fighter/Orbital Bombardment. Indicate the Unit ID# of the unit being carried or being carried by this unit. In the case of a hex shared between more than one Settlement, *e.g. much of Earth,* specify here which Settlement the unit is in.

Action ID: Assign a unique letter to all units that are conducting the exact same actions e.g. *moving to and from the same place, attacking a certain hex*. Include in the RPOL Followup orders thread for the nation a description of just which action this letter corresponds to. Also needed if the unit is doing something usual that needs to be noted *e.g. using WMDs, not participating in the defence against an attack.* Field must be kept updated by the owner.

Damaged? Whether or not the unit is damaged, as per section 10.6 of the rules.

Base Strength: Attack and Defensive Strength represents the firepower of the unit and its ability to absorb the same. For Spaceships, this is listed in the Notes entry.

Armour: A unit's armour ratings, U, L, M or H. This represents the average defensive capability of the unit. For Spaceships, this is listed in the Notes entry.

Abilities: Any special abilities that the unit has, see section 8.8 of the rules. At most 2 different abilities per unit are possible.

SU: What is the Supply Unit cost per Turn to maintain the unit.

For NPC nations the characteristics of their armed forces are at the discretion of the Referee but are usually treated as units with a Military Rank, total Base Combat Strength (Attack and Defence combined), and Military Tech level as listed on the Settlement_List spreadsheet. The availability of Supply Units is at the discretion of the Referee. The total Base Combat Strength is usually split into units of 5 Combat Strength points each and has other characteristics according to the following table:

Settlement Military Rank	Quality Level	Armour Type	Moves As
4	Reserve	U	Cannot move
3	Green	L	Ground
2	Experienced	M	Naval, Ground
1	Veteran	H	Space, Naval, Ground

8.3. Unit Construction

Units can only be built on the surface hexes of a friendly Core Settlement or a Heavy Industry facility of a Colony Settlement. The new unit must be assigned a new, unique Unit ID number. The cost and mass of new units include an appropriate expansion of your nation's support units to aid the new unit. Units may be further specialised with the addition of one or two special Abilities as listed in the following tables. The construction of a unit may not be spread out over several Turns. No hybrid, partial, or unique units are allowed.

If the orders to construct a unit somehow fail *e.g. the needed prerequisites are not available, the construction is illegal for some reason, etc.*, then the unit will be considered to be destroyed, its mass and $ wasted. No preemptive orders on a backup plan will be accepted.

The minimum appropriate tech level of the Settlement needed to build a unit locally at base cost are listed in section 8.7. For Naval units the appropriate tech types are Military-Naval and Power, for Air Force units it is Military-Air and Electronics, for Ground units it is Military-Ground and Materials, for Space units it is Military-Space and Space tech. Listed in the budget spreadsheet are the maximum tech levels known to humanity at that time for each category; for each 0.1 the local tech level is below the minimum tech level but not higher than the maximum known to humanity, the unit may be built but add 50% to the base cost, roundup to nearest integer. The final unit cost of a unit is:

> (Base unit cost) X (1 + Quality level modifier + Special Abilities modifier) (1 + 5X(Sum of Tech levels needed - Sum of Tech levels available, if positive only)), rounded up to the nearest whole number. Each Special Ability for a unit adds a modifier of 0.5. Quality level modifier: Reserve: -0.5, Green: -0.25, Experienced: 0, Veteran: +1, Elite: +2.
>
> *E.g. Russia wants to build a Veteran ABM unit, at the time Russia's Space tech level is 8.4, and Military-Space tech level is 7.9, the maximum tech level known to humanity at this time is 8.6 in both categories. Final cost is ($175 base cost) + (1 + 1 for Veteran) X (1 + 50% X 10((8.5 minimum Space tech level needed to build - 8.4 Russia's Space tech level) + (8.5 minimum Military-Space tech level needed to build - 7.9 Russia's Military-Space tech level)) = $1575. If the maximum Military-Space tech level known to humanity was 8.4 then the ABM unit could not be built.*

If a unit is at a Friendly Site then it may have its Quality Level (see section 8.6) increased or special abilities (see section 8.8) added by spending the difference between the costs. The cost difference is not refunded for downgrading a unit. Units can be changed by any number of Quality levels or special abilities per Turn this way.

8.4. Maintenance

Due to the high cost of getting things to orbit we can assume that every effort has been made to make Military Units as long lasting, rugged, self-sufficient and self-repairing as possible; but eventually everything needs outside help. Military Units have a basic level of consumption of Supply Units depending on their Type, and Quality Level (see section 8.6) ~~and then extra according to the following table at a rate that depends upon the type of World that the unit occupies at the beginning of the Turn~~. The default action by the Referee is that if Supply Units are available then a military unit will consume them as needed, no explicit orders needed by the Player. ~~A non-Spaceship type military unit in the Orbit hex of a World is counted as being in an Inhospitable World, regardless of the habitability of the World it orbits.~~ If a military unit is not completely supplied with Supply then it is permanently reduced to Reserve Quality Level (see section 8.6) if it was not already.

Unit Quality and Type	Base Supply Unit Maintenance	~~Extra SU for Inhospitable World~~
Reserve Spaceship	0	~~0~~

Any Other Reserve Unit	0	+5
Non-Reserve Spaceship	1	0
Any Other Non-Reserve Unit	5	+5

During the current Turn, the player must arrange for the delivery of these Supply Units to the surface of the World that a unit occupies at the start of the Turn. Unless there is some reason to think that the particular hex occupied by a unit is cut off then we assume that your staff will automatically move the Supply Units from the local Spaceport or Industry to all other hexes on the same World.

8.5. Labour

Each new Unit consumes Population Units. The Population Units that comprise a military unit are not removable, and their mass is ~~now~~ included in the mass of the military unit.

Unit type	Population Units consumed
Spaceship	1
All others	5

8.6. Quality Level

Quality level is not just a reflection of how well trained a unit is but also how well equipped, the quality of that equipment, morale, discipline, the staffing levels, access to special forces, organisation, availability of support units, completeness of the unit, etc. Possible Quality levels are:

Reserve: Units that are either newly raised, in storage, severely under strength, incomplete, have minimal training or unit cohesion or equipment or support units. *Examples of Reserve units circa 1985 would be units of the Polisario Front in the Western Sahara.*

Green: Units that usually have had at least basic training, equipment, supply, support and some recognizable organisation. *Examples of Green units circa 1985 AD would be units of the U.S. National Guard.*

Experienced: Units that usually have more than a basic level training, have performed large unit manoeuvres together; have competent command staff, an experienced NCO corps, and have adequate amounts of useful equipment and access to support units. *Examples of Experienced units circa 1985 AD would be most of the Russian army and units of the U.S. National Guard.*

Veteran: The unit is usually fully manned with many members having some combat experience and have access to above average equipment, support units and supplies. *Representative examples of Veteran units would be most of the U.S. regular army circa 1985 AD.*

Elite: Units like these are always fully staffed with the best trained and most experienced personnel possible and have access to some of the best equipment that humanity can offer including readily available replacements and updates. *Examples of elite units circa 1985 AD would be the U.S. 1st Marine Regiment of the 1st Marine Division.*

8.7. Unit Tables

Type: What kind of unit it is.

Base Combat Strength: The intrinsic combat strength for a unit of that type. If more than one number, the first number refers to being a Defender in an attack, the second number refers to being an Attacker, numbers within a parentheses are for special circumstances as outlined in the unit description.

Armour: A measure of how well protected the unit is against attack. It is more than just the thickness of a metal skin as it includes ECM, manoeuvrability, point defence weapons, etc. Armour modifies the amount of damage that a unit takes.

Base Cost: Cost in $ each.

Tech: The appropriate Tech levels of the Settlement where this unit is produced must be at least equal to this to produce (see sections 7.4) the unit there at unmodified base cost.

Mass: The mass in metric tonnes of a unit. Unlike facilities, this mass includes the mass of the Population Unit needed to crew the unit.

8.7.1. Naval Units:

Type	Base Combat Strength	Armour	Base Cost	Tech	Mass
Corvette	5	U	10	4.0	50 000
Frigates	5	L	25	4.5	100 000
Destroyers	15	M	75	5.0	150 000
Cruisers	25	H	125	5.5	200 000
Attack Submarines	15	L	100	6.0	150 000

Missile Submarines	5 / 1 (75)	M	125	6.5	200 000
Helicopter Carrier	5 / 30	M	150	6.5	350 000
Aircraft Carrier	5 / 30	L	200	6.0	500 000

Corvette: A group of any small, short ranged, shallow water warships, including patrol cutters, littoral and fast attack craft.

Frigates: A group of any small, fast, yet long ranged warship intended for a variety of missions, often escort.

Destroyers: A group of medium-sized, long-endurance warships intended for a wide variety of missions.

Cruisers: A group of large, heavily armed and armoured ocean-going warships intended to dish-out, and take, vast amounts of firepower. This includes ships termed 'battlecruisers', 'dreadnoughts', and 'battleships'.

Attack Submarines: A small group of any kind of waterborne vessels designed primarily to fight underwater with torpedoes, rail-guns, blue-green lasers, and even subcarriers of smaller, short ranged underwater fighter craft. Inherently has 'Stealth' and 'Inhospitable' special ability, for free.

Missile Submarines: Larger submarines equipped with longer ranged missiles. May attack as an IRBM type Space unit (see Section 8.7.4) with an attack Combat Strength of 75, WMD equipped (see Section 8.10), if part of an Attacking force in combat. Inherently has 'Stealth' and 'Inhospitable' special ability, for free.

Helicopter Carrier: Ships for the transport and launching of combat helicopters or airships. May attack as a Multirole Helicopter type Air Unit (see Section 8.7.2) with an attack Combat Strength of 30 if part of an Attacking force in combat.

Aircraft Carrier: Ships for the transport and launching of planes May attack as a Multirole Plane type Air Unit (see Section 8.8.2) with an attack Combat Strength of 30 if part of an Attacking force in combat.

For Naval Units the possible Special Abilities are:

Inhospitable: Vacuum suits, sealed and insulated vehicles, needed for the unit to exist and not be destroyed immediately in an 'Inhospitable' type World. See section 8.9 and 10.3.

Orbital Reentry: Dropships and harnesses. See section 8.9, 10.3, and 10.5.

Stealth: Sacrifices performance for difficulty in detection. May avoid combat, see section 10.13.

8.7.2. Air Units:

Type	Base Combat Strength	Armour	Base Cost	Tech	Mass

Multirole Planes	5 / 15	M	35	5.5	50 000
Bomber Planes	5 / 25 (75)	H	50	5.5	75 000
Helicopters	5 / 15	L	20	6.0	25 000
Multirole Airships	5 / 10	U	15	4.0	25 000
Bomber Airships	5 / 25 (75)	U	15	4.0	50 000
SAM	1 (25) / 0	U	20	6.0	25 000

Multirole Planes: Fixed, or partially variable wing, air-breathing aircraft which may have VTOL or STOL capacities. Has some mixture of attack and bombing capabilities and are often adapted for many different purposes. Requires an Atmosphere type 4 - 9 to function.

Bomber Planes: Fixed, or partially variable wing, air-breathing aircraft which are designed to carry large payloads to attack ground targets. May attack with a WMD tipped (see section 8.10) Base Combat Strength of 75 if part of an Attacking force in a combat where the Defender includes Ground or Naval units. Requires an Atmosphere type 4 - 9 to function.

