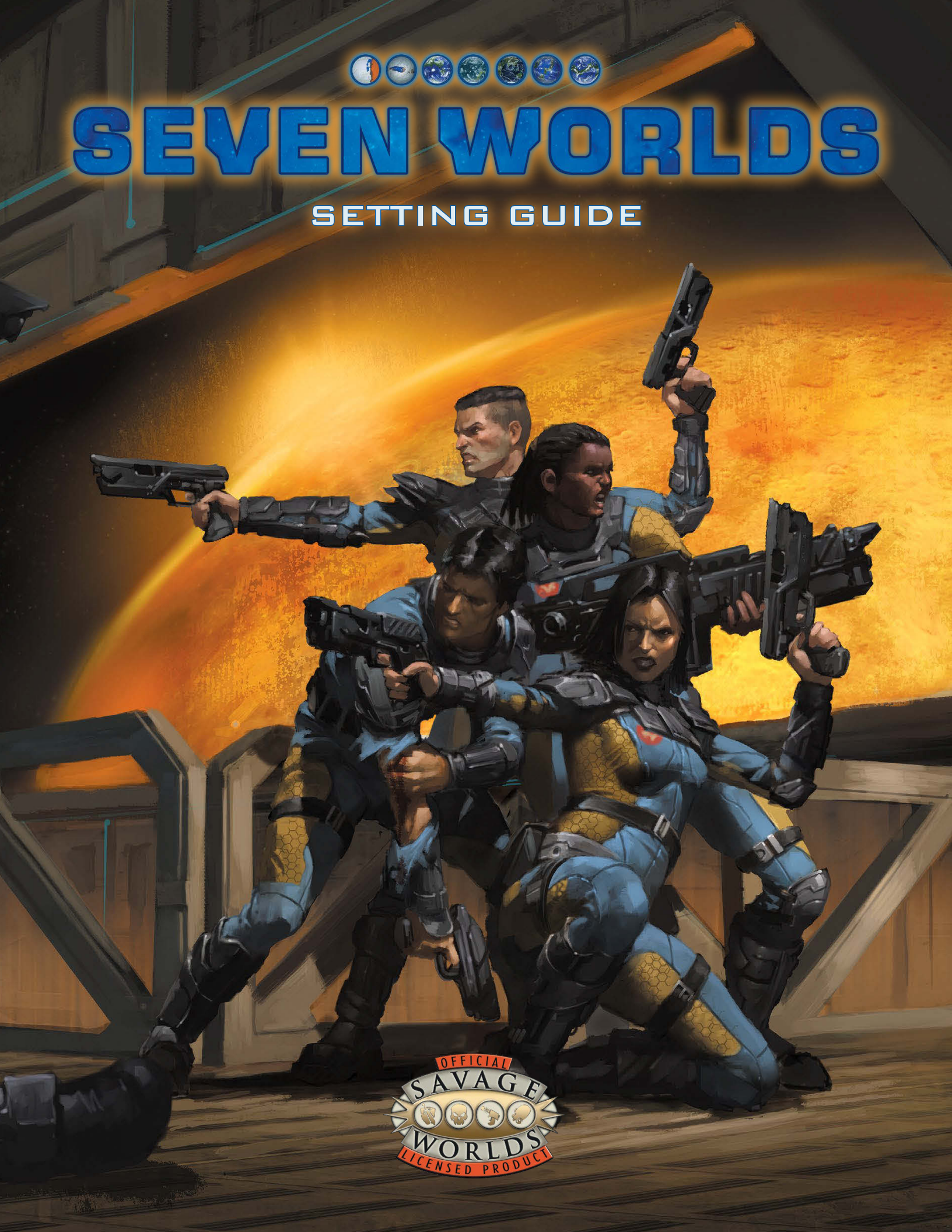
SEVEN WORLDS

SETTING GUIDE



OFFICIAL SAVAGE WORLDS LICENSED PRODUCT


Gliese 10025
Gliese 1002
EQ Pegasi
4.9
5.2
6.3
3.9
Ross 780
Gliese 908
Ross 671
4.0
EZ Aquarii
4.1
6.3
Lacaille 9352
AX Microscopii
Barnard's Star
8.0
7.4
5.5
Ross 154
4.2
7.8
Gliese 832
Gliese 674
Gliese 570
4.3
1.2
7.1
5.3
Harris Station
(Gliese 682)
7.7
Gliese 588
4.8
6.0
8.4
36 Ophiuchi
Apollo
(Epsion Indi)
Wolf 629
6.8
4.2
Hoffnung
Station
(Gliese 667)
Zarmina ("Gee")
(Gliese 581;
Wolf 562)
6.6
Gliese 784
HIP 85295
6.7
7.6
Waypoint Station
(Alpha Lyrae/Vega)
2MASS 1835+325
6.9
6.6
4.6
7.3
Gliese 1
HIP 86287
G 208-044
7.6
Kruger 60
Hernandez
Station
(Delta Pavonis)
7.2
4.4
4.8
6.1
Mu Herculis
YZ Ceti
6.2
GX/GQ
Andromedae
5.6
3.8
Concordia
(Epsilon Eridani)
Van Maanen's Star
UV/BL Ceti
5.1
4.8
TZ Arietis
LHS 1723
6.3
3.6
Tau Ceti
(Not populated yet)
Bay Jing
(Omicron 2
Eridani)
2.5
2MASS 0415-093
SEVEN WORLDS


LEGEND
Settled Star System
Space Station / Human Outpost
Uninhabited Star System
0.2 Main Route (Stellar Communication Network)
0.2 Secondary Route
0.2 Dead-end Route
Proxima Centauri
0.2
Liberty Station (Alpha Centauri)
4.4
Ross 619
4.2
Ross 882
7.4
Luyten's Star
1.0
Procyon
4.5
Sirius
5.5
Ross 614
4.5
Ross 47
3.9
G 099-049
4.4
Ross 128
3.9
Ross 359
7.7
DX Cancri
5.0
61 Cygni
Ross 248
Mu Casseiopeiae
5.5
Gliese 892
4.9
Logan's End (Eta Cassiopeiae)
7.7
EV Lacertae
WD 0552-041
6.5
WD 0552+053
5.7
HIP 25578
4.7
6.2
Chi 1 Orionis
5.3
Wolf 227
6.8
HIP 22923
7.1
Mussala Station (Pi 3 Orionis)
6.5
WD 0435-088
4.2
HIP 23311
8.1
HIP 23512
5.7
HIP 33499
6.7
AB Columbae
6.6
Nouvelle Vie (Gamma Leporis)
5.0
HIP 23452
7.5
HIP 18899
4.0
Delta Eridani
7.9
LP 771-095
8.0
HIP 14101

SEVEN WORLDS
SETTING GUIDE

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DEDICATION
To Karem, who distilled infinite love into infinite patience. To Alejandra, Miranda and Valeria, who will see in their lifetimes many of the breakthroughs mentioned in this book… and way before 2217!

All URLS in the book were valid at the time of writing, and were tested before sending to publication. We cannot guarantee the links are still valid by the time you read this. In fact, we guarantee some of them will not be valid anymore. That's the internet for you. V-world will be much better.

www.intellistories.com

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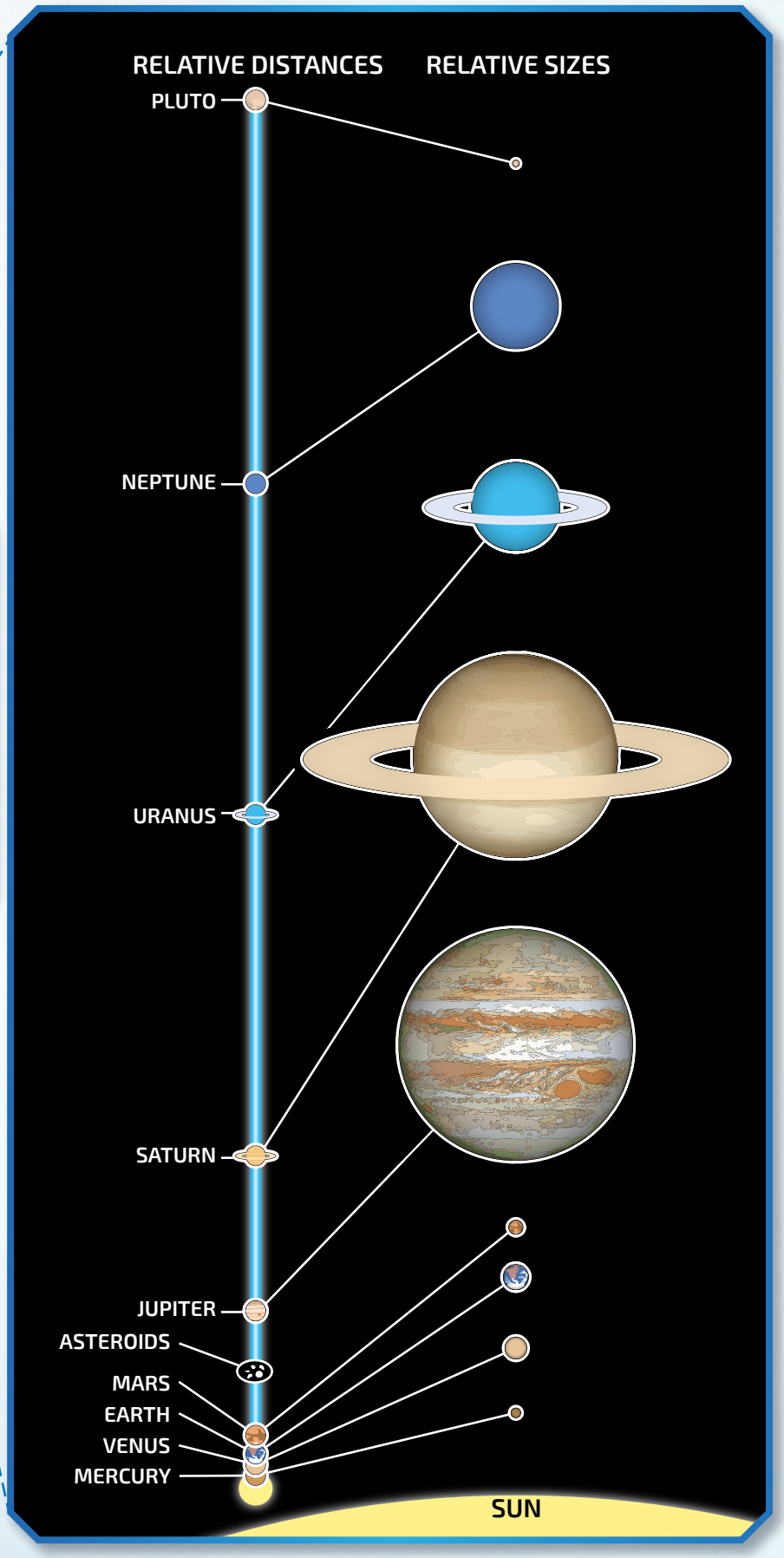
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HOW FAR AWAY IS THE CLOSEST STAR TO THE SUN?

It can be very hard for us humans to understand the vastness of space. The blue line that starts in this page and continues up to the end of the book shows the distance between the Sun and its closest star, Proxima Centauri, at scale.

And that's just the closest star!



introduction

"THE FUTURE IS NOT A PLACE WE ARE GOING TO, IT'S A PLACE WE ARE CREATING. THE ROADS TO IT ARE NOT FOUND, THEY ARE MADE."

— JOHN SCHAAR

Welcome to *Seven Worlds*, a role-playing adventure about the survival of Humanity among the stars!

The year is 2217 AD and mankind has taken its first steps to the stars. Humanity now lives on six more planets, besides Earth, several light-years away. Transportation between planets is common. We've established contact with one alien species, much older and more powerful than us. Our worlds are blossoming and our opportunities as a species are limitless. However, dark elements are conspiring to bring everything down, and a few bold heroes and their ship are everything that stands between us and the greatest threat we've ever faced!

Are you ready for the challenge? Then read on!

WHAT MAKES SEVEN WORLDS SPECIAL?

Thanks for asking! Here are a few of the many things that make *Seven Worlds* unique:

- **Space Opera with a Hard-SF flavor.** If you like Science Fiction (SF), then you've probably heard about "soft" SF, the one with space battles that look like World War II dogfights in space and funny humanoid English-speaking aliens with ridges in their foreheads. You might also have heard about "hard" SF, the one where science and technology are so accurate and detailed you need a Ph.D. in Physics just to understand what's going on. Well, **Seven Worlds is a soft-SF game with a hard-SF flavor**. We've based as much of the setting and rules on real physics and science as possible, while at the same time streamlining anything that interferes with a fun game. If you want a fun, unashamed space opera adventure that nevertheless gets (most of) its science right, this is the game for you! Also, check out the new included rules for space battles with a realistic bent!
- **Science for the Rest of Us.** Throughout this book you will find **dozens of sidebars explaining concepts and cool facts about space and physics.** We have tried to make all the science in this book as non-intimidating as possible, and to help you learn while reading it. So if you'd like to learn more about science, give this book a spin!
- **Paper-and-pencil-and-technology.** Space is tri-dimensional, so why just look at a map on a page? If you have a compatible computer, smartphone, or tablet, go to www.sevenworldsrpg.com and download the *Seven Worlds* 3-D Starmap! **The Seven Worlds Starmap gives you a new level of game immersion by allowing you to explore in 3-D all the planets in known human space, with real star locations.** Traveling from planet to planet will never be the same again!
- **Not a setting with a story, but a story with a setting:** *Seven Worlds* has been designed as an awesome, compelling, epic campaign where the heroes have the opportunity to save their civilization or see it destroyed. Everything in this Setting Guide has been written to make the adventure more compelling and immersive. At the same time, the setting accommodates groups that don't want to play the main *Seven Worlds* campaign but would rather use its rich and detailed setting to weave their own stories into it.

WHO WILL YOU BE?

In *Seven Worlds*, each player takes the role of a member of the Circle, an independent organization dedicated to the protection of Humanity and the preservation of the peace. The Circle accepts heroes from all walks of life such as:

- **Pilots,** daring adventurers intimately connected to the deadly spaceships of the year 2217.
- **Soldiers,** individuals trained and prepared to fight and win all kinds of combat.
- **Diplomats,** specialists in negotiating their way out of difficult situations, and always getting their way.

- **Psions,** gifted individuals with the power to read minds and manipulate the universe with but a thought.
- **Scientists,** scholars with the knowledge to understand science and the universe that surrounds Humanity.
- **Explorers,** people ready to brave the unknown to discover new worlds, and to settle and build colonies on them.
- **Merchants,** experts in doing business between the worlds of human space.
- **Hackers,** able to deal with the computers of V-World, the digital world of 2217, and bend them to their will.

And many more!

QUICK FACTS ABOUT THE SEVEN WORLDS

Here's a very short overview of the universe of *Seven Worlds*. There's a lot more detail about this in the rest of the book!

- The year is 2217 and Humanity has reached the stars. Besides Earth, humans have settled six other worlds. We also have several space stations orbiting important stars close to Sol (the formal name for our Sun).
- Two organizations have shaped the history of the last two hundred years: The Circle, created to expand Humanity's reach into space; and the Psion Brotherhood, dedicated to the integration of Psions into human society. Psions are humans who have developed amazing mental powers called "Psionics," such as the power to lift objects (Telekinesis) and to communicate with thoughts (Telepathy).
- Three individuals from the past have also shaped our history: William Donovan, entrepreneur, inventor of the interplanetary and interstellar jump drives, and founder of the Circle; Daniel Michaels, the first Psion in recorded history, and a teenage friend of Donovan in their small home town in Arizona; and Melissa Fischer, the girl who was romantically involved with both, who influenced their actions during most of their lives, and who ultimately caused the souring of their relationship. How this unlikely trio changed the fate of Humanity is cause for endless debate and research amongst scholars, even today.
- We have discovered one alien species, or rather, they have discovered us. They call themselves the N'ahili, and are by all appearances vastly older and more powerful than we are. The N'ahili have provided us with the coordinates needed to colonize space, and have given us useful, advanced technology. However, even now, more than a hundred and twenty years after meeting them, they are as mysterious and unfathomable as ever. We have given up hope of ever understanding them, why they are helping us, or what their true intentions are.
- Even with technologies that allow us to "jump" to other star systems in a matter of seconds, it usually takes one week to travel between jump points in two neighboring star systems. Some of the farthest planets, such as Nouvelle Vie, are seventeen jumps away from Earth. This means a trip from Earth to Nouvelle Vie takes approximately seventeen weeks, or a little more than four months! However, communications technologies such as the Stellar Communications Network allow sending messages between planets in hours, or days at the most.
- The Internet of the 21st century has evolved into something called V-World (for Virtual World). Using Augmented Reality (AR) glasses, lenses and screens, we are always connected to V-World and can see and browse information at will. We can enter full-3D virtual environments to work, have meetings or just to have fun.
- Friendly digital Assistants help us organize our lives and do many of our chores for us. Behaving like a digital sidekick (with a personality) that lives in V-World, Assistants can do many things for us such as controlling the physical environment around us, help us locate important information, and even support during combat situations.
- As the two hundredth anniversary of the founding of the Circle and the hundredth anniversary of the founding of Concordia approach, tensions are mounting between forces in one of the frontier planets, Nouvelle Vie. We have explored all the star systems the N'ahili have given us coordinates for and have found no new planets to settle. Some wait for the N'ahili to give us the next batch of coordinates; others frantically search for undiscovered jump point membranes to other star systems; still others suggest that maybe we should just focus on what we have achieved and forgo expansion for some time.
- And strange reports have been arriving from stellar miners and explorers in Nouvelle Vie. Reports of mysterious sightings and weird energy readings. A few ships have also been reported missing…

overview

"IT IS QUITE CONCEIVABLE THAT 36,000KM WILL PROVE THE LIMIT OF HUMAN AMBITION. IT IS EQUALLY CONCEIVABLE THAT THE FANTASY—MADE—REALITY OF HUMAN SPACE FLIGHT WILL RETURN TO FANTASY. IT IS LIKELY THAT THE SPACE AGE IS OVER."

