

SKYMARSHAL #3

Hey guys, thanks for taking the time to read my online ezine. I am calling it Skymarshal 3, mainly because no one has continued in the Skymarshal venue. This is a completely *unofficial* document, basically a mish-mash of ideas, thoughts, short stories, and various technologies that I have found interesting over the last couple of years. All of the rules, technologies, and charts in Skymarshal 3 are *optional* and are mainly intended to spark interest, debate, and creative gaming within the Starfire universe. It is *not* my attempt for vainglory or impose my ideas on Starfire players, just a venue in which myself and others can express themselves in a more detailed format. First, I want to state for the record that I beg, borrow and (ahem) grab great ideas from all over and this isn't an attempt to steal anyone's ideas. On the contrary this is a way to highlight a person's idea that I feel has been neglected by the List. Second, send me info on what you would like to see! Third, although I am the "King of Alternative Tech" I am really loathe to introduce new weapons and technology as *canon*, but new *optional* ideas and technologies are always welcome. I hope you enjoy reading this article and positive feedback is highly encouraged (I have imbedded a Feedback Form in the email which delivers this ezine). I also wanted you guys to know that I will be including unique software and campaign material in every other 'zine. This document is best printed in .doc form with all margins set at .5. Finally, Skymarshal will mainly be dealing with 3rd Edition Starfire. Thanks for reading! Damon

IMPORTANT WAR DATES

EVENT	DATES	LENGTH
ISW1	2205-2212	6 years
ISW2	2228-2230	2 years
ISW3	2244-2247	3 years
Theban War	2298-2302	4 years
ISW4	2360-2370	10 years
Insurrection	2438-2444	6 years

SKYMARSHAL ELLEN DEVORE

Born on the religious, isolated world Alta Gracia in the Islands Chain, Ellen Devore was the complete maverick warrior: a maverick in terms of conventional military thinking, a maverick in her whole attitude to the established military system, and a maverick in her attitude to all the accepted social mores of the military community in which she served. She showed contempt for many military customs and conventions, and this may well be the reason why, more than fifteen years after the Second Arachnid War, her name is still reviled by many PSU regular military officers. Interestingly, her reputation with the PSU High Command with the Ophiuchi fighter community, and with special forces teams across the Federation is unimpeachable.

She was certainly one of the most controversial figures among the upper echelons of the PSU military during the Second Arachnid War. A rare, balanced comment from General Aidan Woodsworth, who served as PSU military liaison during *Operation Thursday* was that Devore was a brilliant leader, but she was a very odd person indeed.

A very substantial cause for Devore's extremely uncomfortable journey through life was her severe upbringing. Her parents were devout eCatholics, and she spent much of her young life conscious that she suffered God's displeasure. Even when she was serving in the navy, in contrast to most young officers, she pondered over the deeper meaning of life and death, and from an early age felt that she was destined for a violent death. She was born on Alta Gracia in 2425 AD. As a growing child, with her brother and sisters, she was often left with aunts while her parents went to Old Earth. She rarely mixed with other children, and as a girl who did not play games and did not attend assemblies, she was eventually isolated and she remained a loner throughout her life. Ellen emerged from school a lonely girl, who did not share in normal school friendships, who often antagonized her peers, and was perhaps too ready to challenge authority.

When he went to the Royal Military Academy on Malagasy in 2445, a similar pattern emerged. Other cadets found her surly and unfriendly. A fellow cadet found her "odd, anti-social, and out of step with the rest of us". But throughout her life Ellen Devore seemed to enjoy easy access to distinguished people who were able to forward her career. After graduating as an officer in 2450, she was given a small destroyer command in the Golden Chain. Devore enjoyed her independent command, and she liked going off on expeditions, which she organized. Her superiors found her interesting and impressive--her fellows found her insufferable. Her pirate hunting in the Omega System gave her very valuable experience in planning and executing her own tactics.

When the Second Arachnid War broke out, then Senior Captain Devore was sent to the front lines along with any and all available warships to hold back the massive Bug tide. By the end of 2454, Devore, with her single battleship squadron, had destroyed more enemy warships than any two divisions combined. Of course, this did not endear Ellen to the military establishment. Admiral King-Clark, who served with Devore, said that she was uncomfortable and abrasive at close quarters, but was a woman of formidable physical courage and moral integrity. Devore's own views on military affairs were also recorded at the time. She said: "Great soldiers are serious, diligent, and of outstanding character," and she added that a coarse and savage man makes a bad soldier.

After a major victory during *Operation Dragoon*, Devore was advanced to Commodore but immediately after she was called to HQ, and was told that her battleship squadron was immediately disbanded, and was ordered to Bannockburn as a mere Captain. This was the military establishment wreaking revenge. After a period of serious illness, she was sent back to Alta Gracia for convalescence. She returned to the warmth and affection of her family and, as always, managed to re-establish contact with some of her high-level supporters. Her censure after *Operation Dragoon* was shown to Skymarshel MacBannock, who reversed it.

During her leave to Alta Gracia, Devore simmered with resentment at the way she had been treated, and when she was posted to distant New Salem System she suspected it was to silence her. It was in New Salem that Devore first had contact with the newly forming PSU-based Ophiuchi fighter groups and several special forces personnel. The Chain Commander at the time (Fleet Admiral Yamal Nosworthy) did not believe Devore was fit for command and that her ideas to utilize fighter jocks and special forces teams were impracticable. At the time, Devore went through the PSU's Advanced Military Course and throughout her training her passionate conviction and amazing attention to detail created a confident and aggressive attitude throughout the training squadrons she commanded. That attitude was to serve Devore well for she was called up to fight in the breaking PSU-Biomechphilit Conflict, even though she had made many formidable enemies. Skymarshel MacDonald, who had heard of Devore, referred to her successes and called her "this woman of genius and audacity". He regarded her as a woman of highest quality and invited her to the Admiralty. After that meeting, Devore's ideas for using the PSU's Ophiuchi fighter pilots and augmented special forces was adopted by the rest of the PSU military after MacDonald endorsed it.

All during her career Ellen Devore faced petty, puerile, and bloody-minded opposition at every level, but her character and military philosophy were so dominant that she remained for many years as controversial as when she was on the front lines. Because she is a complete maverick, rejecting most military conventions, and most social conventions as well, she is positively hated by large numbers of military officials who have never even met her. Her enemies loathe her but most PSU leaders consider her to be a towering military genius and one of the PSU's greatest war leaders, thus conferring upon her the title of Skymarshel in 2459 (just in time for the Armageddon War).

ELLEN'S QUOTES

I hate to waste a really good threat.

Murphy's Law is the only true dependable in my life most of the time.

Paranoia is just another word for longevity.

There are some things more important than physical survival. You gotta be able to look yourself in the mirror.

Assuming the worst is always safer. And usually truer.

I never forgave anyone for anything. A character flaw to be sure, but hell, everyone's got to have at least one.

*I never met coffee that wasn't wonderful. It was just a matter of how wonderful it was.
Killing I understand. Relationships confuse me.
Mercy will get you killed, but sometimes it's all that makes us human.*

OPHIUCHI WARS

The pre-Association Navy of the Ophiuchi realm had a much different view on military warfare and tactics, so much so that their early conflicts nearly cost them the stars. This article will examine the fundamental problems of the early Ophiuchi military forces, and the changes that were made that allowed them to become a major stellar nation. Special thanks go to Lt. JG Sima Wei who spent over two years on the Ophiuchi homeworld, sifting through ancient records to find the truth.

The pre-Association Ophiuchi Navy was generally ineffective until the formation of the OADC and the incorporation of alien ideas into that service. Ophiuchi naval forces performed very poorly against Losoti vessels in the early expansion of the Ophiuchi realm. The Ophiuchi could only impose their will in the Losoti System by the use of overwhelming weaponry and numbers. They also showed ineptness against an R'8lek military ripped apart by revolutionary turmoil and could not win a three-decades-long war against the Aieun. Even after the OADC incorporation the Ophiuchi military performance on both sides of the Shadwar-Aieun War was mediocre. And the Ophiuchi have done poorly in nearly all the military confrontations with the elusive Tangri. Why this unimpressive record? There are many factors --- economic, ideological, technical --- but perhaps the most important has to do with culture and certain societal attributes which had inhibited the Ophiuchi from producing an effective military force.

Including culture in strategic assessments has a poor legacy, for it has often been spun from an ugly brew of ignorance, wishful thinking, and mythology. Thus, the Terran Federation in the early expansion phase of their sphere evaluated the Orion national character as lacking originality and drew the unwarranted conclusion that that race would be permanently disadvantaged in technology. The Orions dismissed the Terran Federation as a mongrel society and consequently underestimated the impact of the war with the Federation. Terran strategists assumed that the pain threshold of the Arachnids approximated our own and that the naval thrusts of the Federation would bring them to their knees. Six weeks of massive space attacks were thought to be all the Reformation Group could withstand; in fact, the pacifist Reformers never caved in to the Federation's military forces.

As these examples suggest, when culture is considered in calculating the relative strengths and weaknesses of opposing forces, it tends to lead to wild distortions, especially when it is a matter of understanding why states unprepared for war enter into combat flushed with confidence. The temptation is to impute cultural attributes to the enemy state that negate its superior numbers or weaponry. Or the opposite: to view the potential enemy through the prism of one's own cultural norms.

It is particularly dangerous to make facile assumptions about abilities in warfare based on past performance, for societies evolve and so does the military subculture with it. The dismal Orion performance in the First Interstellar War led the Terran Federation high command to an overly optimistic assessment prior to the Second Interstellar War. Then tenacity and courage of Theban soldiers in the Theban War lead everyone from Howard Anderson to the Federation High Command to vastly overestimate the Theban military's fighting abilities. Federation Admirals underestimated the Tangri fleet and based its view that their hapless performance would continue, which sparked substantial Tangri raids into the Mission Stars District several years ago.

Culture is difficult to pin down. It is not synonymous with an individual race nor ethnic identity. The history of warfare makes a mockery of attempts to assign rigid cultural attributes to individuals - as the military histories of the Arachnid and Theban empires illustrate. In both cases it was training, discipline, esprit, and élan which made the difference, not the individual soldiers' origin.

These problems notwithstanding, culture does need to be taken into account. Indeed, awareness of prior mistakes should make it possible to assess the role of cultural factors in warfare. Howard Anderson, the eminent Admiral of warfare, argued that culture is a prime determinant of the nature of warfare. In contrast to the usual manner of space warfare, which he termed "face to face," Anderson depicted the early Terran

naval strategy as becoming masters of evasion, delay, and indirection. Examining Terran warfare over several centuries leads to the conclusion that the Terrans remain more successful in insurgent, or political, warfare - what T. E. Lawrence termed "winning wars without battles." Even the much-lauded TFN assault into Thebes at its core entailed a masterful deception plan. It may well be that these seemingly permanent attributes result from a culture that engenders subtlety, indirection, and dissimulation in personal relationships.

Along these lines, Ambassador Ian Young concluded his exhaustive study of Ophiuchi military effectiveness by noting that "certain patterns of behavior fostered by the dominant culture were the most important factors contributing to the limited military effectiveness of early Ophiuchi military forces." These attributes included over-centralization, discouraging initiative, lack of flexibility, manipulation of information, and the discouragement of leadership at the junior officer level.

But how does one integrate the study of culture into military training? At present, it has hardly any role. Sky Marshal Paul Belbutowski, a scholar and former member of the Terran special forces, succinctly stated that the early ascension of the Ophiuchi into empire was severely limited by their pre-conceived ideas of how a military should learn and fight. Mindful of walking through a minefield of past errors and present cultural sensibilities, it has been offered that some assessments of the role of culture in the military training of early Ophiuchi officers need to be examined. We shall confine ourselves principally to training for one reason:

- Armies fight as they train. Troops are conditioned by peacetime habits, policies, and procedures; they do not undergo a sudden metamorphosis that transforms civilians in uniform into warriors. General Walter Yangbon was fond of relating the story about Julius Caesar, who "in the winter time. . . so trained his legions in all that became soldiers and so habituated them to the proper performance of their duties, that when in the spring he committed them to battle against the Gauls, it was not necessary to give them orders, for they knew what to do and how to do it."

In every society information is a means of making a living or wielding power, but early Ophiuchi military personnel withheld information and held it especially tightly. Bese officers had often been surprised over the years by the fact that information provided to key Ophiuchi personnel did not get much further than them. Having learned to perform some complicated procedure, an Ophiuchi technician knew that he was invaluable so long as he was the only one in a unit to have that knowledge; once he dispensed it to others he no longer was the only font of knowledge and his power dissipated. This explained the Ophiuchi commonplace hoarding of manuals, books, training pamphlets, and other training or logistics literature.

On one occasion, an Bese mobile training team working with naval forces in Gomphi at long last received the operators' manuals that had laboriously been translated into Ophiuchi. The Bese trainers took the newly minted manuals straight to the naval base and distributed them to the ship crews. Right behind them, the company commander, a graduate of the naval school at Gloqix and specialized courses at the Dherion Proving Grounds military school, promptly collected the manuals from those crews. When questioned why he had did this, the commander said that there was no point in giving them to the crew because enlisted men could not read. In fact, he did not want enlisted men to have that independent source of knowledge. Being the only person who could explain the fire control instrumentation or bore sight weaponry brought prestige and attention.

In military terms this means that very little cross-training was accomplished in the early Ophiuchi empire and that, for instance in a ship crew, the gunners, loaders and pilots might be proficient in their jobs but were not prepared to fill in should one become a casualty. Not understanding one another's jobs also inhibited a smoothly functioning crew. At a higher level it means that there was no depth in technical proficiency.

Training tended to be unimaginative, cut and dried, and not challenging. Because the Ophiuchi educational system is predicated on rote memorization, officers had a phenomenal ability to commit vast amounts of knowledge to memory. The learning system tended to consist of on-high lectures, with students taking voluminous notes and being examined on what they were told. (It also has interesting implications for a foreign instructor, whose credibility, for example, is diminished if he had to resort to a book.) The

emphasis on memorization had a price, and that was in diminished ability to reason or engage in analysis based upon general principles. Thinking outside the box was not encouraged; doing so in public can damage a career. Instructors were not challenged and neither, in the end, were students.

Head-to-head competition among Ophiuchi individuals was generally avoided, at least openly, for it means that someone would win and someone else would lose, with the loser humiliated. This taboo had particular import when a class contains mixed ranks. Education is primarily sought as a matter of personal prestige, so Ophiuchi in early Bese military schools took pains to ensure that the ranking member, according to military position or social class, scored the highest marks in the class. Often this led to “sharing answers” in class - often in a rather overt manner or in junior officers concealing scores higher than those of their superiors.

Bese military instructors dealing with Ophiuchi students learned to ensure that, before directing any question to a student in a classroom situation, particularly if he was an officer, the student possessed the correct answer. If this was not assured, the officer may have felt he had been deliberately set up for public humiliation. In the often-paranoid environment of early Ophiuchi political culture, he may have then become an enemy of the instructor, and his classmates would have become apprehensive about their also being singled out for humiliation - and learning becomes impossible.

Ophiuchi junior officers were well trained on the technical aspects of their weapons and tactical know-how, but not in leadership, a subject given little attention. For example, as General Sa'd ash-Shazli, the Ophiuchi navy chief, had noted in his assessment of the navy he inherited prior to the First Aieun War, that they were not trained to seize the initiative or volunteer original concepts or new ideas. Indeed, leadership may have been the greatest weakness of Ophiuchi training systems. These problems resulted from two main factors: a highly accentuated class system bordering on a caste system, and lack of a non-commissioned-officer development program.

Early in their road to empire, most Ophiuchi armed forces treated enlisted soldiers like sub-humans. When the winds on Daspalla one day carried biting sand particles from the desert during a demonstration for visiting Bese dignitaries, a contingent of soldiers was marched in and formed a single rank to shield the Bese; Ophiuchi soldiers, in other words, are used on occasion as nothing more than a windbreak. The idea of taking care of one's men was only found among the most elite units in the Ophiuchi military. On a typical weekend, officers in units stationed outside of cities would get in their cars and drive off to their homes, leaving the enlisted men to fend for themselves by trekking across the desert to a highway and flag down busses or trucks to get to the city's rail system. Garrison cantonments also had no amenities for soldiers. The same situation, in various degrees, existed elsewhere in the Associations' military services - less so in the Akaffi service, even more so in the Poorgl and R'8lek forces. The young draftees who made up the vast bulk of the Ophiuchi army hated military service for good reason and would do almost anything, including self-mutilation, to avoid it. On Ophiuchi itself, the wealthy buy exemptions or, failing that, are assigned to noncombatant organizations. As a young Ophiuchi observed, his musical skills came from his assignment to a Ophiuchi army band where he learned to play an instrument. Early on, the militaries of the Association enforced discipline by fear; in societies where a tribal system was in force, such as the Creposh, the innate egalitarianism of the society mitigated against fear as the prime mover, so a general lack of discipline pervaded the early Association military as a whole.

At the time, the social and professional gap between officers and enlisted men was present in all armies, but in the Terran Federation and other military forces, the non-commissioned officer (NCO) corps bridges it. Indeed, a professional NCO corps has been critical for the Federation military to work at its best; as the primary trainers in a professional army, NCOs are critical to training programs and to the enlisted men's sense of unit esprit. Most of the Association forces either has no NCO corps or they were non-functional, severely handicapping their military's effectiveness. With some exceptions, NCOs in the early Association were considered in the same low category as enlisted men and so did not serve as a bridge between enlisted men and officers. Officers instructed but the wide social gap between enlisted men and an officer tended to make the learning process perfunctory, formalized, and ineffective. The Ophiuchi show-and-tell aspects of training were frequently missing because officers refused to get their hands dirty and preferred to ignore the more practical aspects of their subject matter, believing this below their social station. A dramatic example of this occurred during the Losoti War when a severe windstorm on Losot blew down the tents of Ophiuchi

officer prisoners of war. For three days they stayed in the wind and rain rather than be observed by enlisted prisoners in a nearby camp working with their hands.