Helicopter: Rotary powered craft, includes 'Vectored-thrust' and 'X-wing' type gunships. Requires an Atmosphere type 6 - 9 to function. ~~Considered to be a 'Ground' unit for purposes of combat with Plane type units, see section 10.9.~~

Multirole Airship: A large lighter-than-air ship. Requires an Atmosphere type 2 - A to function. ~~Is considered to be a 'Ground' unit for purposes of combat with Plane or Helicopter type units, see section 10.9.~~

Bomber Airship: Large, lighter-than-air ships which are designed to carry large payloads to attack ground targets. May attack with a WMD tipped (see section 8.10) Base Combat Strength of 75. ~~if part of an Attacking force against a Defender which includes Ground or Naval units~~. ~~Is considered to be a 'Ground' unit for purposes of combat with Plane or Helicopter type units, see section 10.10.~~ Requires an Atmosphere type 2 - A to function.

SAM: Surface to Air Missiles. This includes any kind of mobile or fixed, ~~surface-based~~ air defence system, such as Interceptor type aircraft, as well as the radar/detection network as needed. Has a Combat Strength of 25 if is a Defender in a combat where the Attacker includes Air Units which are targeted at the hex they occupy or up to (10 / World Size, rounded down) hexes away, 1 otherwise.

For Air Units the possible Special Abilities are:

Inhospitable: Vacuum suits, sealed and insulated vehicles, needed for the unit to exist and not be destroyed immediately in an 'Inhospitable' type World. See section 8.9 and 10.3.

~~**Interceptor**: Also known as 'Superiority' fighters, these are specialized in neutralizing attacking Air Units. Multi-Role Plane or Multi-Role Airship type Air units only. See section 10.9.~~

Orbital Reentry: Dropships and harnesses. See section 8.9, 10.3, and 10.5.

Stealth: Sacrifices performance for difficulty in detection. May avoid combat, see section 10.10.

8.7.3. Ground Units:

Type	Base Combat Strength	Armour	Base Cost	Tech	Mass
Infantry	5	U	5	4.0	25 000
Motorised	5	U	10	5.0	50 000
Mechanised	15	M	25	5.5	75 000
Armour	25	H	35	6.0	125 000

Infantry: Largely leg mobile units using mostly man-portable weapons.
Motorised: Soldiers with, at best, lightly armoured, organic transport.
Mechanised: Soldiers with armoured, organic transport including elements of attached armour and artillery. Advanced versions include one-man bipedal tanks known as 'Combat Walkers'.
Armour: Units where the main combat components are wheeled or tracked AFVs; at higher tech levels this includes hovertanks.

For Ground Units the possible Special Abilities are:

Airborne: Air transport vehicles and specially light equipment to drop from the air. See section 10.3. Only Infantry units may have this ability. Multiply the mass of this unit by X2 to include the extra mass of the air transport vehicles. Requires an Atmosphere type 4 - 9 to function.

Amphibious: Watercraft and training to storm beaches. See sections 10.3 and 10.5. Multiply the mass of this unit by X5 to include the extra mass of the water transport vehicles.

Inhospitable: Vacuum suits, sealed and insulated vehicles, needed for the unit to exist and not be destroyed immediately in an 'Inhospitable' type World. See sections 8.9 and 10.3.

Orbital Reentry: Dropships and harnesses. See sections 8.9, 10.3, and 10.5.

Stealth: Infiltration troops. May avoid combat, see section 10.10

8.7.4. Space Units:

Type	Base Combat Strength	Armour	Base Cost	Tech	Mass
IRBM	1 / 75	U	75	6.0	25 000
ICBM	1 / 75	H	100	7.0	75 000
ABM	1 (50) / 0	H	175	8.5	50 000
Spaceships	See section 9	See section 9	See section 9	See section 9	See section 9

IRBM: Intermediate Range Ballistic missiles, this includes what are termed short and medium-range ballistic missiles, cruise missiles, and submarine-launched missiles, usually the smaller, highly mobile missiles. Attack combat strength is 75 and WMD tipped (see section 8.10), 1 otherwise. In a War Round an IRBM can attack units up to (50 / World Size, rounded down) hexes away. Units that currently have 'Damaged' status or are 'Reserve' Quality level may not attack. ~~May only be part of an Attacker's force once per War Round.~~ Moves as a non-Infantry Ground Unit (see sections 8.9.3 and 10.3.3)

ICBM: Intercontinental Ballistic missiles. Large missiles fired from fixed installations. Attack combat strength is 75 and WMD tipped (see section 8.10), 1 otherwise. Can hit anywhere on the surface of a World or the Orbit hex. Units that currently have 'Damaged' status or are 'Reserve' Quality level may not attack. ~~In a War Round an IRBM may only be part of an Attacker's force once per War Round.~~ Moves as an Air ~~Ground~~ Unit (see sections 8.9.2 and 10.3.2) ~~during a Turn but may not move during Combat~~.

ABM: Anti-Ballistic Missiles, this includes any kind of large fixed installations that have weapons specifically designed to shoot down large numbers of incoming missiles and overcoming those missile's defensive countermeasures. Has a ~~In a War Round an ABM can never be part of an Attacker's force, but has an defensive~~ Combat Strength of 50 if is a Defender in a combat where the Attacker includes IRBMs, ICBMs, Spaceship Missiles, Orbital Bombardment, or Fighters which are targeted at the hex they occupy or up to (10 / World Size, rounded down) hexes away, 1 otherwise. Moves as an Air ~~Ground~~ Unit (see sections 8.9.2 and 10.3.2) ~~during a Turn but may not move during Combat~~.

Spaceships: See section 9.

For Space Units the possible Special Abilities are:

> **Amphibious**: Watercraft and training to storm beaches. See sections 10.3 and 10.5. IRBMs only may have this ability. Multiply the mass of this unit by X5 to include the extra mass of the water transport vehicles.
>
> **Inhospitable**: Vacuum suits, sealed and insulated vehicles, needed for the unit to exist and not be destroyed immediately in an 'Inhospitable' type World. See sections 8.9 and 10.3. Spaceships inherently have this ability, for free.
>
> **Orbital Reentry**: Dropships and harnesses. IRBMs only may have this ability. See sections 8.9, 10.3, and 10.5.
>
> **Stealth**: Sacrifices performance for difficulty in detection. May avoid combat, see section 10.10. Spaceships have their own version of this ability, see section 9.2.

8.8. Military Rank

Military Rank is a measure of the depth and extent of a nation's military infrastructure and covers everything that is not specifically related to individual military units. So Intelligence Agencies, office buildings to house the accountants who handle the bookkeeping on the fuel expenses for the fleet, and far-flung depots or airstrips; the whole 'Military-Industrial Complex', etc. are included. Military Rank is expressed as an integer number from 1 (best) to 4 (worst). Reducing the Military Rank of a nation requires the successful completion of a Routine level difficulty Task ~~succeeding at a Task set by the Referee~~. Nations with a Military Rank of 4 cannot have any Elite or Veteran Quality units. Nations with a Military Rank of 3 cannot have any Elite Quality units.

*Example: C*irca 1990

First-Rank Armies: America, Britain, Canada, France, Germany, Japan, and Israel.

Second-rank armies: The Soviet Army, and second-tier NATO armies (Greece, Turkey, etc.).

Third-rank armies: Average Third World nations, Brazil, Turkey, Indonesia, Chile, Peru, Mexico.

Fourth-rank armies: Armies of truly underdeveloped countries like Zaire, Rwanda, Somalia (warlord forces), Sudan, etc. ~~*or the average rebel forces of an insurgency*~~*.*

8.9. Movement in a Turn

Orders for the movement of all Military units between hexes will only be accepted if posted to the tab for your nation in the Unit List spreadsheet. In the columns labelled 'Moving to' put the Star System, Star, World and hex of the unit's final destination. A unit can move within a hex to any other part of the same hex without limitation unless explicitly directed not to by the Referee. Within a Turn, any unit may move an unlimited number of hexes, AUs or Star Systems as long as they can:

-Enter each point along their path (see below) *e.g. A Ground Military unit cannot go to the Orbit hex without Interface capacity or move to a different Star System without the aid of StutterWarp equipped Spacecraft.*

-Can establish a chain of hexes owned by Settlements which permit the unit's passage, each no more than their maximum range (see below) apart including the endpoint.

-A path that will not start any combat.

-Non-Spaceship military units must end each Turn ~~either~~ on the surface of a World ~~or in an Orbital Barracks facility~~. They are destroyed if found not to be in an appropriate location between Turns.

-Units with Orbital Reentry ability in the Orbit hex may land anywhere on a World without needing an Interface facility or Spaceship having to land.

-No unit can ever go to the surface of an Inhospitable type World, and is immediately destroyed if they try, unless the unit is a Spaceship or has the 'Inhospitable' ability.

-No unit can ever go to the surface of an Intolerable type World and is immediately destroyed if they try.

-If the orders to move a unit somehow fail *e.g. the hex is taken by another nation, a deal for transportation of the mass falls through, the move is illegal for some reason, etc.*, what happens to the unit is at the discretion of the Referee but the default action is to leave the unit in place. No preemptive orders on a backup location will be accepted.

8.9.1. Naval Units

Naval units may move anywhere within a Settlement of the same owner, or up to a maximum of:

100 / ((Military Rank of the owning nation) X (World Size)), fractions rounded down

hexes away from a Friendly (Core Settlement or Military Base) of the owning nation as long as all of those hexes are a contiguous body of Water, Archipelago, Archipelago(Ice), or Ice (Water) hexes, or any Land/Ice/Desert/Scattered Lakes/Scattered Lakes(Ice)/Jungle hex adjacent to hexes with water.

8.9.2. Air Units

Air units move as Ground units, see section 8.9.3.

8.9.3. Ground Units

Ground units may move anywhere within a Settlement of the same owner, or up to a maximum of:

20 / ((Military Rank of the owning nation) X (World Size)), fractions rounded down

hexes away from a Friendly (Core Settlement or Military Base) of the owning nation as long as all of those hexes are contiguous Land, Land(Ice), Desert, Scattered Lakes or Jungle hexes. Archipelago and Archipelago(Ice) count as 2 hexes. If there are no Road facilities in the hex then it counts as 2 hexes of the same type for range *e.g. an Archipelago(ice) hex with no Road facilities would count as 4 hexes.* If there is a Railway/Airfilm/Maglev facility then the hex is not counted for range purposes. Ground units can use the same movement rules as Naval units if they embark and disembark at a Friendly Settlement or Military Base. A unit with 'Amphibious' special ability may use all the rules of movement for Naval units.

8.9.4. Space Units

Non-Spaceship type Space units move as dependent upon the type and special ability as stated in their descriptions in section 8.8.3.

Spaceships without SutterWarp drive Modules must stay within the AU distance to a (Core Settlement or OT) of the owning nation equal to:

(number of non-StutterWarp Propulsion Modules that the ship has) / (Military Rank of the owning nation); rounded down to nearest 0.1 AU. Where AU distance is always measured as if the Spaceship and the endpoint are on the same side of the Star System. *Example: A German (Military Rank 1) non-Stutterwarp Spaceship from Earth may not reach Jupiter without at least (Earth 1.0 AU to Sol, Jupiter 5.2 AU to Sol, AU distance is 5.2 – 1.0 =4.2) 5 / (Military Rank 1) = 5.* The AU position of a world can be found in the Heaven&Earth software on the System→Primary or Binary Map tabs. Hold your cursor over the desired world and the 'Orbital Distance' will appear which is to be used as the AU position. The distance within a World and its satellites is always counted as 0.25 AU. The distance between any point of different star systems within a Binary or Trinary system is always treated as being 100AU.