—THE ECONOMIST MAGAZINE, EARTH, JUNE 30TH, 2011 (206 YEARS AGO)

What follows is a short overview of the history of mankind from the 21st to the 23rd century.

A HISTORY OF THE SEVEN WORLDS

At the dawn of the 21st century, the word that best described mankind's feelings towards Space was *disappointment*. The great glories of the 20th century (Sputnik, Apollo, the Space Shuttle program) were behind, and the future looked like a long procession of unmanned probes sent to the corners of the Solar System. With luck, the most Humanity had to look forward to was a trip to Mars within a few decades.

Then, in 2017, William Donovan created the Circle Foundation.

THE FOUNDERS OF THE FUTURE

At age 44, William Donovan was already one of the richest men on Earth, founder and owner of EnergyNeering, the most successful technology corporation on the planet. Donovan's passion for space was well known, but he was still laughed at for the creation of The Circle, a foundation with the goal of "expanding Humanity's reach into space, and protecting humans from the dangers presented there." Less laughable was the fact that the Circle Foundation was endowed with non-voting stock in EnergyNeering, making it the richest NGO in the world.

Initially, the Circle seemed to be nothing more than a publicity stunt. There was no practical means of going into space, after all, nor a compelling reason to do so. Until 2021, when EnergyNeering stunned the world by announcing the first stable fusion energy reactor that significantly surpassed the break-even point. The key to this reactor was a hard-to-find element called Helium-3, or ^{3}He. The reactor needed significant amounts of ^{3}He to produce energy, which EnergyNeering conveniently also announced it had. Although ^{3}He stockpiles on Earth have been very low since the dismantling of terrestrial production, EnergyNeering simultaneously announced a breakthrough procedure to effectively separate ^{3}He from other varieties of Helium in natural gas deposits. For the last eighteen years, EnergyNeering had been secretly stockpiling ^{3}He for use in its fusion reactor project. The size of the available ^{3}He stockpile, plus the efficiency of the newly announced reactor, meant Earth's energy problems seemed to be at an end, at least while the supplies lasted.

It was also in the first decades of the 21st century that Psions made their appearance. Men and women gifted with extraordinary powers, they could read thoughts, lift objects with their thoughts, and many other things. The first known Psion in history was Daniel Michaels, a U.S. Senator who left his position to found The Psion Brotherhood, an organization dedicated to detecting potential Psions and educating them so they could live better lives and be an asset to society. Soon Psions were collaborating with the police to solve cases, support trustworthy negotiations, help patients traumatized by terrible events, and do many other previously impossible things. Given the natural fear and distrust of non-Psions towards Psions, the fact that within a few short decades the Psion Brotherhood was a respected and indispensable part of society can only be attributed to Daniel Michaels' tireless efforts for integration.

It is interesting to note that Donovan and Michaels were teenage friends in the small town of Edmonton, Arizona, where they both attended high school. There they met Melissa Fischer, both men's only love, and the person who most influenced their future lives and decisions. The story of this trio and of how their relationship changed the world has been one of the most studied (and mysterious, even now) chapters of all recent human history.

HUMANITY'S FIRST STEPS INTO SPACE

By the 2030's several EnergyNeering fusion reactors were in operation, providing energy for important parts of the world. However, even with new procedures to create ^{3}He in particle accelerators and increased tritium production, ^{3}He was too scarce on Earth. This made it hard to increase production and coverage to the entire planet. Earth's energy problems would not be solved unless more ^{3}He could be found.

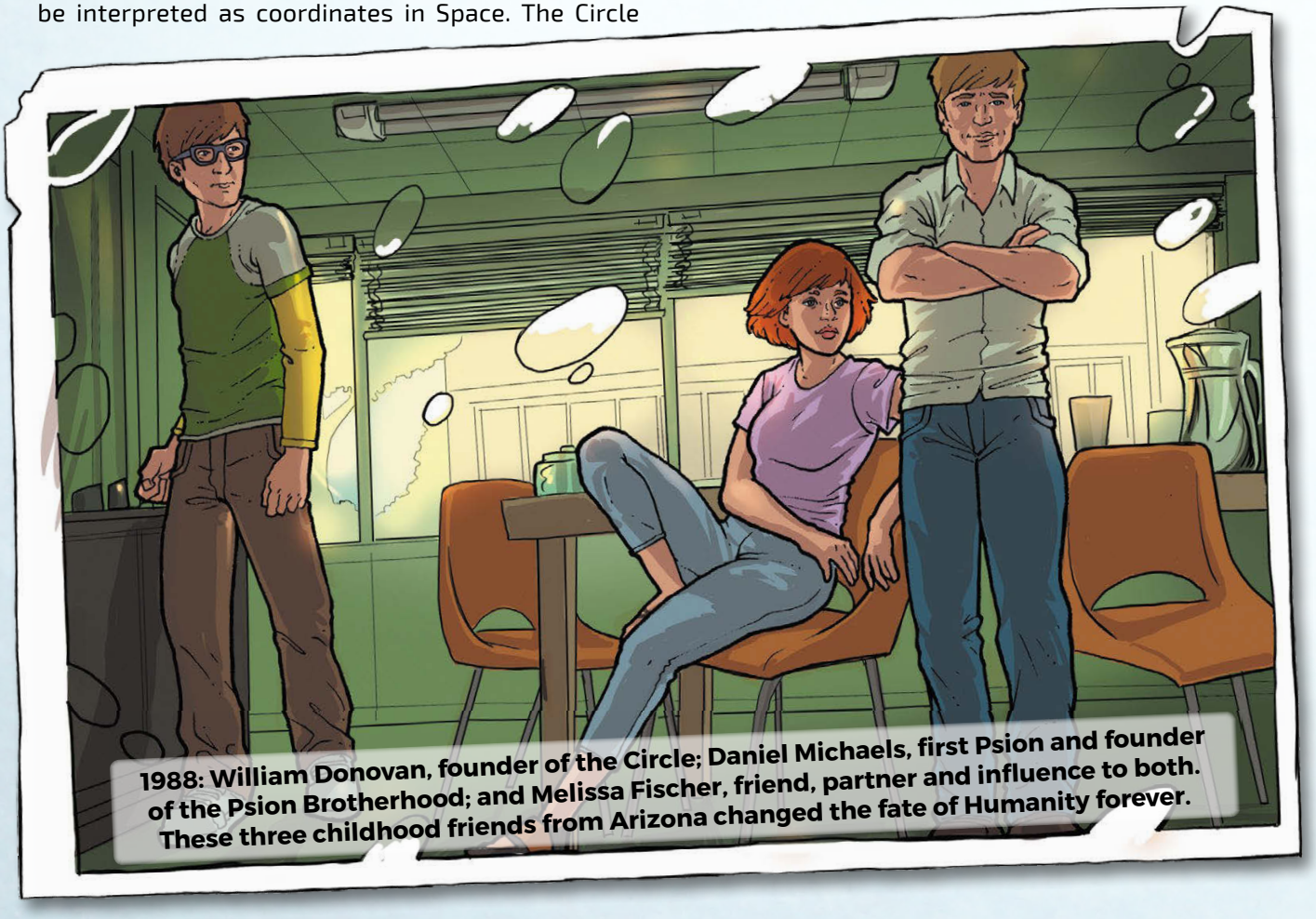
Thus it was that the first missions to the Solar System were organized. In the 2040's the moon (a limited source of ^{3}He) was visited again, as well as Venus and Mars. But it was in the 2050's that the first missions to Saturn, a gas giant with an atmosphere rich in ^{3}He, were organized, and ^{3}He "harvesting" began in earnest.

It is around this time that both William Donovan and Daniel Michaels pass away, leaving the legacy of their respective organizations behind. After Donovan's death, his partner Melissa Fischer bequeathed to the Circle Foundation several of his digital notebooks. In one of them, the Circle researchers found formulas and a theory for the workings of an Interstellar Engine. They also found a set of numbers which could only be interpreted as coordinates in Space. The Circle foundation immediately turned to EnergyNeering to research and build this potentially game-changing technology.

Several months after donating her late partner's notebooks, Melissa Fischer mysteriously disappeared, and, despite many searches and investigations, was never heard from again.

INTERSTELLAR TRAVEL AND ALIEN CONTACT

By 2080 there was a steady supply of ^{3}He from Saturn and Uranus and Earth's energy problems seemed to be a thing of the past. EnergyNeering finished the first prototype of the Interstellar Engine and together with the Circle began testing. By 2089, preliminary trials seemed to be complete and the Circle selected a place to test. Using the coordinates in Donovan's digital notes, a Circle scout crew moved the ship to a position approximately one AU above the plane of the Ecliptic. When they activated the Interstellar Drive, they found themselves next to Barnard's Star, six light-years away. After spending a few hours analyzing their surroundings, the crew jumped back to the Solar System. Mankind had discovered interstellar travel.



1988: William Donovan, founder of the Circle; Daniel Michaels, first Psion and founder of the Psion Brotherhood; and Melissa Fischer, friend, partner and influence to both. These three childhood friends from Arizona changed the fate of Humanity forever.

THE ENERGY OF THE FUTURE

When everything's said and done, Humanity's future challenges all relate to energy.

Many problems both present and future could be considered energy challenges. Although our current energy consumption is significant, it is mostly based on fossil fuels, with all the depletion and pollution challenges they bring.

When it comes to the exploration of space, man has made things fly by using chemical reactions. Oil and gas, powder and even hydrogen engines basically depend on blowing stuff up to make things move. This is easy and effective, but is too wasteful and inefficient for the times and distances involved in space. Just to give an idea on how inefficient chemical rockets are, some scientists from Icarus Interstellar, a five-year research project into interstellar probes, have estimated that accelerating a probe to a speed of 5 percent of the speed of light using chemical rockets would require more chemical rocket fuel than there is matter in the known Universe!

The problem is, what do we use instead?

Although several alternatives have been proposed, including matter-antimatter reactors, the most realistic medium-term candidate for the next revolution in energy is Nuclear Fusion. This is a special type of nuclear reaction where two or more nuclei collide at high speeds, releasing immense amounts of energy in the process. Today, the main-sequence stars in the universe emit energy created by fusion. And it's a lot of energy: In just one second the Sun emits almost a million times as much energy as the Earth consumes in an entire year. Another way to think about the amount of energy in the Sun is this: The Sun heats our face at 8-light minutes away; on the other hand, a fireplace stops heating us after a few feet.

The Helium-3 (or ^3He) isotope mentioned in the game is a promising potential fuel for the fusion energy reactors of the future. It is currently difficult to get, existing in insignificant amounts on Earth (inside gas wells), in trace amounts on the surface on the moon, and then in the atmosphere of some gas giants and other bodies. In *Seven Worlds*, EnergyNeering found a breakthrough procedure to easily separate ^4He from ^3He in gas deposits, thus creating a stockpile of ^3He for interplanetary exploration using a D-^3He reaction. The bulk of ^3He in the game, though, comes from mining or skimming in gas giants.

Helium-3 may not be, however, powerful enough to sustain long-term engines to travel to the stars. Although other fusion reactions using deuterium and boron, among others, have been suggested, there also exists the possibility that no known element is powerful enough for our needs. That's why science fiction authors have invented Unobtanium, a mythical element that supposedly has enough energy to power the science-fiction setting's engine of choice. Called dillithium, tyllium or other more esoteric names depending on the science-fiction property, it is an easy way to sidestep the energy conundrum.

Of course, all of this assumes fusion reactions are a reality, and we're not there yet, although scientists expect we'll be there soon. Some outfits, such as Lockheed Martin, are estimating the technology should be available by the end of this decade. These first fusion reactions do not use ^3He yet, though. It will be at least few more decades before ^3He fusion is ready, if ever.

The excitement over this discovery was tempered by the fact that finding a "membrane", a location in space that allowed fast travel to other far-away locations, was a very difficult endeavor. In fact, over the next two years, despite the efforts of all of Humanity, no other jump points were found. How William Donovan deduced the location of the first jump point in order to put it in his notes was (and still is) an unsolved mystery.

After two years, however, searching for a jump point became unnecessary, because the N'ahili arrived. Attracted by the energy released by the jump to Barnard's Star, the arrival of these aliens far more advanced than us caused a redefinition of the perception of our role in the universe. Fortunately, the N'ahili, while unfathomable beyond anything we've ever encountered, appeared to be genuinely interested in helping us reach the stars, and shared with us a crucial piece of information: The coordinates to jump membranes to several stars within twelve light-years of Earth. Suddenly we had everything we needed to expand to other worlds. And that's exactly what we did.

THE FIRST EXPANSION

From 2091 until 2133, Humanity exploded into space. Although most of the Solar System had been explored by now, there was little use in building huge settlements in hostile airless planets and moons like Mars or Saturn's moons when several Earth-like worlds were available for settling mere weeks away. **Zarmina** (nicknamed "Gee," in the Gliese 581 star system) was the first Earth-like planet settled

INTERPLANETARY TRAVEL

Before figuring out how to travel between stars, we first need to learn to travel between planets. Let's take Mars, for example.

On average, Mars is just about 0.5 AUs away from Earth, or half the distance from the Earth to the Sun. However, both the Earth and Mars are moving in orbits around the sun, meaning that their distance changes over time. On top of that, our current rocket technology does not give us enough punch to travel from Earth to Mars at anything similar to full speed; if anything, we barely have enough fuel to "coast" from here to there. So what do we do?

What we do is take advantage of the fact that both the Earth and Mars are constantly moving to time our launch at the exact moment that will make a rocket ship launched from Earth intersect naturally with Mars at some point in the future. That way we only have to worry about launching the ship and then braking it when it reaches Mars. This is similar to a quarterback throwing a football to a position where he knows the other player will be in a few seconds from now.

This kind of path is called a *Hohmann Orbit* by astronomers, and occurs infrequently between planets. In the case of the Earth and Mars, this "launch window" occurs every 2 years, 1 month and 19 days. If a launch misses the window, it has to wait until the next window appears.

Even then, this type of travel is optimized for fuel usage, not for time. A one-way trip to Mars could easily take eight-and-a-half months at this rate. Besides being slow and complex, it places a strain on food and supplies, and exposes astronauts to many risks ranging from radiation to space particles. To accelerate ships further without using fuel, scientists sometimes try to take advantage of gravity-assisted travel, by leveraging the gravitational pull of other planets to create a "slingshot" effect.Theoretically, if we had super-powerful fusion-powered engines we could just launch from Earth, keep accelerating in space until we reach a mid-point and then turn the ship around and decelerate until we reach Mars. This is the actual opposite of the Hohmann Orbit approach in that it minimizes time and maximizes fuel spent, and is called a *Brachistochrone* Trajectory.

By way of comparison, a fusion-powered ship in *Seven Worlds* in a brachistochrone trajectory at an acceleration of one gravity could take just under two days to go from Earth to Mars. Even if Mars were as far away from Earth as possible, a trip would only take four-and-a-half days under these parameters.

Of course, ships do not accelerate that much, not even in *Seven Worlds*. Outside combat (where they accelerate to as much as 5–6 gees) spaceships in this setting usually travel at no more than 0.2g acceleration. At this rate, a trip from Earth to Mars takes between 4.5 and 12 days, and a trip to Neptune (the farthermost planet we could go) using these parameters would take just 41 days.