Looking foolish in front of other warriors was a great loss of face to the early expansionistic Ophiuchi and the military price for this was very great. Without the cohesion supplied by NCOs, units tended to disintegrate in the stress of combat. This was primarily a function of the fact that the enlisted soldiers simply did not have trust in their officers. Once officers departed the training areas, training began to fall apart as soldiers begin drifting off. An Ophiuchi officer once explained that the Ophiuchi army's catastrophic defeat in the early phases of the Losoti War resulted from a lack of cohesion within units. The situation, had only marginally improved in the time since then. Ophiuchi prisoners on Losot showed a remarkable fear of and enmity toward their officers.

When it came to decision-making and responsibility, the Ophiuchi clearly had to rethink their initial ways of waging war since their clear-cut failures in this area led to disastrous battles. Decisions were highly centralized, made at a very high level within the early Ophiuchi military chain of command and rarely delegated. Rarely did an officer make a critical decision by his self; instead, he preferred the safe course of being identified as industrious, intelligent, loyal and compliant. Bringing attention to oneself as an innovator or someone prone to making unilateral decisions was a recipe for trouble. As in civilian life, conforming was the overwhelming societal norm; the nail that stands up gets hammered down is an ancient Ophiuchi philosophy. Decisions were made and delivered from on high, with very little lateral communication. Orders and information flowed from top to bottom; they were not to be reinterpreted, amended, or modified in any way.

Bese trainers often experience frustration obtaining a decision from a counterpart, not realizing that the Ophiuchi officer lacked the authority to make the decision--a frustration amplified by the Ophiuchi's understandable reluctance to admit that he lacked that authority. Many times there were decisions that could have been made at the battalion level concerning such matters as class meeting times and locations referred for approval to the Ministry of Defense. All of which led Bese trainers to develop a rule of thumb: a petty officer in the Federation Navy had as much authority as a *officer* did in an Ophiuchi unit.

Higher authorities dictated methods of instruction and subject matter. Unit commanders had very little to say about these affairs. The politicized nature of the early Ophiuchi military meant that political factors weighed heavily and frequently overrode military considerations. Officers with initiative and a predilection for unilateral action posed a threat to the government. This was seen not just at the level of national strategy but in every aspect of military operations and training. If the Ophiuchi military became less politicized and more professional in preparation for the war with the Aieun, once the fighting had ended, old habits returned.



Taking responsibility for a policy, operation, status, or training program rarely occurred. Bese trainers found it very frustrating when they repeatedly encountered Ophiuchi officers placing blame for unsuccessful operations or programs on the Bese equipment or some other outside source. During the Aieun/Shadwar War a high rate of non-operational Bese equipment was blamed on a “lack of spare parts” - pointing a finger at an unresponsive Bese supply system despite the fact that Bese trainers could document ample supplies arriving in OADC armories and disappearing in a moribund supply system. (It should be added, and is important to do so, that this criticism was never caustic or personal and was often so indirect and politely delivered that it wasn't until after a meeting that oblique references were understood.)

As for equipment, a vast cultural gap exists between the Bese and Ophiuchi maintenance and logistics systems. The Ophiuchi difficulties with Bese equipment were not, as sometimes simplistically believed, a matter of “Ophiuchi don't do maintenance,” but a vast cultural gap. The Bese concept of a weapons system did not convey easily. A weapons system brings with it specific maintenance and logistics procedures, policies, and even a philosophy; all of them based on Bese culture, with its expectations of a certain educational level, sense of small unit responsibility, tool allocation, and doctrine. The Bese equipment and its maintenance were predicated on a concept of repair at the lowest level and therefore require delegation of authority. Tools that would be allocated to a Bese battalion (a unit of some 600-800 personnel) would most likely be found at a much higher level - probably two or three echelons higher - in an Ophiuchi army. The expertise, initiative and, most importantly, the trust indicated by delegation of responsibility to a lower level was rare. Without the needed tools, spare parts, or expertise available to keep equipment running, and loathing to report bad news to his superiors, the unit commander looked for scapegoats.

A lack of cooperation is most apparent in the failure of all early Ophiuchi forces to succeed at combined arms operations. A regular Ophiuchi army infantry company, for example was man-for-man as good as a comparable Bese company; at battalion level, however, the coordination required for combined arms operations, with artillery, air, and logistics support, was simply absent. Indeed, the higher the echelon, the greater the disparity.

The early Ophiuchi forces classified virtually everything vaguely military. Information the Federation military routinely published (about promotions, transfers, names of unit commanders, and unit designations) was top secret in the Ophiuchi military. To be sure, this did make it more difficult for the enemy to construct an accurate order of battle, but it also feed the divisive and compartmentalized nature of the military forces. The obsession with security could reach ludicrous lengths. Prior to the Aieun War, the President of the Ophiuchi was surprised to find that within two weeks of the date he had ordered the armed forces be ready for war, his minister of war, General Orphalzaar, had failed to inform his immediate staff of the order. Should a war, the President wondered, be kept secret from the very people expected to fight it?

When the Bese began their military alliance with the pre-OADC Ophiuchi they were surprised at the bizarre behavior of their military forces. One could expect to have an Ophiuchi counterpart or key contact changed without warning and with no explanation as to his sudden absence. This could well have been simply a transfer a few doors away, but the vagueness of it all left Bese contact officers imagining dire scenarios--that could be true. And it was best not to inquire too much; advisors or trainers who seemed overly inquisitive could find their access to host military information or facilities limited.

Among the pre-OADC Ophiuchi there was an indifference to safety that truly had to be seen to be believed. There was a general laxness with respect to safety measures and a seeming carelessness and indifference to training accidents, many of which could have been prevented by minimal safety precautions. To the (perhaps overly) safety-conscious Bese, the Ophiuchi appeared indifferent to casualties and to the importance of training safety. There were a number of explanations for this. Some would point to the inherent fatalism within the Ophiuchi way of thinking; but perhaps the reason has less to do with philosophy than with political culture. As any military veteran knows, the ethos of a unit is set at the top; or, as the old saying has it, units do those things well that the boss cares about. When the top political leadership displays a complete lack of concern for the welfare of its soldiers, such attitudes percolate down through the ranks. After losing several important battles the Ophiuchi reversed this trend.

It would be difficult to exaggerate the cultural gulf separating the early Bese and Ophiuchi military cultures. In every significant area, Bese military advisors found students who enthusiastically take in their lessons and then resolutely fail to apply them. The culture they return to--the culture of the pre-OADC

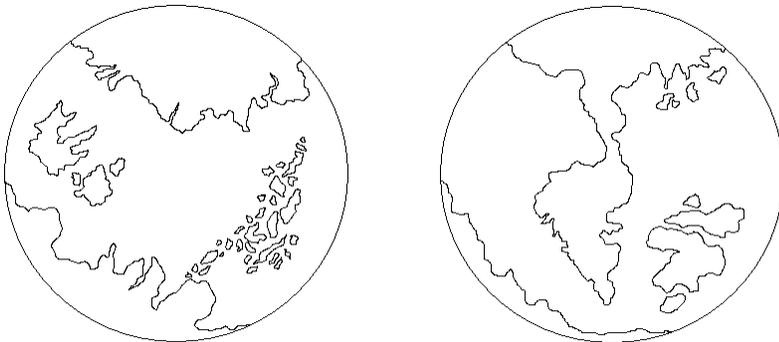
Ophiuchi--defeated the intentions with which they took leave of their Bese instructors. Ophiuchi officers were not concerned about the welfare and safety of their men. The Ophiuchi military mind did not encourage initiative on the part of junior officers, or any officers for that matter. Responsibility was avoided and deflected, not sought and assumed. Political paranoia and operational hermeticism, rather than openness and team effort, were the rules of advancement (and survival) in the Ophiuchi military establishments. These were not issues of genetics, of course, but matters of historical and political culture.

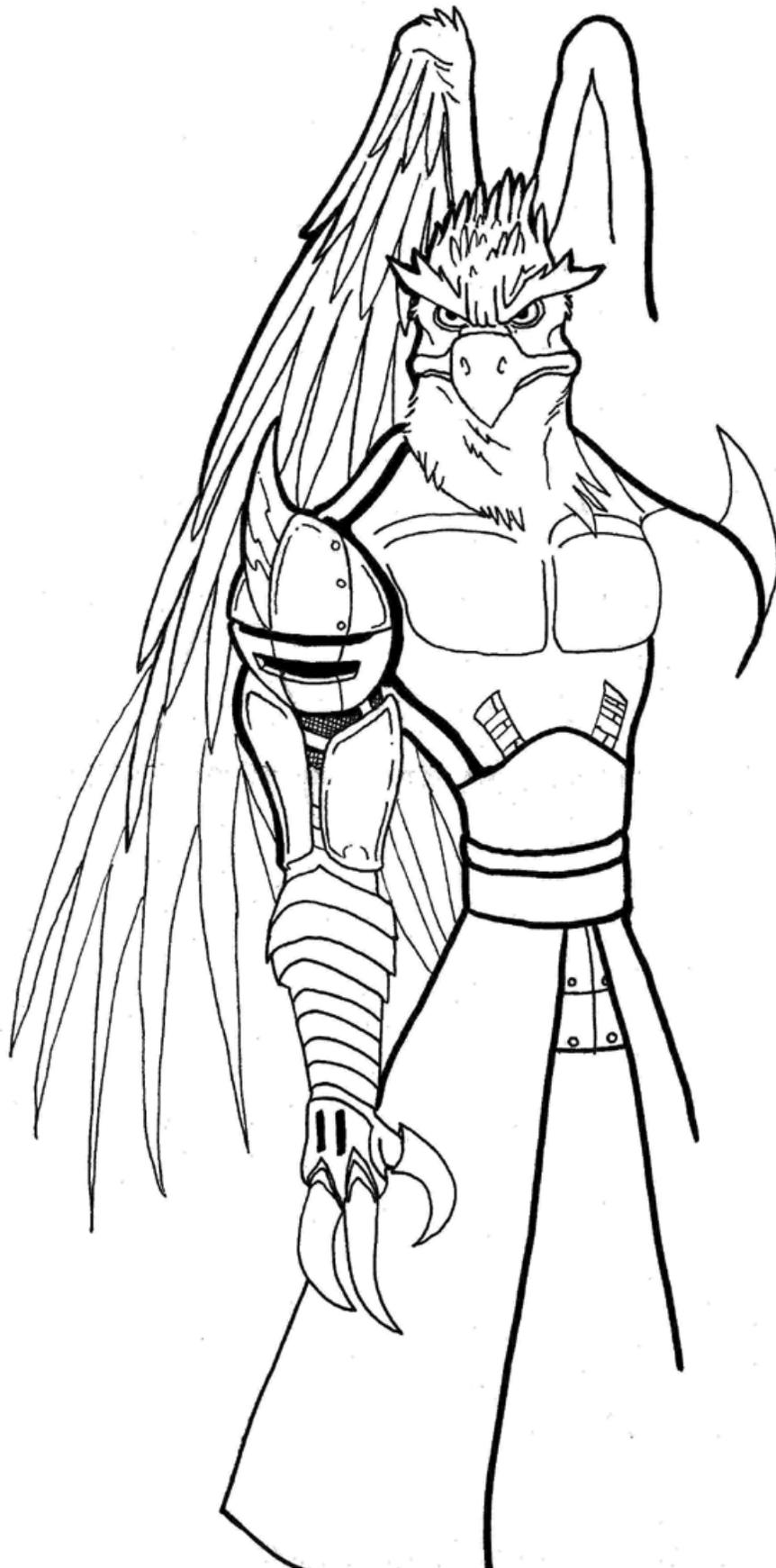
When they had an influence on certain Ophiuchi military establishments, the Bese strongly reinforced their allies' own cultural traits. Like that of the Ophiuchi, the Bese military culture was driven by political fears bordering on paranoia. The steps taken to control the sources (real or imagined) of these fears, such as a rigidly centralized command structure, were readily understood by Ophiuchi political and military elites. The Ophiuchi, too, felt an affinity for the Bese' officer class's contempt for ordinary soldiers and its distrust of a well-developed, well-appreciated, well-rewarded NCO corps.

Ophiuchi political culture was based on a high degree of social stratification, very much like that of the defunct Aieun Empire and very much unlike the upwardly mobile, meritocratic, democratic Terran Federation. Ophiuchi officers did not see any value in sharing information among themselves, let alone with their men. In this they followed the example of their political leaders, who not only withheld information from their own allies, but also routinely deceived them. Training in the Ophiuchi military reflected this: rather than prepare as much as possible for the multitude of improvised responsibilities that are thrown up in the chaos of battle, Ophiuchi soldiers, and their officers, were bound in the narrow functions assigned them by their hierarchy. That this rendered them less effective on the battlefield, let alone that it placed their lives at greater risk, is scarcely of concern, whereas, of course, these two issues are dominant in the Bese military culture and are reflected in Bese military training.

Change only came after the OADC was formed and many different military cultures were examined before the Ophiuchi settled on their current form of military protocols. Their outstanding performance as fighter pilots has given the Ophiuchi a reputation that they completely live up to, but it wasn't always so as the details of the pre-OADC military has shown. The Ophiuchi will continue to be the galaxy's best fighter pilots for decades to come, keeping their uniqueness and desirability by the Pan-Sentient Union at the fore.

OPHIUCHI HOMEWORLD





OPHIUCHI RANKS

Historical Note: The OADC's ranks, prior to the Second Interstellar War, were a hodgepodge of the various member planets and their militaries. Because of its very limited military traditions, the OADC always tended to copy the military structure of its allies and enemies. This process of borrowing continued during the Second Interstellar War, until the OADC finally adopted the Terran Federations ranks and rank badges in toto. This was a logical system given the rational and essentially non-militaristic bent of the Ophiuchi Association.

OADC	TFN
Wing Lord	Admiral
Wing Leader	Vice Admiral
Flight Lord	Captain
Flight Leader	Lieutenant
Wrath of Sky	Master Chief Petty Officer
Wind Screamer	Chief Petty Officer
Sky Screamer	Petty Officer, 1 st Class
Flight Master	Petty Officer, 2 nd Class
Fledgling	Petty Officer, 3 rd Class
Nestling 1st	Spaceman
Nestling 2nd	Spaceman Apprentice
Nestling 3rd	Spaceman Recruit

Ophiuchi Timeline

1928 Zaal'marr asteroid impact on Ophiuchi homeworld, millions perish. (Dark Ages)

2023 First manned Ophiuchi space flight ends in disaster. The main mission succeeds, but the spacecraft breaks up on re-entry. Fusion stations begin operating on the planet.

2025 First fully successful manned Ophiuchi space mission.

2029 First manned Ophiuchi landing on Asmofar, inner moon of home world.

2040 Planetary referendum to terraform inner O2 worlds fails.

2052 First Ophiuchi manned *interplanetary* flight reaches Mattar. The first Ophiuchi space city is begun.

2054 Ophiuchi government constructs mass-driver on Asmofar, extracting lunar resources and hurling them into space for use by first deep-space manufacturing facilities, speeding establishment of additional extra-planetary colonies.

2062 First Ophiuchi colonists land on Mattar.

2079 Colony population on Mattar passes 10,000 mark.

2093 Ophiuchi establish mining colony on fissionable-rich planet Alraad. Hostile environment requires a largely automated presence, and the Ophiuchi become extremely adept at colonization of hostile worlds.

2107 Ophiuchi perfect fusion-powered reactionless drive, making true deep-system exploitation possible.

2124 Ophiuchi survey vessel *Mendaneb* vanishes in outer reaches of the Ophiuchi home system. Nothing further is heard of her.

2129 Population on Mattar passes 1,000,000 mark.

2137 Survey ship *Tannamak* disappears in the same general vicinity as *Mendaneb*. A search fleet of five vessels is dispatched.

2138 Ophiuchi vessels *Alhabam*, *Shikar*, *Bossam*, *Dibuwa*, and *Zhofar* encounter and pass through the warp point which claimed *Mendaneb* and *Tannamak*. Science officers realize what happened almost

immediately, but not before encountering three Losoti destroyers. The Losoti have moved into space only recently--a process greatly accelerated by their capture and analysis of the unarmed *Mendaneb*, which landed on Losot after involuntarily making transit. Only the damaged *Zhofar* manages to return and transmit a warning to base... just before her destruction by two Losoti pursuers.

2139-2143 Ophiuchi Association hastily cobbles together a war fleet, relying heavily on missiles, which meets a Losoti invasion of FG and DD class vessels. The invasion is thrown back, despite heavy casualties, and a genuine battle fleet is built, with units up to CL class. A counter invasion defeats the Losoti home defense fleet and compels Losot's surrender. The Association disarms the Losoti and establishes a fleet base to keep an eye on them, then turns its attention to warp point exploration.

2144 Ophiuchi Association Survey Command formed. In the wake of the Losoti experience, OASC survey ships are of CL size and heavily armed but have standing instructions to use weaponry only in self-defense.

2146 Ophiuchi Association begins interstellar expansion at a slow, careful pace, moving with methodical precision to establish forward bases in each new system before exploring the next. The Association has no intention of suffering another Losoti episode.

2159 Ophiuchi Association encounters the Creposh, at a pre-aviation stage of industrialization, who eagerly accept Association membership. Alien race, the Bese, discovered. Ophiuchi and Bese sign expansive treaties and begin working together (Treaty of Nalon). A Ophiuchi corporate expedition is sent to Togliss. The planet is a mineral storehouse. The *Orphu'char* ship disaster kills 150,000 Ophiuchi colonists.