Once StutterWarp drive is discovered, travel between Star Systems becomes possible. StutterWarp drive uses an isomer of the rare element Tantalum to create a macro-sized quantum tunnelling effect which is cycled many times a second to move an object at a pseudo-velocity that can exceed the speed of light by a factor of several hundred. The slightly less rare element Hafnium will also serve but the drive will be unstable and tends to only be used in one-shot devices like missiles. The speed efficiency of the drive somewhat depends upon the ship mass but largely depends upon the strength of the local gravity field. In a weak enough gravity field the ship attains superluminal velocities for up to a maximum of 7.7 ly distance at the end of which the drive must enter the gravity well of a World to discharge an otherwise dangerous build-up of gravic charge which would destroy the ship in a cascade of radiation. Spaceships with StutterWarp drive Modules may go anywhere in their current Star System but must stay within range a number of linked Star Systems on our Subway Maps (see section 2.4) to a (Core Settlement or OT) of the owning nation equal to:

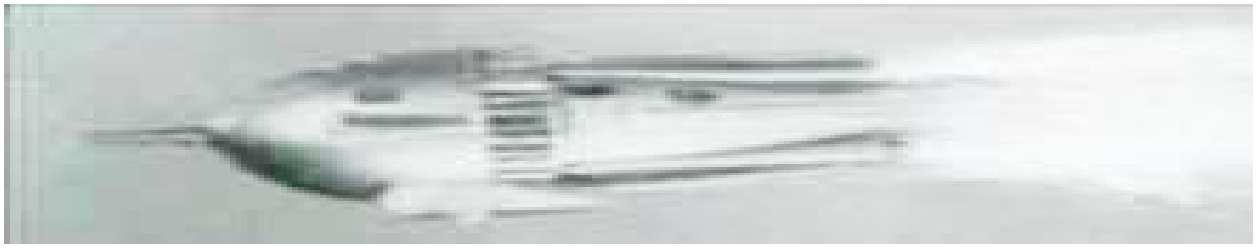
2 X (number of StutterWarp Propulsion Modules that the ship has) / (Military Rank of the owning nation), rounded up to the nearest integer.

Example: A StutterWarp equipped ship leaves Earth, headed for the Alpha Centauri Star System*. Starting in the 'Orbit' hex at a distance of 20 000 km from the centre of the Earth (where G is 0.1) the ship picks up speed until it passes the asteroid belt (and exceeds the 0.0001G threshold for Sol) where it goes superluminal and arrives in Alpha Centauri. As the distance travelled was only 4.5 ly the ship could immediately go on to the Proxima Centauri Star System but the captain decides to stop at the planet Tirane, take on some cargo and discharge the gravic charge build-up before departing on the much longer trip to Barnard's Star.*

8.10. WMDs and WMD Armed Nations

There are weapons which have a large but unfocused destructive capacity which far exceeds that of most other weapons and they are called Weapons of Mass Destruction, or WMDs for short. For a game of this scope it does not matter if the WMDs are nuclear, chemical, biological, memetic, cyber, etc. Use of WMDs usually only happens at the explicit orders of the player. 'WMD Armed' refers to if a nation can construct and has possession of sufficient numbers of WMDs of various types, along with sufficient delivery systems of various types, to be capable of repeatedly destroying large swaths of territory. Mere possession of a few WMDs is not sufficient to be counted as a 'WMD Armed' nation as the game defines it; sometimes even very poor entities have a handful of WMDs but this does not make them 'WMD Armed'. Possession of ICBM units, or Spaceship Missile Modules, or Spaceship Orbital Bombardment Modules requires that the nation be 'WMD Armed'. A nation may become 'WMD Armed' upon the successful completion of a Routine level difficulty Task ~~whose difficulty is set by the Referee~~.

9. Spaceships



9.1. Spaceships Overview

Spaceships cover all units that have the ability to move in space. For game simplicity, we will only concern ourselves with Spaceships that are important to conquest and colonisation. Other ship types, e.g. *luxury cruise liners, couriers, tugs, independent prospectors, etc*. will be played as being subsumed within the support craft included within a normal Spaceship unit. Spaceships are military units, any rule that applies to military units applies to Spaceships as well.

The ownership of Spaceships may be transferred between two nations at the price of whatever the two nations work out between themselves for the privilege of the transfer but there is no tech upgrade for the buying nation. In the transfer, if the Quality Level of the Spaceship is better than Reserve, it is made worse by one Level *e.g. Veteran becomes Experienced*. In any deal that involves the transfer of a Spaceship between nations, to keep the bookkeeping simple, the original owner must show on its budget spreadsheet that it has paid for the entire construction cost of the Spaceship.

9.2. Spaceship Construction

It is recommended to use the Spaceship Designer spreadsheet to aid in the calculations needed. A Spaceship is made up of a number of Modules, each with their own, mass, cost, and power requirements. Spaceship Modules can be built on the surface hexes of a friendly Core Settlement or a Heavy Industry facility. All Spaceship Modules include whatever crew quarters, life support, small craft, sensor, and bridge components that are needed to run the ship effectively. Total Power production of the Spaceship must at least equal power consumption. Spaceships require at least 1 Propulsion Module and a number of Hull Modules at least equal to:

> (Total mass of the ship including Hull Modules) / (1000 Tonnes , rounded up. Hull Modules must all be the same type within the same Spaceship.

Spaceships can be built from their component Modules at a Spaceport facility if all Modules are available on the surface of the World and the Spaceship can move to the Orbit hex (see section 9.3); one Spaceport facility in the same hex must be allocated for the full Turn per 10 000 Tonnes, roundup, of mass of the Spaceship. Spaceships can be built in the Orbit hex from their component Modules at a Naval Shipyard facility if all Modules are available in the same Orbit hex; one Naval Shipyard facility must be allocated for the full Turn per 10 000 Tonnes, rounded up, of mass of the Spaceship. Unattached modules cannot be stored between Turns, and are destroyed at the end of a Turn if not attached to a Spaceship. Modules are highly customised to the Spaceship they are built for, so at the moment of construction Spaceship Modules are permanently assigned to a specific Spaceship and can never be transferred to another Spaceship.

The appropriate tech level of the Settlement where a Module is constructed (see section 7.4) must be at least equal to the listed minimum tech level needed to produce the Module locally at base cost. For Spaceship Hull type modules the appropriate tech types are Materials and Space tech, for Power Plant and Propulsion type modules it is Power tech and Space tech, for Other type modules Electronics tech and Space tech, for Weapons modules it is Military-Space tech and Space tech. Listed in the budget spreadsheets are the maximum tech levels known to humanity at that time for each category; for each 0.1 the local tech level is below the minimum tech level but not higher than the maximum known to humanity, the Module may be built but add 50% to the base cost, roundup to nearest integer. *E.g. In 2075 Nigeria wants to build a Thrusters module. At the time Nigeria's Space tech level is 9.1, and Power tech level is 9.3, the maximum tech level known to humanity at this time is 9.6 in both categories. Final cost is ($7 base cost) + [1 + 0.5 X (9.5 minimum Space tech level needed to build - 9.1 Nigeria's Space tech level) X 10 + 0.5 X (9.5 minimum Power tech level needed to build - 9.3 Nigeria's Power tech level) X 10] = $28. If the maximum Power tech or Space tech level known to humanity was 9.4, then the Thrusters module could not be built by anyone.*

If a Spaceship is at a friendly Naval Shipyard or Spaceport then its Quality or Modules may be altered by the application of additional Modules which are in the same hex for a cost of (Base Cost of the new Modules) X (1+ Quality Modifier). These facilities can alter any number of Spaceships over a Turn but only 1 per War Round. Any Module of a ship may be replaced except adding Streamlined, Stealth or changing the number and type of the Hull Modules. Modules removed from a Spaceship are always considered to be destroyed, their inputs are not refunded.

Type: What kind of Module it is.

Base Cost: Cost in $ each.

Tech: The appropriate tech levels of the Settlement where this unit is produced must be at least equal to this to produce the module there at unmodified base cost.

Power: Power produced or consumed by the Module.

Notes: Any special notes about the module.

Mass: The mass in metric tonnes of the Module.

Type	Base Cost	Tech	Power	Notes	Mass
Hull					
U	0.1	7.0	0	1 per 1000 Tonnes of ship	50
L	0.5	9.5	0	1 per 1000 Tonnes of ship	100
M	1.5	9.5	-0.001	1 per 1000 Tonnes of ship	200
H	3	9.5	-0.002	1 per 1000 Tonnes of ship	300
Power Plant					
ChemicalP	0.1	7.0	+0.001	Includes fuel.	500
MHD	1	8.7	+0.002	Includes fuel.	400
Fission	20	7.5	+0.01	-	1 000
Fusion	50	10.5	+0.1	-	5 000
Propulsion					
Chemical	5	7.0	-0.0015	-	100
Solar Sail	1	8.0	0	-	500
Thrusters	7	9.5	-0.001	1 MHD, Fission of Fusion	50
StutterWarp	15	9.0+ Refere e event	-0.01	Military-Space 9.0+, 1 Tantalum Special Resource Unit	10
Weapons					
Beam	5	8.5	-0.01	-	100
Missile	10	7.5	0	-	200
Fighters	15	10.0	0	-	1 000
Orbital Bombardment	1	6.5	0	-	150
Other					
CCC	5	9.5	0	-	2 000
Sensors	1	8.8	-0.01	-	200

Survey	10	10.0	-0.005	-	3 000
Streamlined	0.1	7.0	0	1 per Hull Module..	100
Stealth	1	9.0	0	1 per Hull Module.	75
Cargo	0	5.0	0	-	1 000
Passenger	2	8.0	0	-	10 000
Orbital Assault	50	10.0	-0.1	-	75 000

Hull:

U, L, M, H: One U, L, M, or H Module is required per 1 000 Tonnes (rounded up) of ship mass.. Armour type includes toughness of the ship's skin, screens, manoeuvrability, anti-missile and other defensive weapons including point defence, marine guards, etc.

Power Plant: Includes the mass for the fuel supply, as well as disposable rocket engines or drop fuel tanks as needed, which is large enough to sustain the craft on a long journey.

ChemicalP (CP): Uses oxidation of chemicals to produce energy.

MHD (MHDP): The practical development of a Magneto-Hydro-Dynamic generator for converting the energy of moving plasma into electricity or thrust.

Fission (FisP): Uses the energy released from the controlled splitting of unstable heavy elements.

Fusion (FP): Uses the energy released from the fusion of lighter elements into heavier ones.

Propulsion:

Chemical (Cp): Directed blasts of burning chemicals to produce thrust.

Solar Sails (SS): Large, thin, metallic sails using the pressure coming from the solar wind or a network of emplaced 'pusher' lasers to propel a Spaceship. This includes any constant, low thrust, low energy systems such as an Ion drive or Mass drivers. A ship entirely equipped with Solar Sails is not affected by the lack of an OT facility at the endpoints of a journey, see section 9.3. The Spaceship can only have U Hull type Modules because of the low acceleration of this system.

Thrusters (T): An upgrade of a plasma 'Pinch' device to achieve high thrust by use of intense magnetic fields to cause the momentary fusion of a compressed stream of ionised hydrogen. This includes Nuclear Pulse *i.e. 'Orion*' type, drives. The Spaceship must have at least one MHD, Fusion, or Fission Module per Thruster Module.

StutterWarp (SW): Also known as a 'Jerome Drive', creates a macro-sized quantum tunnelling effect which is cycled many times a second to move an object at a pseudo-velocity that can exceed the speed of light. A Spaceship equipped with Stutterwarp drive may traverse links between Star Systems of 7.7 light years or less between entering the Orbit hex at a World with at least Size 1. Construction consumes 1 unit of Tantalum Special Resource Unit. Military-Space tech level of the nation must be 9.0 or above. The first Module may only be actually constructed after a Referee approved event signalling the breakthrough of an FTL drive development.