Incidentally, that is the reason why in *Seven Worlds* trips between a planet and a jump point usually take a week or so. Since most jump points are approximately 1 AU away from the largest mass in the star system (the star itself), and since the usual maximum acceleration or deceleration used in *Seven Worlds* is around 0.2g, a simple brachistochrone trajectory calculation determines one week travel time.

by human beings, followed by **Apollo**, in the Epsilon Indi star system. Soon thereafter the N'ahili provided mankind with a second set of coordinates, extending our reach to about twenty-two light-years from Earth. Using this information, we successfully settled **Concordia**, in the Epsilon Eridani star system, and **Bay Jing**, in the Omicron 2 Eridani star system. Scientific settlements and space stations were also built around other stars.

Concordia and Bay Jing were particularly interesting and important planets. Two "garden worlds", planets extremely similar to Earth in atmosphere and temperature, they were also just one jump point apart. This made them an attractive destination for settlers.

Technology was advancing in other areas, too. The first nanomaterials, super-strong elements to build superstructures on Earth and in space, were becoming available. Engine capacity was also improving very fast. The Circle took a leading position in organizing migrations by designing and building massive Settler Ships capable of transporting thousands of passengers. The challenge was taking that many people from Earth, up the gravity well, and into space. Scientists began to design the first space tethers and space elevators to make it easier and cheaper to get from planetary surface into space and thus meet the challenge of moving many people from Earth to the settlements.

Then in 2133 something unexpected happened. A hitherto-unknown comet was discovered approaching Earth on an impact trajectory. How it evaded detection until a year before impact is still a hotly-debated topic among scientists. But the fact is, by the time we discovered Comet Sol-C/2132 N2 was coming for

us, it was too late to do anything meaningful about it. With chaos and panic invading society, our hastily assembled emergency missions and rockets were able to break the object into shards, but several pieces, including a 4-km-across chunk of comet, impacted Earth on October 4th, 2133.

THE DARK TIMES

The weeks before impact had been used wisely by Earth's leaders, both preparing underground shelters and stockpiling large amounts of food, water and medicine. Still, billions died in the first hours after the impact, and many more in the coming weeks and months as the Earth's ecosystem was disrupted and an impact-induced nuclear winter began. No corner of the Earth was spared the effect of the crash. Help was needed, and fast.

Both the Circle and the Psion Brotherhood took the lead in organizing the rescue. The Circle used their entire Settler Ship fleet to transport supplies to Earth and organize the remaining four worlds' support in food, fuel and energy. The other planets nobly fulfilled their duty and gave everything they had. Many members of the Brotherhood risked their lives organizing the rescue on the surface and coordinating the planets' activities with EarthGov, the caretaker organization that took responsibility for what remained of government on Earth.

Even so, from the beginning it was clear that the lack of a method to massively transport supplies down to the surface, and to transport survivors from the surface into space, would hamper all efforts at a successful rescue. The fact that the planets most likely to produce food and support survivors, such as Bay Jing and Concordia, were eight weeks away, also made rescue very difficult. Thus it was that the Circle spent every resource it had left on a bold initiative. Dubbed Project Ascension, it involved the construction of two space tethers and the design of a

HOW DO YOU KNOW WHERE YOU ARE IN SPACE?

Locating things in space can get tricky. Ancient astronomers used systems based on the ecliptic to locate our nearest stars and planets. As astronomy has advanced, more complex methods have appeared, based on the locations of celestial bodies in space. Currently the International Astronomical Union (IAU) has a standard called the International Celestial Reference System (ICRS) that endeavors to ease localization of celestial bodies.

Space travelers, however, will have to face much more difficult issues when traveling beyond the Solar System. On the one hand, given the limits of the speed of light as postulated by the Theory of Relativity, figuring out where you are in space is a matter of not only knowing where you are, but also knowing when you are. Thus knowing where you are in space becomes a matter of measuring your location in space-time.

In this game, things get even trickier because by jumping through membranes, ships are basically traveling faster than light, thus changing where they are in time as well as in space. So, when a ship comes out of a jump point, how does it know where and when it is?

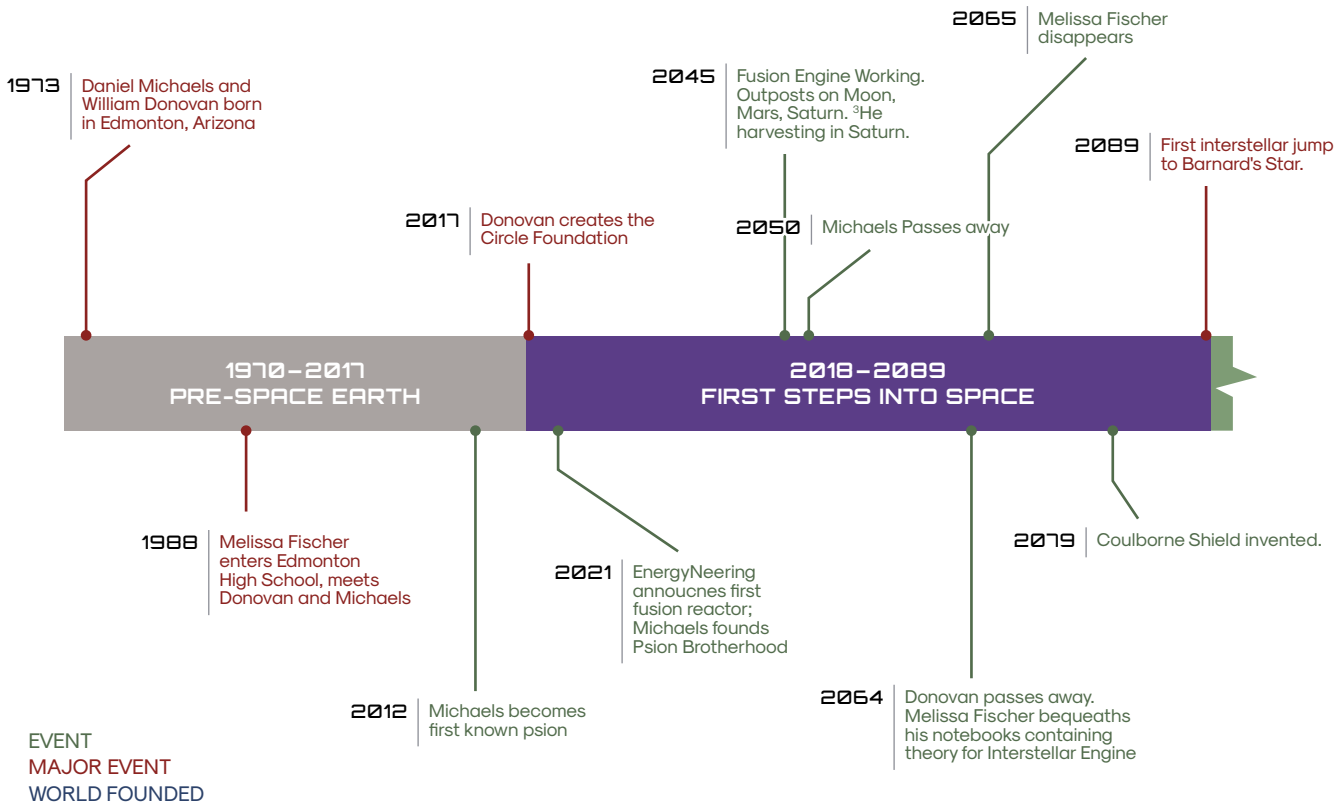
Some scientists have suggested using far away objects, such as galaxies, globular clusters, "interesting stars" such as red supergiants, and the galactic core as landmarks to triangulate our position by a process called Optical Navigation or OPNAV.

Enter pulsars. Pulsars are rotating neutron stars that emit beams of electromagnetic radiation. Since pulsars rotate like a lighthouse, in a very predictable manner, and their rotation rates slowly decrease, they can be used as guideposts to figure out where and when a space traveller is. Specifically, when a ship appears in space it sweeps around to locate its reference pulsars and then locks to their rotational periods. By using several of these, scientists reckon it may be possible to estimate one's location in space-time. In fact, Carl Sagan and Frank Drake included a "pulsar map" of the Solar System in the Pioneer Plaque and Voyager Golden Record launched with the 1972 and 1973 Pioneer missions and 1977 Voyager mission, respectively, so that an alien intelligence could locate us and visit.

Detecting a pulsar's beam is not easy and requires sensitive measuring equipment with significant amounts of energy. And the "pulses" emitted by a pulsar cannot be seen from everywhere, thus restricting their use. In this game, we are still just a few dozen light-years from Sol, so we assume pulsars are visible landmarks for navigation within human space. We also assume spaceships have equipment that has evolved to tackle these challenges, and thus a ship knows where it is after just a few minutes to hours after coming out of the jump point.

Note that within a star system sometimes relative coordinate systems are also used, as they are easier to navigate with than the pulsar-based system. Ships automatically convert between absolute and relative systems when necessary.

TIME LINE



new fleet of atmospheric transports and Settler Ships that interfaced with the tethers. Implementation took years, during which many hundreds of thousands died on a devastated Earth while more conventional methods were used, but a few years after the impact, the Circle was evacuating and transporting to the settler planets almost thirty-five hundred people each day. Ships were cramped and travel conditions during those eight weeks to the other worlds were horrendous, but by and large the initiative met its goals. All in all, almost thirty-two million people were evacuated from Earth in the thirty-year period after the comet impact. Project Ascension was also crucial in delivering enough food, supplies and technology to sustain important parts of the population and to produce food locally.

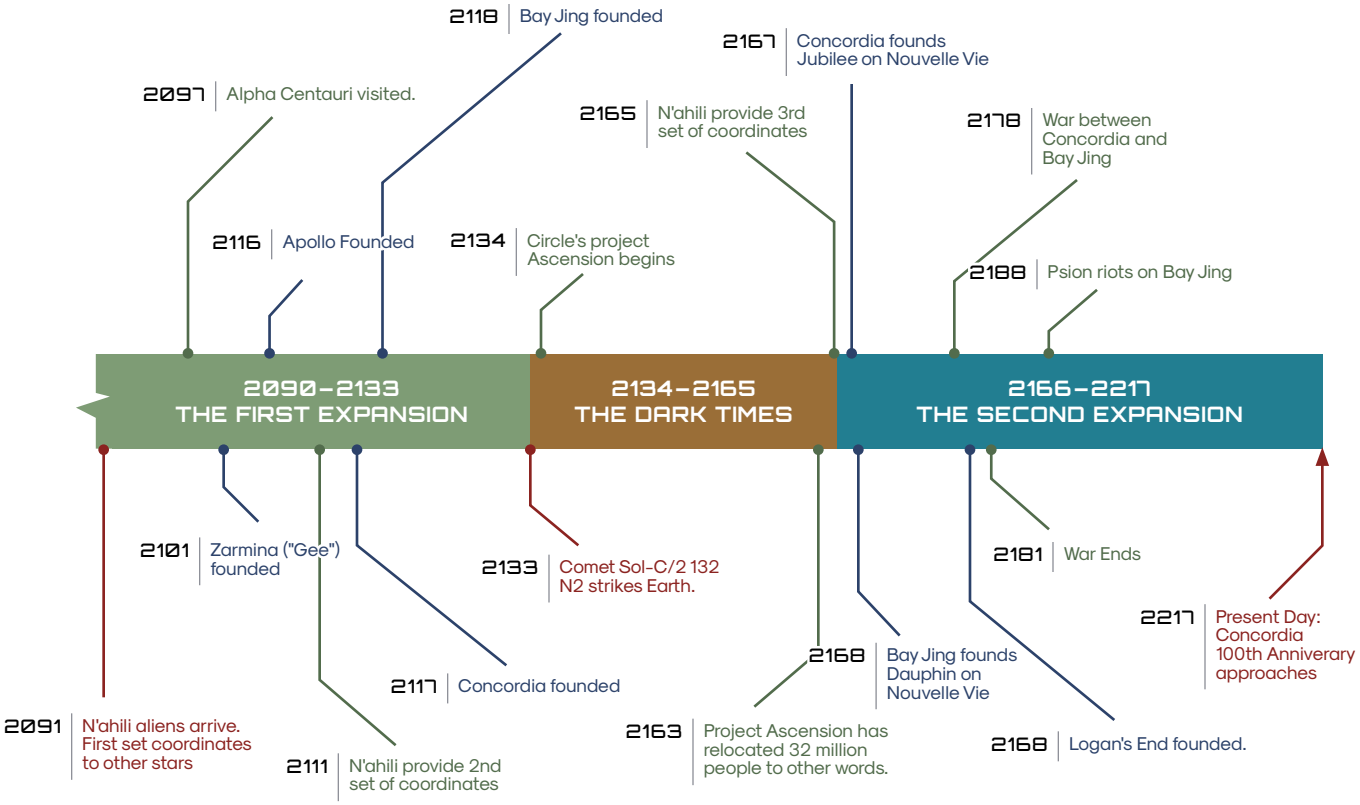
Most of the refugees ended up at Concordia and Bay Jing, which saw their populations swell. In the power vacuum left by Earth, these two planets took on the role of leading and organizing Humanity. By 2150, when the effects of the impact began to fade, these two planets were the equals of Earth, if not in population, at least in importance and technology. The well-known current rivalry between Concordia and Bay Jing dates from this time.

During these difficult times, the N'ahili did nothing other than watch, and did not help Humanity at all. Even though scientists believe this has more to do with the aliens' belief system than with any misplaced perception of indifference, this behavior did not gain the aliens any new friends. However, as 2165 approached, the N'ahili surprised humans again by providing a third, fresh set of coordinates to jump points, this time covering stars up to thirty light-years from Sol.

THE SECOND EXPANSION

The next twenty years saw the settling of two new Earth-like worlds: **Nouvelle Vie**, in the Gamma Leporis star system; and **Logan's End**, in the Eta Cassiopeiae star system.

Nouvelle Vie was unique in that it was born divided, with two separate colonies founded by the rival planets of Concordia (the Jubilee colony) and Bay Jing (the Dauphin colony). The fact that these two colonies share the largest landmass in the mostly



water-covered world caused conflicts that led to the first and only war Humanity has had in space. Concordia and Bay Jing went to war in 2178 around the orbit of Gamma Leporis, with the Circle and EarthGov taking a neutral stance.

During this time the Circle was instrumental in stopping atrocities from being committed, such as attacks on civilian vessels or dropping of projectiles on the planet. An important weapon in the Circle's arsenal was the use of the new Stellar Communications Network, a set of automated stations designed to broadcast information between jump points to most planets in human space. As had been discovered centuries previously, keeping the population of most planets informed of what was happening was one of the best ways to keep atrocities and barbaric actions from occurring. Not that the governments of Concordia or Bay Jing reacted kindly to the open coverage of their war activities.

The Psion Brotherhood also took an active role as a deterrent during the war, minimizing the violence with mind-reading and emotional suggestion without resorting to direct mind control.

When hostilities ended in 2181 (officially as a cease-fire but in reality as a result of a string of Concordian victories against Bay Jing), both the Circle and the Psion Brotherhood were hailed as the protectors of the peace in space. This ironically had the effect of increasing the simmering rivalry between these two organizations. The Circle returned to its headquarters in Concordia, temporarily abandoned to prevent the appearance of preferences during the war. Even so, relations between the Circle and Concordia have been difficult since the war.

In the case of Bay Jing, the government manipulated common sentiment against the Psion Brotherhood. The veiled attacks and abuse against the Brotherhood culminated in 2188 in the Psion Riots, a population uprising that ended with the lynching of hundreds of Psions. The scars of that episode still reverberate around today. The current leader of the Psion Brotherhood, Ganendra Nathan, is one of the survivors of the Psion Riots, and has devoted his life to healing the wounds caused by this conflict.

Logan's End was founded in 2179 by colonists looking to remove themselves from the chaos of the war. Although the existence of an Earth-like planet

around the star of Eta Cassiopeiae had been known for years, the fact that the star was fifteen jumps away meant the planet was almost impossible to settle. This problem was solved with the creation of Waypoint Station in the Alpha Lyrae/Vega star system, a convenient ^{3}He collection point and refueling stop for settler ships on their way to Logan's End.

PRESENT DAY

Things have become quieter since the war. Earth has now returned to its former level of maturity and influence, but it has to share the stage with the major powers of Concordia and Bay Jing. Nouvelle Vie has never found complete peace, as terrorist elements in Jubilee and Dauphin continue an undercover guerrilla war with their respective planets supporting from the sidelines; many believe sooner or later war will start again. Logan's End has become the ultimate frontier world, and its exotic jungles have made it a popular wildlife tourist attraction for the affluent. Technology has advanced to a point where engines, weapons, and material construction have improved significantly.