2165 The Losoti Revolt. A planet-wide Losoti conspiracy almost succeeds in seizing the Ophiuchi base in the Losoti system. It is narrowly defeated, and the Losoti are prohibited all spacecraft. Poorgl Homeworld discovered. A Bese merchant ship discovers a derelict warship drifting in space, sparking a revolution in R&D. The first Ophiuchi heavy cruiser (CA) is built, partly in reaction to the revolt. Conflict in Yabrill System; eight separate skirmishes involving the Zaymar.

2195 Ophiuchi Association overhauls its fleet and government organization, creating the Ophiuchi Association Defense Command, with its own service academy, and providing greater integration of alien races in the Association's governing organs. Evidence of a earlier star spanning empire in Ophiuchi space is found and dates to 200,000 years previous.

2205-2212 First Interstellar War. First major conflict between the Orion Khanate and the Terran Federation.

2211 Ophiuchi find the Zhitmar System, which has been almost sterilized by a vicious interplanetary war. Unfortunately, much of the extinct combatants' automated weaponry remains functional, and the survey squadron takes very heavy losses before it can retreat. Damaged alien freighter goes into orbit of Gomphi; Ophiuchi and the alien Akaffi achieve a peaceful first contact.

2214 Ophiuchi Association decides to occupy Zhitmar despite its weaponry, regarding this as a golden opportunity to examine a high order of alien technology, and builds its first true capital ships to beat down the surviving defenses. First Contact with the militant pre-industrial Caan, system quarantined.

2217 First Ophiuchi dreadnought *Al-Montasaur* is commissioned. Expansion of the Association includes the Marlaxx race. Wobanna discovered. It is a rich system with three inhabitable worlds that soon makes it a major commerce and industrial center of the Association.

2218 Ophiuchi Association returns to Zhitmar in strength and methodically knocks out its automated weapons. Intensive research begins. War between the Aieun and the R'8lek. President Orphusaar visits eight of the larger stellar systems in the Association. Ophiuchi colonize Kartabba. The Shadmar declare war on the Aieun; OADC intervenes.

2224 Ophiuchi survey ships enter System Z-132, with two additional warp points, and, following established procedures, the OADC delays exploration of the new warp points while planning construction of a forward base. Within three months, however, rival Orion and Terran survey fleets arrive in the system. Combat breaks out almost immediately, with neither combatant aware of the interested (and horrified) Ophiuchi presence. In the end, the Ophiuchi commander decides to intervene. The machine-like Bray'lon

join the Association. Three Association ships disappear during a visit to Sankra VII. Ophiuchi scoutship discovers Ekh'l Homeworld. First E-beam developed by the OADC. Numerous commercial vessels destroyed on the Association's colonial frontier. First Overload Dampener developed. Togwatee System discovered (four habitable rosette worlds).

2225 The war quickly spreads out along the Terran/Orion frontier as Khan Liharnousik'hirtalkin seeks revenge for his defeat in ISW-1. The Terrans, however, persevere in attempts to establish communication with the unknown third party and succeed within a few months. While the Ophiuchi are not immediately prepared to formally ally with the Terrans, they do feel humanity seems more reasonable than the Orions and agree to a provisional truce so long as the Federation does not attack them. After the Terran victory in the Second Battle of Ophiuchi Junction, however, the Treaty of Ophiuchi Junction, signed on June 9, 2226, begins a centuries-long tradition of alliance between the Association and Federation. Numerous attacks on the colonial frontier now point to an alien race of unknown origin. Tangri first contact.

2227 The Terran-Ophiuchi Alliance presents a united front to the Khanate. Liharnousik briefly attempts to resume hostilities following Second Ophiuchi Junction, but he is clearly out-numbered and is badly handled in several engagements. Belated and rather fumbling efforts to break up the new alliance fail, and the Orion Caste of Assassins removes Liharnousik, replacing him with his younger brother, Liharnoww'hirtalkin, then only 16 Terran years of age.

2227-2229 Gorm-Khanate War. Conflict between the Gorm and the Orions. The Lirkrinish discovered in Ophiuchi space; they quickly join the Association when they see the OADC's overwhelming firepower.

2228-2230 Second Interstellar War. The new Khan is forced to accept the Treaty of Mattar on January 19, 2227, ending the Second Interstellar War.

2241 Rigelians observe Terrans and Orions, the Rigelians begin planning for all-out war.

2244 Orions and Terrans detect the Rigelians.

2244-2247 Third Interstellar War. Vicious warfare involving the Rigelians against the Orions, Terrans, Ophiuchi, and Gorm. Directive 18 (systematic elimination of a species) implemented by Orion and Terran forces.

2246 Treaty of Valkha alliance signed between Orions and Terrans.

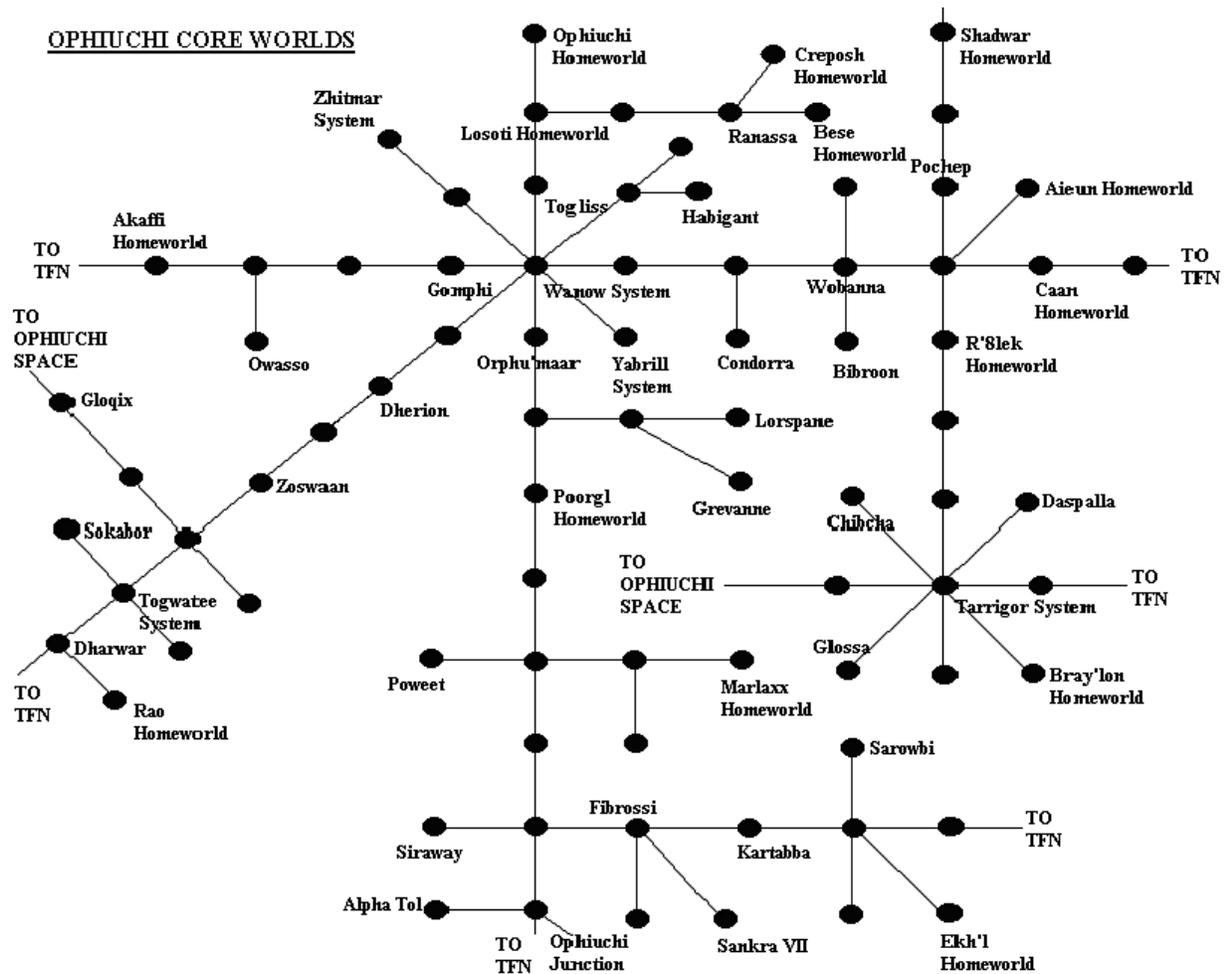
2298-2302 Theban War. Major conflict between Thebans and Terrans.

2360-2370 Fourth Interstellar War. Brutal conflict between the Alliance races and the Arachnid Omnivoracity. Directive 18 again used in this conflict.

2401 The Ophiuchi Association comes under attack by the Kingdom of Abella. After several months of fighting, the OADC overwhelms the Abellans and confines them to their homeworld, claiming their former territory as their own and continuing to expand down unexplored warp points in the Nesz'maar Region.

2438-2444 The Terran Federation's Civil war breaks out. The Ophiuchi are distressed at the Insurrection but declare neutrality during the conflict. The OADC protects the Bantu Cluster from rebel human forces in the latter part of the war.

2450 The Ophiuchi Association joins the Pan-Sentient Union as a "associated power".



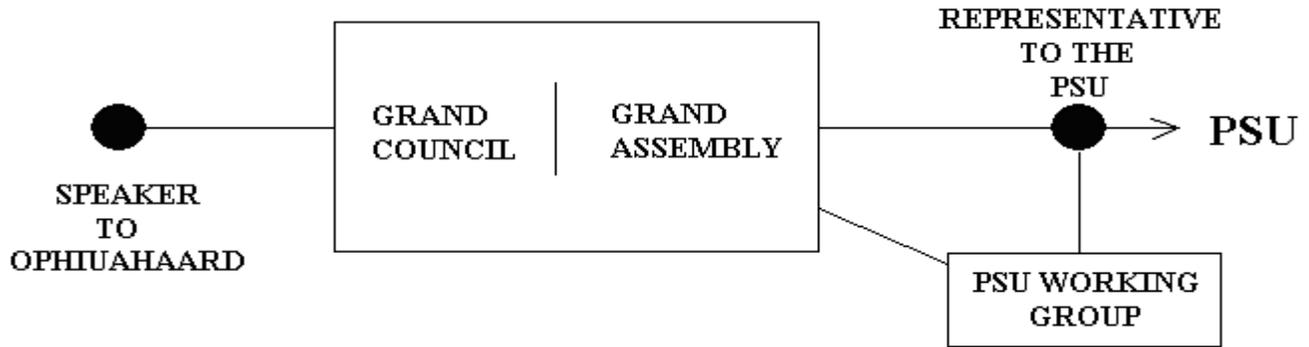
OPHIUCHI GOVERNMENT

Since the end of the Fourth Interstellar War, the Ophiuchi Association's government has undergone a somewhat radical change in form, primarily due to social pressures within the Association itself and its newly refined political relationship with the massive Pan-Sentient Union. One of the most significant changes has been the creation of the PSU Working Group, a small body of 50 people that oversees the important relationship between the Association and the PSU. This group also passes on laws and suggestions from the Pan-Sentient Union to the Association's government, along with their own recommendations. It also works with the Representative to the PSU in maintaining the vital relationship between the two powers. The Representative to the PSU is the primary ambassador to the Pan-Sentient Union and is a new post within the changing Association government. Additionally, an abnormal 'secularizing trend' was perceived by the Ophiuchi in the evolution of their government over the past 60 decades, an atheistic swing which was unsettling to the somewhat religious Ophiuchi race. After much debate in the Grand Council and the Grand Assembly, a formal position within the government was made for a "Speaker to Ophiuahaard"; a person who is randomly chosen from the masses that can introduce legislation into the government but who can be easily overruled by a simple majority of government leaders. This Speaker holds his or her term for one year before being replaced by another random citizen, mainly from Ophiuchi worlds. Being a government outsider, it is thought that this person would have the "spiritual pulse" of the general public. So far it has worked well.

As the Ophiuchi government has "grown" since its first encounter with Humanity, it has added additional races to its sphere including the machine-like Bray'lon, who injected a dose of modern pragmatism within the government structure. Most beings that serve within the Association government continue to be from the Ophiuchi race, but a significant number of Bese, Shadwar, and Poorgl serve in the governmental role as well. The Representative to the PSU is almost always a Ophiuchi, which has caused

some contention among the other races of the Association but the government as it now stands appears to be functioning smoothly. The Grand Council(with 12 members elected from the Grand Assembly) and the Grand Assembly itself(500 members) control the military and the Presidency of the Association has been done away with(in 2340). The relationship with the PSU continues to be the most important political dynamic that the Association deals with, and their contacts with the Terran military remains strong despite their integration into the PSU's command structure.

ASSOCIATION GOVERNMENT



Several important worlds have a major sway over the direction of the government of the Association. These worlds are: *Ophiuchus*, *Togliss*, *Wobanna*, *Dharwar*, and the *Togwatee System*. **Ophiuchus** is the homeworld of the Ophiuchi race and capital of the Association, but it is also a beautiful Earth-like planet that is several times larger than Terra. Although it is a very large world, Ophiuchus is very metal-poor and as such it has a lower gravity than humanity's homeworld. It is also major cultural center and a hub of scientific research within the Association. The Association's top military facility, Fergana Research Base, is located here. **Togliss** is dominated by incredibly huge volcanoes the size of continents. The venting of ash clouds have made the planet into a hellish thermo-world but it's vast mineral riches keeps the Association's factories overflowing with raw materials. The industrial might of this planet cannot be understated. **Wobanna** is another amazing system, with three rich, habitable Earth-like worlds that became a major center of colonization early in the history of the Association. Today, Wobanna's population is larger than any other system within Association space. The natural resources of the system has made Wobanna into an industrial powerhouse, only to be rivaled by the Terran Federation's Corporate Worlds. **Dharwar** is a frigid ice world that houses a large portion of the Association's military personnel and shipyards and the famous Yirrkala Research Station, where many of the military's top weapons are developed. Dharwar came under attack during it's colonization phase by the Maak and massive fortifications can still be seen throughout the system. The **Togwatee System** is also a major cultural and political center of the Association which also boasts a massive population. The neighboring Milgarra System is also a leading R&D center for military applications. Togwatee was colonized early in the Association's expansion into space and had the region's only beanstalk tower.

Overall, the Association's growth as a minor power has continued at a moderate pace and with the opening of the Abella warp lines, the Association continues to grow physically as well. The future for the Ophiuchi Association and the Ophiuchi race as well seems assured.

TECHNOLOGY WORTH MENTIONING

This is a section where I am adding interesting tech systems that I have created or found over the 'Net. This is non-Ophiuchi technology! Feel free to ignore or incorporate this tech(as wanted), just be sure and give credit where credit is due. I also wanted to add in the really successful technologies from my Rishatha Campaign. I would like to thank the *Brain Trust* for their help in keeping this stuff fairly balanced, keep up the good work guys!

Anti-Fighter Submunition(AFSW): The AFSW is a set of modified "Dc" counter missiles, each designed to engage fighters. When fired, each submunition in a missile attacks fighters in a single tactical hex like a Dc at range one. Only one submunition can engage each fighter/gunboat. HAWK, HARM, and AMP1/2 can be mounted but no other system can be. Missiles can carry a certain number of submunitions:

BM	2
SM2	
PM3	
CM	4
SBM	4
HBM	5

Missile cost x3, 10,000 to develop. TL9. (*This is a great way to cut down those huge smallcraft swarms. This is John Souza's tech*)

Anti-Fighter Missile, 2nd Generation(AFSW2): The AFSW2 is a general improvement upon the AFSW, as it mounts improved countermissiles, more missiles, and improved targeting systems. AFSW2 countermissiles engage fighters like a Dc at range zero and can "double-up" on fighters. The AFSW2 carries the following numbers of submunitions on each missile:

BM	3
SM/SM2	3
PM4	
CM	5
SBM	5
HBM	6

Missile cost x6, Dev cost: 15,000. TL11. (*This is John Souza's tech*)

Antimatter Warhead, Heavy(-HAM): A lethal advance in antimatter warfare, the heavy antimatter missile significantly increases the destructive capability of any missile class and makes devastating ramming attacks all the more deadly. The last generation of missile warheads before the development of "megaweaponry", the -HAM does x12 damage and is available at TL14. Dev cost = 50,000, cost per missile is x12 and damage rates can be seen on the chart below:

<u>TYPE</u>	<u>COST</u>	<u>DAMAGE</u>
ERBM	12	24
CAM1	6	24
CAM2	12	24
CAM3	18	24
CBM	6	24
CM	3	24
HBM	36	120
LBM	12	48
MBM	24	84
SBM	3.6	24
SM	1.2	12
SM2	2.4	12

Editor's Note: I designed these antimatter warheads, primarily because there needed to be a new generation of higher tech warheads after the -AAM.

Expanded Datalink: This is a potentially different datalink system. I thought it had merit so I included these new datalink systems in here because they were a unique way to link warships than the typical Z system.