Weapons:

Beam (B): Hyper-velocity mass drivers, high powered lasers or particle accelerators. May only target objects which are in the same Orbit hex as the firing Spaceship or the surface of a World from the Orbit hex. May not target the surface of a World with an Atmosphere of 4 or greater. Adds 5 to the Base Combat Strength of the Spaceship. ~~if part of a combat where the opposing side includes Air Units, IRBMs, ICBMs, Spaceship Missiles, or Fighters~~

Missile (M): Always WMD tipped. May target objects which are in a different Orbit hex than the firing Spaceship, up to 0.1 AU distant or 1 AU distant if StutterWarp has been developed. ~~May only be an Attacker once per War Round.~~ Adds 0/15 to the Base Combat Strength of the Spaceship.

Fighters (F): Small, manned, high-performance armed craft. May target objects which are in a different Orbit hex than the firing Spaceship, up to 0.2AU distant or anywhere in the Star System if StutterWarp has been developed. Adds 20 to the Base Combat Strength of the Spaceship.

Orbital Bombardment (OB): Hyper-kinetic energy projectiles, redirected asteroids, dropped nuclear charges, anything designed to indiscriminately devastate large areas of the surface of a World. Always WMD tipped. May only be fired from the Orbit hex to the surface. Adds 25 to the Base Combat Strength of the Spaceship.

Other: Spaceships that currently have 'Damaged' status or are 'Reserve' Quality level lose the use of any of these Modules.

CCC (CCC): A Flag Bridge and extra facilities for command, communication, and coordination with other Military Units. Helps to improve the initiative of friendly forces, see section 10.3.

Sensors (Ss): A system of sensor arrays and probes for gathering information on ships and facilities, see section 10.13.

Streamlined (St): Hangers full of cargo landers craft or control surfaces, secondary engines, disposable boosters, and a balanced aerodynamic shape of the Spaceship giving it the ability to land. Includes the extra mass of the fuel. To have this ability, one Module is required per Hull type Module of the Spaceship.

Stealth (Sh): The use of low radar signature composites in the hull and other measures to mask heat signature. May avoid combat, see section 10.13. To have this ability, one Module is required per Hull type Module of the Spaceship.

Survey (Sy): Onboard scientific instruments, laboratories, scientific personal, and even some interface craft; for the purpose of a thorough analysis of a World. After one Turn of work on a World (time to transit to the World is not counted against this) the Farming, Mineral, and Special Resource potentials of that World are revealed to all players and a Colony Settlement may be established there next Turn.

Cargo (C): Generic space to carry a mass of 1 000 Tonnes of cargo, see section 9.3. Spaceship mass does not depend on there being actual items in a cargo module.

Passenger (P): Generic berths and life support for carrying one Population Unit, see section 9.3. Accommodations are usually cramped and miserable, but the people will get to their destination alive.

Orbital Assault (OA): Sufficient berths and interface capacity to carry, land and maintain a Military unit on the surface of a World without reliance on local interface. This module can also withdraw the Military unit back to the Orbit hex, but in doing so a non-Reserve quality unit is considered to be damaged in combat as per section 10.8. Note that this Module does not include the cost or mass of the carried unit. This Module creates one temporary Friendly Site, see section 8.1, in a hex that the owner chooses which can be used to maintain the one military unit it landed up to 1 hex away. This Friendly Site can be moved to a different hex once per War Round before any movement, but if the Spaceship leaves the Orbit hex then this Friendly Site is lost.

Example: American Lewis&Clark class Explorer:

Type	*Number*	*Base Cost*	*Power*	*Mass*
Hull U	*7*	*$0.7*	*0*	*350*
MHD power	*8*	*$8*	*+0.016*	*3 200*
StutterWarp	*1*	*$15*	*-0.01*	*10*
Survey	*1*	*$10*	*-0.005*	*3 000*
Total		*$33.7*	*0*	*6 560 Tonnes*

Example: Canadian Hudson class Cargo Carrier.

Type	*Number*	*Base Cost*	*Power*	*Mass*
Hull U	*24*	*$2.4*	*0*	*1 200*
MHD power	*5*	*$5*	*+0.01*	*2 000*
StutterWarp	*1*	*$15*	*-0.01*	*10*
Cargo	*20*	*$0*	*0*	*20 000*
Total		*$22.4*	*0*	*23 210 Tonnes*

Example: American Kennedy class Missile Cruiser:

Type	*Number*	*Base Cost*	*Power*	*Mass*

Hull L	*9*	*$4.5*	*0*	*900*
Fusion power	*1*	*$50*	*+0.1*	*5 000*
StutterWarp	*9*	*$135*	*-0.09*	*90*
Beam	*1*	*$5*	*-0.01*	*100*
Missile	*4*	*$40*	*0*	*800*
Cargo	*1*	*$0*	*0*	*1 000*
Stealth	*9*	*$9*	*0*	*900*
Total		*$243.5*	*0*	*8 790 Tonnes*

Example: French Tallyrand class Battleship:

Type	*Number*	*Base Cost*	*Power*	*Mass*
Hull L	*116*	*$58*	*0*	*116 000*
Fusion power	*3*	*$150*	*+0.3*	*15 000*
StutterWarp	*10*	*$100*	*-0.15*	*100*
Beam	*10*	*$50*	*-0.10*	*1 000*
Missile	*1*	*$10*	*0*	*200*
Fighter	*1*	*$15*	*0*	*1 000*
CCC	*1*	*$5*	*0*	*2 000*
Cargo	*10*	*$0*	*0*	*10 000*
Orbital Assault	*1*	*$50*	*-0.1*	*75 000*
Total		*$488*	*0*	*115 900 Tonnes*

9.3. Landings and Transport

Spaceships can carry units and facilities to other Worlds, and once an FTL drive is developed, to other Star Systems. Spaceships that currently have 'Reserve' Quality level may not transport anything. Transporting a Population Unit requires the services of 1 Passenger Module as well as 5 000 Tonnes of cargo capacity to carry the mass of the Population Unit. Transporting a Military Unit requires the services of 5 Passenger Modules or 1 Orbital Assault Module, as well as enough Cargo capacity to carry the mass of the unit. Spaceships may carry cargo in a War Round (see section 10.3.4) only if they have made no round trips in the Turn. An OT facility is required to transfer units between Spaceships and Interface facilities in the Orbit hex.

A given economic or military unit, including facilities, may be carried ~~on multiple Spaceships~~ on multiple trips within a Turn, but not over multiple Turns or on multiple Spaceships. Until all its mass has been transported a military unit is considered to exist at both the beginning and end point but have 'Reserve' quality level for all purposes of Combat (see section 10). This also means a facility can exist in both the beginning and endpoint but is considered to be 'Idled' until all its mass has been transported.

For Worlds size 0, 1, R, or S

-Any Spaceship may move between the surface of a World and its Orbit hex

-Any cargo may be uplifted by a Spaceship from the surface to the Orbit hex

For Worlds size 2 - A

-Spaceships that have 'Reserve' Quality level or Damaged status may not move between surface and Orbit hex

-A Spaceship may move between the surface of a World and its Orbit hex if:

(number of Chemical + Thrusters Modules for Propulsion that the Spaceship has) is greater than (Ship Mass X World Size) / (10 000 or 25 000 if Atmosphere type of the World is 4 - 9 and the Spaceship has Streamlined Modules) the Ship Mass never includes the mass of any carried cargo.

-Spaceships may only land or take off from a friendly Spaceport facility, unless it has enough Thruster Propulsion Modules to move between the surface of a World and its Orbit hex using those Thruster modules only.

-No cargo may be uplifted by a Spaceship from the surface to the Orbit hex

~~Spaceships that currently have 'Reserve' Quality level may not move between surface and Orbit hex unless World Size is 0, 1, R or S. Spaceships may only land or take off from a friendly Spaceport facility, unless it has enough Thruster Propulsion Modules to move between the surface of a World and its Orbit hex using those Thruster modules only. In landing, a Spaceship does not need Interface facilities to downlift its cargo from the Orbit hex to the surface. No cargo may be uplifted by a Spaceship from the surface to the Orbit hex unless World Size is 0, 1, R or S, when anything may be taken.~~ Unless they have 'Orbital Re-entry' special ability, a Military unit may not move or be an Attacker in the same War Round that it was landed, if attacked then they fight as though they have 'Reserve' quality level.

After adding in all the time needed to match orbits for docking, the transfer of cargo, wait for orbital positions are aligned to make the trip with available fuel delta-V, and downtime for maintenance; the number of round trips that a Spaceship can expect to make in one Turn is limited. A cargo carrying Spaceship can make:

#Round trips within a Star System = (% of the Turn spent on this task, in increments of 5%) X [2 500 X (# of non-StutterWarp Propulsion Modules) / (Spaceship Mass) + 50 X (# of StutterWarp Modules)] X (Military–Space tech level – 7.0) / (AU of one endpoint + AU of other endpoint) If the ship has at least one Chemical, Thruster or StutterWarp type Propulsion Module and there are no friendly OT or S facilities at an endpoint then add 5 AU for distance calculations. Add 1 to # of StutterWarp Modules if the Spaceship mass is 5 000 Tonnes or less, or subtract 1 StutterWarp Module for every full 25 000 Tonnes (rounded down) of Spaceship mass. Each endpoint which includes landing on the surface of a World adds 5AU to the distance calculations or 50AU if the Spaceship has StutterWarp Modules.

#Round trips between Star Systems = (% of the Turn spent on this task, in increments of 5%) X 25 X (# of StutterWarp Modules) X (Military–Space tech level – 9.0) / (# of linked Star Systems on our Subway Maps needed between endpoints, one way) If there are no friendly OT facilities in a Star System traversed then that Star System counts as 5 Star Systems for distance calculations. Add 1 to # of StutterWarp Modules if the Spaceship mass is 5 000 Tonnes or less, or subtract 1 StutterWarp Module for every full 25 000 Tonnes (rounded down) of Spaceship mass. Each endpoint which includes landing on the surface of a World adds 5 Star Systems to the distance calculations.

If the #Round trips is >1 then round fractions down, if the #Round trips are <1 then rounded down to the nearest 0.1 and multiply total cargo and passengers that may be carried in a Turn by that number. Spaceship Mass never includes the mass of carried cargo in any calculation. The AU of an endpoint is the AU position of a world which can be found in the Heaven&Earth software on the System→Primary or Binary map tabs; hold the cursor over the desired world and the AU of its position will appear. The unmodified sum of the endpoints within a World ← → Satellite system, *e.g. Earth* ← → *Luna*, is always 0.25 AU. The unmodified sum of the endpoints between any point of different star systems within a Binary or Trinary system is always 100AU.

10. Combat

10.1. Combat Rules Overview

Combat is divided into War Rounds, ~~of about 1 month long~~ generally 'War Rounds' will not be tied to a specific year or month within a 5-year Turn but are instead assumed to happen at some indefinite point within that Turn. It will be up to the Referee to determine if combat occurring across multiple Worlds or Star Systems is happening simultaneously or sequentially with each other. If combat has been going on for a significant number of War Rounds then the Referee may declare that enough time has passed that a new 5-year Turn has started, usually after at most 10 War Rounds or 3 Quick Combat Rounds. For simplicity, all the written orders submitted with your Turn not involving the construction or modification of units or facilities *e.g. all production not relating to new units/facilities, income collection and expenditure, non-combat movement of all units including supplies, Political Actions, etc.* will usually be assumed to be completed simultaneously and in their entirety before combat starts. The Referee may declare that only some or part of a player's initial written orders have been executed before a particular combat begins.