Exploration-wise, we have already explored most of the systems accessible to us via the jump points provided by the N'ahili. There are no new Earth-like worlds available, and there is no interest in settling hostile environments with so much space available in the currently inhabited Seven Worlds. Scout ships still try the needle-in-the-haystack search for jump points, but everyone is impatiently expecting the N'ahili to provide us with a fourth set of coordinates, while at the same time dreaming of a way for humans to wean off of our dependence on these strange uncaring aliens.

THE SEVEN STARS

The seven worlds that are home to Humanity in 2217 orbit real stars. They are:

- **Earth**, our home planet, orbiting our home star of Sol.
- **Zarmina (Gliese 581g, or "Gee")**, orbiting Gliese 581.
- **Apollo**, orbiting Epsilon Indi.
- **Concordia**, orbiting Epsilon Eridani.
- **Bay Jing**, orbiting Omicro|n 2 Eridani.
- **Nouvelle Vie**, orbiting Gamma Leporis.
- **Logan's End**, orbiting Eta Cassiopeiae.

Check out the sidebar on page 73 for more information on why the *Seven Worlds* orbit these stars.

The Circle and the Psion Brotherhood continue their tireless job of helping Humanity evolve. The Circle still runs peacekeeping operations around Nouvelle Vie, where hostilities between the terrorist groups are increasing in preparation for the upcoming 100th anniversary of the founding of Concordia and Bay Jing.

In the last few years there have been several reports of strange activity in space. Strange energy signatures have been detected in space around the asteroid belt and in the far reaches of the Nouvelle Vie system. Ships have disappeared, and strange stories have circulated. In Nouvelle Vie, people have a tendency to view anything suspicious as the next "secret weapon" in the shadow war between Concordia and Bay Jing, but maybe something stranger is going on.

TRAVELING IN SPACE

While the standard fusion drive, based on the invention of the fusion reactor by William Donovan and EnergyNeering, accelerated initial manned interplanetary exploration for Humanity, two other crucial technologies opened the stars for us. One of these was also invented by Donovan, and is known as the Interstellar Jump Drive; the other one is known as the Coulborne Shield.

THE INTERSTELLAR JUMP DRIVE

When in 2064 researchers from the Circle began to study William Donovan's digital notebooks bequeathed to them by Melissa Fischer, they were dumbfounded. Donovan had combined the theories of respected physicists such as Schwarzschild, Rosen, Einstein, and others with several never-before-seen quantum mechanics equations. The end result was the prediction that space is riddled with "membranes" that separate dimensional fixed connections between places that are faraway in real-world terms. In order to cross these additional dimensions and reach other places faster, it is necessary to cross the membrane. The membrane (also called a jump point) occupies a spherical volume of space a few thousand kilometers across.

According to Donovan's theories, large amounts of energy released at a specific location in space would puncture the membrane long enough for a ship to go through and come out the other side of the connection. This would make instantaneous interstellar travel possible, up to an absolute maximum distance of eight light-years per jump.

Deciphering the formula and working out the kinks in the theory took a few years; building the first prototypes of the Interstellar Drive (a joint Circle-EnergyNeering endeavor) took a few more. Finally, when the ship was ready to be tested, the scientists tackled the next problem in Donovan's theory: The apparent impossibility of detecting a membrane in space.

The theory predicts that most membranes, because of gravitational effects, are located approximately one Astronomical Unit away from the main star in the system, and outside the plane of the ecliptic. Even with these restrictions, this is a huge area to search. Since membranes are practically undetectable, the only way to find one is to travel around space periodically activating the Interstellar Drive until a jump occurs. This not only would consume large amounts of energy, but also was impractical given that no one knew if the Interstellar Drive itself would work.

Enter the curious coordinates in Donovan's notes. After several paragraphs of notes that scientists have not been able to make sense of, Donovan mentioned a specific location in space, almost perpendicular to the sun and to the plane of the ecliptic, where the jump should be tested. As we now know, these coordinates turned out to be the location of the membrane that covers the jump point to Barnard's Star, six light-years away.

Since then, and thanks to the dozens of jump point coordinates provided by the N'ahili, we have managed to visit seventy-eight stars a few dozen light-years from Earth. Unfortunately, we have not been able to find any new jump points, which means almost 140 years after discovering the Interstellar Drive we can only visit the stars the aliens provide us coordinates to. Needless to say, Humanity is not happy with this state of affairs.

How do the N'ahili know where to look? How did they find the jump points? Trial-and-error, like us? Or do they know something we don't?

Our inability to find jump points by ourselves also keeps us from settling star systems such as Tau Ceti: This star, only 5.5 light-years from Concordia, contains an almost-perfect Earth-like world. However, despite decades of searching, we have not been able to find a jump point to the system, and the N'ahili are not saying if they have the coordinates or not. Many scouts and automated ships search for this valuable jump point, if one exists (see page 74).

Jumping between two locations is an instantaneous activity, followed by a few minutes spent orienting and navigating the ship. Dizziness and disorientation are common symptoms in the first few minutes after a jump, and most crews are prepared for them. It usually takes about one week of interplanetary travel, give or take, for most ships to either reach their destination world or the next jump point in their voyage. Thus, for example, a trip between Earth and Concordia, eight star systems away, usually takes about eight weeks to complete.

DISTANCES IN SPACE

Measuring distance in space is tricky. As a quick refresher, the distance units you will see most commonly referenced in this book are:

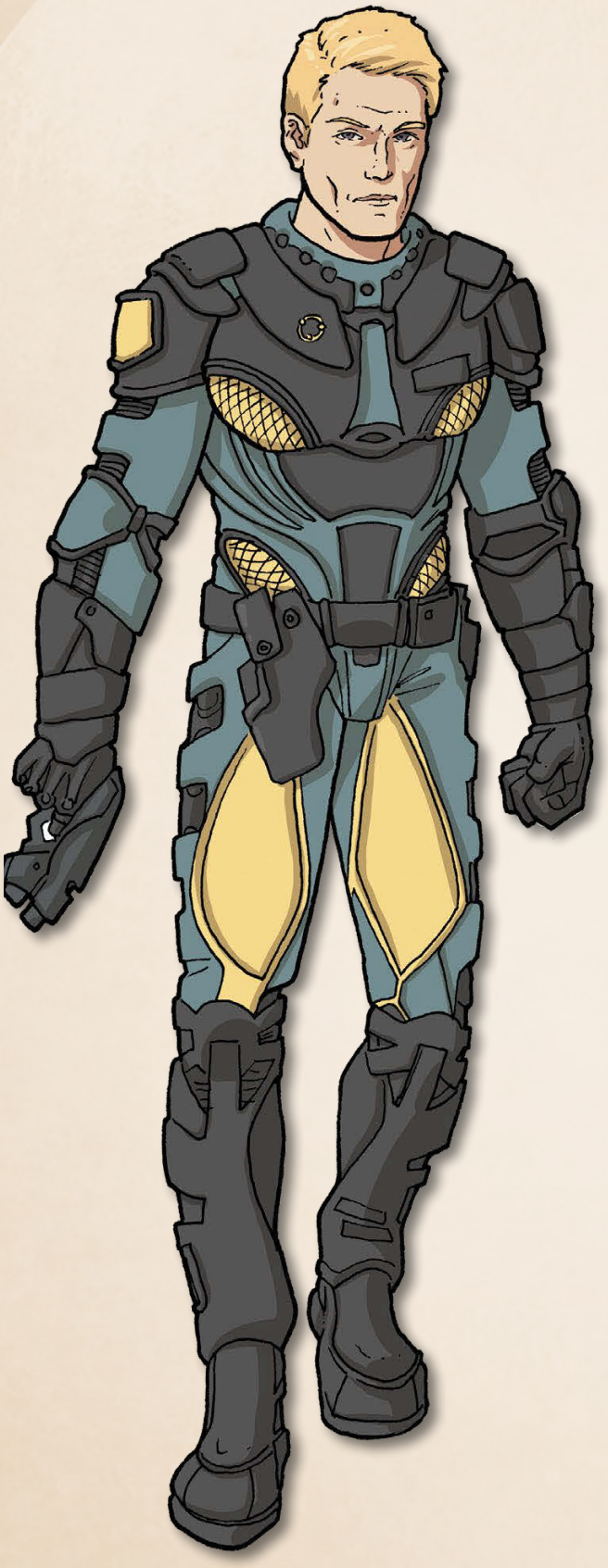
- Light-years, or the distance light travels in a vacuum in an Earth (Julian) year. This is equal to 9,460,730,472,580,800 meters.
- **Light-seconds**, or the distance light travels in a vacuum in one second. They are equal to 299,792,458 meters.
- **Astronomical Units** (or AUs), or the distance between the Earth and the Sun. They are equal to 149,597,870,700 meters. It is also roughly equal to 499 light-seconds, meaning that a ray of sunlight takes eight minutes and nineteen seconds to travel a full AU. To give an idea of an AU's length, Wikipedia uses this example: "If the Sun were to be scaled down to the size of an NBA basketball (24 cm diameter) then the Earth would be half the diameter of a.177 calibre BB pellet, and at this scale one AU is the distance between the two hoops on a basketball court."

In the game you will see light-seconds frequently mentioned when ships meet or communicate, or when they approach a planet. AUs will be mentioned when talking about interplanetary travels or travel between jump points. And light-years will be used when talking about interstellar distances.

Although a unit called a Parsec is also used frequently by astronomers and is a more "official" measurement, the more popular light-year is used in this game as it is more accessible and easier to explain.

THE COULBORNE SHIELD

One of the many challenges faced by space travelers was the deadly risk of radiation. Both the naturally occurring radiation in space (such as from cosmic rays and solar storms) and gamma and neutron radiation caused by a starship's fusion engines cause cancer, bone marrow loss, disease, and death. Although



derrick

Looks and acts like a leader, is convinced he is a fraud.

Derrick was born on Apollo, the son of an EarthGov Naval Officer and a wealthy local merchant's daughter. Derrick was the youngest of the couple's four children. A carefree, jovial boy, more interested in sports and physical activities than in studying or listening to his father's old stories of military honor, Derrick grew up believing he could do anything. And he usually could.

While his brothers and sister focused on their grandfather's merchant business, or on following their father's footsteps in the EarthGov Security Forces, Derrick grew up an attractive, brawny young man, focused on fun, girls and sports. He didn't like to study, but when he did he displayed enough smarts to easily pass his classes with no need for hard work. His good looks, brash manner and fearless personality made him idolized by the girls and respected by the boys.

When the time arrived to decide what to do with his life, Derrick decided to enter EarthGov Academy. His proud father deluded himself into believing his son had finally developed a sense of responsibility and wanted to follow family tradition, but it was all a sham. Derrick saw the Academy as the easiest way to get his father off his back. He also saw himself as a hotshot uniform-clad starship pilot living on the mother planet, the epitome of success and attractiveness. He was self-confident enough to believe he'd breeze thru the Academy. He had given no thought to what happened afterwards, as he usually didn't plan that far.

At the Academy on Earth, Derrick gained a reputation as a reckless, risk-taking natural leader. With three other friends, all devoted to him, he formed a small band and spent most of his free time pulling off the most outrageous challenges and pranks. It was one of these that ultimately changed his life.

Evan Mollenar was an outstanding pilot, an all-business, no-smiles student from Earth, and the closest to Derrick in piloting skill. He was thus, in Derrick's mind, his main competitor. A few months before the end of the final term, Derrick and his friends decided to teach Evan a lesson. They ambushed Evan during one of his flight practice runs in the upper atmosphere, and took turns maneuvering around him in sub-orbital space, teasing and dizzying him. They thought Evan, good pilot as he was, could take it. As he panicked, Evan lost control of his ship and plunged headlong into the atmosphere, disintegrating his ship. Derrick and his friends realized how wrong they were.

Back on Earth, Derrick and his friends nervously awaited their inevitable expulsion and arrest. There were a million ways in which their prank could be detected. The Assistants on both Evan's and their ships could sense the manoeuvre and try to dissuade them or take control (Derrick and his friends had temporarily disabled their own assistants, a suspicious thing in itself). The detection systems in use around Earth should have recorded the entire manoeuvre. The curious, unauthorized path their ships took could be deduced from their engine signatures. In this day and age, they were drowning in damning evidence. Thus, they were very surprised when, mysteriously, none of this evidence surfaced.

Almost nothing of Evan's ship could be recovered, certainly not the computer logs from Evan's Assistant. There had been some sort of problem with the V-World connection and parts of the ship's transmissions were lost, and neither Evan, Derrick nor his friends had any records of their personal activity during the flight. Their Assistants had been detected as active by V-World, except that they didn't sync their offline info with their vault, instead they erased it. The radar and detection records should still have shown the manoeuvre, but for some reason, either because the human space traffic investigative bureaucracy was incompetent or because it didn't investigate carefully enough, no one came to arrest Derrick or his friends. After Evan's funeral had come and gone and several weeks had passed, Derrick was forced to face the truth. He was responsible for Evan's death and had miraculously gotten away with it.

Derrick's friends breathed a sigh of relief and got on with their studies, but Derrick was now a changed man. Consumed for the first time by guilt and shame, unable to understand why Evan was dead and he was free, he was forced to accept the consequences of his actions. The night before his graduation Derrick left EarthGov Academy and never came back. His former friends, who had carefully guarded their shared dark secret, were alarmed and angered. Here was one who could, if he ever decided to break their shared oath of silence, destroy all their careers. Derrick now knows he has three enemies where he used to have friends, and is careful everywhere he goes.

Derrick decided to escape into the only place that would not inquire about his past and accept his skills for the future: The Circle. His (official) accomplishments while at Earth Academy were quickly recognized, and he became the leader of one of the small cells the Circle is composed of. He excels at leading small teams in dangerous missions, and goes out of his way to help the needy and weak. There is still a trace of the easy-going, charismatic party guy in him, but it is tempered by the seriousness of someone who tries to atone for his sins by helping and saving as many people as he can. He still cannot make sense of the fact that his crime was not discovered; in his mind it borders on the impossible that so many records were missing. He fears seeing his secret come out, maybe by someone figuring out the truth, or by some of the missing records from his sensor or the detector satellites surfacing. He fears how such a secret would be used against his family in the corrupt, crime-riddled environment of his home planet of Apollo. Above all, he fears facing his father, and having to explain what he has done.

He is sure, however, that sooner or later he will be discovered.

DERRICK

Rank: Novice (Beta-level Officer)
Attributes: Agility d8, Smarts d6, Spirit d4, Strength d6, Vigor d8
Skills: Fighting d8, Intimidation d6, Notice d6, Persuasion d4, Piloting d10, Repair d4, Knowledge (Ship Ops) d4, Shooting d8
Cha: +1; **Pace:** 6; **Parry:** 6; **Toughness:** 9 (2); **Mental Toughness:** 4
Hindrances: Heroic, Loyal, Death Wish (will do anything to quell the guilt he feels for causing his classmate's death).
Edges: Ace, Brawny, Scoundrel, Experienced Officer, Military Family.
Gear: Assistant, Enhanced Autopistol (Range 12/24/48, Damage 2d6, AP 1, Semi-Auto, 20 bullets, can fire 1 explosive round), Explosive round (Damage 2d8, AP 4), Combat Knife (Damage Str+d4), Reinforced Vacc Suit (+2/+4, protects Arms, Legs, Torso; spacesuit); 2 Bloodstoppers.
Notes: Homeworld Apollo (gains Scoundrel Edge), Beta-level Officer (+2 to Knowledge (Battle) rolls)
Assistant Name and Gender: Assistant Program 3, "Jonathan," Male.
Assistant Skills: Notice d4, Persuasion d6.

APPEARANCE

At first glance, Derrick looks like your stereotypical V-World fantasy leading man: a well-built, square-jawed, attractive young man of about 24. He dresses formally with Circle vacc suit uniform, and keeps his hair cropped short. Most of the time Derrick is humor,

factual and serious, and whenever he "lets himself go" he usually gets back in control of himself really fast. During emergency situations, however, Derrick's true personality bubbles to the surface: He becomes electric and transmits his energy to everyone else; he quips and drops witty comments and cracks jokes at his opponents' expense; and his words and body language shows his subordinates he really cares about them. Once the fight is won, Derrick will celebrate for a few seconds and then slip back into his personality mask. Derrick never abandons defenseless people during a fight, and does not hesitate to place his life in danger to save his subordinates.