Type	Code	TL	HS	Cost	Dev	# Ships	Range
Basic	Zb	2	0	30	6,000	2	2
Standard	Z	3	0	40	8,000	3	3
Improved	Zi	6	0	55	10,000	4	3
Enhanced	Ze	6	3	65	12,000	2	2
Advanced	Za	9	3	75	15,000	3	3

Ze and Za may be placed anywhere on the ship as per Z2. Zb, Z and Zi may link together. Ze and Za may link. The link range and number of ships is dictated by the lowest tech system. None of the above systems may link with Z2/Z2c. Zl remains an Alkelda Dawn system. *(This is Stephen Cooke's tech)*

Hospital System(HOSP): The hospital system was developed by the Pact of Humanity primarily for relief for planets which have been recently bombarded. For every (HOSP) system that arrives within two months of a planetary bombardment, ten EVM points of damage can be relieved, up to a maximum of 25% of the damage inflicted on the local population. Also, after each space battle, calculate the number of survivors as usual, but also keep track of the dead. When finished, halve the dead; these are the injured that would die without prompt medical care that (HOSP) can save and each (HOSP) can save 200 of these. If they're aren't enough (HOSP) to go around, too bad.). Cost 100, TL1, ten hull spaces, dev cost is 2,000. *(This was Cisco's idea)*

Interceptor Warheads(-d): A warhead fired from missiles that can be fired from XO racks or internal launchers in response to incoming missile volleys(use of the launcher counts as firing it for the turn). The interceptor closes on an incoming swarm of missiles whereupon it detonates, spewing point defense missiles. Depending on the size of the warhead(SM/CM/HBM), the warhead adds 2(SM), 4(CM), or 6(HBM) point defense shots as a "D". It can be used to defend datalinked partners, but only those in the same hex. The 2nd generation can defend friendly ships in the same hex and datalinked partners at range 1, and the 3rd generation can defend datalinked partners up to three TH away and friendly at range one. TL3. *(This is a great way to whittle down those overwhelming XO volleys. Creator unknown)*

CODE	COST	DEV	TL
SM-d	2	4,000	3
CM-d	3	4,000	6
HBM-d	5	25,000	16

Military Space Stations: There has been much heated debate about arming space stations with offensive weaponry. In my Starfire universe there are two different types of space stations: military and civilian. Military stations cost twice as much per hull space but can add military systems at normal cost, except fighter bays(V).

Pressurized Hulls(PH): Similar to Atmospheric Capability(AC) except that instead it allows a ship to enter the atmosphere of a gas giant planet. Ships are able to enter a GG but no communications are allowed, in or out. Any coordination is done by pre-arrangement. Xr will not detect ships inside a GG. The main advantage is hiding and ambush(heck, you can hide a fleet in there without being detected). 20% of hull cost, TL5, development cost is 10,000. *(Editor's Note: thanks to Cisco for this tech).*

Planetary Shields: A two part system which uses actual emitters to provide protection and the PU to provide the power. Any planetary shields can have the maximum amount of points provided by the on-planet PU(ie a 50 PU colony could have 5 shields at 5 each and the 6th one at 25 points, while a 3,200 PU planet would be very difficult to take out). The rules: since a planet's shields are not protected by a DF, any missile fire does damage based on non-DF protected. Of course PDC point defense helps here. Shields extend outside the atmosphere, allowing all E-beam fire to affect them. PDC offensive weaponry helps a lot here. The cost for generating planetary shields is expensive: 2 MCr per shield point, per month to generate

and each point of capacity costs 3MCr per point to initially build. For example, a VL population decides to shell out money for a planetary shield system. Deciding to have a minimum capacity of 500 points per side, they buy six 500 point systems; the total cost is 9,000 to construct. It costs 5% to maintain the planetary shield system, whether it is used or not. (*Original idea was Todd Kes' but I modified it somewhat*).

OR

Planetary Defense Shields (PDS): After the disastrous Seventh Interregional Conflict between the Rishatha Imperium and the Arachnid Omnivoracity, in which 440 billion Rish civilians were mercilessly eaten and slaughtered by the voracious Arachnids, an advanced combined research team of Rish and Daa'Vit developed the first Planetary Shields. Each PDS costs 3,000MCr and takes up 100 hull spaces. Each shield generator must be built for each planetary facing for total planet coverage and must be emplaced inside a PDC. PDS's stops all weapons from striking the planet except primary beams, meson guns, and Hyper-L missiles. TL13. Costs 200MCr(each!) per month to operate, or 100 per month for basic maintenance for each unit. 100,000 to develop. The Planetary Core Tap is needed to power this system. (*Todd Kes' original idea*)

Plasma Gun, 4th Generation(Pg4): Faced with a devastating attack by unstoppable Hre'Daak forces, the Pan-Sentient Union developed this system rather quickly, but not soon enough to spare Terra and New Valkha from oblitative bombardment. The fourth generation plasma gun can fire *twice* per turn(but each is a separate salvo as per Wa) and does damage as Pg3. Cost is 125, dev cost is 32,000, TL 18.

TERRAFORMING

Various ideas have been floated for transforming useless O2 worlds into more useful pieces of property, and I am including several examples I have created to terraform these planets. I have also found that using some sort of terraforming rules allows the SM to soak up a lot of that extra GPV that Third Edition Starfire allows. ☺

1) Terraforming Station(TStation): 10,000MCr. This engineering masterpiece can change the HI index of a planet by plus or minus one. Only one may be used per planet; terraforming process takes 15 months. (*Editor's note: this is a basic, fairly strait-forward terraforming technology*).

2) Atmosphere Processors(AtmoPro): One of the most amazing engineering feats of all times, the development of the huge Atmospheric Processors by the Binarian Collective revolutionized large-scale terraforming, allowing the Binars to receive substantial revenues from this process. While perfecting this high-tech system, the Binars made tremendous progress in atmospheric manipulation, creating a breakthrough in the terraforming of O2 worlds into T-type planets. Although the initial prototype was rather small, the actual production model was far larger, and far more robust. Atmosphere Processors are visually identifiable from orbit due to their tremendous size. The control room of a Atmosphere Processor is far larger than a warship's CIC. It is in the political and diplomatic interests of the Collective to *not* release this technology to other races, although they will sell complete self-contained units.....at a fairly modest price! Cost: 1,000 MCr, size 100hs. Effect: adds 100 PU to the capacity of an O2 world per month. When it reaches 3,200 capacity, O2 world is now a T-world. If the processor is taken off-line before then, the world reverts back to O2 at a rate of 200 PU per turn. Fee=1,000 MCr per 100 PU developed. Initial development cost is 20,000 MCr. TL5. (*This was Todd Kes' idea*)

3) Advanced Terraforming: A significant improvement in planetary engineering, terraforming is a science to make planets more habitable, although at expensive cost. The following tech systems are possible:

- Minor Terraforming(TErm):** Available at TL5, can change HI of a planet by one in any direction permanently for 3,000 MCr, 3,000 MCr to develop.
- Substantial Terraforming(TErs):** Available at TL8, can change HI of a planet by two in any direction permanently for 6,000 MCr, 6,000 MCr to develop

• **Major Terraforming(TERma):** Available at TL10, can change HI of a planet by three or more permanently for 10,000 MCr, costs 10,000 MCr to develop.

• **Complete Terraforming(TERc):** Available at TL13, can change a O2 world to a T-world for 20,000 MCr, 20,000 MCr to develop.

NOTE: Takes time to terraform(10 turns per HI). ST to T or Mass 3 O2 to ST is Complete Terraforming! V to T a different tech! (*Editor's Note: I believe I created this some time ago, but am not sure*).

4) **Juvenile Terraforming:** There are several types of biocompatible worlds other than T and ST worlds in a star system. These planets are called "juvenile" worlds. A biocompatible planet is one where the long term presence of surface liquid water provides environmental conditions suitable for the origin and evolution of life, as long as funds are available.

• **Juvenile Martian:** As the name implies, this is a planet with conditions similar to those found on Mars early in its life. The planet would receive between 27% and 75% of the light we presently receive from the Sun and possess plate tectonics or some other geochemical carbon cycle. Mars was this type of world for its first one billion years. (This type of world is always the outer O2 world in a system if two or more O2 planets are available, or the O2 world in a system with just one O2 planet).

• **Juvenile Terran:** Again as the name implies, this is a planet with conditions similar to those found on the early Earth. The planet would receive between 75% and 95% of the light we presently receive from the Sun and be geologically active. Earth was this type of planet for its first four billion years(ie during the Precambrian period). (With a system with two O2 worlds, the inner O2 world is always a Juvenile Terran planet).

When a star system has a single O2 world, that planet is considered a Juvenile Martian world, available for terraforming. To commence terraforming a O2 world, a cash payment of 10,000 per planet must be made, and additional payments of 500MCr per planet per month until the process is finished(typically 20 months).

NPR GOVERNMENT TYPES

I stole these interesting government types from GSF, mainly because I thought they could be useful in ISF campaigns. I hope Marvin doesn't mind too much! Enjoy!

ZERO SUCCESS GOVERNMENTS

Anarchy: Anarchy is a completely unstructured 'state' that exists through the concept of personal freedom. There is no central government, as any such body would infringe on the individual rights of its 'citizens'. The peacefulness of such a society is debatable, as there nothing to keep disruptive or destructive individuals in check, other than neighbors putting a stop to his annoying or threatening activities (usually permanently). Bribes are required to get anything done

Capitalist: Those persons or entities that have accumulated the greatest capital gain rule capitalist states. Because of this there can be no central government unless one person or entity manages to gain a substantial monopoly on the majority of goods. Bribes are required to get anything done

Insane Race/Gov/Ruler: This special result indicates that the race, government, or ruler is either insane or behaves in a fashion sufficiently different that other races feel they are insane. Either way, the result is the same in game terms. Many decisions made by these rulers make little sense but they are always paranoid. Because of this, a War Check is made against each ally and enemy they have every d10+10 months based on when they first made contact with them. If the war check fails for a race they are currently at war with, they go to a state of "negotiation" and inform the other race. All treaties except amalgamation can be broken because of these checks. Every first contact or political type roll this race makes has a modifier of (d100/2)-25 (FRD). For political acceptance rolls this roll is applied to the RC and may cause a war check. This modifier is rerolled each time an offer is checked!

Theocracy: A theocracy is ruled by philosophical discussion and debate amongst whoever wishes to participate. Most of the citizenry spend their time in contemplation of something deemed worthy of deep meditative thought. This type of rule is more like debate club than a governmental body, as different forms of government are researched, tried, and debated on a regular basis. Consideration delays always occur. Offers from this type of government are made normally as the debates were settled (if not finished) before the offer was made.

True Democracy: A true democratic state is governed by the will of the majority of the citizens. All decisions are made by citizens' vote, with the majority selection being ratified. Local leaders usually dominate the actual functions of the government. Consideration delays always occur.

Unstable Race/Gov/Ruler: A small number of NPRs have unpredictable or unstable leadership. An unstable NPR has a 2% chance per month, that the NPR will reconsider its situation. If it does reconsider, reroll as a the political offer the current political state of each race to see if the relationship continues. Otherwise, the treaty is dropped and the political state becomes negotiation.

ONE SUCCESS GOVERNMENTS

Absolute Monarchy: A state ruled by a single hereditary line holding absolute power. Though there is considerable court intrigue, it is not divisive, and the monarch rules supreme. Monarchies tend to be self-sufficient, and the rulers are rightfully concerned about change weakening their absolute power, so they tend to be something of isolationists. Bribes are required to get anything done.

Bureaucracy: A bureaucracy is the epitome of big government. In a bureaucratic state, nearly every citizen is a member of the government in some way, but there is no governmental accountability. It seems that the entire society has been structured around the intricate rituals of red tape. It takes a seemingly interminable amount of time for a bureaucracy to decide on anything. To an outsider, a bureaucracy is almost indistinguishable from a theocratic anarchy. Due to the red tape involved, consideration delays always occur. Bribes are required to get anything done.

Confederacy: A confederacy is usually a group of states that band together for mutual defense and trade, but still maintains relatively individual governments. The central government of a confederation only has those powers that its members grant it, thus local governments have greater authority when dealing with local issues.

Because of this, the central government is usually relatively slow to react to a crisis, while those local governments tend to react as they see fit in a timely manner. To reflect this, each small or larger population is treated as having a free (ICC) which can issue orders to units within two warp jumps of the system.

Very close to a group of clans in nature, it is usually a hotbed of political intrigue and plotting between the member states. Confederacies are always willing to add nations to their merry little club through treaties and alliances, but tend to insist upon the individual freedoms of each of their members. Because all the members must agree on any treaty negotiation, consideration delays always occur.

Despotism: Despotism is a state ruled by someone that under reasonable circumstances would not be in charge. Despots either seize power by the use of force, or are placed in power by someone else through the use of force. As the backbone of sustained rule is the military, despots spend a considerable percentage of the government's resources on the military, which is quite respectable. Nonetheless, despots always face factions supporting the 'rightful' rulers, and thus cannot be considered as unified as a dictatorship. There is a 2% chance per turn that a despotism will destabilize itself. Bribes are required to get anything done

Herd Race(a.k.a. the Bovine Herbivoracity): This race is just sounds like - a space faring species that has all the behavior and instincts of herd beasts. This means they are generally peaceful beings that would rather run from a threat than fight it they are cornered and forced into combat, at which point they fight like rabid animals.

Herd races will only emplace colonies on habitable planets. However, they can emplace (or evacuate) those populations using 50% the normal Q requirements at 75% the norm, H requirements are at normal rates and costs. In order to compensate for losses inflicted by predators, they tend to breed faster than other races. All Herd race population growth is at 150% the normal rate(after all other modifiers).

Herd races have a great deal of social inertia. This they are slow to make decisions or start working on something new. Despite this reduced technological capability, herd races are always able to build freighter hulls two sizes larger than normally allowed by economic level.

They rarely initiate treaties with other races due to the (usually true) idea that others are out to get them and consideration delays always occur. The number of warships other races in their system always affects the RC of the herd race towards all races that currently have ships in the system as if they in a First Contact situation.

When another race enters a herd race system, the herd will not initiate contact but will respond to contact. If a race does not initiate first contact and does not show evidence of having "significant military capability or mindset", there is a chance that the herd race will ignore the presence of the other race, and continue on as if they were there. When first encountering a new race, make a RC check and if the result is less than the herd races' RC they consider this intrusion to be a threat. If the other race *does* show a "significant military capability or mindset" the herd race think of them as a threat, and respond accordingly.

When threatened or when negotiation results indicate, a roll on the War Type Table is made and the result becomes number of warp jumps they will travel in an attempt to escape the race that threatens them (exception: the Herd race will not leave its homeworld nor jump past it). An All Out War result means they will move $(d10/2)+2$ systems away. After running the indicated number of warp jumps, the herd race will begin surveying for a habitable planet in which to set up a new colony, being *sure* not to go in the direction of any races they may be trying to avoid. Because a herd race may need to perform warp point surveys on short notice, all of their ships greater than 30 hull spaces must have science instruments.

Actions that herd races considered to be threatening:

- If more than 10% of the ships other races have in the system are warships (number of ships exceeds 2).
- If a race in a Herd system, drills ships or fires on *any* race's ships or colonies.

If a herd race colony is attacked, it will be abandoned to its fate, and all nearby colonists will be saved if it can be safely done. Herds are willing to sacrifice a small number of their kin to preserve the existence of the rest; thus, when fleeing in a combat situation, they willingly use simultaneous transit in order escape.

When trapped (no WPs known or in the home system), they turn on whatever it is they consider to be threatening them. When this happens, they will attempt to perform a naval "stampede" past/through enemy fleets including ramming.

Herd races favor distant "less threatening" combat.

Socialism: A socialist state is built by careful control and distribution of goods and labor. All distribution, including who gets what job, is arranged by the government in the way the it feels is most beneficial for 'the people'. To a socialist, there is no such thing as personal property, so one must be very talented indeed to initiate trade with such a state.

Theocratic Democracy: Theocratic democracy is a democracy in which members of the church are the citizens. Those who do not follow the ways of the one true religion are worthy only of contempt, and are shunned. Only citizens of the one true church may participate in government. Since review, and prayer, by Church officials is necessary, consideration delays always occur.

Theocratic Anarchy: An anarchic state unified by it's people's love of religion, if nothing else. This government is typified either by myriad religions without enough political strength to actually take control of the government, or by sundered groups of prophets and theologians who can agree on nothing but the most basic concepts of the core religion. Theocratic anarchies tend to be very unstable and inefficient, thus, consideration delays always occur.

TWO SUCCESS GOVERNMENTS

Clan: Clans are groups of interrelated families (which can sometimes grow quite large). Among the clans strong rivalries thrive, but at the appearance of an outside threat they tend to band together for mutual defense, in a fashion similar to a confederacy or feudal system. Unlike confederacies or feudal governments, however, clans are much more likely to be friendly towards outsiders. Because of their internal squabbling, they have very respectable militaries and consideration delays always occur.

Constitutional Monarchy: A monarchy having a constitution that defines exactly what powers the monarch does and does not have. With the exception of having a parliament that shares governmental powers with the monarch, this government type is essentially the same as an absolute monarchy. Consideration delays always occur.

Fascism: This government type is an ordered police state, believing in its own superiority. Fascists have a market economy, and will often willingly trade with other races. As they believe in the superiority of their race, they are highly resistant to Amalgamation, and will only do so if the offering race is a D/C type race. (I.E. willing to allow the Fascists their autonomy - in which case, it is more a partnership than an amalgamation anyways).

Feudal Monarchy: Delegated rule through a series of ever more localized aristocrats, who in turn rule the common serfs of their lands. Though feudal societies are prone to territorial disputes and court intrigues, they can pose a rather thorny threat to those who take them lightly. All power ultimately rests on a ruling monarch, who can levy troops to defend the kingdom. Feudal kingdoms tend to fight only defensive actions or very limited wars to expand their holdings. Because of this feudal monarchies always have a +10 modifier when making a War Check. Bribes are required to get anything done.

Guild Syndicate: Function-specific guild masters who in turn preside over the journeymen rule a guild syndicate. Every segment of society has their associated guild to which they owe fealty and gold. Guild syndicates tend to fight only defensive actions or very limited wars to expand their holdings. They have a -10 modifier when checking War Type. Bribes are required to get anything done.

Imperial Council: An imperial council is an empire of subject nations who have given all power to a central corps of imperial ministers and advisors. Each of these has direct control over a particular aspect of the internal workings of the empire (for instance, trade, militia, fleet, civil defense, transportation, etc.). Imperial councils answer quickly to changes in the political environment. They are, however, prone to internal squabbling over funding that never seems able to cover all of their grandiose plans. Bribes are required to get anything done.