If two or more nations want to act as a multi-national alliance they must inform the Referee of that ahead of time, they will then move as one side, their initiative is calculated as one side and they may add their total combat strengths together in an attack. Effective Military Rank of the multinational alliance is the average Military Rank of all the members, rounded up to the nearest integer. The Referee's default assumption is that exactly who makes the decisions for the actions of a multinational alliance is up to the ad hoc judgement of whoever is available when the Referee needs decisions to be made. ~~The Military tech levels of an NPC at any given moment is at the discretion of the Referee.~~

10.2. Your War Round Orders

Keep the orders for your units' simple, there are a lot of perfectly competent people under your command to handle all the little details. If your orders are any less clear or comprehensive than what is listed below then the Referee will have to guess at what you intended to do and it will be your own fault if the Referee guesses wrong. Your orders will only be accepted if you specify:

-In the tab for your nation in the Unit List spreadsheet

-Assign a unique letter code in the 'Action ID' column to units conducting the same actions

-Movement of Military units from one hex/World/Star System to another. In the columns labelled 'Moving to' put the Star System, Star, World and hex of the unit's final destination. In the columns labelled 'Notes' list the path taken, and if need be what transport *e.g. moved by a particular Spaceship*, taken.

-In the private thread on the RPOL forum titled 'Follow-up Orders for <Nation>' inform the Referee that you are making an attack. Specify the actions being done for what each letter code represents in the 'Action ID' column of the Unit List spreadsheet, including but not limited to.

-Attacking a specific Settlement or group of units. The Referee will decide which units actually participate in a defence or attack, but guidance from the owner would be appreciated.

-Any special instructions relevant to the rule mechanics of the game. E.g. *carrying another unit, using WMDs or not.* The default assumption by the Referee is to attack any non-allied units they come in contact with but not use WMDs in an attack if that is an option for the units involved. Orders based on any "If …" statements cannot be accepted *e.g. attack if the Nigerian units do not move out of the hex.*

-Exactly what path of hexes for movement, including what transportation facility/unit is used.

-Which units are repaired, see section 10.7

-(optional) A written paragraph describing the overall battle plan of your forces, this may influence the opinion of the Referee on the success of your actions. This is only needed if you intend to do something different than what any loyal, professional military staff with the ordinary resources of a nation might come up with. *I.e.Trying to deliberately lose a battle, or involves the interaction of a Political Action with PApoints.*

10.3. Movement in a War Round

Orders for the movement of all Military units between hexes will only be accepted if posted to the Unit List spreadsheet. Units moving in a War Round are subject to all the same maximum range and limitations of which hex they can enter as per section 8.10, Movement in a Turn.

~~Inside a Core Settlement,~~ Air and Ground units can move the same as ~~Ground or~~ Naval units~~, using the civilian transportation networks~~ if they have not attacked yet in the War Round. To do so they must embark and disembark at a Friendly Site and for that War Round and they are treated as having 'Reserve' Quality level (exception: see 'Amphibious ability below) for the remainder of the War Round.

Units with Orbital Reentry ability may move in the same War Round on the surface of a World that it started in the Orbit hex. Units with Amphibious ability may move as a Naval unit, during such time it fights as a 'Reserve' Quality unit but need not disembark at a Friendly Site.

10.3.1. Naval Units

Naval units have (100 / World Size, rounded down) movement points per War Round. Naval units move into hexes of contiguous Scattered Lakes hexes or contiguous Water, Archipelago, Archipelago(Ice), Water(Ice), and any Land/Ice/Desert/Jungle hex adjacent to those hexes with water, by expending some of their available movement points as per the table below. An entry of 'NA' means that the unit may not enter the hex. Any Naval unit can move within a hex to any water portion of the same hex without limitation unless explicitly directed not to by the Referee.

Unit Type	Water, Archipelago	Water(Ice), Archipelago (Ice)	Adjacent Land / Desert / Jungle	Scattered Lakes
Corvette	10	10	5	10
Non- Corvette	1	3	3	NA
Unit is Reserve Quality or Damaged	5	10	10	NA

10.3.2. Air Units

Air units move as a non-Infantry type Ground unit, see section 10.3.3. May not be part of an Attacker's force during a War Round when the unit moves.

10.3.3. Ground Units

Ground units have (50 / World Size, rounded down) movement points per War Round. Ground units move into hexes of contiguous Land, Land(Ice), Desert, Scattered Lakes, Scattered Lakes (Ice), or Jungle hexes per War Round by expending some of their available movement points as per the table below. Any Ground unit can move within a hex to any portion of the same hex without limitation unless explicitly directed not to by the Referee. One, active, and friendly, *i.e. has permission from the owner*, Rail or Airfilm or Maglev or Airship Net facility may move one ~~Brigade sized unit, or 5 facilities for one Division sized~~ military unit, per War Round through its hex at a cost of 0 movement points.

Unit Type	Land, Scattered Lakes, Desert	Land(Ice), Scattered Lakes (Ice), Jungle	Has Road facility	Has Rail, Airfilm, Maglev, Airship able to carry	Rugged, Mountain, Volcano
Infantry	5	5	5	0	+0
Non- Infantry	2	3	1	0	+3

Unit is Reserve Quality or Damaged	5	5	Cannot use	Cannot use	+0

10.3.4. Space Units

Non-Spaceship type Space units move as dependent upon their type and Special ability as stated in their descriptions in section 8.8.4

Spaceship type Space units may move:

#AU per War Round = (0.1 if Reserve Quality, 0.5 if Green Quality, 1 if Experienced Quality, 1.5 if Veteran Quality, 2 if Elite Quality) X [500 X (# of non-StutterWarp Propulsion Modules) X (Military–Space tech level – 7.0) / (Spaceship Mass) + 10 X (# of StutterWarp Modules) X (Military–Space tech level – 9.0)], round fractions up to nearest 0.1 AU Add 1 to # of StutterWarp Modules if Spaceship mass is 5 000 Tonnes or less, or subtract 1 StutterWarp Module for every full 25 000 Tonnes (rounded down) of Spaceship mass. Spaceship mass never includes the mass of any carried cargo.

#of Links per War Round = (# of StutterWarp Modules) X (Military–Space tech level – 9.0) X (0.1 if Reserve Quality, 0.5 if Green Quality, 1 if Experienced Quality, 1.5 if Veteran Quality, 2 if Elite Quality) / 2, round fractions up to the nearest whole number. Add 1 to # of StutterWarp Modules if Spaceship mass is 5 000 Tonnes or less, or subtract 1 StutterWarp Module for every full 25 000 Tonnes (rounded down) of Spaceship mass. Spaceship mass never includes the mass of any carried cargo.

The AU position of a world can be found in the Heaven&Earth software on the System→Primary or Binary map tabs. Hold the cursor over the desired world and the 'Orbital Distance' will appear which is to be used as the AU position. The distance between a World and any of its satellites is always counted as 0.25 AU. The distance between any point of different star systems within a Binary or Trinary system is always treated as being 100AU.

Spaceships transiting between the surface of a World and deep space must first pass through the Orbit hex of the World. Spaceships without Stutterwarp moving into or out of the Orbit hex of a World uses up 0.25 AU of their available moves. Spaceships with Stutterwarp moving into or out of the Orbit hex of a World uses up 1 Star System or 1 AU of their available moves. One, active, and friendly, *i.e. has permission from the owner*, Drive Tuner module may move one unit per War Round through its Star System so it does not count against the total allowed movement of that unit. Spaceships may carry cargo in a War Round only if they have made no cargo carrying round trips in the same Turn as per section 9.3.

10.4. Initiative

At the beginning of a particular combat, usually one combat for each World or Star System with possible combatants, the Referee will determine which side has the initiative using the following calculation:

The Referee rolls a 1D10 dice for each side in the conflict and uses the following modifiers if the forces of a side in a combat:

-Have the most total number of (Infantry units, Airship units, Spaceships with 'Solar Sail' for propulsion, units with 'Reserve' Quality status): -1 for each category (For PC forces only)

-Are part of the same multi-national alliance: -5

-is multi-national but are not in an alliance: -10

-Have the most total number of (Air units, Multirole plane units, units with Veteran or Elite Quality together, units with 'Stealth' ability, GPS Networks, Spy Networks, Communications Networks, Spaceships in orbit, Spaceships with Thruster propulsion, Spaceships with StutterWarp propulsion, Spaceship CCC modules): +1 for each category (For PC forces only)

-Is the only side with (Air units, Multirole plane units, units with Veteran or Elite Quality together, units with 'Stealth' ability, GPS Networks, Spy Networks, Communications Networks, Spaceships in orbit, Spaceships with Thruster propulsion, Spaceships with StutterWarp propulsion, Spaceship CCC modules): +2 for each category (For PC forces only)

-For the side with the highest average Military tech level rounded down to the nearest 0.1, per 0.1 of difference between the average Military tech level rounded down to the nearest 0.1 of the average of all other sides with the lower tech levels: +2

-For a side with average (rounded up) Military Rank is 4: 0, Military Rank 3: +5, Military Rank 2: +10, Military Rank 1: +15 (For PC forces only)

-Military Rank is 4: +2 Military Rank 3: +8, Military Rank 2: +15, Military Rank 1: +25 (For NPC forces only)

-For each good plan the player proposes, good role-playing by the player, favourable political or terrain situation, PA spent in assistance of, surprise, etc.: +1 to +5. At the Referee's discretion.

The Referee rolls the dice and modifiers added in, the total for each nation is their Initiative score for the rest of that combat. However, if the Referee decides that the situation has significantly changed *e.g. massive reinforcements have arrived or the fighting has moved into some very different area* then the Referee may decide to repeat the initiative determination process.

After the Referee informs the players what their Initiative score is, ~~deciding who has the initiative,~~ players may then reduce any positive Initiative score by buying Initiative Advantages. These advantages may be bought multiple times and are bought before combat is started, inform the Referee~~, unallocated points are lost~~.

-5 points: Add +15 to their Initiative score the next time Initiative is calculated in a related combat that occurs later. Referee's discretion as to which combat is 'related'.

-5 points: Get +200 in Assets to detect or hide Hidden Units (see section 10.10).

-10 points: Change the die roll by 3 in any direction for one ~~combat roll~~ Combat Cycle (see section 10.7) of the player's choice (see section 10.6). The player must inform the Referee of the decision to use this advantage before the die roll on the combat is made.

~~-10 points: Reverse the order of one Combat Cycle (see section 10.6) *e.g. order becomes lowest to highest Initiative score, or back again.*~~

-25 points: Get a 1 column shift in your favour to all combat rolls (see section 10.7) where your side is the Attacker.

-25 points: Get a 1 column shift in your favour to all combat rolls (see section 10.7) where your side is the Defender.

-15 points: Reverse the direction in which units take damage from combat (see section 10.8). *e.g. 'Greatest Base Combat Strength through to Referee's discretion' becomes 'Referee's discretion through to greatest Base Combat Strength.* The player must inform the Referee of the decision to use this advantage before the die roll on the combat is made.

-15 ~~Variable points~~: An additional chance to force one 'Hidden' status unit or facility to be revealed each War Round (see section 10.10).