When off duty, Derrick does not like to be surrounded by many people, at most by those he trusts. He thus is not the most appropriate negotiator or diplomat in his team. But he is honest, capable and trustworthy. Recently, however, he has been eyeing alcohol as a way to forget his painful memories. He's already lost consciousness to drink twice in the past few weeks, and is starting to worry that maybe he has a problem.

DERRICK'S ASSISTANT: "JONATHAN"

Derrick's Assistant's name is Jonathan. He has the appearance of a young male. Dressed like a recently graduated EarthGov Academy Officer, Jonathan always assists Derrick seriously, behaving like a military subordinate. He rarely offers proactive advice or comments on the actions of his owner, but sometimes it seems like he was on the verge of crossing the line. Jonathan takes care of all communications Derrick needs to do with anyone, even his family.

several types of shielding were used to minimize these effects, these severely constrained ship design and efficiency, and ultimately the possibility of frequent spaceflight.

The invention in 2079 of the Coulborne Shield revolutionized spaceflight and contributed to its democratization. Officially invented by Dr. Grace Coulborne from EnergyNeering, but according to popular legend originally conceived by William Donovan (another example of the cult of personality created around Donovan), the Coulborne Shield works in a perfect vacuum, and has the property to absorb most kinds of energy (including kinetic energy) and radiation, effectively shielding the other side from its effects. The shield then slowly radiates the energy away into space as heat.

Modern ships carry a Coulborne Shield generator that protects the crew from the deadly neutron reaction and energy created by the ship's fusion reactor, makes the reaction itself more efficient, and helps transfer heat to the ship radiators. That's one of the reasons modern ships are more compact and efficient, and can go on longer trips.

The internal Coulborne Shield is shaped like a cylinder covering the fusion reactor and the exhaust chamber. If for some reason the Coulborne Shield overloads, it explodes, radiating all of its energy in a burst and most likely destroying the ship and everyone on board. For this reason, the engineer has a way to disable the reactor and the Shield in case of emergency. Ships have a very small emergency shielded "storm cellar" where the crew can hide if something like this happens.

Coulborne Shields are important in combat scenarios for their ability to work as a "heat sink," thus temporarily absorbing deadly heat to radiate later. They are also crucial for their ability to protect the ship against incoming attacks. In this last scenario, the Coulborne Shield looks like a giant black sphere of energy that contains the entire ship. Given that the shield needs a vacuum to work this has not significantly helped planetary combat, but is indispensable when ships fight in space. This use of the Coulborne Shield is explained in more detail on page 13.

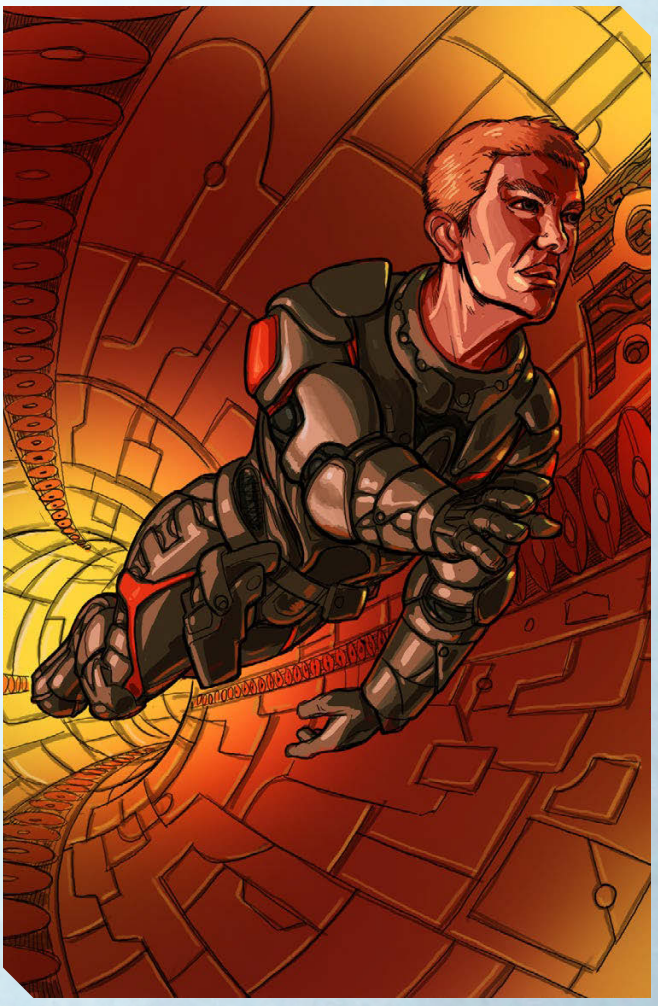
Usually ships have the external Coulborne Shield always up and in use, but in low-energy mode. This mode protects against interstellar radiation, gamma rays, and the occasional microscopic particle. When combat is expected, the engineer turns up the Coulborne Shield to full power in order to protect the ship. Since in space a ship knows it will be in combat hours or days before it meets the enemy ship, there is usually ample time to do this.

SPACE SHIPS

The Spaceships in *Seven Worlds* are the products of what Humanity has learned since the dawn of the Space Age.

EXTERIOR

Most modern spaceships are spherical in shape, with two or more large fusion-powered engines on a side. The outer surface of the ship is crisscrossed with a grid of superconductive magnetic tracks, on top of which run small sliding robotic attitude jets equipped with control momentum gyroscopes (CMGs) and gimbals. These jets serve a dual purpose: If the ship is moving relatively slowly, the jets may slow the ship down or change its direction; if the ship is moving fast, the jets are used to quickly gyrate the ship in order for the large engines to do the heavy work of changing ship direction and speed. Specific points in the surface grid act as energy chargers using energy generated by the fusion engine, and periodically the moving jets position themselves in one of these to recharge.



'WHY A SPHERE?' AND OTHER COMMON MISCONCEPTIONS ABOUT SPACESHIPS

Few topics have as many misconceptions and mistakes as starship shapes. This is mostly due to the influence of movies and TV on our expectations of how a ship looks.

To start, the vacuum of space is not the sea. There is no need then for large ships with naval-sounding names (although we use them in this game) or with decks perpendicular to the axis of thrust. "Down" in a spaceship is the direction the ships engines' exhaust points towards. There is also no need to put the "Bridge" at the top of the ship. In fact, the senior officers are probably safer from enemy attacks if they are in the center of the ship, and computers and other sensors can take care of looking out.

Which brings us to: Ships should not have windows, just like submarines. Most of the time there is nothing to see. Windows are a structural weakness in hulls. And space battles are waged at such long distances that you won't see anything until a laser hits the ship and fries your eyes, or radiation seeps in. Future ships will allow the walls to project filtered views from the outside, with perfect resolution and none of these risks.

There is no atmosphere in the vacuum of space, and therefore ships should not look like fighter planes. There is no need for wings or aerodynamic configurations and no need to "swerve" and "bank" during battle. There is no need for sleek-looking ships since speed and maneuvering mostly don't depend on a ship's shape. There is also no need to "shake the enemy off my tail" since ships in space can turn and point in a different direction than they're traveling in.

Real spaceships must be designed for the conditions of space. They must allow for significant amounts of fuel and propellant, they must be designed to simulate some kind of gravity to keep passengers' muscles from atrophying, they must have an effective way to turn and change course during travels and battles, most likely using gimbals; and they must have significant protection against radiation and enemy attacks. Finally, heat retention and radiation must be considered in the design.

So, how should these ships look?

There is a consensus around the two main shapes of ships that are realistic and feasible: a cylindrical, elongated shape; and a spherical shape.

Cylindrical or elongated ships make sense since they offer a great distance between the engines and the crew quarters, thus allowing for the implementation of shadow shields against radiation. They could also be rotated on their long side to simulate gravity for the crew. On the other hand, pitch and yaw maneuvers are harder and more costly.

Spherical ships, on the other hand, have a smaller moment of inertia, thus making it easier to pitch and yaw; this is useful during space battles. Also, spheres have the largest enclosed volume for the smallest surface area. This is important since hull protection is critical for a spaceship. Taken together, better maneuvering and smaller surface area mean a higher chance of evading enemy fire.

The biggest drawback with spherical ships (other than that they don't look as sleek as cylindrical ones) is that the engines are close to the passengers, thus making radiation poisoning critical. Fortunately in the *Seven Worlds* setting, ships are equipped with Coulborne Shields that surround the engines and prevent radiation leakage. Without this technology ships would have to be elongated after all.

If the ship has weapons or counter-attack systems, these are also built as robotic devices moving across the magnetic grid on the ship's surface.

These spherical spaceships have no windows; they are not necessary. Most walls in the ship are already screens, and can project anything, including the view from outside. Especially designed cameras allow the crew to "look" outside without the risk of receiving space radiation or a lethally blinding energy weapon. Besides, having reinforced walls instead of windows outside increases the ship's ability to resist impacts with dust or attacks by deadly weapons during combat.

Between the spherical shape, the dozens of little robots running around the surface, the lack of windows, and the rotating gravity environment and heat radiators that are periodically extended from the ship (see below), a spaceship from the 23rd century is truly a sight to behold. It is a testament to the design abilities of current ship architects that ships still manage to look elegant and effective.

INTERIOR

The sphere contains several decks positioned like layers around the center of the ship. Given that there is no gravity inside the ship but there is the feeling of acceleration in the direction opposite of the engines, surfaces and doors are designed to be handled in microgravity conditions.

Throughout the ship's rooms and corridors, superconductive material has been placed to create low-intensity magnetic fields that interact with the crew's vacc suit uniforms to propel them in different directions. Crewmembers can enable these fields at will. It is thus an amazing spectacle to see trained crewmembers "fly" through the corridors of the ship while performing impossible acrobatic feats. In emergency situations, it is important for crewmembers to quickly jump and move between the different decks, to different consoles and repair positions. The ship decks also are equipped with many handles, and the crew is trained to use these to move between the different decks if the magnetic fields are not available, a common situation when the ship overheats.

During combat, special couches with gimbals allow the crew to lie horizontally, firmly attached to the seat, and to rotate independently of the direction the ship is moving on. Built using claytronics (see page 82) which dynamically change shape and mold themselves to securely and comfortably grasp the user's body, these horizontal couches also protect crewmembers from drastic acceleration and direction changes, impacts and attacks. Most ship functions and navigation operations are performed with a V-World interface. Most commands are given via speech, giving orders to an Assistant. Finger movements, a flick of a wrist or even a quick thought can also be used as commands. During space combat, most crewmembers have full vacc suits in spacesuit mode in case of breach or decompression.

The interior of the ship is thinly illuminated by the wall-screens, powered by energy from the reactor. However, specially designed emergency "glow-tubes" filled with tritium gas are positioned at specific places to light the interior if the power goes out.

GRAVITY EFFECTS

Although crewmembers are exposed to a slight acceleration during their travels, and superconductive material usually creates a magnetic attraction field to keep them active, lack of gravity can severely atrophy the human body. To mitigate the problems created by the lack of gravity, ships are equipped with special spin habitats. Nicknamed "G-gyms", these cylindrical spaces are centrifugal environments that are detached from the ship and extended by means of a tether to approximately two-hundred meters from its surface. The tether then rotates around the ship about twice per minute using a robotic device on the magnetic grid on the surface of the ship. A small capsule connected to the tether allows crewmembers to move between the ship and the rotating environment. Set up this way, spin habitats provide a simulated gravity environment with minimal Coriolis Effects. All crew must use this environment periodically (at least once a day) to keep their bodies from atrophying. Even with these measures, crewmembers on spaceships must periodically take some time off on a planet, to recover from the effects of weeks-long travels through space.

AN EXAMPLE OF A SHIP

Check out a description and map of the *Voyager*, a sample heroes' ship, on page 190 to get an idea of the logic and distribution of spaceships in this setting.

SURFACE-TO-ORBIT

Space ships are designed to move in space, not in an atmosphere. This means modern space travelers need a way to travel from the surface of the planet to the orbital stations where the ships are parked and vice versa. Most worlds, with the exception of Logan's End, have at least one rotovator. Rotovator Planes ferry Orbital Shuttles to the rotovator, which releases them in orbit and vice versa.

Earth is currently the only planet with a space elevator, but construction of these has begun on Concordia and Bay Jing. Surface-to-Orbit Shuttles are also available in all worlds.

HEAT

Fusion engines and life-support systems inside a spaceship generate large amounts of heat that the ship needs to dispose of. Part of the heat generated by the engine is eliminated by the exhaust of the engine itself but enough heat stays to make it necessary to have a way to eliminate it. This is done in two ways: physical radiators and the Coulborne Shield.

Physical radiators are large retractable panels that look like solar batteries. The consolidated heat from different parts of the ship is radiated into space by use of these. Radiators are large, flimsy, and prone to be destroyed by space dust and debris. Also, they are completely unusable during space combat, and are usually retracted for the duration of the battle. Even so, all ships equip radiators both as a simple, cheap way to radiate heat during long flights as well as a backup heat radiation method if there's a problem with the Coulborne Shield.

The Coulborne Shield by itself is both a heat radiator and a heat sink. During normal travel, the internal Coulborne Shield reflects part of the heat to the ship exhaust, and accumulates remaining heat. This heat is directed to the physical radiators. Periodically the

external Coulborne Shield is enabled to radiate extra heat into space.

Note that ships usually have different sets of radiators for heat generated by the reactors and heat generated by the life-support systems.

Inside the ship, temperatures are usually on the standard to warm side, and can become quite hot during combat. Having a cold interior during space travel is a luxury indeed.

LIFE IN SPACE

Despite the constraints of living in a relatively small environment with no natural light and microgravity conditions, crews have many interesting activities to keep them busy. Of course a structured crew schedule is critical to maintaining security and efficiency in the ship. When off-duty, crewmembers spend time in V-World, where all kinds of places can be (virtually) visited, and many activities and games take place. It is not unusual for crewmembers to live parallel lives for a while within their particular V-World.

A practically unlimited library of digital books, movies and entertainment is available instantly in the ship's local copy of V-World. Crewmembers can visit historical moments, watch recorded concerts live as if they were in the audience, or attend pre-packaged college courses.

The G-gym environment is available once a day, and all crewmembers must use it. Aerobic and anaerobic exercising is the norm in most of these G-gyms. The G-gyms include virtual personal trainers that keep track of exercise programs and muscle development. Some ships have G-gyms large enough to host competitions such as wrestling, boxing, or others.

Ship V-World environments also include a therapy program, one which all crewmembers have to use at least twice a week. The virtual therapist works as a "secret confidant" and escape valve for crewmembers (information stored here is encrypted so it cannot be accessed by anyone, not even the crewmember's

THE SCALE OF SPACE AND TIME

Douglas Adams said that space is vastly, hugely mind-bogglingly big, and he was right: There is just no way for our brains to conceive of the size of the Universe, so we won't try to explain it here. But space is not the only thing that goes beyond any understandable scale. Space's Siamese brother, Time, is also mind-bogglingly big!

We invite you to use the interactive programs and watch the videos in the References section, since they'll do a much better job of explaining how huge time and space are than we could. We'll just drop one or two interesting facts and let you move on to the References:

- **Distance:** In the exploration of space, our radio waves precede us. We've inadvertently been sending radio and TV broadcast waves to the skies for almost one hundred years. Since these waves travel at practically the speed of light, you could say that Humanity has broadcast proof of its existence in what by now is a sphere with a radius of one hundred light years. This is a far larger distance that we expect to be able to cross, even with probes, for the next few hundred years. Yet the Milky Way galaxy is 120,000 light-years across! In the references you can find a diagram of the Milky Way with the radius of our radio transmissions marked with a dot.
- **Time:** If the entire existence of the universe were scaled down to 14 minutes, the time humans have existed would be less than a fraction of a second. In fact, someone has done this scaling for you and created a video out of it, see the References section for more information.
- **Temperature:** We're also in the low scale of temperature resistance. The difference between the hottest and the coldest recorded temperatures in inhabited locations on Earth is 120 degrees Celsius, meaning that's the entire range of (uncomfortable) human temperature resistance. Yet using colliders we have been able to simulate temperatures approaching the stars', such as 13,000,000,000,000,000,000 Celsius (that's a 13 with eighteen zeroes after it).
- **Perception:** Let's talk about visual range now. We believe we see a rich palette of colors from the darkest to the brightest. Yet "colors" are just waves, part of the electromagnetic spectrum. And it turns out that our eyes only sense an extremely small part of that spectrum, just about 1 part out of 10-followed-by-30-zeroes parts.

We could go on and on, but the point is that the scale of the Universe is simply impossible to grasp for human beings. We can barely grasp the impossibility of grasping it.