Military Bureaucracy: Basically the military bureaucracy is a military hierarchy....in triplicate, submitted to the Accounting Department after being approved by the Oversight Committee for Space Expeditionary Forces Abroad, and authorized by Sector High Command. Like the military theocracy, this state is highly chauvinistic, and extremely militant. The big difference between the two is that one follows the Book, the other the Manual. Needless to say, consideration delays always occur.

Military Hierarchy: Ever been in the armed forces? Imagine if all of society was like that. Always follow your chain of command! A military hierarchy is willing to hire mercenaries (how they feel of military alliances) as long as they know their place in the command structure and follow orders like proper soldiers. Usually members of a military hierarchy are extremely diligent in following through on any plan of action (as if they have any other kinds of plans). Once engaged in a war, if they have the advantage, they will not stop until the enemy is totally defeated. But they will accept peace talks in a stalemate or losing situation.

Pedagogical Oligarchy: Think of college. The teachers are in charge. Students are merely mentally impoverished citizens, who might one day rule if they show themselves to be intelligent enough to join the ruling class. Though the government may seem too weak to be considered a two-success race at first, think of what can occur in a society built solely on the supremacy of knowledge. Pedagogical Oligarchies research like mad. Any one facing them can expect a small and poorly trained, but scientifically advanced fleet. To reflect their academic acumen, increase all starting SL by 1 plus all target RP are -20% and the chance of any breakthrough is doubled.

Plutocracy: An Plutocracy is rule by the very rich (either one must achieve a certain level of wealth before becoming a citizen, or there are only so many persons who are allowed to rule, and the richest few reign). More militant than some, mainly because the citizens are not in the military classes, these governments can be tough opponents, particularly if their rearward areas (containing their non-combatant

leaders) are attacked. They are always hungry for trade to make them richer, and for militaries mightier than their own to engage their enemies far from their holdings. Consideration delays always occur.

Republic: Each individual "state" that is part of the republic has a governor, and one or more representatives in the Senate. The Senate makes all official policy for the republic as a whole, while the individual governors set policy for their individual states. Consideration delays always occur because, on the month a treaty is offered, acceptance is checked for normally, and may be tentatively accepted. The following month, a second check is made to see if the Senate ratifies this decision, making it official and final. This process is also used when making a War Check.

Theocracy: Priests of a single powerful religion are in control of a theocratic government through canonical law. They dislike anyone interfering in their affairs and they are disinclined to be controlled by anyone. NOTE: Don't be fooled by the apparent weakness of this government type. They have no overt advantages, but no disadvantages either. They are in essence a Player Race that is unlikely to jump into a treaty with anyone.

THREE SUCCESS GOVERNMENTS

Feudal Theocracy: Delegated rule through a series of ever more localized church officials, who in turn rule the faithful of their lands. Though feudal societies are prone to territorial disputes and intrigues, they can pose a rather thorny threat to those who take them lightly. All power ultimately rests with the mother church, who can levy troops from the various lords. Feudal theocracies tend to fight limited wars to spread the faith and expand their holdings. Due to the number of wars they fight, a Feudal Theocracy starts with two crack admirals, one average admiral, and they have a permanent +10 modifier for War Checks to reflect their willingness to convert their neighbors "by the sword". During these crusades, the feudal theocracy will attempt to minimize civilian losses, as they are potential converts.

Khanate: A group of clans, unified under a single leader through the use of military force into an empire of uncompromising honor and discipline is known as a Khanate. Very impulsive, a khanate tends not to wait around to see what will happen next, but will instead take immediate military action.

They have a +20 modifier to all War Checks. One of their favorite tactics is to perform a Demonstration Nuclear Strike to show their willingness to crush their enemies beneath their boot. If the population receiving the demonstration does not surrender, the Khanate will instead attempt to raze the planet through the use of nuclear, or if available, antimatter bombardment.

First Contact normally includes a request for the other race to surrender to the Khanate immediately. Negotiations will proceed from there. If a race manages to defeat an attempted conquest, the Khanate will show great respect and have a permanent -10 RC modifier towards that race. Any act of treachery on a Khanate will result in a permanent +10 RC modifier towards the treacherous race, and the Khanate will declare all out war in an attempt to eradicate the offending government from the face of the universe. The Moral: always deal carefully, and honestly with a Khanate.

Khanate will always keep 75% or more of their active military fleet on the borders of their territory. Non-border systems will be lightly guarded, if at all. If a non-border system is attacked by a race previously known, the Khanate will not fall back to re-conquer the system. Instead they will mount an immediate attack on any systems known to belong to their treacherous neighbor, and attempt to burn a path of nuclear fire to their recently invaded system over the ashen corpses of the assassins' fallen colonies. During this time, any inactive or home defense units will be activated to prevent the invasion from getting any further.

A khanate uses low security levels with conquered colonies hoping to speed the process of integrating the colony. Any revolt is considered treachery.

If a khanate is offered a treaty, they will only provide an answer if they are willing to accept and NO answer if they do not accept (it is always under consideration). A Khanate will never accept amalgamation into another race, however they may partner with or amalgamate races they have conquered into their empire.

Every month there is a 2% chance of succession. If succession occurs the highest graded admiral becomes the new Ilkhan, and is no longer available to personally lead military forces. Existing treaties will be unaffected by this transition.

Military Corporation: Similar to a corporate government, a military corporation is ruled by one or more major military or defense contractors. These corporations usually came to power due to long planetary (or possibly interplanetary) conflict allowing them to slowly gain in influence and policy setting capability through successful political ballot stuffing and spin doctor lobbying. They care little for low-return investments and are very open to any negotiations that will enrich the ruling corporations.

They will happily enter into and honor any military alliance, and because of their desire to continue providing quality (expensive) military and defense products all War Checks are at +10 due to their devious diplomatic practices (remember the lobbying and ballot stuffing?). Any race that has a Military (or Trade and Military) treaty with them will receive a +5 modifier to their War Checks as well. If they possess a military system one of their allies does not, they will be more than happy to provide the information on the system ... for 100x the systems price. [Reminder: Never trust a smiling SM.]

Military Empire: The military empire is normally the result of a military hierarchy (or bureaucracy) that has conquered and integrated other governments into itself. Conquered states eventually become integrated into the 'chain of command'. The ties between the members of the empire are almost exclusively military, with civilian aspects of government normally left up to local officials. A military empire will normally not attempt genocide upon their enemies, as would be a waste of potential military resources (once they have been properly indoctrinated, educated).

Military Republic: Each individual "state" that is part of the republic has a military governor, and one or more civilian representatives in the Senate. The Senate makes all official civilian policy and makes recommendations to the military for the republic as a whole, while the individual governors set policy for their individual states. Consideration delays always occur because, on the month a treaty is offered, acceptance is checked for normally, and may be tentatively accepted. The following month, a second check is made to see if the Senate ratifies this decision, making it official and final. This process is also used when making a War Check but all War Checks receive a +10 modifier.

Military Unity: The military unity is a state where every person is part of the military, and they all work towards a common, united end. There is little, if any, discord within the ranks of a military unity, only single-minded pursuit of purpose. Due to their skill at arms, a military unity has no compunction against using force to achieve their goals. To reflect this they have a +20 modifier to all War Checks.

Racial Unity: A racial unity is a species where each person knows his place and fulfills it to the best of his ability, while at the same time knowing exactly how his work fits into the whole. This means that everyone gets along almost perfectly, thus creating an extremely efficient group capable of completing just about anything they set their minds to. Because members of this race work so efficiently together, their ships base crew grade is crack. Due to the racial solidarity, it is extremely difficult for any race (even another racial unity) to amalgamate with them.

OPTIONAL RULES

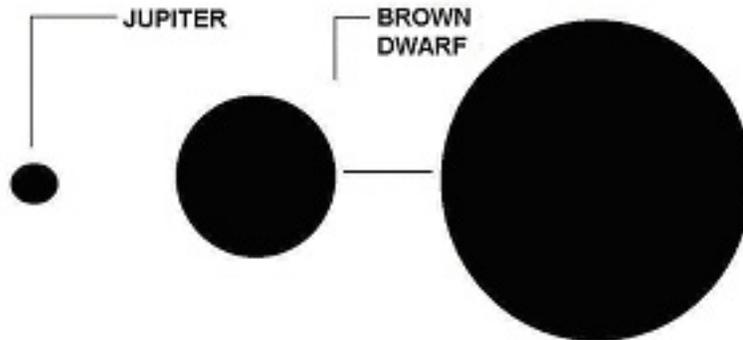
Aquan Race: A unique and powerful NPR (or possible player race), I developed Aquan races after I came up with the idea that all T10 worlds were waterworlds (this was before I discovered circular habitability). If a T10 world is a player or NPR homeworld, then they are automatically an "Aquan Race". Aquan races have the following abilities:

- Their T10 worlds can have x3 as many PU (9600) as other races (they get to use all of a planets' surface, not just the continental areas).
- Aquan races get +1 to small craft combat (they are born and move in a natural 3D environment). Max population size for non-Waterworld races is 1800 PTU.

Benign Hive Mind Race: This is a seriously dangerous race that can ally with a player race to help him/her out in difficult times. These aliens are exactly like the standard "hive mind race" except they are friendly! This type of NPR (should never be a player race!) can be the best ally you ever had, and a major headache for a SM. *Editor's note: Once I was done needing this race, I have had them "mutate" into*

something less destructive and in once case the whole race got a highly contagious fatal disease which wiped out 90% of their population(the guy really didn't need their help anymore).

Brown Dwarf(BD): Exceptionally large gas giants, Brown Dwarfs are usually up to 10-30 times larger than Sol's Jupiter. These gas giants are on the edge of being a planet as anything more massive would ignite into a star. Intense radiation and gravity bands circle this star, making it a most unfriendly environment, lethal to ships without DF. There is a chance that the three innermost moons are T-type planets (50%, 30%, 20% chance respectively). Brown Dwarfs have 5 moons and 1d10 additional moons (due to the BD's massive size and gravity well).



Balkanized World: This planet has 1d10+1 large “nation states”, which between them control the entire world. While this state will not persist once the race becomes HTL, it makes dealing with them a pain. Each nation has an equal share of the population, and must have separate treaties formed with each nation. Once you form a treaty with one nation, the RC of all the other nations goes up by five points, for good (increase only once).

The nation states will not form any treaties between each other, and threats and posturing are perfectly normal, although their low tech weapons limits their ability to threaten off-worlders. However, it is not untypical for a number of smaller nations to form voting blocks vs. larger nations. Each nation will begin building a space station when they reach Ind-2, although there is a 75% chance that any given nation's space station actually gets finished (otherwise it has an accident; blows up or something). Each space station is as follows: HQLhBbs(SY).

Each nation state has its own government type (no three success governments) even if still Industrial. Multiple governments of the same type are allowed. No nation will control more than four times as many PU as the smallest nation and no government will have more than 50% of the PU (unless only two governments exist in which case the larger will have 50+2d10%).

When the “Nation States” becomes HTL, roll 1d100 vs. the original RC. If lower or equal to RC, then a brief but nasty “*War of Unification*” is fought, and 1d5 of the nation states and 50+2d20% of their populations are destroyed. Surviving population (or is all dice roll is above RC), re-roll government type as per-normal for their active status.

If a nation becomes involved in a war, roll 1d100 for each other nation.

1-60 Nation aids the first nation

61-80 Nation is neutral

81-100 Nation declares war on the first nation.

Editor's Note: This type of planet can be very useful. I placed a balkanized world like this in a strategic system that gave one of my players' fits. It was a Warp Point Junction (the only one in that entire universe), a vital crossroads that my player was desperate to control. He was forced to intervene in the local politics and unite the entire planet, bogging his exploration surveys down.

Circular Habibility: Circular habibility is a great idea, one of the best I have ever seen. This allows T10 homeworld races to colonize T1 and T2 worlds as benign planets. For example, if you have a T8 or a T1 as a homeworld, then the habibility of the following worlds can be seen below:

<u>Planet</u>	<u>Habibility</u>	<u>Planet</u>	<u>Habibility</u>
T1	Harsh	T1	Homeworld
T2	Harsh	T2	Benign
T3	Harsh	T3	Benign
T4	Harsh	T4	Harsh
T5	Harsh	T5	Harsh
T6	Benign	T6	Harsh
T7	Benign	T7	Harsh
T8	Homeworld	T8	Harsh
T9	Benign	T9	Benign
T10	Benign	T10	Benign

Dormant Berserker Base: Oops, you have found a dormant Berserker Home Base! Closer investigation will activate the base, which is built into a moon, contains a berserker fleet. There are 1d10x100 hull spaces worth of berserker warships (SM's choice of hull sizes). The base takes 500 points of damage before being destroyed, and it is partially protected by a Reinforcer Field: the moon is covered by a modified drive field projector and thus takes normal damage. The berserker fleet will attack any ships in the system and they have an additional 1d4+3 warp points adjacent to their system mapped out and able to pursue enemy vessels into those systems. Once destroyed, the berserker base contains 10,000 MCr worth of raw materials. This is a random chance happening, up to the SM's whim.

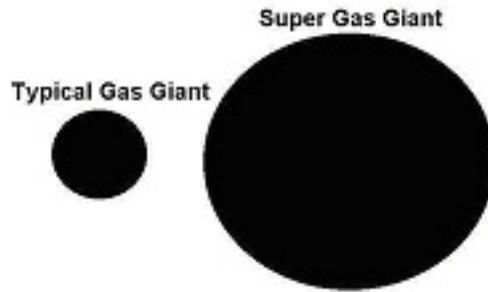
Greenhouse Worlds: The "active CO2 cycle" of a planet can sometimes allow the formation of a Greenhouse World, a O2 planet that is inhabitable. The first O2 planet of any system can possibly be a T-world with an active carbon dioxide cycle that enables life to flourish outside the normal Habitable Zone. There is a 5% chance for this to occur, first inner O2 world only. *This modification and "waterworlds" are in the System Generator that Troy has built for my Universal Bug Hunt Campaign (thanks Troy!).*

Gunboats in Boat Bays: Someone had a idea that I thought was really great: *the basing of Gunboats in boat bays.* I believe the rule was one Gunboat could be held and re-armed within a BbL. I am not sure about the re-arming *time*, but a good SM can figure out his own timeframe.

Hive World Civilization: This is a high-tech race. Any and all habitable worlds in the system are covered by vast spires and buildings, spanning the entire planet. All non-habitable bodies are totally full, and habitable bodies have *double* the usual limit of PU(in the wrong system they can have a *massive* amount of PU!). In all other ways this race is normal and they will colonize normally—it took them centuries of building to make their home worlds into "hive world" types, which is not possible within the Starfire timescale. A very nasty NPR....

Megaplanet: This planet has been inhabited for such a long time that its entire surface is totally covered by a single large megacity, with a trillion inhabitants living under its vast metallic surface. While one trillion people equals to 80,000 PU, a SM can modify this number to less than that for gaming purposes if needed. While 80,000 PU equals to about 250,000 GPV(that's *alot* of cash!) if a seriously nasty NPR or ally is needed, or a race is unwilling to leave their home system, then this race is an acceptable ally. *Editor's Note: several times I had a player who had made a big mistake(or two) and needed help so I sent these guys in to help him out with a fleet or two; well yeah they were really large fleets, but the guy needed a lot of help! ☺*

Super Gas Giants(SGG): If a gas giant is massive enough to reduce the next planet to rubble(creating an AF), it is classified as a Super Gas Giant(ISF, pg 14). SGG have an additional 3d6 moons. The innermost moon has a 50% chance of being T-class, which is automatically Harsh and can support a maximum population of Small.



Trinary Star Systems: A rare star system, there are three types of Trinary stars:

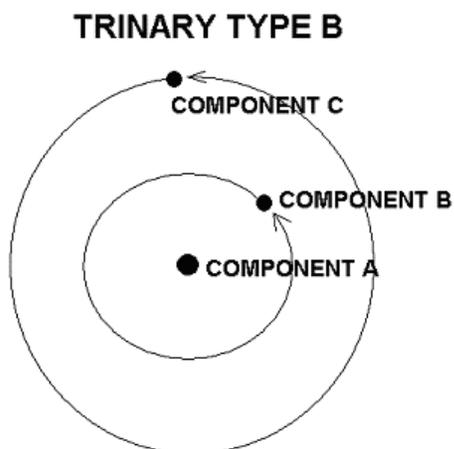
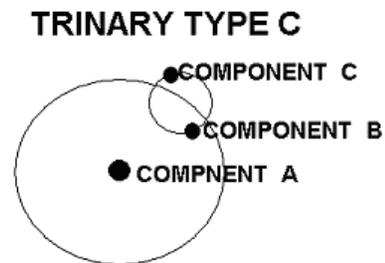
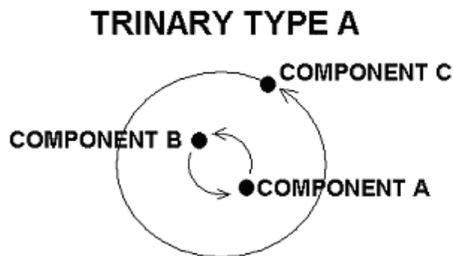
Type A (01-60%): Central star with two other stars orbiting it, the second star at:

- 01-25% 50 LM
- 26-50% 150LM + an additional 2d10x2 LM
- 51-00% 250LM

The third star is located at 700LM (usually a red dwarf star -70% chance, or red star -30%).