~~*Example: On the Jovian moon of Europa the USA has forces in hex 4N3 and wants to initiate an attack against the Iranian forces in the same hex. After all modifiers are totalled, the USA has an initiative score of 31 vs. 26 for Iran. Iran has significant reinforcements in hex 4N2 and wants to avoid combat in hex 4N3, ordinarily Iran would buy 'Reverse the order of the Combat Cycle' advantages, meaning the Americans would have no choice but to meet the combined Iranian force in hex 4N2. GGuessing that this was likely to happen, the Iranian player instead informs the Referee he is buying 1 X 'Change the die roll by 2 in any direction to any one combat roll' and 1 X "Get a 1 column shift (any direction) to all combat rolls"' advantages, using 25 of his available 26 points, and uses them to make the USA pay a heavy price for their hasty attack.*~~

10.5. Combat Cycle

The units of the nation with the highest Initiative score moves and attacks with all of their units first. Movement stops and combat occurs when units are in the same hex as enemy units, with some exceptions, see the unit descriptions *e.g. Spaceships entering the Orbit hex of a World could be targeted by some Space type units from the surface*, then conducts attacks by grouping together all units of a side attacking a single hex. ~~(in order) individual non-CCC grouped Spaceships units first, then all CCC grouped Spaceships together, all other Space units together, all Air Units together, all Naval units together then all Ground units together~~. The nation with the next highest Initiative then goes next. Ties in Initiative are resolved at the Referee's discretion. ~~This continues until all nations have had at least one chance to move, if there are still units which have available moves or wishes to initiate an attack then the Combat cycle repeats until they are done. Within a War Round units may initiate an attack as many times as they want, but only once per Combat Cycle; the exception is IRBM, ICBM and Spaceship Missiles which may initiate an attack only once per War Round and units with Reserve Quality level which may not attack at all.~~ A War Round ends when the Referee decrees it, usually after all units have moved and had a chance to be an Attacker at least once. After all movement and combat for the War Round is done then units which need Supply Units may be resupplied (see section 10.8).

Units with Orbital Reentry special ability may be an Attacker in the same War Round on the surface of a World that it started in the Orbit hex. Units with Amphibious special ability may be an Attacker in the same War Round that it moved as a Naval unit; need not have disembarked at a Friendly Site. Units with Airborne special ability may once per War Round, when initiating an attack it may do so using the Air unit ~~and Air Defence~~ rules (see section ~~10.10 and~~ 10.10) being treated as a Plane type Air unit.

~~Spaceships and Armed facilities may only engage in combat when both are in the same Orbit hex. Ground versus Naval units need not engage in combat unless both sides want to because of the limited range of their weapons unless of course, the Referee decrees the situation allows for it *e.g. the amphibious assault on a defended ground position*. Ground or Naval units may not be an Attacker against Air units unless they are both in the same hex.~~

10.6. Battle Resolution

The final combat strength of each unit is equal to:

> (Base Combat strength) X (Quality modifier) X $(\text{Tech})^2$, rounded down, where Quality modifier: Reserve: 0.1; Green: 0.5; Experienced: 1; Veteran: 1.5; Elite: 2. Tech is the current National Military-Air tech level for Air units, Military-Naval tech level for Naval units, Military-Ground tech level for Ground units, Military–Space tech levels for Space units.

~~If attacked by Ground or Naval Units, all friendly non-Spaceship Space and Air Units must be with at least an equal number of friendly Ground or Naval Units in the same hex, else divide the final combat strength of the non-Spaceship Space and Air Units by 5.~~ For Spaceships, ODI, and armed OT facilities, the Base Combat Strength is the sum of all of its weapon Modules, regardless if they fire or can hit the target.

*Example: An American Kennedy class missile cruiser with Experienced quality level is in the Orbit hex about the World of Neuerde in the Alpha Centauri Star System and is attacked by two Experienced German ICBM units on the surface. America has a Military–Space tech level of 11.5, Germany has a Military–Space tech level of 11.1. The Kennedy has two types of weapons systems, 1 Beam 1 and 4 Missile for a final Combat Strength of ((1*5 Beam vs. ICBM + 4*0/15 Missile) X (1 for Experienced Quality) X (11.5 tech level)^2 = 661.25 / 8 596.25 rounded down to 661 / 8 596, the German ICBM units has a final Combat Strength of (1 / 75 Base Combat Strength) ~~X (0.5 for ICBM unit on surface vs. a unit in orbit, see section 10.9)~~ X (1 for Experienced Quality) X (tech level 11.1)^2 =) 123.21 / 9 240.75 = 123 / 8240 each.*

Total the Combat Strength of all units of each nation involved in an attack, as determined by the Referee, ordinarily this will be only the units of the Attacker whose weapons can reach a given hex vs. all of the units of the Defender in that same hex. See the specific exceptions for Air and Space units. The Combat Strengths of units of different nations will only be added together if they belong to an alliance which has successfully completed a Task of hidden difficulty as set by the Referee for unity.

The odds are determined by computing the ratio of the total Combat Strength of all involved units of the side which initiated the attack over the side being attacked, using the nearest odds column on the Combat Results Table (CRT), taking any factions as a shift to the left, and implementing any column shifts. Additional column shifts may be applied at the discretion of the Referee *e.g. WMD use, appropriateness of a nation's unit composition to the task, a good attack plan the player proposes, good role-playing by the player, favourable political or terrain situation, PA spent in assistance of, etc.* For simplicity of display, odds greater than 5:1 and less than 1:5 are grouped together but each integer multiple still counts as a separate column for purposes of column shifting. The Referee finds the appropriate odds level column and the Attacking player rolls a 1D10 on the RPOL site. *Example: In the Attack by German ICBM units on the American Kennedy class missile cruiser the odds on the CRT are (9 240 +9 240) / 661 = 27.95 rounded to the left = >10:1 column, because the Kennedy had enough Initiative advantages to buy 1 column shifts to the left so the 7:1-10:1 column is used.*

Combat Results Table

Roll/Odds	<1:10	1:7 – 1:10	1:5 -1:6	1:4	1:3	1:2	1:1.5
1	240,0	240,0	200,0	200,0	160,0	160,0	120,0
2	240,0	200,0	200,0	160,0	160,0	120,0	100,0
3	200,0	200,0	160,0	160,0	120,0	100,0	100,0
4	200,0	160,0	160,0	120,0	120,0	100,0	100,20
5	160,0	160,0	120,0	120,0	100,0	100,20	80,20
6	160,0	120,0	120,0	100,0	100,0	100,20	60,20
7	120,0	120,0	100,0	100,0	100,0	80,20	60,20

8	120,0	100,0	100,0	100,0	80,20	60,20	40,20
9	100,0	100,0	80,10	60,20	60,20	40,20	20,20
10	100,10	80,10	40,20	40,20	20,20	20,20	20,40

Roll/Odds	**1:1**	**1.5:1**	**2:1**	**3:1**	**4:1**	**5:1 – 6:1**	**7:1 – 10:1**	**>10:1**
1	100,0	60,0	40,0	40,20	20,40	20,60	20,80	10,80
2	80,0	60,0	40,20	20,20	20,60	20,80	20,100	10,100
3	80,20	60,20	40,20	20,40	20,60	20,80	10,100	0,100
4	60,20	40,20	20,40	20,60	20,80	10,100	0,100	0,100
5	60,40	40,40	20,40	20,60	20,100	0,100	0,100	0,100
6	40,20	40,40	20,60	20,80	20,100	0,100	0,100	0,120
7	40,20	20,40	20,60	20,100	0,100	0,100	0,120	0,120
8	20,40	20,60	20,80	0,100	0,100	0,120	0,120	0,160
9	20,40	0,60	0,80	0,100	0,120	0,120	0,160	0,160
10	0,40	0,60	0,100	0,120	0,120	0,160	0,160	0,200

The first number in every column entry represents the percentage of Strength the Attacker loses, the second number is the percentage lost by the Defender, a fraction of a hit is rounded up. Damage from combat is applied immediately, see section 10.7

Example: In the battle between the American Kennedy class missile cruiser and the German ICBM units the Referee rolls a 1, so a 20% loss to the ICBM units, 80% loss to the Kennedy.

10.7. Damage Allocation

Of all the units on one side, the Referee chooses one unit based on the following priority: First, has the greatest Base Defensive Combat Strength, next is an ICBM/IRBM~~/Artillery~~ type unit, the greatest mass next has, and finally at the Referee's discretion. Players can suggest what is their priority. This unit will absorb hits up to the unit's Combat Strength and if so it is immediately noted as being 'Damaged' status in the unit notes of the Unit List spreadsheet (see section 8.2). Units with L/M/H armour require 15/30/50% additional hits, rounded up, to be Damaged. Remaining hits are applied to the next unit which meets the above criteria until it too is reduced to 'Damaged' status. If a Military unit is currently 'Damaged' status or 'Reserve' Quality level, then the unit is instead destroyed. If a Spaceship is destroyed, anything being carried is also destroyed; no additional hits are needed to do that. The process repeats until there are insufficient hits to Damage/Destroy the unit which is next in line, remaining hits are retained for any further combat in the same War Round but discarded after that. For combat involving a small number of units, the Referee may retain the hits, recording them elsewhere for subsequent War Rounds, instead of discarding them. If a facility with a Combat Strength is reduced to Damaged status then it is rendered 'Idled', may not continue to fight and is destroyed ~~subject to capture~~ if there are no other friendly forces in the same hex.

A unit with 'Damaged' status is treated the same as a 'Reserve' Quality level unit for purposes of combat strength and movement, except that it can be repaired (see section 10.8). If a Spaceship is reduced to Damaged status then any carried Military units are also reduced to Damaged status, no additional hits are needed to do that. 'Damaged' Spaceships lose the ability to use any Module listed in the 'Other' category of Spaceship construction (see Section 9.2), so any carried unit must be immediately offloaded, regardless of what it does to that carried unit.

Damage to units is ignored unless the opponent's weapons can reach those units. ~~*e.g. In a combined attack of Bombers and Multi-role Planes against defending Multi-role Planes, the damage from the attacker is reduced to the portion of Multi-role Planes in the attacking force, as the Bombers could not hit the defending Multi-role Planes.*~~ The number of hits from an attack which includes Spaceship Weapon Modules that do not fire or cannot reach the target is reduced by an amount equal to the Combat Strength of those weapons. The number of hits from an attack which includes IRBM units, ICBM units, Spaceship Missiles/Fighters/Orbital Bombardment Modules is first reduced by ABM units, SAM units, Starship Beam Modules, and Missile Defence facilities by an amount equal to the Final Combat Strength of those weapons X (1d10 rolled by the Referee + (Defender Mil-Space tech level - Attacker Mil-Space tech leve)) X 10%, round fractions down, up to a maximum of the number of hits inflicted by weapons which can be intercepted.

*Example: In the battle between the American Kennedy class missile cruiser units and the German ICBM units, the Kennedy has (661 hits) X (1 + 0.15 for the L armour of the Kennedy) = 760.15 = 760 hits, each German ICBM has (121 hits) X (1 + 0.5 for H armour) = 181.5 = 181 hits. The Kennedy must take (661 hits) X (80% damage) = 528.8 = 528 available hits but the Kennedy has 1 Beam weapon so the number of available hits is reduced by 5 X 11.5^2 X (roll of 6 + (11.5 defender tech -11.1 attacker tech) X 10% = 423.2 = 423 so final hits is 528 - 423 = 105 hits done. The German ICBM units have to take (20% damage) X (123 hits for each unit) X (2 units) = 49.2 = 49 hits, but if the Atmosphere code of the Neuerde is greater than 4 it will prevent the Kennedy's Beam weapons from attacking a unit on the surface so the number of hits that the ICBM unit must take is reduced proportionally to (49 hits X (4*15 Missile / (1*5 Beam + 4*15 Missile)) =) 45.23 = 45. There are insufficient hits applied to either the Kennedy or the German ICBM units to reduce even one of them to Damaged status. Due to the small number of units involved in the combat the Referee may discard these hits or choose to retain them for the next War Round.*

In any attack occurring on an inhabited hex on a Colony Settlement, for every 250 Combat Strength points of normal weapons, or 25 Combat Strength points if WMDs are used, of the Attacker that can reach the hex and hit the defender i.e. *after interceptions but not including Armour*, then as collateral damage 1 Population Unit is killed and 1 facility of Referee's choice in the same hex is destroyed. For an attack occurring in an inhabited hex on a Core Settlement, for every 2 500 Combat Strength points of normal weapons, or 100 Combat Strength points if WMDs are used, of the Attacker that can reach the hex and hit the defender i.e. *after interceptions but not including Armour*, the GDP and SRU production of that hex is permanently reduced by 1% and population by 0.5%. Unless otherwise specified we assume the GDP, SRU production and population of a Core Settlement are evenly divided between all occupied hexes.