If you're still not convinced and like more poetic descriptions of the scale of space and time, check out Carl Sagan's essay on "Reflections on a Mote of Dust", in the References section, or the first episode of the "Cosmos" 2014 TV show.

Assistant) and also to detect situations that may lead to mental health problems with the crewmember, such as depression or V-World addiction. The therapist combines the results of therapy with periodically run neurological scans of the subject's brain to diagnose and help the patient. If the digital therapist detects a dangerous condition it notifies the captain, all the time striving to keep confidential the details of the patient's revelations. If the ship is in a star system within the Stellar Communications Network, the digital therapist can also notify the appropriate authorities so the crewmember can receive assistance at their destination or next stop.

Ships usually carry a supply of fresh meats, fruits and vegetables to last the entire trip, as well as a month's supply of processed foods in case an emergency occurs (or when money runs low). Most ships also have small gardens designed to grow fresh vegetables. In general, a crew's diet is satisfactory and interesting. Eating in micro-gravity is still done with care, though, as liquids can float around, and crumbs can clog vents and other sensitive parts of the ship. Fortunately, the superconducting elements surrounding the crew make it a bit easier to carry and transport all kinds of devices, including trays and other implements.

The ship carries a large supply of water, but recycling is crucial. Using energy from the reactor, water recycling technology removes any pathogens, oxidizes the salts in the urine, and separates components, creating fresh water effortlessly. Even the taste of pure water is preserved (although some crews violently dispute this point).

While ships strive to keep temperature at a comfortable level, heat radiation is a critical worry in spaceships, and paradoxically, keeping the insides colder generates more heat. Because of this, there may be times when temperature has to be kept higher than crews would wish. This is less of a problem now but was very common in the early days of interstellar travel, earning ships the nickname "sweat shops." Although those days are mostly over, the stereotype still lives in the minds of many people who have not travelled through space.

IS INTERSTELLAR TRAVEL POSSIBLE?

Although interstellar travel is definitely possible, it is constrained by the limits of physics, particularly the speed of light. Probes made with our current technology would take thousands of years to cross the stars. If the *Voyager* 1 spacecraft, currently in the outskirts of the Solar System, were on its way to Alpha Centauri (the closest star to us, along with Proxima Centauri) it would take about 80,000 years to get there. Clearly that's too long for human travel.

Having better propulsion systems won't help, either. As a ship's speed approaches the speed of light, it behaves as if it had more mass, making it difficult or impossible to keep accelerating. So, even if we had the energy and the technology, traveling to Alpha Centauri, according to the laws of physics, would take quite a few years (in the movie *Avatar,* James Cameron assumed such a trip would take at least six years).

Clearly a faster medium is needed if we expect heroes to visit many stars in their lifetimes. Unfortunately, no scientifically-proven method or theory for "FTL travel" exists yet. Superstring theory specific cases, Lorentzian wormholes, and others have been suggested as ideas, but they are not concrete examples. Besides, Relativity predicts interesting side effects if something managed to go faster than the speed of light. For example, it would appear to go backwards in time.

In Science Fiction, authors are always looking for ways to create a plausible explanation to allow heroes to zip around the galaxy in hours or days instead of millennia. Teleportation, warp drives, hyperspace and wormholes are some of the most common tricks of the trade. *Seven Worlds* assumes there are "wormholes" in space that connect specific points around approximately 1AU of a star. These are called "jump points" in the game, and are separated by a membrane.

THE STELLAR COMMUNICATIONS NETWORK

The Stellar Communications Network is the backbone of civilization between the worlds in human space.

Although ships can travel faster than light using jump points, it is not possible to send a communication signal through the jump point. Therefore, fast communication between the worlds is a challenge. In theory, if a ship takes eight weeks to travel between Earth and Concordia, for example, a message carried by that ship would also take eight weeks. This is unacceptable for most business and tactical communications. To circumvent this problem, the Stellar Communications Network, or SCN was invented.

The Stellar Communications Network consists of a network of semi-automated space stations permanently located very close to each jump point. There is one of these stations on each side of the jump point. Each station manages several dozen



SPACE RADIATION

Radiation is considered a major risk of space travel. On Earth, radiation is even suspected of increasing the chances of Alzheimer's (among other things), a theory that some scientists oppose. In all cases, however, a human being on the surface of the planet is somewhat protected from space radiation by the atmosphere and Earth's magnetic field, but in space that protection is gone. So how at risk is an astronaut from Galactic Cosmic Radiation (GCR)?

Not as much as expected, it turns out. Scientists estimate that a dose of 400,000 millirem of radiation will kill 50% of adults that receive it (for comparison, a chest X-ray exposes a human to just 10 millirems). Average GCR is estimated at 1.2 millirem per hour, or 28.8 millirem per day. At this rate, an astronaut would have to be exposed to GCR for 9.5 years in order to receive a quarter of the deadly dose.

Of course, there are other sources of radiation besides just plain cosmic radiation. The most likely radiation danger to astronauts is the ship's fusion engine itself, which would require significant protection to avoid leakage. In the *Seven Worlds* setting, the Coulborne Shield acts as a protection against radiation, keeping astronauts safe from nuclear fusion reactions.

relay drones, small automated probes equipped with Interstellar Jump Drives.

When a message from Earth needs to be transmitted to Concordia, the message is radioed or beamed from Earth to the SCN Station orbiting the Solar System's jump point to Barnard's Star, the next star in the route to Concordia. This Station in turn transmits the message to one of its relay drones. The drone flies towards the jump point and jumps to Barnard's Star. There, it transmits its message to the Station next to that jump point, which transmits it to the Station in the Barnard's Star System that hovers next to the jump point to Ross 154, the next star system in the route. This station sends a relay drone to jump through its jump point to the next star system, and so on.

Since most jump points are approximately 1AU away from their sun, they are usually one or two AUs away from each other, or between eight and sixteen light-minutes. Counting the time it takes a relay drone to travel to a jump point, jump, and travel at the other side, it usually takes about two hours for a message to cross a star system. Therefore, using this relay system a high-priority message sent from Earth to Concordia could reach its destination in just sixteen hours.

The Stellar Comm Network stations use algorithms that intelligently manage, share and redistribute relay drones, compensating according to predicted usage patterns and message priorities, but always ready for emergency transmissions.

High-priority messages, such as political or military communications, are immediately relayed via dedicated drones. Medium- and Low-priority messages, however, such as day-to-day communications, are queued and buffered at each station and sent in batches to save in relay drone jump costs. A typical batch of medium-priority messages usually takes about eight hours to cross one jump point. Therefore, a medium-priority message between Earth and Concordia would take approximately 64 hours to arrive, or two days and a half.

Low-priority messages are reserved for planetary synchronization purposes. Differential copies of V-World information, common databases, ID and profile information from the registrars in charge of identification, etcetera, are transmitted in large, slow batches through the Comm Network. Thus, eventually every planet has a complete database of all the (non-confidential) information produced by every other planet. The system supports specific requests, so that if someone from Concordia needs information from Earth that has not been replicated yet, a message is sent to Earth to prioritize the replication of that specific

GRAVITY

The human body is designed to thrive in Earth's gravity, and rapidly deteriorates in microgravity conditions:

- Muscles stop having to perform even the normal efforts they make to keep us upright.
- The heart stops pumping blood to the extremities and lets blood pool in the chest; blood that used to go down to the legs also moves upwards.
- Believing it is overhydrated due to all the liquids in its chest, the body starts to dispose of water by peeing.
- Calcium and potassium are ejected from the bone marrow through the urine. This causes bone weakness and could cause kidney failure and arrhythmia.
- Since body heat doesn't rise off the skin the body has to sweat to cool itself down. That sweat doesn't drip or evaporate, it just builds up on the skin.
- Without gravity, fluids rise to the head, and among other things, put more pressure on the eyes. This squashes the eyeballs and blurs vision. The swelling of the optic nerve could even cause blindness if left untreated for too long.
- The body seems to grow up to two inches taller since the spine, no longer compressed by gravity, expands and lengthens.

As if all this weren't fun enough, the environment itself behaves differently in microgravity: bacteria grow larger, faster and deadlier; flames become spherical; smells change; and bubbles don't go up, making drinking a soda a very uncomfortable proposition. So it is important to provide space travelers with ways to experience gravity periodically.

Leaving aside fantastic alternatives such as gravitic plates and antigravity technology, there are currently only two ways to simulate gravity in a spaceship: Linear acceleration and centrifugal force.

Linear acceleration means the ship must constantly accelerate at the same rate to give the crew the feeling that they have acceleration. The spherical structure of the ship allows them to trade places and use the ceiling as a floor as the ship begins the deceleration phase. In *Seven Worlds* ships can accelerate up to 5g's (more on this later) but they usually travel at 0.15g's, or a bit more than a tenth of Earth's gravity. This is a start, but it's clearly not enough.

Centrifugal force is what the passenger of a roller coaster feels when he rides through a loop and doesn't fall out. At a specific rotation speed the body feels pushed outwards. With a tether that creates a circumference of a certain length and at a certain speed, Earth's gravity could be simulated. This is why circular space stations gyrate in movies and TV, and is the reason for the "G-Gyms" in *Seven Worlds*.

While the engines of *Seven Worlds* would make significant accelerations possible, the human body also has a limit to how much acceleration it can sustain. While experiments with short-term accelerations of 15g's or more have been performed, a sustained acceleration of 5g seems to be the maximum that a human being can sustain for long stretches of time, and that with only slight movements of the head and hands being possible. To allow humans more range of movement, human-crewed ships in space battles in *Seven Worlds* accelerate at between 2 and 4g.

As an aside, we've used the terms "microgravity" and "Zero-G" interchangeably, but they are not the same. In Earth orbit, astronauts seem to float in Zero-G, but they are actually falling in space, subject to Earth's gravity (93% of Earth's gravity, to be exact). Gravity can actually be felt a long way out, making actual "Zero-G" difficult to find in space.

piece of information. This still takes days, but people have grown accustomed to working with the system.

The Stellar Comm Network has another important purpose: The stations in the network detect, record and transmit the signatures of every ship that passes through their jump point, as well as of any ships traveling throughout the system they are located in. This information is available to the law enforcement organizations in each planet, as well as to the Circle. This helps keep the space lanes safe, as everyone knows they are being recorded at all times. See the sidebar on Stealth (page 95) for a list of all the ship information recorded by the Stellar Comm Network.

Unfortunately, the expense and complexity of the Stellar Comm Network means that not all worlds and stations have this means of communication. Currently the most important planet without Comm Network access is Logan's End, but Hoffnung, Waypoint and Hernandez Stations also lack this technology. The citizens of Logan's End are desperate to implement Stellar Comm Network services to their planet, but so far have not been able to afford it. When a ship is scheduled to travel to or from these locations, the last available Stellar Comm Network station in the route transmits the batch of information for that destination in encrypted form to the ship. The

ship stores this information in its local database, and transmits it back to its destination when it arrives. All ships are required to support information transportation services such as these when traveling to these locations.

Stellar Communications Network stations use solar energy to power themselves, periodically correct their position to stay close to the jump point, and transfer energy to the relay drones. In the star systems with smaller stars, though, the large amount of energy needed to power the drones' Interstellar Drives requires periodic refueling. Therefore, a dedicated fleet of maintenance ships flies and visits the stations to refuel and check correct operations.

SUPERCONDUCTORS

Superconductors are the theoretical ticket to a new age, the Age of Magnetism. Materials that under specific temperature conditions lose all resistance to the conduction of electricity and have special magnetic properties, superconductors could change our way of life forever.

Besides their ability to transmit electricity with zero resistance, superconductors can be used to create incredibly powerful magnets relatively easily. Superconductors could potentially create magnetic fields a million times more powerful than the Earth's magnetic field by taking advantage of a property called the Meissner effect. Levitating trains and cars, floating a few feet or yards from the ground, become a possibility, for example. It may also be possible to place tiny superconductors in furniture, clothes, belts, shoes and other everyday objects so that a tiny amount of electricity allows furniture to move by itself, or humans to float via magnetic power.

The greatest scientific challenge to making this future a reality is that currently superconductors need extremely low temperatures to work (-135 degrees Celsius, for example). But if "room-temperature superconductors" are ever invented this would not be an issue anymore.

In *Seven Worlds*, superconductors are everywhere: Cities, houses and cars. In space, superconductors are used to allow humans to easily "fly" within their ship corridors. Sensors in their suits turn the appropriate superconductor on or off to provide a seamless gliding sensation as the person moves along the corridors of their ship. All the devices that roam around the outer hull of the ship also take advantage of superconductors to work their magic.

INTRASYSTEM COMMUNICATIONS

Since jump points are usually 1 AU away from their star, most intrasystem communications are made at a distance of at most two AUs, or sixteen light-minutes away. This means that most ship-to-ship (or ship-to-planet) communications are more like one-way messages until the ship is very close to its destination, usually two light-seconds or less. One-way messages are usually audio or video messages, which can be translated to text if necessary.

At distances of two-light seconds or less, standard bi-directional audio or video conversations can begin, with a slight lag. Most planets also have a pretty robust communications system available in orbit, so communications and transactions can be made between orbit and the surface without the need to go down to the planet.

THE CIRCLE

The Circle Foundation, brainchild of William Donovan, has been one of the defining forces for the development of Humanity and the conquest of space.

BEGINNINGS

Founded in 2017 by the magnate himself, the Circle's motto ("Nos Unum Sumus", or "We Are One") attempts to tie all Humanity together. It also has a mission statement that sounded preposterous at the time: "Expanding Humanity's reach into space while protecting Humanity from space itself."

The Circle had ample funds at its disposal, given that it owned part of Donovan's EnergyNeering Corporation. Modern in its management, it behaved like a company itself, using its shrewd investments to gain influence and achieve the goals of its mission statement. This allowed it to fund research into space activities as well as surface-to-orbit services for companies and tourists. The Circle was one of the first organizations to own a fully private space station in orbit around Earth. From the creation of the first Fusion-powered interplanetary drive, the Circle led the exploration of the Solar System, and the creation of the first outposts in the outer planets and moons to support the mining and harvesting of ^{3}He.

The Circle took pains to cultivate its PR image as well. The daring creation of outposts, the all-encompassing vision that fueled dreams of a future in space, and the smart ads showing brave men and women in modern uniforms with the Circle logo, ready to face danger in defense of Humanity, won over the collective

WHY CAN'T A SHIP ENTER AND LEAVE THE ATMOSPHERE AND ALSO TRAVEL IN SPACE?

Movies and TV have accustomed us to the image of the sleek spaceship that, after crossing the vastness of the stars, effortlessly lands on a planet surface and then blasts off again into space. Although with enough energy such a ship could be built, in real life it makes more sense to create two different ships: One for taking off and landing and another one to travel between planetary orbits.

Technically speaking, the designs for a surface-to-orbit ship and an orbit-to-orbit ship are significantly different. One of them must have the capacity and engines to create significant amounts of thrust to lift-off, as well as heat technology or wings to land. The other one must be designed to brave the challenges of interplanetary or interstellar travel, including energy, heat, radiation and other things. Combining both into one ship makes as little sense as, in Robert Heinlein's words, "combining a ferry boat, a subway train, and an express elevator."

Regarding Delta-V, for example, the same amount of Delta-V needed to launch from Earth's surface to Earth's orbit is enough to take a ship from Earth's orbit to the orbit of Saturn using a Hohmann trajectory (see the sidebar on interplanetary travel). Yet the first one is a trip of just 360km and the second one a trip of over 1,433,000,000 kilometers!

As if all this weren't enough, there's the matter of the propulsion method itself: Assuming future spaceships use nuclear fusion engines, their exhaust gases would most likely be radioactive. In space the radioactive plume would expand until its radioactivity thins to insignificance, but in Earth's atmosphere the effects would be disastrous. This points towards the use of different propulsion technologies in Earth's atmosphere and in space.

The logical choice then would be to build an efficient, reusable ship that can take cargo and passengers to planetary orbit and back, using powerful engines and thrusters, and that takes advantage of the planet's atmosphere to fly like a plane on the way up and down. This ship does not need a large supply of fuel as it can refuel after each flight, and it would use the propellant in the atmosphere during part of its trip. It would also be protected against the heat of re-entry by powerful ceramic heat diffusors.

On the other hand, a specially designed orbit-to-orbit ship would not worry about dealing with atmospheres and such, but it would include the engines, fuel and propellant necessary for long space trips. Stations in orbit could transfer passengers from the surface-to-orbit ship to the orbit-to-orbit one.