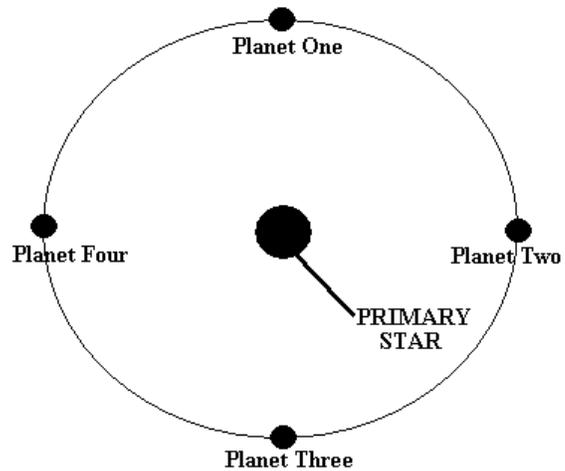
Type B (61-90%): Two stars orbiting each other and one star at 2,400LM from Component A and three radians clockwise from bearing of Component B. It takes 4 StMP to travel to or from Component C from either A or B or the warp points. The third star is always a red dwarf.

Type C (91-00%): A primary star with two companion stars (90% Red Dwarfs, 10% Brown Dwarf).



Rosetta Worlds: This system contains 2-6 planets in the same (randomly rolled) orbit--the orbit must be within the rocky planet zone. For two planets orbit 180 degrees from each other, for 3 they orbit 120 degrees from each other, for 4 they orbit 90 degrees from each other, 5 orbit 72 degrees from each other, and 6 orbit 60 degrees from each other. Moons, mass, richness, and habitability are rolled separately. Rosetta worlds are *not* naturally occurring!

ROSETTE WORLDS



Warp Point Junction: A significant and strategic warp point anomaly, a Warp Point *Junction* is different from a Warp Point *Nexus* in the following manner: a Junction has up to six warp points in close proximity to one another. The WP are all located within a single System Hex, with each WP being within 20 tH from the center of the sH in a different scattergram direction. There is a 10% chance that this system has 10 warp points, each located on a different radian. WPs can have different visibilities.

CHARTS SECTION

I created this section to be a “help” to other players and SMs who are tired of looking through three books for tech information and pulling their hair trying to figure out how many XO Racks each starship can have. Also included are some alternate NPR rules:

NPR DISCOVERY RATES

ROLL	TL
01-71	None
72-73	Discovering Race -4
74-75	Discovering race -3(min Ind2)
76-80	Highest player race -3(min Ind2)
81-83	Discovering race -2(min TL1)
84-86	Discovering race -1(min TL1)
87-90	Discovering race
91-94	Highest player race
95-97	Highest player race +1
98+	Highest player race +2

(Thanks Daniel Kocheiser for this chart!)

NUCLEAR BOMBARDMENT TABLE

It is possible and even probable that through the course of the game people are going to use large amounts of nuclear weapons on planetary surfaces. There will be consequence to using weapons massive amounts of nuclear weapons. These effects are as follows:

For every population level that is destroyed by Nuclear or Antimatter Weapons the planets habitability is reduced by 1 level. Consult the chart #1 to see the different levels. All Nuclear or Antimatter weapons used against PDC and / or PCF’s cause collateral damage. Collateral damage will kill a number of PU/IU equal to the damage of the nuclear or antimatter weapon used. Do not count the x5 bonus damage missile weapons get for being used in an atmosphere. Also 10% of all nuclear and antimatter weapons that miss their targets will cause collateral damage. Do not count weapons shot down by point defense and please note point defense maybe used to shoot down weapons that miss to prevent collateral damage.

Bloody enough for you? It gets better. PDC can use their missile weapons in a ground support mode to help repel invading PCF’s. Just as nuclear or antimatter weapons fired from space, these ground fire PDC will cause the same exact collateral damage.

PLANETARY BOMBARDMENT CHART

Population Levels Destroyed	New Effective Habitability Level
1	No Effect
2	No Effect
3	Outside of Habitability Index
4	Counts as a Hostile Environment
5	Counts as a Desolate Environment (O2)
6	Counts as a Desolate Environment (O2)
7	Counts as a Extreme Environment (O1)

*Please note if a planet is normally a Hostile Environment for your race and planet has suffered a planetary bombardment please move down two levels on chart for number of levels destroyed. (Editor's Note: thanks Mike Rohde for this chart!)

TECH CHART

Tech Level	Code	Cost	Spaces	Code	Tech Level	Cost	Spaces
Ind-2	A	2	1	!#	5	##*25	1
Ind-2	Gb	5	3	"(Ig)"	12	150	3
Ind-2	BM	0.05	-	"(It2)"	11	80/HS	Varies
Ind-2	GMB	0.01	-	"ADMc"	13	5	-
Ind-2	B	2	1	"AFMc"	11	10	-
Ind-2	H	1	1	"AMBAM"	10	30	-
Ind-2	Hs	1	1/2	"fL2I"	13	15	-
Ind-2	Q	5	1	"-HK"	8	Free	-
Ind-2	L	30	4	"-It"	7	50	1
Ind-2	Lh	20	1	"XOg"	10	30	1 per 8
Ind-2	Mg	10	1	(\$R1)	15	125	1
Ind-2	R	10	3	(2Mi#)	13	350/level	3
Ind-2	Bomb	0.05	-	(-AAM)	11	Missile x9	-
Ind-2	Qs	15	1	(AC)	1	20% of Hull	-
Ind-2	(SP)	5	30	(AM)	5	50% of EC	-
1	(AC)	20% of Hull	-	(AM2)	8	100% of EC	-
1	(BbL)	20	3	(AM3)	14	200% of EC	-
1	(BbM)	15	2	(AMG)	13	125	2
1	(BbS)	10	1	(BbL)	1	20	3
1	(CHS)	100	15	(BbM)	1	15	2
1	(CIC)	50	4	(BbS)	1	10	1
1	Ic	4	2	(CC)	2	100	5
1	ct	8	-	(CHS)	1	100	15
1	ic	3	1	(CHS2)	5	200	10
1	i	5	One	(CIC)	1	50	4
1	ICC	7500	Small Pop	(CIC2)	12	150	1
1	(SYMx)	150	25	(DCS)	3	100	8
1	I	10	1	(DCS2)	11	160	4
1	X	50	1	(DeC)	8	50	10
1	S	4	1	(Dec2)	13	85	8
1	(Syx)	400	80	(HET2)	11	95	5
1	st	20	-	(HET3)	15	140	4
2	Db	15	2	(Ig2)	15	250	3
2	(CC)	100	5	(It3)	13	100/HS	Varies
2	CD	2	-	(It4)	15	120/HS	Varies
2	DSB-n	10	-	(MCS)	6	100	3
2	(XO)	3	1 per 5 HS	(MF)	6	15 per pattern	-
2	G	15	3	(Mi-#)	9	200/level	8
2	W	20	3	(MSx)	3	100	25
2	M#	(15*#) -5	1	(RAM)	8	75	15
2	GM	0.1	-	(SP)	Ind-2	5	30
2	SM	0.1	-	(SYMx)	1	150	25
3	ast	30	-	(Syx)	1	400	80
3	Z	40	0	(XO)	2	3	1 per 5 HS
3	(DCS)	100	8	(Z2c)	11	250	10

Tech Level	Code	Cost	Spaces	Code	Tech Level	Cost	Spaces
3	DSB-L	35	-	?#	4	20 + #*20	1
3	Xr	50	2	?g#	15	150 + #*50	3
3	(MSx)	100	25	?j	9	90	2
3	D	25	2	?k	11	120	4
3	T	10	2	A	Ind-2	2	1
4	?#	20 + #*20	1	Ac	9	5	1/3
4	EDM	3	-	Ac2	12	9	1/6
4	F	40	4	Ac3	15	12	1/9
4	DSB-ncd	150	-	ADM	7	1	-
4	Pb	10	2	AFM	10	4	-
4	C	15	1	AFM2	11	6	-
5	(AM)	50% of EC	-	AFM3	13	3	-
5	CM	0.25	-	AFM4	15	4	-
5	Rc	40	5	AFSC	6	30	-
5	(CHS2)	200	10	Ai	5	4	1/2
5	!#	#*25	1	AI	11	9	-
5	Ai	4	1/2	AI2	12	12	1/3
5	Bi	4	1/2	AI3	15	15	1/5
5	P	50	4	AM	9	Missile x 4	-
5	DSB-Xr	15	-	AMBAM2	12	50	-
5	Tf	5	1	AMBAM3	15	50	-
5	Tx	50	2	AMBAMP	13	35	-
6	Wa	55	3	AMBAMP2	16	50	-
6	AFSC	30	-	AMMF	10	35 per pattern	-
6	S0	6	1/2	AMP1	13	Missile x1.5	-
6	Dc	35	3	AMP2	15	Missile x2	-
6	Tc	20	3	Apn	8	60	-
6	E	45	4	ast	3	30	-
6	IDEW-x	Weapon +15	-	ast2	11	55	-
6	(MCS)	100	3	B	Ind-2	2	1
6	(MF)	15 per pattern	-	BAM-G	8	5	-
6	Pg	35	2	BAM-R	8	1.5	-
6	pfG	0.5	-	BAM-Rc	8	5	-
6	Xrs	25	1	Bc	9	5	1/3
7	ADM	1	-	Bc2	12	9	1/6
7	Pbc	20	3	Bc3	15	12	1/9
7	CAM	0.5	-	Bi	5	4	1/2
7	Dz	50	2	BM	Ind-2	0.05	-
7	"-It"	50	1	Bomb	Ind-2	0.05	-
7	HET	70	6	C	4	15	1
7	Ti	15	2	CAM	7	0.5	-
7	LT1	As Missile	-	CAM2	11	1	-
7	O	20	1	CAM3	15	1.5	-
7	pn	45	-	Cb	11	150	6
8	(AM2)	100% of EC	-	Cbc	16	300	9
8	Apn	60	-	CBM	11	0.5	-
8	BAM-Rc	5	-	CD	2	2	-
8	Fc	80	6	CM	5	0.25	-
8	Pc	75	6	CPM	14	150/Pattern	-
8	(RAM)	75	15	ct	1	8	-
8	fR	1	-	D	3	25	2
8	fG	1	-	Db	2	15	2
8	BAM-G	5	-	Dc	6	35	3
8	V	10	1	Dce	14	180	3
8	"-HK"	Free	-	Dcx	10	100	3
8	N	55	4	Dcz	12	160	3
8	F0	20	-	Di	9	30	3
8	BAM-R	1.5	-	DPOD	13	20	-
8	(DeC)	50	10	DSB-?d	13	200	-
8	Lx	40	3	DSB-?j	12	100	-
8	LWH 1	1	-	DSB-L	3	35	-

Tech Level	Code	Cost	Spaces	Code	Tech Level	Cost	Spaces
9	fR-AM	4	-	DSB-n	2	10	-
9	AM	Missile x 4	-	DSB-ncd	4	150	-
9	Ec	100	6	DSB-Xr	5	15	-
9	Ac	5	1/3	DSB-Xr2	11	55	-
9	Bc	5	1/3	Dx	10	75	2
9	f?#	#*20	-	Dxe	13	150	2
9	fL	8	-	Dxz	11	120	2
9	fM	0.2	-	Dz	7	50	2
9	F1	30	-	E	6	45	4
9	Tci	30	3	Ec	9	100	6
9	(Mi-#)	200/level	8	Ec2	11	150	6
9	Di	30	3	Ec3	14	150	6
9	?j	90	2	EDM	4	3	-
9	SBMHAWK	20	-	EDM2	11	4	-
9	Fs	120	10	EDM3	12	5	-
9	SBM	0.3	-	EDM4	15	6	-
10	Dcx	100	3	ERBM	14	1	-
10	IDEW-ax	Weapon + 30	-	F	4	40	4
10	Dx	75	2	f!#	10	#*25	-
10	AFM	4	-	f?#	9	#*20	-
10	AMMF	35 per pattern	-	F0	8	20	-
10	"AMBAM"	30	-	F1	9	30	-
10	f!#	#*25	-	F2	10	40	-
10	fLs	2	-	F3	11	50	-
10	fM2	0.2	-	F4	12	60	-
10	"XOg"	30	1 per 8	F5	13	70	-
10	S1	8	1/3	Fc	8	80	6
10	fXr	10	-	Fc2	11	90	6
10	GB0	80	-	Fc3	14	100	6
10	LT2	Missile x 4	-	fFK	14	4	-
10	SBMHAWK2	30	-	fG	8	1	-
10	F2	40	-	fL	9	8	-
11	fR-AAM	9	-	fL2	12	10	-
11	(-AAM)	Missile x9	-	fLs	10	2	-
11	AFM2	6	-	fM	9	0.2	-
11	A1	9	-	fM?	13	8	-
11	"AFMc"	10	-	fM2	10	0.2	-
11	CBM	0.5	-	fM3	12	1.25	-
11	Wc	60	5	fM4	14	2	-
11	?k	120	4	fM5	16	3	-
11	Z2	80	3	fP	13	50	-
11	(Z2c)	250	10	fR	8	1	-
11	Dxz	120	2	fR-AAM	11	9	-
11	Cb	150	6	fR-AM	9	4	-
11	DSB-Xr2	55	-	Fs	9	120	10
11	"(It2)"	80/HS	Varies	Fs2	12	135	10
11	ast2	55	-	Fs3	15	150	10
11	Ec2	150	6	Fvc	15	200	6
11	Fc2	90	6	fXr	10	10	-
11	CAM2	1	-	G	2	15	3
11	(DCS2)	160	4	Gb	Ind-2	5	3
11	EDM2	4	-	GB0	10	80	-
11	(HET2)	95	5	GB1	12	100	-
11	pn2	60	-	GB2	14	120	-
11	Pg2	75	2	GB3	16	150	-
11	SM2	1	-	gJ-1	12	30	-
11	SBMHAWK3	40	-	gJ-2	13	50	-
11	F3	50	-	GM	2	0.1	-
12	Dcz	160	3	Gmb	Ind-2	0.01	-
12	"(Ig)"	150	3	H	Ind-2	1	1
12	fL2	10	-	HARM	12	Missile x1.2	-

Tech Level	Code	Cost	Spaces	Code	Tech Level	Cost	Spaces
12	fM3	1.25	-	HBM1	15	3	-
12	F4	60	-	HET	7	70	6
12	GB1	100	-	Hs	Ind-2	1	1/2
12	gJ-1	30	-	i	1	5	One
12	HARM	Missile x1.2	-	I	1	10	1
12	DSB-?j	100	-	Ic	1	4	2
12	Wb	60	2	ic	1	3	1
12	RD	50	-	ICC	1	7500	Small Pop
12	AMBAM2	50	-	IDEW-ax	10	Weapon + 30	-
12	AI2	12	1/3	IDEW-x	6	Weapon +15	-
12	(CIC2)	150	1	JSF	15	80	-
12	Ac2	9	1/6	L	Ind-2	30	4
12	Bc2	9	1/6	Lh	Ind-2	20	1
12	S2	12	1/5	LT1	7	As Missile	-
12	O2	45	1	LT2	10	Missile x 4	-
12	Fs2	135	10	LT3	13	Missile x 9	-
12	Sr	125	3	LT4	16	Missile x16	-
12	EDM3	5	-	LWH 1	8	1	-
13	(Dec2)	85	8	Lx	8	40	3
13	AMP1	Missile x1.5	-	M#	2	(15*#) -5	1
13	Ta	30	1	Mg	Ind-2	10	1
13	AMBAMP	35	-	N	8	55	4
13	(AMG)	125	2	O	7	20	1
13	"ADMc"	5	-	O2	12	45	1
13	DSB-?d	200	-	O3	15	120	1
13	DPOD	20	-	P	5	50	4
13	(It3)	100/HS	Varies	Pb	4	10	2
13	Dxe	150	2	Pbc	7	20	3
13	F5	70	-	Pc	8	75	6
13	fM?	8	-	Pc2	14	205	6
13	fP	50	-	Pc3	16	300	6
13	SBMHAWK4	35	-	pfG	6	0.5	-
13	gJ-2	50	-	Pg	6	35	2
13	"fL2I"	15	-	Pg2	11	75	2
13	AFM3	3	-	Pg3	16	100	2
13	(2Mi#)	350/level	3	pn	7	45	-
13	RD2	90	-	pn2	11	60	-
13	SCW1	Missile x1.75	-	Q	Ind-2	5	1
13	LT3	Missile x 9	-	Qs	Ind-2	15	1
14	(AM3)	200% of EC	-	R	Ind-2	10	3
14	CPM	150/Pattern	-	Rc	5	40	5
14	Dce	180	3	RD	12	50	-
14	ERBM	1	-	RD2	13	90	-
14	ffK	4	-	Rh	15	500	15
14	fM4	2	-	S	1	4	1
14	Wa2	80	3	S0	6	6	1/2
14	Pc2	205	6	S1	10	8	1/3
14	GB2	120	-	S2	12	12	1/5
14	Ec3	150	6	S3	15	16	1/8
14	Fc3	100	6	SBM	9	0.3	-
15	Tca	60	2	SBMHAWK	9	20	-
15	AMP2	Missile x2	-	SBMHAWK2	10	30	-
15	Fvc	200	6	SBMHAWK3	11	40	-
15	(It4)	120/HS	Varies	SBMHAWK4	13	35	-
15	AFM4	4	-	SBMHAWK5	15	60	-
15	SBMHAWK5	60	-	SCW1	13	Missile x1.75	-
15	EDM4	6	-	SCW2	15	Missile x2.25	-
15	?g#	150 + #*50	3	SM	2	0.1	-
15	Rh	500	15	SM2	11	1	-
15	HBM1	3	-	Sr	12	125	3
15	JSF	80	-	st	1	20	-