10.8. After Combat

At the end of a War Round in which a unit was an Attacker or Defender, that unit must consume extra Supply Unit, brought to it in the same Orbit hex or World surface as the unit equal to the unit's Base Supply Unit Maintenance cost ~~as if the unit started the Turn in its current hex~~, see table in section 8.4. The default action by the Referee is that if there are Supply Units available in the World or Orbit hex, then they will automatically be used to resupply units in order of best to worst unit Quality Level. If there are insufficient Supply Units available to be consumed then the remaining units are considered as damaged in combat as per section 10.7, ~~by default~~ the Referee chooses to which units this happens to.

Damaged status for a unit may be removed if, at the beginning of the War Round the unit is at a Friendly Site and it receives extra Supply Units equal to its Base Maintenance cost for the Turn (see table in section 8.4). The exception is damaged Spaceships, they can only be repaired once they arrive at a friendly Orbital Shipyard or landing at a Spaceport facility; each facility may only repair 1 Spaceship per War Round. ~~If any damaged unit is not repaired at this time, then fulfilling the usual unit maintenance cost (see section 8.4) at the beginning of the next Turn will immediately repair the unit regardless of its location.~~ The player must explicitly order the repair of a unit, using the~~ The default action by the Referee is that if there are~~ Supply Units available in the World or Orbit hex~~, then they will automatically be used to repair in order of best to worst unit Quality Level~~. Repair occurs before all combat and movement have occurred in a War Round.

Unarmed facilities, and armed facilities with 'Damaged' status, are immediately captured and rendered 'Idled' if there are no friendly military units in their hex, only enemy ones. Idled facilities have 0 Combat Strength, do not consume or produce or do anything, are not able to move or hold other units, and may not serve as the prerequisite for anything. Reactivating a facility rendered 'Idled' can be done in the beginning of the next War Round by having extra Supply Units equal to its full maintenance cost for the Turn (see table in section 8.4) delivered to it. If at the end of a Turn, only enemy units occupy a hex of a Core type Settlement then a portion of the GDP and SRU production may be given to the occupier instead of the Settlement owner, it is the responsibility of the occupier to inform the Referee of this condition before the start of the new Turn.

As long as the Supply Units can be brought to the same Orbit hex or surface of a Friendly Settlement on a World then your staff will automatically take care of the details of moving the Supply Units to any other Friendly Settlements or units on that same World/Orbit hex. This assumes everything is within range of a Friendly Settlement (see section 8.10) and there is no reason to believe that the hex or unit has been cut off, as determined by the Referee.

10.9. Air Units

Air units have special rules since they are able to move so quickly and rely on refuelling and rearming behind their own lines. Multirole type units can be part of an Attacker's force if the attack occurs in the hex they occupy or up to (10 / World Size, rounded down) hexes away, can be part of a Defender's force if either the attacking or defending units are up to (10 / World Size, rounded down) hexes away. Bomber type units can be part of an Attacker's force if the attack occurs in the hex they occupy or up to (25 / World Size, rounded down) hexes away. Helicopters type units may be part of an Attacker's force if the attack occurs in the hex they occupy or up to (5 / World Size, rounded down) hexes away, can be part of a Defender's force if either the attacking or defending units are up to (5 / World Size, rounded down) hexes away. SAM type units may not attack, but can be a Defender in a combat where the Attacker includes Air Units, IRBMs, or Fighters, which are targeted at the hex they occupy or up to (10 / World Size, rounded down) hexes away. ~~A unit with Interceptor special ability may not be part of an Attacker's force, but it's Base Combat Strength is increased by 150%, round fractions down, if it is a Defender in a combat where the Attacker includes other Air Units.~~

Air units may aid in the defence, *e.g. have combat strengths added to and absorb damage,* of units ~~in the same hex as their own, an unlimited number of times during a Combat Cycle. Air units may also aid in the defence, *e.g. have combat strengths added to and absorb damage,* of units~~ if either the Attacker or Defender has units in another hex ~~other than their own if~~ within the range of the Air unit if the Air unit is not part of an Attacker's force in the same Combat Cycle *i.e. An Air unit cannot do both Attack and Defend in the same Combat Cycle*. ~~For simplicity, the Referee will usually assume that your Air units will come to the aid of the first attack by enemy units within range of those Air units.~~ Inform the Referee that the Air Unit will be aiding in the defence as part of your orders.

~~**Air Defence and Ground Support**~~

~~The Combat Strength of a unit versus the units above it is different from what it is for units fighting the same elevation and is referred to as the unit's 'Air Defence' strength. This adjustment to Combat Strength does not affect the number of hits that a unit can take during Damage Allocation. Adjustment is for Air, Ground or Naval units when attacked by Air or Space Units. For purposes of this section; Space units always count as attacking from the Orbit hex no matter where they are located, Helicopters and Airships are considered to be 'Ground' units for the purposes of this section when an attack includes any Plane type Air units.~~

~~Air Defence = Combat Strength X 0.25 Exceptions: Is an ICBM or IRBM vs. units in the Orbit hex, the multiplier is 0.5. Is an ABM unit or Missile Defence facility vs. an attack that includes ICBMs or units in Orbit, the multiplier is 1.0. Is an ABM unit or Missile Defence facility vs. an attack that includes IRBMs, the multiplier is 1.5.~~

10.10. Hidden Status and Stealth Ability

Any Star System is so large that a unit or facility can be hard to find even when it is not trying to hide, so all Spaceships, as well as certain military units or Orbital facilities are considered to be 'Hidden' before the start of combat. If an Orbital facility is not located in the Orbit hex of a World with a Core Settlement then the facility is considered to be 'Hidden' status units. For 4th Rank militaries, to reflect that most of the units are just ad-hoc militia, all Reserve Quality level units may start at 'Hidden' status.

While Hidden, the unit or facility may move and its presence in the hex is known to the opposition but it may not be attacked, may not attack, and may not be allocated damage. A Hidden status unit or facility may be revealed by choice~~, by enemy action~~, or the owning player decides to allocate damage to the unit or by attempting to be an Attacker in a combat (see section 10.5). A Hidden unit or facility that has been revealed must remain revealed for the remainder of the current combat in the Star System, it is the Referee's discretion as to how long that is. A unit with Stealth ability, if revealed, may choose to return to Hidden status at the end of the current War Round. The Referee has the option to create and move indefinite sensor contacts known as 'black globes', which are phantom units and facilities~~, to keep other players from concentrating their forces on real targets~~.

~~On the surface of a World, It costs 10 Initiative advantage points (see section 10.5) for a chance to force one Hidden status unit of their choice to be revealed for each War Round. In space, the number of Initiative advantage points required to force one Hidden status unit or facility of their choice per War Round is dependent on Star System layout, assets of the detecting force, and assets of the force trying to stay hidden. The numbers in the table below are added together to determine the number of points required to reveal one Hidden status unit or facility per War Round. A side with insufficient points to reveal even one unit per War Round may instead reveal hidden units at a rate of 1 every (# needed) / (#available), roundup, War Rounds.~~

Forcing one Hidden status unit or facility to be revealed is a Task, Routine, Instant, one attempt may be made per Star System per War Round. Which unit is revealed is at the discretion of the Referee, but players may request a focus on a particular unit. Reveal will occur before the orders deadline of the War Round. The numbers in the table below are added to the Assets of the Attacker and Defender.

Assets of Detecting Force:

+200 per friendly Spaceship within the same Star System.

+300 per friendly Spy Network Orbital Facility, if the Hidden units are on the same World surface

+300 per friendly Spaceship with a Survey Module within the same Star System.

+400 per friendly Spaceship with a Sensor Module within the same Star System.

+500 per friendly Listening Post monitoring the same Star System.

Assets of the Hidden Units/Facilities:

+400 is an Orbital type facility or a Hidden unit.

+300 includes a Spaceship with Solar Sail propulsion only.

+150 per World in the Star System (includes Orbital type facilities or Spaceships, only).

-300 includes a unit on the surface hex of a Core type Settlement.

~~*Example: If the Alpha Centauri system has 18 Worlds and at the beginning of combat the system has some Chinese orbital facilities, as well as 1 Chinese Spaceship with Stealth ability, and is being monitored by 2 Chinese Listening Post facilities when an Indian task force of 3 ships, one of which is equipped with a Sensor Module, warps into the system. The Chinese will detect one Indian ship per War Round if they invest (+2 X 18 Worlds - 5 X 2 Listening Posts) = 26 Initiative advantage points. The Indians will detect the Chinese Spaceship in 1 War Round if they invest (+2 X 18 Worlds - 2 X 3 of their own Spaceships within the system - 5 X 1 Sensor Module equipped Spaceship within the system + 5 for enemy Spaceship with Stealth ability) = 30 Initiative advantage points. The Indians will detect the Chinese OT in 1 War Round if they invest (+2 X 18 Worlds - 2 X 3 of their own Spaceships within the system - 5 X 1 Sensor Module equipped Spaceship within the system - 2 for enemy Orbital type facility) = 23 Initiative advantage points. If the Indians have only 4 Initiative advantage points to allocate to finding hidden units then they will detect the Chinese Spaceship after (30 / 4 = 7.5, rounded up to) 8 War Rounds, by which time the Spaceship could have long ago vacated the system.*~~

10.11. Quick Combat

At any time the Referee may declare that the Quick Combat rules will be used. The Quick Combat rules are a simplified set of rules for use when the Referee decides that an encounter is too complex or not important enough to fully game out with the usual rules.

Quick Combat for a particular conflict will be split into a number of Quick Combat Rounds. The number of Quick Combat Rounds in a particular conflict is at the Referee's discretion, typically from 1 for a minor revolt on an underdeveloped Colony, up to 3 for a war between adjacent Core Settlements. Each Quick Combat Round will consist of the Referee assigning one ~~giving each~~ side in the conflict ~~one opportunity t~~o be an Attacker and the other side will be the Defender, the order will be determined by the Referee based on the situation and player actions.