This is not the only way to take passengers and cargo from surface and orbit. See the sidebar on Rotovators and Space Elevators for an example of another technology in heavy use in the *Seven Worlds*.

consciousness of Earth. Everyone wanted to be part of the organization. The foundation of Circle Academy, the learning institution dedicated to preparing the Circle members of the future while at the same time teaching the careers and skills needed for the present, dates from this time.

Given the goals he had set for his foundation, it was logical for William Donovan to bequeath to it his personal digital notes on interstellar engine theory. The Circle took this gift seriously, devoting as many resources as needed to crack the problem in secret. In 2089, this effort paid off with the invention of the Interstellar Engine and the first interstellar trip to Barnard's Star. The Circle's popularity reached new heights.

EXPANSION

When the N'ahili arrived and shared their first and second sets of coordinates, thus opening the stars for colonization, the Outer Space Treaty that governed rights for Earth colonization missions (page 51) became crucial and relevant. The treaty gave equal opportunity to as many nations as possible to settle space, but in reality it would have been very easy for the few powerful nations that could conquer the stars to ignore it and grab a planet or star system for themselves. The Circle had long foreseen this, and thus took an immediate role in supporting as many colonies under the auspices of the treaty as it could. This strategy was made easier by the fact that initially the Circle had a larger "fleet" of Interstellar ships than any country on Earth, thus making the foundation the de-facto leader in space.

As Humanity expanded into space, the Circle walked with them. Several of the first settlement missions were funded and sponsored by the Circle, regardless of the nation or organization that requested it. The Circle's stated goal, in accordance with the Outer Space Treaty, was to allow as much heterogeneity in space as possible: Smaller nations, religious settlements, and

HEAT? REALLY?

Given that the vacuum of space has practically the coldest temperature anywhere in the Universe you would not expect death from heat to be a risk. And you'd be wrong.

It turns out that spaceships collect a lot of heat from many sources, such as sunlight, fusion reactors, enemy weapons, and human life support systems. If this heat is not eliminated, the ship itself will become uninhabitable and melt in a very short time. Therefore, spaceships must include technology to store and eliminate heat. This is something you don't hear too much about in science-fiction stories.

But how do you eliminate heat in space?

On Earth heat is transferred in the air by conduction or convection. Given that there is no air in space, it is not possible to transfer heat by these processes. Instead, spaceships radiate heat, emitting heat in the form of infrared energy. They do this by using *Heat Radiators,* large outstretched "wings" resembling solar panels, although they come in other configurations. For example, you might remember all those pictures you've seen of the Space Shuttle orbiting Earth with its cargo bay doors open. But why? Part of the reason is that the Space Shuttle's life-system heat radiators were inside the cargo bay doors, so they had to be open in order to radiate heat.

Radiators have to be big, particularly if we are looking to generate "comfortable" temperatures for humans. The International Space Station, for example, keeps its astronauts at an average temperature of 23.8 degrees Celsius (which is a bit on the hot side) and has a living space of 358 square meters. To radiate heat for both life support and its internal systems the ISS deploys 156 square meters of Heat Radiators across its structure. Now, if the ISS had fusion engines capable of taking it to the stars, heat radiators would have to be much bigger.

Heat radiators are flimsy constructs, not prepared to withstand a space battle. Because of this, ships during battles retract the radiators and store heat in the meantime in a heat sink. Heat sinks theoretically allow ships to store significant amounts of heat for later radiation. Once the capacity of the heat sink is reached, the ship cannot handle more heat and melts or explodes.

In *Seven Worlds,* we've made heat and heat management a crucial part of the setting. Conveniently, the Coulborne Shield acts as both a heat radiator and heat sink, thus making it relatively simple to manage heat in space. Even so, spaceships have classic heat radiators to radiate heat outside battles or when the Coulborne Shield is not operative.

minority groups, were all received and supported. In return for its funding and support, the Circle requested two things: A non-revocable advisory and support role in the settlement, enshrined in the settlement's bylaws; and first rights to invest in land, business and other resources in the colony. Given that through this means, the Circle-sponsored businesses usually became the first taxpayers to the fledging colonies, this arrangement usually made sense. The Circle successfully became the most influential institution in space.

By 2117, the Circle decided the next step in its evolution had arrived, and made two daring decisions. The first one was to move its headquarters from Earth to the just-settled garden world of Concordia, ten light-years (and two travel months) away. Although initially expected to cause a backlash on Earth amongst the citizenry, the Circle smartly positioned the move as the next step for humans willing to go to the stars, even including the transfer to the (new) Circle Academy on Concordia for citizens of Earth, as well as periodic six-month trips back home.

The other major decision was to devote a significant part of its resources to significantly increasing colonization from Earth. By 2120, three years after the founding of Concordia and Bay Jing, the total population of all four planets and stations outside Earth was a mere two hundred thousand people (counting immigrants and new births), compared with 9.2 billion on the mother planet. Clearly a way to accelerate immigration was needed.

The Circle devoted all its energies to the job, developing the first Settler Ships, behemoths able to transport thousands of people simultaneously. The first-generation Settler Ships, built in the brand-new Concordia Shipyards, were able to transport about two thousand five hundred people in somewhat cramped spaces. By the end of the decade, the Circle had a fleet of about eighty Settler Ships, including newer second-generation ships with five-thousand passenger capacity. By 2130, the total population living outside Earth had increased eightfold, to one million six hundred and twenty thousand.

The main challenge during this increased migration had been the need to transport people from Earth surface into orbit. By 2130, the Circle was transporting an average of three hundred and seventy six people daily from Earth surface to orbit. As large as this number sounds, it was insignificant in the context of the goals of massive colonization. To increase this, Circle scientists began to design the first rotovators and space

elevators (see page 39). These technologies promised to increase significantly the number of people able to leave Earth and land on other worlds.

ASCENSION

When comet Sol-C/2132 N2 appeared in the sky (page 34), Circle leaders put the Settler Ship fleet to work overtime in order to save as many people as possible, but it was not nearly enough. After the impact, Epsilon Leader Katherine Clarke committed the Circle to using its expertise with the Settler Ships and its research on space elevators to save as many people as possible from the catastrophe of Earth. Thus Project Ascension was created.

Project Ascension was a decades-long project that involved:

- Significantly increasing both the number and capacity of the Settler Ship fleet. By 2130, a fourth-generation Settler Ship could carry an estimated thirteen thousand passengers, and the Circle had a fleet of one hundred and thirty ships, counting second-, third-and fourth-generation ships.
- Creating a chain of growing and distribution of food and medical supplies in the remaining planets to distribute on Earth when the Settler Ship arrived, and to feed passengers on the way back to each world. This also included the thousands of ground and ship personnel required for rescue operations. The support of the Psion Brotherhood was crucial here, as Psions helped keep the passengers calm and patient during the long trip.
- Preparing relocation programs on different destination planets to allow immigrants to survive. Despite being eight weeks away from Earth, Concordia and Bay Jing received almost 94% of immigrants who were moved in the next thirty years. This was due to how hospitable and empty those two planets were when compared to Zarmina ("Gee") and Apollo.
- Moving large numbers of people from surface to orbit. Surface-to-orbit ships were already an established technology, and hundreds of ships were available for this. However, by 2150 around three thousand people were being transported to orbit daily, straining all resources. To solve this problem, the first Rotovator around Earth was implemented in 2144, and the second one in 2152. These made it easier to transport large numbers of people from low atmosphere to orbit and vice versa. The creation of the Rotovator system was one of the many technological triumphs of Project Ascension (see page 39).

LIVING IN SPACE

If you have been reading the previous sidebars you already know living in space is vastly different from what we are accustomed to on Earth. Astronauts on the International Space Station have been documenting day-to-day life in space, and scientists are moving forward with research and studies on how to cope with life in space in the long term.

We encourage you to check all the links and videos in the References section. In the meantime, here are some interesting facts about life in space:

Toilets: Toilets work differently in space, and work with flowing air rather than water. Interesting technologies are being researched to make it easier to process and divide waste for recycling and re-use purposes. Currently solid waste is kept in a solid container and moved back to Earth for disposal.

Food: Astronauts do not need to eat paste-tube food as they did some time ago. Instead they eat food just like most of us here on Earth do. Food is partially or fully dehydrated and drinks stored as powders, so that astronauts mix their meal with water before eating. The food packages are opened with scissors and then the food is eaten with knife and fork. There is of course a large dependence on food that has been prepared and processed on Earth, but future developments such as 3-D printed food and in-vitro meat will change the way food is eaten in long voyages in space.

Exercise: As explained in the section on gravity, strenuous exercise is fundamental to keep one healthy in space. Astronauts must exercise several hours a day using devices such as a Cycle Ergometer (similar to a bicycle), a Treadmill with harnesses to keep the astronaut from floating away, and a Resistance Exercise Device (RED), which allows the astronaut to perform weight-lifting exercises.

Crying: While hopefully this is not exactly a day-to-day experience in space, crying while in space, with no gravity to bring the tears down, is an interesting experience by itself. Go to the references section for a link to the video!

There were hardships and accidents; and the sickness and mortality rate of the cramped Settler Ships was higher than expected; but by 2163, thirty years after the comet impact, *thirty-two million two hundred and ninety thousand people* had been transported from Earth to the other settled planets. Project Ascension had been a success.

The Circle paid dearly for this initiative. Many billions were spent on research, construction and operation. Many of the Circle businesses and assets had to be sold or repurposed. By 2163, the Circle still had some assets, but now it was a much smaller organization than before, and it never again reached the level of assets that it had before the impact. On the other hand, the Circle's mission statement had become a reality, and its standing with Humanity was higher than ever.

ORGANIZATION

Circle members are organized in a rank structure with five seniority levels: Alpha Officer, Beta Officer, Gamma Officer, Delta Officer and Epsilon Officer. These levels apply to most careers or specialties within the organization, and were chosen to maintain a way to keep a chain of command without resorting to more traditional military ranks. Leadership abilities are an important part of the skills taught and required for promotion. Thus, for example, a Gamma-level medic is expected not ontly to be an expert in his field, but also to be able to command teams of Alpha — and Beta-level specialists. The top leader of the organization receives the rank of Epsilon Leader. The current leader of the Circle is Epsilon Leader Trevor Antoine.

Note, however, that the Circle maintains a very relaxed attitude towards the chain of command, particularly in small settings. For example, the crews of most Patrol Ships make decisions in a consensus-driven manner, rather than having a specific leader. Things become more vertical as ships get bigger.

Currently the Circle has a fleet of several hundred ships, most of them Patrol Ships, but also several battleships and cruisers. It has outposts and offices on all planets and stations. Circle members offer medical support for new colonists, patrol planetary orbit looking for outlaws, perform rescue missions for ships in trouble, and help maintain the peace in dangerous zones (such as orbital space in Nouvelle Vie, where the nations of Dauphin and Jubilee maintain a protracted cold war). Circle Headquarters are still located in Melissant, capital of Concordia, where the organization is run by the Circle Council and led by Epsilon Leader Trevor Antoine.

The Circle works as a supra-national organization, and does not consider itself beholden to any one planet or nation. Circle members keep their planetary origin and nationality, of course, but by the act of belonging to the Circle gain the special status of Circle Member when dealing with any planetary or national authorities.

DRESS CODE

Circle members have an official Circle uniform, a Vacc Suit simple enough to move in both planetary and ship environments. These are usually light-blue with the Circle logo emblazoned on the left side of the chest. These Vacc Suit uniforms are prepared to react to the superconductive magnetic fields on ships in order to facilitate moving in microgravity. On-Loans, members from the Psion Brotherhood who are temporarily working with the Circle, receive uniforms that are very similar to the official Circle uniform but have both the Circle and the Brotherhood logo on the chest.

THE N'AHILI

In a universe full of mystery and unknowns, Humanity's encounter with the aliens known as the N'ahili stands out as a particularly bizarre and revolutionary event.

FIRST CONTACT

Technically, humans did not find the N'ahili, but vice versa. In 2091, two years after the first interstellar jump to Barnard's Star, scientists had been desperately and unsuccessfully trying to find new jump points to other star systems. It should be noted that the only known jump point until then was discovered in William Donovan's diary, which did not explain how he arrived at those coordinates. The formula or method used is now lost to Humanity.

In the midst of this frustrating search for more jump points, the N'ahili arrived. They first appeared near Barnard's Star to the crew on the scientific research ship *New Dawn* which was on a mission to explore that star system. They arrived from the jump point to Ross 154 (thus incidentally proving they knew about more jump points than humans did) flying a huge amorphous semi-organic vessel that cycled through the colors of the visible spectrum while constantly changing shape. When the crew of the *New Dawn* calmed down (after a brief period of panic which threatened to bring down the entire first contact) the aliens initiated communication. The first and so far only episode of interspecies contact began.

The N'ahili began their conversation transmitting in standard radio channels at the frequency used by the crew of the *New Dawn*, and talked to them in bland-but-perfect English, French and Chinese (the languages spoken by different crewmembers). They explained that since they detected Humanity's arrival at Barnard's Star two years before, they had spent their time collecting and analyzing all transmissions

sent from Earth, thus learning human languages and customs. They identified themselves as the N'ahili, and opened a video communication channel, again using human video protocols and codecs. Crewmembers expecting to see some bizarre life form where astounded to see in front of them a digital visualization of a human being who introduced himself as Adam, the N'ahili's "virtual ambassador" to Humanity.

They were even more astounded when Adam began by offering, as a token of the aliens' peaceful intentions, a set of fourteen jump point coordinates to other star systems close to ours… and promising more coordinates in the future.

A few short hours later, the *New Dawn* and the strange N'ahili starship arrived at the Solar System's jump point. It was February 19th, 2091.

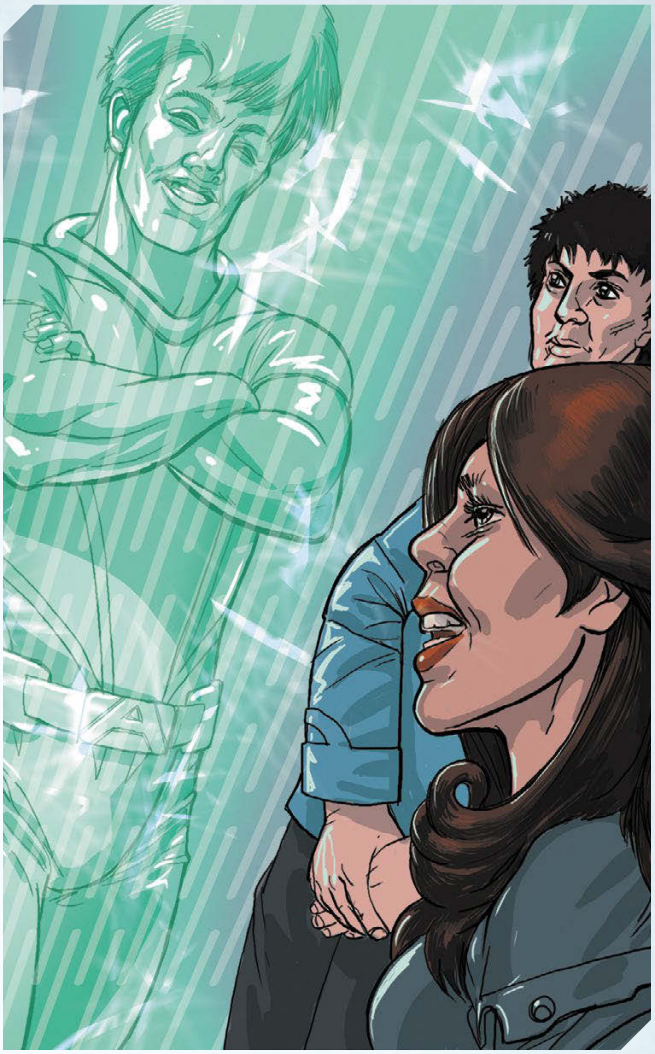
THE N'AHILI AND ADAM

The N'ahili are shrouded in mystery. No one has ever directly seen or talked to one, and they only communicate with humans through Adam. They have explained that they are not a carbon-based life form and that Earth's atmosphere is deadly to them; that they would not survive in Earth's gravity outside their ship (thus implying they have gravity-control technology); and that their look would repel most humans anyway. Even so, their secrecy strikes most humans as odd.

Humans do know how they look, however. The N'ahili have released several recordings and pictures of themselves in their native environment, a planet and star they refuse to name or identify. And they do look bizarre, like bobbing round blowfish-like beings clumsily "swimming" in a dark soupy atmosphere of something that looks like ammonia.