Tech Level	Code	Cost	Spaces	Code	Tech Level	Cost	Spaces
15	Ac3	12	1/9	T	3	10	2
15	Bc3	12	1/9	Ta	13	30	1
15	S3	16	1/8	Tc	6	20	3
15	(Ig2)	250	3	Tca	15	60	2
15	SCW2	Missile x2.25	-	Tci	9	30	3
15	(SR1)	125	1	Tf	5	5	1
15	A13	15	1/5	Ti	7	15	2
15	AMBAM3	50	-	Tx	5	50	2
15	CAM3	1.5	-	V	8	10	1
15	(HET3)	140	4	W	2	20	3
15	O3	120	1	Wa	6	55	3
15	Fs3	150	10	Wa2	14	80	3
16	Wca	150	5	Wb	12	60	2
16	AMBAMP2	50	-	Wbi	16	100	2
16	Cbc	300	9	Wc	11	60	5
16	LT4	Missile x16	-	Wca	16	150	5
16	Wbi	100	2	X	1	50	1
16	fM5	3	-	Xr	3	50	2
16	Pc3	300	6	Xrs	6	25	1
16	GB3	150	-	Z	3	40	0
16	Pg3	100	2	Z2	11	80	3

HULL CHART(EXPANDED)

WARSHIPS	TL	Hull Space	Cost/Space	Turn Mode	Max I Speed	Engine/Move Pt	Total Hull Cost
EX(Explorer)	1	5-7	1.0	2	8	.25	7
ES(Escort)	1	8-12	2.0	2	8	.34	24
CT(Corvette)	1	13-16	2.5	2	8	.50	40
FG(Frigate)	1	17-20	3.0	2	7	.67	60
DD(Destroyer)	1	21-30	4.0	3	7	1.0	120
CL(Light Cruiser)	1	31-40	4.5	3	6	1.5	180
CA(Attack Cruiser)	2	41-60	5.5	3	6	2.0	330
BC(Battlecruiser)	3	61-80	7.0	4	6	2.5	560
BB(Battleship)	5	81-100	8.0	4	5	3.0	800
DN(Dreadnought)	7	101-130	9.0	5	5	4.0	1,170
SD(Superdreadnought)	9	131-165	10	5	4	5.0	1,650
MT(Monitor)	11	166-200	12	6	4	6.0	2,400
MH(Heavy Monitor)	13	201-250	14	6	4	6.0	3,500
SM(Supermonitor)	14	251-300	16	6	3	7.5	4,800
LV(Leviathon)	16	301-400	20	6	2	9.0	8,000
JG(Juggernaut)	18	401-500	24	6	2	12	12,000
TN(Titan)	20	501-700	26	6	1	18	18,200
BT(Battle Titan)	22	701-800	28	6	1	24	22,400
BM(Battle Moon)	24	801-1000	30	6	1	30	30,000

CARRIERS	TL	Hull Space	Cost/Space	Turn Mode	Max I Speed	Engine/Move Pt	Total Hull Cost
CVX(Microcarrier)	1	1-7	6	2	8	.5	45
CVV(Small Carrier)	1	8-22	6.5	2	7	.75	143
CVE(Escort Carrier)	1	23-30	7	2	7	1.0	210
CVS(Strike Carrier)	3	31-45	7.5	2	6	1.5	338
CVL(Light Carrier)	6	46-60	8	3	6	2.0	480
CV(Fleet Carrier)	8	61-85	9	3	6	2.5	765
CVB(Battle Carrier)	10	86-100	10	3	6	3.0	1,000
CVA(Assault Carrier)	12	101-131	12	4	5	4.0	1,560
CVH(Heavy Carrier)	14	132-165	15	4	5	5.0	2,475
CVN(Super Carrier)	16	166-200	18	5	5	6.0	3,600
CVP(Premier Carrier)	18	201-250	21	5	4	7.5	5,250
CVU(Ultimate Carrier)	20	251-300	24	5	4	9.0	7,200

FREIGHTERS	TL	Hull Space	Cost/Space	Turn Mode	Max I Speed	Engine/Move Pt	Total Hull Cost
FT0	1	5-7	1.5	2	4	.25	10
FT1	1	8-12	2.0	2	4	.34	24
FT2	1	13-16	2.5	2	4	.5	40
FT3	1	17-22	2.75	2	4	.67	60
FT4	2	23-30	3.0	2	4	1.0	90
FT5	3	31-45	3.25	3	4	1.5	146
FT6	4	46-60	3.50	3	4	2.0	210
FT7	5	61-80	3.75	4	4	2.5	300
FT8	6	81-100	4.0	4	3	3.0	400
FT9	7	101-130	4.5	5	3	4.0	585
FT10	9	131-165	5.0	5	3	5.0	825
FT11	11	166-200	6.0	6	3	6.0	1,200
FT12	13	201-250	7.0	6	2	7.0	1,750
FT13	14	251-300	8.0	6	2	9.0	2,400
FT14	16	301-400	10	6	1	12	4,000
FT15	18	401-500	12	6	1	15	6,000

BASES	TL	Hull Space	Cost/Space	Total Hull Cost
Base 0 Outpost Station	1	1-15	2	30
Base 1 Defense Station	1	16-25	3	70
Base 2 Light Weapons Station	1	26-50	3.5	105
Base 3 Medium Weapons Platform	3	51-85	4	340
Base 4 Large Weapons Platform	5	86-120	4.5	540
Base 5 Light Battle Station	7	121-180	5	900
Base 6 Battle Station	9	181-250	6	1,500
Base 7 Heavy Battle Station	12	251-375	7	2,625
Base 8 Star Base	14	376-500	8	4,000
Base 9 Star Fortress	16	501-625	9	5,715
Base 10 Citadel	18	626-750	10	7,500

XO CHART

WARSHIPS	XO	COST
EX	1	3
ES	2	6
CT	3	9
FG	4	12
DD	6	18
CL	9	27
CA	12	36
BC	16	48
BB	20	60
DN	26	78
SD	33	99
MT	40	120
MH	50	150
SM	60	180
LV	80	240
JG	100	300
TN	140	420
BT	160	480
BM	200	600

CARRIERS	XO	COST
CVX	1	3
CVV	4	12
CVE	6	36
CVS	9	54
CVL	12	72
CV	17	102
CVB	20	120
CVA	26	156
CVH	33	198
CVN	40	240
CVP	50	300
CVU	60	360

SHIP CHARACTERISTICS

There has been a lot of commentary on the List about the tonnage and crew compliments of Starfire warships. I came up with a basic chart; this is not an absolute chart, just a rough outline which I use in my various stories. The crew requirement's below is a *basic* number, with slightly more or less being okay in my book. Enjoy!

CLASS	CREW	TONNAGE
EX	25	7,000
ES	70	12,000
CT	110	16,000
FG	175	20,000
DD	270	30,000
CL	450	40,000
CA	600	60,000
BC	800	90,000
BB	1,100	130,000
DN	1,550	180,000
SD	2,150	230,000
MT	2,800	285,000
MH	3,750	380,000
SM	4,800	500,000
LN	6,800	700,000
JG	9,000	900,000
TN	12,000	1,200,000
BT	16,000	1,400,000
BM	20,000	1,600,000

CLASS	CREW	TONNAGE
CVX	120	7,000
CVV	200	22,000
CVE	400	30,000
CVS	800	45,000
CVL	1,200	60,000
CV	2,000	100,000
CVB	2,300	130,000
CVA	3,000	180,000
CVH	4,000	230,000
CVN	4,500	285,000
CVP	5,500	350,000
CVU	6,000	425,000

SKY MARSHAL OPTIONAL RULES(SMOR)

1)Assessment of Enemy Tech Systems

(Non-Alkelda Tech Levels 1-9)

Post-Battle Debris Analysis (PBDA): Indicates the percentage chance that examination of enemy debris may yield the information necessary to begin research. Obviously, it is necessary for the enemy to have left the area before examination can begin. A ship mounting Xr is required and must begin the investigation within a week of the battle. This rule doesn't allow for the size of the battle, (a larger battle would produce a greater chance of useful debris) to avoid the tracking of enemy units and systems which would be involved. It can assumed that the detection chance is for a mid-sized battle and will average out over the course of a campaign.

Shields Down Detection (SDD): Indicates whether a system can be scanned sufficiently to gain useful technical information by a ship mounting Xr if the scanning ship is within 10 hexes and the target ship is shields down.

Detection Criteria at Range: Is based on 15 hexes with the targets shields either up or down. If any other range is assumed it will be noted in the text for the individual system. The detection criteria also only apply to ships mounting Xr. The information gained by this method may be readily apparent or the result of post-battle analysis of sensor data.

Name\Type of Tech System	PBDA	SDD	Detection Criteria at Range
Any type of armor	60%	No	None
Any type of shields	30%	No	None
All Beam Weapons (unless noted separately)	20%	No	Weapon is fired
All Missile Launchers (unless noted separately)	20%	No	Launcher is used

Gun\Missile Launcher	20%	No	Detected as an R if used in normal mode, a Gun in sprint mode and a W if the same launcher on the same ship in the same battle uses both the modes.
Advanced Gun\Missile Launcher	20%	No	As Gun\Missile Launcher but also detected as Wa if it fires twice in the same combat round.
All Missiles	-	-	Missile passes within 10 hexes. Note that the launcher could be more than 15 hexes away.
Enhanced Drive Missile	-	-	Used to intercept incoming fire
Anti-Drive Missile	-	-	Successful hit on a vessel within 15 hexes.
SBM	-	-	Passes within 10 hexes but fired at greater than thirty hexes
All Normal Point Defense	20%	No	Used to intercept incoming fire or attack small craft
All types of Datalinked Point Defense	20%	No	Detected as equivalent form of normal point Defense unless used to defend a different ship.
All Small Craft	20%	-	Small Craft flies within 10 Hexes
All Strikefighters	20%	-	Flies within 10 hexes or (within 15 hexes) flies faster or launches more weapons than any previously known fighter
Magazine	20%	Yes	None
Cargo Hold , Crew Quarters and Life Support	40%	Yes	None
Atmospheric Capability	40%	Yes	None
Boat Bay	40%	Yes	None
CIC	20%	Yes	None
Any type of engine	20%	Yes	None
Science Instruments	20%	Yes	Only if being used for surveying
Shipyards Module (+ MSx)	20%	Yes	Only if currently involved in construction
Courier Drone	20%	-	Flies within 10 hexes
XO Rack	40%	Yes	Weapon is launched from XO Rack
Multiplex Tracking	20%	Yes	Ship fires on multiple targets and hits with at least 50% more weapons than would be the statistical norm with standard tracking
Communications Module	20%	Yes	None
DSB	20%	-	Detected within 10 hexes.
Datalink	20%	Yes	Ships fire as a group
(DCS) or (MCS)	20%	Yes	System used to activate buoys
Long Range Sensors	20%	Yes	Xr is used to direct weapons fire against a target greater than 20 hexes distant (Still only detected by a ship or planet at 15 hexes or less)
Tractor Beam	20%	No	System is used
Presser Beam	20%	No	System is used
Shear Plane	20%	Yes	Ship fails to tractor target after successful to hit roll
Advanced Maneuvering 1	20%	Yes	Ship exceeds normal turn mode by 1
ECM	20%	Yes	Ship uses ECM to modify incoming fire
Minefield	-	-	Minefield attacks or ship approaches to 1 hex.
Engine Tuner	20%	No	Can be detected if activated and mounting ship exceeds normal maximum for class.
Improved Tractor Beam	20%	No	Detected as a T if used in tractor mode, a Pb in presser mode and a Ti if both modes are used by the same system on the same ship in the same battle.
Overload Dampener	20%	No	If used to reduce the effect of energy beams
Advanced Maneuvering 2	20%	Yes	Ship exceeds normal turn mode by 2
Hangar Bay	40%	Yes	Launches or recovers fighter
Drive Field RAM	20%	Yes	Active
HAWK Missile Upgrade	-	-	A missile is fired into a ship's blind spot
Fighter Weapons	-	-	Weapon is fired
Second Generation ECM	-	-	Detected when used to jam enemy datalink
Improved Multiplex Tracking	20%	Yes	If in use for five combat rounds or more within 15 hexes, the enemy can detect the small improvement

			in overall accuracy. Reduce this by 1 round for each version above 1.
Anti-matter warhead	-	-	Detonation
SBMHAWK	5%	-	Launches missiles

2)NPR Income - House Rules

- These rules are intended for NPR races that are activated ten turns after Player Races have been active. It was necessary to alter the standard rules because a long-playing NPR or Player Race can easily conquer newly starting out races.
- +0.5% PU on Homeworld per turn of game (e.g. after 80 turns, +40% PU)
- +0.5% per game turn added to system exploitation
- One extra turn's income for every ten turns of game time passed. (In addition to the normal six turns of income)
- Fleet is limited to a size where the total maintenance as a percentage of income is no greater than the warship percentage from the starting fund. If this means that a race cannot spend all of its warship fund, it may spend the money on bases (not space stations) to bring down the maintenance cost.
- Mothballed Fleet is limited to a cost equal to the active fleet
- If there is still money in the warship fund after the above, add it to the FT fund.
- If the system exploitation roll exceeds 120%, money from the FT fund may be spent on unarmed survey ships that do not count against the maintenance limit above.
- If the system exploitation roll exceeds 120% the race has discovered warp points prior to first contact and has explored nearby systems. For every 30% above 120% (FRU), the NPR has explored one transit out from their homeworld. The outer ring of systems will have system body surveys but not warp point surveys. e.g. A race with a roll of 160% will have explored two transits out but will only have carried out WP surveys for those systems one transit away. The population generated from the system exploitation roll may be placed in any of the new systems. The SE roll and any population emplacement is carried out before calculation of the number of IUs and the per turn income. Once the systems have been generated the entry WP of the discovering race is relocated to a random system (which may end up as the same system anyway). If this system has been surveyed then the entry WP is automatically closed. Play then continues as normal.
- Alternatively, for challenging late game NPRs, just allocate population on a reducing basis based on the distance from the home system. e.g. 1-2 transits, all habs maxed, 3-4, all habs at half, 5-6 all habs at one quarter max.

3)Fighter Weapons and ECM

Fighter weapons are less sophisticated than their ship borne cousins as a result they have far poorer accuracy, but they are also less effected by Engine Modulation (EM). As a consequence of this fighter weapons treat all EM at half effect (FRD). Thus a ship/fighter/small craft with 3 points EM would be at -1 to hit fir fighter weapons, but at -3 to hit for none fighter weapons.

Fighter weapons are all weapons prefixed with a lower case "f", they include fR, fR-AM, fR-AAM, fL, fL2, fL2i, fM1 etc.

Note:- Since Ghostmaker ECM produces false images rather than Engine Modulation fighter weapons suffer the full effect of Ghostmaker ECM.

Small craft (including fighter/gunboat) Squadrons and ECCM

When operating in squadron of at least 3 craft ECCM has difficulty in picking out each single craft from the each other and thus works at half effect (FRU). Thus a squadron using ECM and EM movement to produce 3 points of EM when targeted by a ship with !3 is fired at at -1 to hit instead of the normal -3.

Fighter ECM (f?#)

This is the fighter version of ECM. It is a system that modulates the drive field of a unit, perking up some parts and suppressing others, as well as influencing the shape of the drive field.. This has the effect of increasing the apparent volume of space where the unit could be, confusing enemy fire control computers, which will act on the default assumption that the unit is in the center of the drive field. This effect is similar to the effect of a unit modulating its drive field as per Engine modulation and so for game purposes the system adds “free” EM movement to the mounting unit. See the rules on EM for the fuller definition of how this EM movement effects the firing unit. PDCs are unaffected by spacecraft ECM to hit modifiers as their computers are powerful enough to resolve the exact location of the unit regardless of range.

Different versions of fighter ECM are available at various tech levels. Each higher tech unit is a little better than the previous one. These are listed below.

f?1TL9 Gives 2 Point of movement for use towards EM.

f?2...TL11 Gives 3 Points of movement for use towards EM.

f?3...TL13 Gives 4 Points of movement for use towards EM.

f?4...TL15 Gives 5 Points of movement for use towards EM.

f?5...TL17 Gives 6 Points of movement for use towards EM.

Etc. (+2 TL per level, +1 points per level)

Only 1 ECM of this kind system can be used at a time and the maximum points of EM a unit can have is ECM level + 3. A unit mounting ECM can stay in the same hex and still use EM, but ONLY with the points it gets from it's ECM.

Like multiplex tracking only f?1 need be developed, upgrades automatically become available at higher techs.

All are 2 fXO racks.

Development of f?1 costs 25000.

Cost is 20xlevel (f?1 = 20, f?2 = 40, f?3 = 60, ?f4 = 80 etc)

Bear in mind when working out the total EM that the first point of EM costs the unit 2 points of EM movement and all others cost 1 points of EM movement.

Fighter ECCM (f!#)

Fighter ECCM is a package of computers and sensor which tie into a units normal sensors suit and targeting controls to counter a targets EM (either caused by a unit jinking or by ECM).

Different versions of ECM are available at various tech levels. Each higher tech unit is a little better than the previous one. These are listed below.

!1...TL10 Reduces a single target unit 's EM by 1 point for the mounting unit only*

!2...TL13 Reduces a single target unit 's EM by 2 points for the mounting unit only*

!3...TL16 Reduces a single target unit 's EM by 3 points for the mounting unit only*

!4...TL19 Reduces a single target unit 's EM by 4 points for the mounting unit only*

!5...TL22 Reduces a single target unit 's EM by 5 points for the mounting unit only*

Etc. (+3 TL per level, +1 points of reduction)

* (See below for datalinks)

Note:- This is a reduction in the targets EM **not** a reduction in the to hit number. Fighter ECCM cannot reduce a targets EM to less than zero. That is if they had 3 points of EM and you mount !4 he is reduced to zero points of EM. If you had !2 instead he would be reduced to 1 point of EM.

Where a unit is part of a datalink group that unit can use the ECCM level of the lead of the unit in that datalink group. See the rules on datalink for definition of lead unit.

Because a single fighter ECCM unit only can only effect one target at a time, you may wish to mount multiple ECCM systems onto a single unit if you intend to fire at more than one target at a time. A unit can gains no benefit from using the more than one ECCM system against the same target.