Each Quick Combat Round is independent of the usual system of War Rounds/Hexes, and will be of an indefinite time and area to be determined by the Referee. Units involved in the Quick Combat are all those which the Referee decrees could reasonably be involved together~~, not necessarily only those within weapons range of the enemy~~. Quick Combat assumes that the units involved are representative of a normal force, the Referee may do whatever is needed to adjust if the forces on hand are not representative. Explicitly ignored for Quick Combat are section 10.3 (Movement in a War Round), 10.4 (Initiative), 10.5 (Combat Cycle), 10.6 (Battle Resolution), 10.7 (Damage Allocation), 10.8 (After Combat), 10.9 (Air Units), ~~10.10 (Air Defense and Ground Support),~~ and 10.10 (Hidden Status and Stealth Ability). If players want to reinforce or withdraw units from the combat they may do so between Quick Combat Rounds at the Referee's discretion. ~~The default action is that in the first round of a Quick Combat, only units which the Referee decrees started the Turn close enough, or are moved in as part of the player's initial written orders, may participate. In subsequent rounds, the default action is that forces will be added or withdrawn in the round after the round which is in progress. *e.g. as part of the orders for Quick Combat Round#3 Nigeria wants to withdraw after reading the results of its invasion of Benin in Quick Combat Round#2, this withdrawal will not occur until Quick Combat Round#4.* Once ordered, these additions or withdrawals cannot be countermanded during the Round of their arrival/departure. *E.g. the Nigerian forces will be a part of Quick Combat Round#4 even if Nigeria learns that there will also be overwhelming Russian forces also entering the fight on the side of Benin.*~~ If at all possible, the Referee will try to condense a multi-sided war down to just 2 sides.

Total combat strength of each side is equal to:

> Total Combat Strength = (Sum of Average Attack and Defence Base Combat Strengths of each unit which the Referee believes could reasonably be involved) X (Average Military Tech Level of these unit's owners)^2, rounded down to the nearest integer. + [At the Referee's discretion, as per section 3.5, the Combat Strength of a population or of PA points spent].

The odds are determined by computing the ratio of the Total Combat Strength of all involved units of the side which initiated the attack over the side being attacked, using the nearest odds column on the Combat Results Table (CRT) in section 10.6 and implementing any column shifts. Shift the column used to the right by:

2 X (Average Military Rank of the Defenders – Average Military Rank of the Attackers) + 1 for WMD usage by the Attacker -1 for WMD usage by the Defender. Additional column shifts may be applied at the discretion of the Referee,

The Referee finds the appropriate odds level column and rolls a 1D10. The first number in every column entry represents the percentage of Base Combat Strength the Attacker loses, is divided by 2, and rounded up. The second number is the percentage of Base Combat Strength lost by the Defender, is divided by 2, and rounded up.

Damage Allocation is conducted by the Referee choosing units which will absorb hits up to the unit's final Combat Strength, remaining hits destroy at least one unit. Losses are applied immediately, Military units are destroyed; facilities with a Combat Strength are rendered 'Idled' and are captured if there are no other friendly forces in the same area.

For each Quick Combat Round, Supply Units consumed by each unit involved equals 10 X the unit Base unit maintenance cost, see section 8.4. Not having sufficient Supply Units available before the roll for combat is made means that the combat odds are shifted 2 columns in an unfavourable direction ~~and losses are not multiplied by 1/5 *i.e. 100% of the losses are taken as permanent*~~. From which Settlement these Supply Units are drawn from is at the Referee's discretion.

At the Referee's discretion, the side which loses the most hits in each Quick Combat Round can expect to permanently lose ~~about~~ 20% of the original number of hexes, rounded up, of a Friendly Settlement on the World. The last hex of a Friendly Settlement, and all of the Settlement's Orbital facilities, may not be taken until there are no more friendly Military units there. On a Colony Settlement, for every 250 Combat Strength points of normal weapons, or 25 Combat Strength points if WMDs are used, then as collateral damage 5 Population Unit and 5 facilities of Referee's choice are destroyed. On a Core Settlement, for every 2 500 Combat Strength points of normal weapons, or 250 Combat Strength points if WMDs are used, rounded down, then as collateral damage, the GDP and SRU production of that hex is permanently reduced by 5% and population by 2.5%

Example: In the 2005 Turn Georgia wants to attack Russian occupied territories; gambling on Russia being preoccupied and maybe having some Western support. The Referee, Russian and USA players confer. The USA is an ally of Georgia but is busy with Iraq and Afghanistan and does not really want to get involved in a war with Russia. The Russian player decides that Russia does respond, indeed it is eager to show those brigands that if you mess with the Bear you are going to get bit! The Referee concludes that NPC Turkey, Armenia and Azerbaijan do not care to get involved either, so this is definitely a minor conflict that is not worth gaming out in detail and the 'Quick Combat' rules should be used. The Referee decrees there will be 1 Quick Combat Rounds in this war this Turn.

Quick Combat Round#1 Georgia Attacks Russia: At the time, Georgia was a Military Rank 3 nation with an average Military tech level of 7.0, Sum of Base Combat Strength of 33. The Referee figures Georgia's total combat strength to be:

= 33 X $(7.0)^2$ = 1617

At the time, Russia is a Military Rank 2 nation with an average Military tech level of 8.2. The Referee allows Russia to bring some of its Air force, Airborne, and about ½ of its Southern Operation Strategic Command based in hex 5N20 (the Referee declares the other ½ is tied down maintaining order in this restive region) except for the naval forces, for a total of 2 Infantry units, 1 Mechanised unit, 2 Multi-role Planes, and 3 Multi-role Helicopters. The Referee figures Russia's total combat strength to be:

= (2 X 5 + 1 X 15 + 2 X 15 + 3 X 15) X $(8.2)^2$ = 6724

This is (1617 / 6724= 0.24048, odds of 1:4.16 rounded down to) 1:5 odds, shifted by Military-Rank 2 X (2 – 3) = -2 columns to the right, so actually the shift is to the left, and 1:5 becomes 1:7-1:10. If there was a possibility of Georgia making a successful surprise attack then maybe there might be some column shifts to the right but the Referee considers Russia's orbital Spy network and higher overall tech level the Referee decrees this is not possible.

Quick Combat Round#1 - The Roll: *The Referee rolls a '8' on the 1:7-1:10 column, resulting in a (100 / 2 =) 50% loss to Georgia, a (0 / 5) =0% loss to Russia. Georgia loses 33 X 50% = 17.5 = 18 Strength points.*

~~*Russia Attacks Georgia: Russia, not interested in giving the USA a real excuse to intervene, foregoes the opportunity to attack.*~~

Quick Combat Round#1 Aftermath: Georgia loses 20% of its territory to Russia. Georgia is only a 1 hex sized nation and thus cannot be reduced to 0 hexes without first the complete elimination of all its Strength points, but 20% of Georgia's population and GDP will be transferred to Russia. This is role-played as the loss of South Ossetia.

11. Appendixes

11.1.What Has Changed From 20210215 Version Published Rules

-Change to: Enclave cannot be built on Intolerable worlds, closes some difficult questions. What can and cannot be shared of facilities, the book-keeping and tracking was going to become impossible. Taking a hex for a Colony or Core does not require a military unit there, but it does require that no one else has a military unit. Buying Initiative Advantages DOES reduce Initiative score. Players make the roll for their Attack in combat. Units with missiles may attack more than once per round, but not if they are Reserve or Damaged. Going to War Footing requires successful completion of a Task, not just permission of the Referee. A new Turn does not automatically repair damaged units. Repair of damaged units occurs at the explicit orders of the player and happens before all combat and movement in a War Round. Maintaining an alliance is a Task. Revolt now reduces Stability Score, as well as Relations Score with the owner. Construction of new facilities must be mentioned in the Other Notes section of your orders. The definition of Stability Score, to have less overlap with Relations Score. SRU Infrastructure, Conservation, and Alternative Infrastructure options are Tasks. A rework of detecting Hidden(Stealth) units and facilities to make it compatible with the Task system and the changes to how combat is done. How the chance for a Revolt is calculated, making it possible to calculate automatically and be affected by Relations Score with the owner.

-The introduction of: Beanstalk facilities must be located on the World equator, both realistic and keeps with what is done in canon. The Task type of becoming a WMD nation, going to War Footing, maintaining an alliance, and finding a Stealth unit. Explanation of the capabilities of NPC forces. Sidebar articles and an explanation of Instant vs. normal Task, namely altering the rules to look more like those from the 2300AD game by GDW. Units which are part of the same alliance may add their strengths together, otherwise they are separate. Rules for how to lose control of a Settlement.

-Made clearer: No hybrid, partial, or unique units are allowed. Enclave production schedule and loss. Timing of events in a War Footing. Under what circumstances a unit's strength changes. Rules governing Landings on different sized worlds. No conditional *e.g. 'If' or 'Standing'* type orders allowed. That Relations Score with one of your own Settlements is important, settles a long-standing question. Regularised some words to be consistent, British, spelling.

-Rebalancing to: M and H armour types for Spaceships, no reason for them to depend on tech level. SRU produced by Mining and Asteroid Mining facilities. The economic defence strength of Settlements, was too weak. Pai-Leng produced by a University. Finding a Hidden unit always requires 10 Initiative points. The cost, Strength, and TL of many units, trying to bring Air Units more in line. Reduce the effect of force size

on Initiative. Number of rounds, damage, and supplies needed in Quick Combat. Damage at highly adverse odds increased to make a 1 Round annihilation possible, this also reduces a long-standing problem that a small force with high armour is effectively indestructible. Cost of maintaining an alliance. Strength and Military Rank of rebel forces in a revolt.

-Got rid of: Orbital Barracks, they opened up too many questions. Allowing any item to be carried partially by multiple different Spaceships, makes the paperwork much too complex. Allowing Spaceports in multiple hexes to work together to lift the same item, makes the paperwork much too complex. The increment of fractions allowed for use in Starship movement, this is a game not a job. Variability in SRU production based on hex, implementation would be too cumbersome. Limits of which units can attack within a hex due to limited weapons range, a complication which could be abused. The multiplier for Air Defence, cannot handle attacks with combined Air&nonAir units. Simplified the calculation of Attacker and Defender strength for Tasks. Client States, a duplication of what having a high Relations Score gives you. References to Articles, a holdover from when we hoped to have all news through the use of articles. Inherent combat strengths of OT and MilBase facilities. The option to choose to go to War Footing on the Budget Spreadsheet, it is a Task. Simplified Quick combat, to make it truly quick. Political Actions having multiple effects at highly adverse odds, now is a duplicate of the now altered Combat Table. Extra maintenance costs for units on inhospitable worlds, difficult to justify and endless work to maintain. Interceptor ability, an exact duplicate of what SAM units do, will convert all Interceptor units into SAM units. Role-playing where only the Referee will see it, as it is useless. Rules for creation of a new Settlement when a Core Settlement revolts. Job descriptions of the Management, players do not need to see that. Going to War Footing as a player choosable option on the budget spreadsheets, it is something done with approval from the Referee.

~~Job Descriptions~~

~~Referee~~

- ~~Administer budget sheets, Settlement_List sheet, and a script file of all events yet to come.~~
- ~~Make decisions on Political Actions~~
- ~~Create files for the Writer to base the news articles on. Edit all news articles.~~
- ~~Conduct Combat~~
- ~~Manage the affairs of all Non-Player Characters~~
- ~~Answer questions about the rules.~~
- ~~Answer mail and questions from players~~
- ~~Recruit new players~~

~~Co-GM~~

- ~~Take all duties as requested by the Referee~~
- ~~Stay current with the situation in the game~~
- ~~Be able to take over for the position of Referee at a moment's notice.~~

~~Writer~~

- ~~Will write the news articles as per the specifications of the Referee .~~
- ~~Write and keep the entries on Non-Player Characters relevant.~~
- ~~Referee has ownership and total editorial control. Expect the Referee to edit articles without notice or explanation.~~

11.2. Acknowledgments

-Traveller, published by Far Future Enterprises.

-2300AD, published by GDW, especially the colony building rules on pg. 94 of the Director's Guide.

-'The Game' used by GDW to simulate the alternate universe for their 2300AD role-playing game.

- Peter Schutze's 'Great Game'

- Star Cruiser lite - Invasion rules by Terry A. Kuchta.

- Mike Jasinski's 'Boots, Tracks and Hoverskirts'

11.3. Table of Contents