Like multiplex tracking only f!1 need be developed, upgrades automatically become available at higher techs, requiring the unit to be refitted with the new system when it is available to get the benefit.

All are 2 fXO racks.

Development of f!1 costs 30000.

Cost is 25xlevel (f!1 = 25, f!2 = 50, f!3 = 75, f!4 = 100 etc)

Ship ECM

Ghostmaker ECM (?g#)

Ship ECM is somewhat different than traditional fighter ECM. Rather than deforming the drive field, Ghostmaker ECM creates false sensor images, fooling incoming missiles into detonating well away from their target. All fire targeted on a ship protected by Ghostmaker suffer to hit penalty which varies with the Ghostmaker ECM generation in use on the unit. Because of the way it works Ghostmaker is immune to the effects of ECCM. Because Ghostmaker ECM doesn't use the drive field to confuse enemy targeting sensor it can be used by unit's which don't have a drive field which includes PDCs. Unlike normal ECM, PDCs sensors are effected by Ghostmaker ECM.

?g1TL15 Gives -1 to hit when firing at the mounting unit.

?g2...TL18 Gives -2 to hit when firing at the mounting unit.

?g3...TL21 Gives -3 to hit when firing at the mounting unit.

Etc. (+3 TL per level, -1 to hit extra per level)

Only 1 ECM of this kind system can be used at a time.

Like multiplex tracking only ?g1 need be developed, upgrades automatically become available at higher techs.

All are 3 HS.

Development of ?g1 costs 50000.

Cost is 150 + 50xlevel (?g1 = 200, ?g2 = 250, ?g3 = 300 etc)

REAL LIFE SCIENCE

Stellar Evolution

All stars form from clouds of gas and dust condensing in deep space. Only the chemical composition of this cloud, and the amount of material in the cloud that condenses into the actual star, determines what will happen to the star over its entire lifetime.

As an interstellar gas cloud starts to condense under its own gravitation, any tiny amount of spin that it has will become amplified, the way a whirling figure skater spins faster when he brings in his arms. Eventually, little whirlpools or eddies will form in this ever-more-rapidly-spinning collapsing cloud. It's these eddies that will eventually form star systems.

All that gaseous material falling in on itself in a given eddy releases an enormous amount of heat when it starts to collide with itself. The more the whirlpool contracts, the hotter and more opaque it gets, until it gets hot enough and thick enough to glow. Such an object is called a *protostar*; we can see such an object from here on Earth, provided the cloud of gas and dust surrounding it is thin enough to see through.

When the protostar is nearly finished collapsing under its own weight, it will reach its maximum temperature. On the surface, it will actually be hotter than it will when it becomes a main-sequence star. But it's the temperature deep within its core that determines the protostar's fate. In most cases, the protostar's total mass will be less than about eight percent the mass of the sun, and the core temperature and pressure will not be high enough for thermonuclear reactions to begin; or, if they are, the initial belch of nuclear activity will push the outer layers of the protostar outward and rarefy the core enough to snuff the fusion reactions out. Such a "failed star" is called a [brown dwarf](#) and is probably one of the most plentiful, if hard-to-detect, objects in the galaxy.

In some cases, though, the protostar's mass (and therefore its peak core temperature) will be high enough to ignite stable thermonuclear reactions. Soon thereafter, the fusion energy released from the new stellar core reaches its surface, the initial birthing contractions finish, and the newborn star settles down onto the Main Sequence, where it will spend most of its productive lifetime.

Since main-sequence stars do not shrink appreciably over time, *all* of a main-sequence star's radiant energy must be produced in the core by hydrogen fusion. There are two distinct types of hydrogen-burning reactions that stellar core material can undergo. Main-sequence stars lighter than about class F0 fuse

hydrogen into helium via the *proton-proton chain*. This is a rather straightforward nuclear reaction: (1) two protons fuse together, forming a deuterium nucleus and releasing both a neutrino and a positron (the positron eventually annihilates with an electron to produce energy); (2) then, another proton collides with the deuterium nucleus, forming a helium-3 nucleus and giving off a gamma ray photon; (3) finally, another helium-3 nucleus formed by steps 1 and 2 above collides with this helium-3 nucleus, turning it into an ordinary helium-4 nucleus and releasing two protons. The total reaction time for this entire process is on the order of one million years.

Heavier main-sequence stars take advantage of their higher core temperatures to fuse hydrogen into helium more rapidly, by a process called the *CNO cycle*. This is a six-step process that uses ordinary carbon-12 as a kind of nuclear catalyst. The net result is the same: four protons turn into a helium-4 nucleus and two positrons, liberating energy in the process, while all the other materials that partook in the reaction come out unchanged. (Note that, as carbon is required for this reaction, galactic halo population stars will be too heavy-element-poor to undergo it on a large scale; heavy main-sequence stars in the galactic halo use the proton-proton chain just like lighter stars do.) Unlike the slow proton-proton chain, a CNO cycle reaction is about a thousand times faster, taking only a thousand or so years to complete. This means that heavier main-sequence stars that are heavy-element-rich will shine much more brightly than lighter main-sequence stars. It also means that the heavier stars will burn out their core's supply of nuclear fuel much faster.

How hot, and large, and long-lived will a star be once it enters the main sequence? That all depends on its mass:

AVG. MASS *	SPECTRAL CLASS	AVG. LUMINOSITY *	AVG. DIAMETER *	MAIN SEQUENCE LIFETIME **
40	O5	500,000	18	1
17	B0	20,000	7.6	10
7	B5	800	4.0	100
3.6	A0	80	2.6	500
2.2	A5	20	1.8	1,000
1.8	F0	6	1.3	2,000
1.4	F5	2.5	1.2	4,000
1.1	G0	1.3	1.04	10,000
1.0	G2 (Sol)	1.0	1.00	12,000
0.9	G5	0.8	0.93	15,000
0.8	K0	0.4	0.85	20,000
0.7	K5	0.2	0.74	30,000
0.5	M0	0.03	0.63	75,000
0.2	M5	0.008	0.32	200,000

* In Sol Units

** In Millions of Years

(Note that the luminosities and estimated main-sequence lifetime for stars hotter than spectral class F0 assumes it is heavy-element-rich enough to have sufficient carbon to run the CNO cycle; a heavy-element-poor star hotter than F0 would be considerably dimmer and last considerably longer. It should also be noted that the currently estimated age of the universe, according to big bang theory, is between 10,000 and 20,000 million years -- shorter than the lifespan of a class K or M main-sequence star. This means it should be impossible to find the remnants of any former K or M main-sequence stars anywhere in the known universe. If we ever find any, our picture of the universe -- or of stellar evolution -- will have to be revised.)

And what happens to a star when it's reached the end of its main sequence lifetime, when it's exhausted about half the available fuel in its core and can no longer sustain a hydrogen fusion reaction at the rate it once did? Well, like its properties during its main sequence lifetime, that all depends on the mass of the star.

Lightweight Stars

Stars whose main sequence spectral class was anywhere from M on up through the A's will start the Beginning of the End by slowly expanding into a Red Giant (a spectral class M or K star with a luminosity class of III). When nuclear fuel is no longer plentiful in the core, it can no longer maintain its main-sequence outward pressure and begins to contract under its own weight. As it collapses, the layers above it fall inward on top of it, causing them to heat up. Soon, the layer immediately above the core will become

hot enough and high-pressure enough to undergo thermonuclear reactions on its own -- and since this layer has an ample supply of hydrogen (unlike the exhausted core), it becomes a self-sustaining hydrogen-burning shell and will actually burn hydrogen into helium faster than the core did during its main-sequence lifetime. The added energy and outward pressure from this hydrogen-burning shell stops the collapse of the upper layers; in fact they begin expanding, and will keep expanding until the star becomes a Red Giant. It takes thousands of years for a star to grow from initial-collapse-at-the-end-of-the-main-sequence to the full-blown red giant stage (a 1962 study claims that it takes "only" about 20 000 years for a spectral class A main-sequence star to evolve into a class M red giant).

After a few million years, the new hydrogen-burning shell will exhaust itself also. This causes the star to contract under its own weight once again. Briefly, the super-compacted core may flash into life, fusing helium into carbon for a brief instant measured literally in seconds (the reaction rate for helium fusion is about a million million times faster than hydrogen fusion), but as helium-fusion produces much less energy than hydrogen-fusion does, and since the core is buried so deeply within the star, this *helium flash* will not be seen and is only predicted in theory. Finally, as this last burp of energy generated by the helium flash slowly reaches the surface, the star becomes a red giant a second time, sheds up to half its mass into interstellar space as a so-called "planetary nebula," and leaves only its core behind.

The core that it leaves behind, though, is a fascinating object. It weighs about half of what the star did during its main sequence lifetime, yet it's smaller than Uranus or Neptune. It's hotter than the star was when it was on the main sequence, and gives off blackbody radiation just like a hot star would; yet it produces no energy of its own and glows simply because it hasn't cooled off yet. Its surface gravity can measure well over 100 000 times the surface gravity of the Earth. Its average density is over a ton to the cubic centimeter; it is so incredibly dense, in fact, that all the atoms that make it up are packed together as tightly as the laws of Fermion physics will allow, making it a totally incompressible "electron degenerate" gas. This oddball super-dense stellar remnant is called a white dwarf.

Electron-degeneracy theory predicts that the uppermost mass a white dwarf can attain is about 1.4 times the mass of the sun, called the Chandrasekhar Limit. Any heavier, and the tremendous pressure on the innermost atoms would squeeze their electrons into the nuclei they orbit, turning all the protons and electrons in the star into neutrons. So far, no white dwarfs of more than 1.4 solar masses have been found, so the theory seems to be on firm ground.

The low surface area and high specific heat of a white dwarf means that such an object would take a long time to cool off -- longer, even, than the currently estimated age of the universe. If the universe were a few hundred thousand million years older, we would expect it to be populated by white dwarfs that have cooled off below the point where they glow; these academic objects are referred to as black dwarfs.

Middleweight Stars

Class B main-sequence stars will leave the main sequence much as lighter stars do, collapsing a little, forming a hydrogen-burning shell, turning into a Red Giant (or a Cepheid variable like Polaris), shrinking again as its hydrogen-burning shell exhausts itself, then shining more brightly as its core goes through a helium-burning phase. The difference now, though, is that burning helium into carbon in the star's core is no longer the end of the road. As this fuel supply runs out, the star's collapse reignites the depleted hydrogen-burning shell and turns it into a helium-burning shell. This renewed energy then creates a new hydrogen burning shell in a layer above the old one, so that as we move inward from the star's surface, we get a hydrogen burning shell, then a helium burning shell, and finally the core underneath. The core will likewise undergo renewed thermonuclear vigor, fusing its old carbon together with more helium to form oxygen.

When this stage completes, the core can begin fusing oxygen into neon, the old helium-burning shell can become a carbon-burning shell, the formerly outermost hydrogen-burning shell becomes the new helium-burning shell, and yet another thin hydrogen-burning shell emerges outside of that. And then, neon can fuse into magnesium, then magnesium can fuse into silicon, and so on down the periodic chart until, finally, chromium gets fused into iron. Each of these fusion stages (helium-to-carbon, carbon-to-oxygen, chromium-to-iron) produces less energy than the preceding stage does, and thus exhausts its own fuel supply ever more rapidly. During these late stages of its evolution, the star can bloat up to hundreds of times the diameter of the sun, becoming a red supergiant like Betelgeuse.

Finally, though, when the star gets around to wanting to fuse iron into something heavier, it runs into a problem. Iron is at the "bottom of the well" when it comes to nuclear reactions. Fusing it into something heavier, or for that matter breaking it apart into something lighter, always consumes more energy than it produces. So when the core starts to "burn" iron, it ends up getting cooler, not hotter. All the outward pressure that its nuclear reactions have been generating suddenly vanishes. The star's core collapses in the blink of an eye. And, since the core takes up such a large fraction of the star's total mass, it's heavier than the maximum 1.4 solar masses that can support a white dwarf. Its protons and electrons get squeezed together until it is a solid ball of neutrons, no bigger across than Los Angeles and with the density of an atomic nucleus (around a thousand million tons to the cubic centimeter). It is now a neutron star and is said to be "neutron-degenerate." The surface gravity of such a beast is on the order of a million G's.

In collapsing in on itself to such dense proportions, all of the core's gravitational potential energy has to be released in the form of heat, just like the collapsing cloud that originally formed the star heated up as it contracted. This time, though, the amount of energy released is much greater and happens over the span of a few seconds. All the outer layers of the star, even those that never became nuclear fusion shells, will become superheated plasmas hot enough to fuse their constituent ions into not only iron, but copper, strontium, silver, gold, lead -- even uranium. These super-hot, super-bright outer layers race off into interstellar space at nearly the speed of light, carrying their newly-formed heavy elements with them and creating one of the most spectacular and rare sights in the heavens: a type II supernova.

(Incidentally, it's believed that supernovae are the only phenomena that can send heavy elements into the interstellar medium. Thus, the heavy element enrichment that our solar system enjoys is thought to be the product of earlier supernovas that infused their products into the cloud that our own sun (and its planets) condensed out of.)

With the aid of telescopes, the expanding cloud from a type II supernova can be seen for many centuries hence as a nebula (such as the crab nebula). The neutron star left at the cloud's center is too small to be seen with current instruments, but it can be detected by its radio emissions if one of its magnetic poles happens to sweep past the Earth as the star rotates. (Its collapse to such a compact object means it will be spinning very rapidly; its magnetic pole may sweep past the Earth hundreds of times a second. It would thus appear to a radio telescope to be a very rapidly, regularly pulsating radio source called a pulsar.)

Heavyweight Stars

The rare class O main-sequence stars start the end of their lives as the middleweight stars do, bloating, forming energy-producing shells around the core, and fusing heavier and heavier elements together until the core becomes iron. And, once again, when the core attempts to fuse iron into something heavier, it loses its energy support and collapses, crossing the Chandrasekhar Limit and squeezing itself into a ball of neutrons.

There is, however, a theoretical limit on how heavy even a neutron star can become. Past about three solar masses, even neutron degeneracy can't support the core's weight. In fact, no force known can support its weight. The core continues to collapse until it is an infinitely small, infinitely dense point called a singularity. Its gravity will be so strong that neither the material from the original core's outer layers, nor the energy from the core's collapse, or even a beam of light directed straight outward can escape it. Nothing that comes within the Schwarzschild Radius (3 kilometers times the mass of the singularity in solar masses) can escape it. As far as the outer layers of the star are concerned, the core has merely fizzled out, removing its energy support and letting them fall; these outer layers too will fall within the singularity's gravitational grip never to be seen again. The whole star swallows itself, leaving only its gravity behind; it's now called a black hole.

A word about novae and X-ray bursters

In a binary star system, one star will usually be more massive than the other, meaning that the heavier star of the pair may end its main-sequence lifetime millions or thousands of millions of years before its lighter companion does. Many white dwarfs, for instance, have been detected because of oddities in the movement or appearance of their main-sequence companion -- Sirius B being the most famous example, discovered by accident over a century ago when a new telescope lens resolved Sirius's companion during a test. Sometimes, due to orbital decay or the fact that the longer-lived companion star has reached the end of

its lifetime and is turning into a red giant, a white dwarf, neutron star, or black hole can come so close to its binary host-star that its strong gravity begins drawing (or "accreting") material off its host. Such a system is called a mass-exchange binary.

This sucked-up gas swirls around the white dwarf or neutron star, forming an accretion disk as it spirals in toward its new owner's surface. In the case of a neutron star or black hole, the accretion disk will be the only feature of the companion star visible from the Earth. Material accreted "onto" a black hole essentially goes down the event-horizon drain and is gone forever. Material accreted onto a neutron star or white dwarf, however, will accumulate on that star's surface, forming thicker and thicker layers of super-compressed hydrogen. If the infalling material is moving fast enough, this accreted hydrogen can gain sufficient heat and pressure for thermonuclear reactions to occur.

Depending on how fast the incoming material is moving, several things can happen to a white dwarf. Very rapidly infalling material will ignite all at once, causing the white dwarf to shine several times more brightly than its companion for a few days, then taper off back down to its original brightness. Years or centuries later, the process may repeat itself. This phenomenon is called a nova (the Latin word for "new") because, to the unaided eye, it looks like a new star has appeared in the sky where before there was none. If the accreted material is trickling in more slowly, it will only ignite in small spurts, turning the white dwarf into a cataclysmic variable. If the accreted material accumulates very slowly, the white dwarf can heat up as a whole, until the entire star blows itself apart in one massive thermonuclear fireball called a type I supernova.

A neutron star whose accreted layers ignite will burn all its available newfound hydrogen into helium in a matter of seconds. This is only visible as an intense burst of X-rays lasting for, at most, a minute or two. The process repeats itself sporadically every few hours as new material is accreted. Not surprisingly, such phenomena are called X-ray bursters.

STARFIRE ERRATA

At the start of ISW4, the KON consisted of 405 starships DD sized and larger

By 2205 the TF has discovered 26 intelligent race: 19 Pre-Ind, 7 Ind1

By 2446 the Federation is over 1,400 LY across

Fighter squadrons consist of 30-40 people, including alternate flight crews

Fighters travel at .2c

In 2226 the Treaty of Ophiuchi Junction unites the OADC and TF against the KO

Insurrection is approximately 60 years after ISW4

Marines: 500/battalion, 10/squad

Non-Intercourse Edict of 2097

Pg have a range of 9 LS

Prohibition of 2249 outlaws genocide

SBM travel at .8c

TF shared fighter technology with KO during ISW3

TFN drones travel at 60,000 KPS

Type 4 OWP displaces 200,000 tons

Bibliography: Arab Wars, SM2, 3rd Design Group (UTM), GSF, and Astronomy Magazine.

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