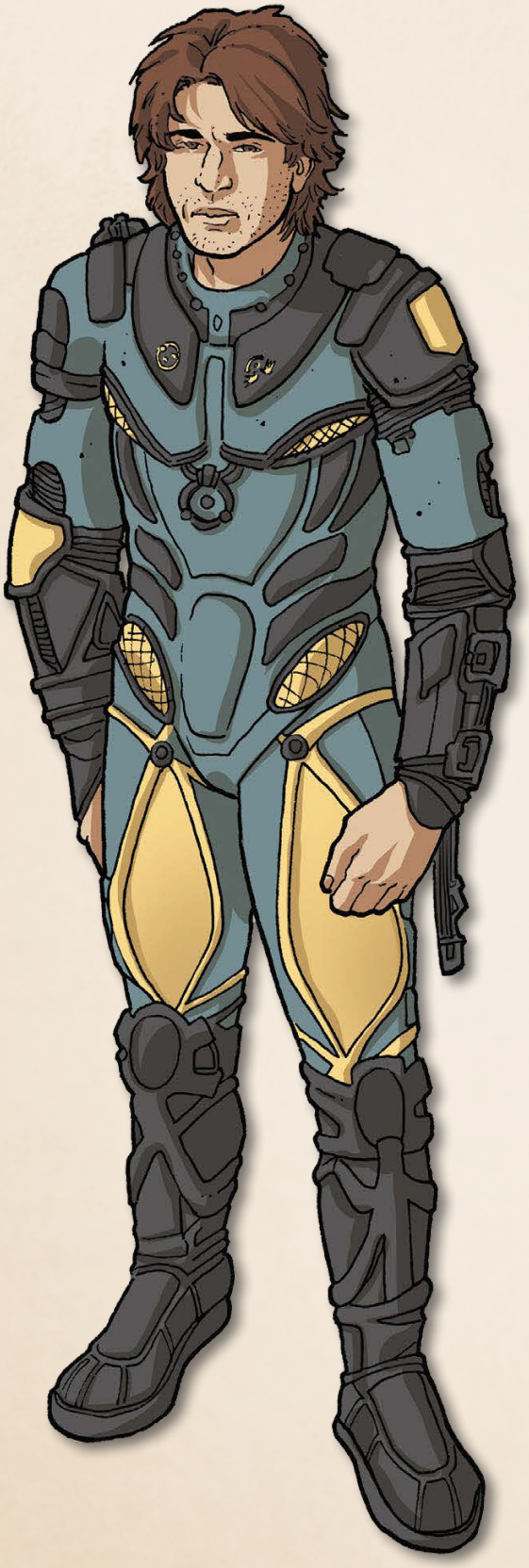
Instead of dealing with the "blowfish," as some people dismissively call them, humans deal with Adam, the N'ahili's virtual ambassador on Earth. Adam is the N'ahili version of an Assistant, a digital virtual human accessible via a V-World interface the N'ahili have built to connect to our technology. Adam is in many ways an idealization of the perfect human being: Young, attractive, sure of himself, respectful, charismatic, wise, able to speak in practically every human language with almost perfect ease. Inevitably, Adam is the most well-known face in all of the Seven Worlds.

Through Adam, the N'ahili perform their diplomatic interactions with Humanity. He represents them through V-World meetings or via a screen conversation, just as if he were a real person. The N'ahili have made sure to keep Adam unique, and there is never more than one instance of Adam at the same time, thus keeping the value and impact of "meeting Adam" as well as avoiding forgeries or digital impersonations.



That is not to say that the alienness of Adam does not show sometimes. Every once in a while he utters the wrong word or phrase, or takes a few seconds to understand or comprehend what is being said, or requires humans to restate what they have just said. Some people guess that since Adam is just an interface to real N'ahili, the inevitable translation of concepts during a conversation is not perfect, nor will it ever be. In any case, those unintended reminders of how alien Adam really is color mankind's perceptions of the N'ahili. Comedy programs picture the aliens as a ridiculous caricature of Adam with green, scaly skin, a round, blowfish-like face with alien antennae, and tiny fins. Fortunately for humans, humorless appears to be beyond the aliens' understanding.

While the aliens offered the desire to exchange knowledge and information between the species



duarthe

A psion who refuses to accept who he is.

Duarthe was born to a second generation migrant family in the planet of Zarmina ("Gee"). An only child, he lost his mother at a very early age, and barely remembers her. His father, crewman of a medium freighter transporting supplies and people from Earth to Gee and back, was a distant man, who loved him but was incapable of understanding or emotionally connecting with him. Certainly not with the complex, dark son he had conceived.

Because of his father's frequent trips, Duarthe lived with a distant aunt and uncle who took care of him as a favor to his dad. Duarthe's father died in an accident in space when Duarthe was nine; a runaway engine created too much heat, the heat sinks in his ship failed and the entire ship blew apart. While Duarthe cried a lot, it was more from the feeling of utter loneliness than out of any deep love for his progenitor.

Duarthe was a weak (for Zarmina), quiet kid, who made few friends. His father never had the money to spend on genetic improvements, so he began at a disadvantage. Even so, he grew up a very intelligent boy. He was withdrawn, studious, bookish, lonely, profound and philosophical. He was also weird enough to be the target for bullying and violence from the other kids. The Assistants running on each child's lenses and on the school grounds detected and reported this, of course, and teachers tried to take action against it; but some things change very little, and children only find more sophisticated ways to do what they've done for millennia: be cruel to each other.

Duarthe got into many fights he didn't begin, and he rarely won them. But he never shied from them, and even his bully-torturers had to admit that. Gradually, Duarthe built a hatred for these kids who believed themselves superior to others, better than the rest. He knew he'd get beaten up, but at some point he came to relish the other kids' cruelty; standing up to them, regardless of the consequences, was his way of telling himself that he would not submit to those who preyed on the weak. Given the nil support he got at home, this twisted pride was all he had.

Then, when he was twelve, Duarthe came into the biggest surprise of his life: He tested positive at a routine Psion test at school (he and his family had the psion gene, they all knew that; but it's not strange to have the gene and test negative. In fact, he was the first psion in his family's generation or the previous one). Most psions are discovered by age eight or

nine; twelve is very old for the power to manifest. But manifest it did. And thus Duarthe found himself at twelve, being drafted into the Psion Brotherhood and transferred to Earth.

Duarthe arrived, afraid but full of hopes, at the Psion Brotherhood headquarters on Brotherhood Station above Earth, on the Space Elevator. Now he belonged to something! Although he began his basic psionic studies as one of the oldest children, he excelled psionically and academically, even catching the eye of the legendary Ganendra Nathan, Leader of the Psion Brotherhood. Nathan began taking a close interest in the shy, hostile-looking boy from Zarmina.

But even here, as a member of one of Humanity's most powerful organizations, and with a promising future ahead of him, Duarthe felt lonely. He was unable to make friends among his 'brothers', and in fact caused antipathy. He began to feel the superiority, even contempt, felt by his fellow students towards non-psions, and these feelings repelled him. He also noticed how low the opinion was of "On-Loans", the name given to Psions who leave the Brotherhood for a few years to join the Circle, part of the commitment agreed upon centuries ago by William Donovan, founder of the Circle, and Daniel Michaels, founder of the Brotherhood, respectively. The goal of the On-Loans was to support the activities the Circle performs protecting Humanity; but from the point of view of many psions, working with a bunch of mentally-blind humans must be very frustrating indeed.

Even Nathan, one of the most charismatic Brotherhood leaders in memory, very outspoken about the importance of respect between psions and non-psions, felt suspicious to Duarthe. When Duarthe looked at Nathan, he felt the glint of smugness in his eyes, the scent of the schoolyard bully (a very subtle, devious one). Is that all Nathan and the Brotherhood were, just a more sophisticated kind of bully, ready to smack humans down when the time comes? Or was Duarthe imagining things?

Further proof of the immense powers and great promise that Duarthe had is that he was able to shield these thoughts, which would be considered deviant by most teachers in the Brotherhood, from the frequent probe scans all students underwent. But everyone noticed that his antisocial behavior could affect a very promising career.

One day, Duarthe and Trevor, one of his schoolmates, went down to Earth on one of their monthly mandatory trips to mingle with non-psions and create emotional connections with them. Unusually, though, while walking down a dark street they were insulted and verbally attacked by a human, a bigot with some personality problems and a dislike towards psions.

DUARTHE

Rank: Novice (Alpha-level Officer)
Attributes: Agility d6, Smarts d8, Spirit d8, Strength d6 Vigor d4
Skills: Fighting d6, Healing d4, Intimidation d6, Investigation d8, Knowledge (Science) d4, Notice d8, Psionics d8, Shooting d6
Cha: –2; **Pace:** 6; **Parry:** 5; **Toughness:** 5 (2); **Mental Toughness:** 6
Hindrances: Small, Outsider, Pacifist (Minor), Vow (Major—Psion Vow: Unless there is a moral and ethically defensible reason, I will not use my powers against anyone; I will not use them without informing all involved parties; and I will not reveal information obtained with my powers).
Edges: Arcane Background (Psionics), Soul Drain, Mentalist
Powers: *Bolt, Deflection, Read Surface Thoughts.* **Power Points:** 10
Gear: Assistant, Enhanced Autopistol (Range 12/24/48, Damage 2d6, AP 1, Semi-Auto, 20 bullets, can fire 1 explosive round), Explosive round (Damage 2d8, AP 4), Combat Knife (Damage Str+d4), Reinforced Vacc Suit (+2/+4, protects Arms, Legs, Torso; spacesuit); 2 Bloodstoppers, Portable Healing Kit.
Notes: Homeworld Zarmina ("Gee") (begins with a d6 in Strength)
Assistant Name and Gender: Assistant Program 3, "Dante," Male.
Assistant Skills: Knowledge (Science) d4, Hacking d6.

Brotherhood policy dictated that psions should ignore the prodding and leave, but this human pushed his insults too far and caused Trevor to react, breaking the Psion Vow, mentally attacking the human. In minutes, the whole situation spiraled out of control and Duarthe and Trevor found themselves the target of an attack by a crazed mob of violent non-psions.

As he saw Trevor savagely attacked, Duarthe prepared himself to stop these humans and defend himself and his friend (without causing damage, of course), but at the last moment stopped: Was he becoming what he hated most? Who was the bully here, and who was being bullied? Finding himself unable to use his psionic powers on these humans (even the harmless powers, like *telepathy*), feeling more identified with them than with his own kind, Duarthe instead defended himself physically, using

his arms and fists, with the expected result that he was soundly beaten down. What he did not expect, however, was that by the time the tussle ended, Trevor was dead, lynched by an angry mob that vanished as soon as it realized what it had done.

The fight made global news. The humans who instigated the fight were arrested, and Nathan himself went on record in V-World with soothing, conciliatory words about the need for humans and psions to respect one another, and saying that nothing justifies a psion using his powers to harm a non-psion, like Trevor did. But while Nathan was giving his stirring speech, Duarthe, there in the room with hundreds of other psions standing firm in respect, caught his eye. For a brief instant, without needing to read his thoughts, Duarthe knew what Nathan was really thinking: Nathan didn't really mean what he was saying. In fact, he was immensely angry and disappointed with him. Why had his psions been attacked? Why had Duarthe done nothing about it?

The realization hit Duarthe and caused him to reel backwards in surprise. Was this what the Brotherhood was? Had Duarthe become what he hated the most? On the other hand, wasn't it right to defend a fellow psion who was being attacked? In his paranoia, wasn't Duarthe taking things too far?

The next day, Duarthe registered as an "On-Loan" and prepared to go to the Circle as a Brotherhood representative. When Nathan saw Duarthe's transfer request, he called him to his office and flat out rejected it with very harsh words. Duarthe sat unmoved and repeated his request. Nathan looked at Duarthe for several seconds, with a hard look in his eyes, and then approved the request without a single word. Less than an hour later, Duarthe had left the Brotherhood, officially on-loan for a few years.

He has spent the last few months at the Circle. He, of course, has no close friends, suspected as a spy within his own Circle group. But at least he sees a genuine interest in helping and defending those who need it, an ideal he shares. And, most important, here he is not pressured into being superior to anyone. He hopes he can use his powers to improve the lot of humans and psions alike. And he fears what will happen the next time he meets Nathan, or when his "On-Loan" status ends and he is forced to return to the Brotherhood.

APPEARANCE

Duarthe is twenty-two years old, but looks older than he is. He is a small but strong man who always looks disheveled, as if he has had a bad night's sleep. His dark hair is long and he does not apply shaving bio-cream frequently so he usually has a few-days' beard. He always wears official Circle vacc suit uniforms, which are usually rumpled and sometimes sealed incorrectly. He avoids wearing the light-blue sash expected of psions who are not wearing the Psion Brotherhood uniforms, but always wears the requisite Psion Brotherhood Logo pin (two open hands) to make sure no one mistakes the fact that he is a psion. He spends a lot of time by himself, reading books using his sensor glasses. Even though his disheveled appearance may bring attention to him, his behavior is as low-key as possible, and to most people he looks as a non-important member of the team, or an underling. Until they see the pin.

He is usually quiet, except around his friends. It takes a long time for him to consider someone a friend.

DUARTHE'S ASSISTANT: "DANTE"

Duarthe's assistant, Dante, is as peculiar as Duarthe himself. Dante has no visual manifestation, by Duarthe's own choice. He only has a disembodied voice, and appears like a floating black point. Duarthe requested his assistant to be reserved and obedient. Dante, however, is slightly rebellious and more than once has questioned or contradicted his owner. Assistant personalities have a random deviation component by design, but it is to be assumed that Duarthe secretly likes Dante's quirks, otherwise he'd have them changed.

as one of the reasons for their visit, not much has been exchanged except that which humans wanted most: The jump point coordinates to several nearby star systems. The N'ahili have to date provided three sets of coordinates, in 2091, 2111 and 2165. Much as humans would like to deny it, the Seven Worlds have been settled only because the N'ahili provided those coordinates. For this reason alone, and the expectation of new sets of coordinates, humans are wary of antagonizing the N'ahili in any way. Patience is running thin, however. It's been fifty-two years since the N'ahili have provided any coordinates to humans, and in the eyes of some the time has come for more.

The N'ahili have spent the last 126 years in their "embassy", which is nothing but their alien ship floating on the ocean, several hundred kilometers away from the Eastern coast of North America. As peaceful as they seem to be, when in 2093 their ship was attacked by a fringe terrorist group opposed to "alien invasion," the N'ahili blasted the attacking planes from the sky without so much as a warning. Humans have grown wary of provoking the N'ahili again.

But beyond all this, the N'ahili remain an enigma: How many of them are there on the ship? Where do they come from? Why have no other N'ahili ships arrived? When will the N'ahili leave, if ever? Will we ever see them directly? Why won't they give us

ALIENS: WHERE ARE THEY?

Let's get this off the table: If we ever meet aliens, they will be truly bizarrely alien. No humanoids with forehead ridges here, but strange beings with otherworldly bodies composed of surprising compounds, with incomprehensible ways of communication and baffling psychologies. Rather than belabor the point, we will take the fundamental differences of aliens as a given and move on.

Arthur C. Clarke once said that if we ever find aliens, "we will find apes or angels, but not men." And of course he was right.

In the Sidebar "The Scale of Space and Time", we explored the unimaginable distances that separate us from other star systems and their potential life forms. From a time perspective, the Milky Way is at least 12 billion years old, and the Sun only 4.6 billion. If we pick any star like the Sun that formed just a million years before ours (nothing in relative terms) we could imagine alien civilizations existing well before us. On top of that, the entirety of recorded human history encompasses just 10,000 years. In other words, our entire existence as humans is just 0.00008% of the existence of the Milky Way. What are the chances that there have been other species in the galaxy before us but we've missed them because we became self-aware as a species too late? What are the chances that the alien species we are looking for is on the verge of appearing in the galaxy in the next 10,000 years or so?

We may be missing other aliens not only in space, but also in time.

On the other hand, there are billions of stars in the galaxy. The odds for there being life somewhere should be relatively high. Yet, as the physicist Enrico Fermi once supposedly said during lunch with his colleagues, "Where are they?" Fermi's and others' thoughts have been consolidated in what is known as the Fermi Paradox, the apparent contradiction between the perception that the Milky Way should be teeming with intelligent life and the fact that we can't seem to find any evidence for it.

Any sufficiently advanced civilization could already have explored the entire galaxy. By creating artificial self-replicating probes (known as Von Neumann probes), a species could explore and colonize a star system, then use machines or robots that mine resources in the star system to create copies of the probe itself and send them on to the next star system. Assuming a probe reaches a star system every 100 years (not difficult if the probe accelerates until reaching a fraction of the speed of light), there would be 1000 probes after one thousand years, and a billion probes after just three thousand years. The entire galaxy could be visited by these probes in 50 million years or less. Given that our sun is relatively new compared to the age of the Milky Way, why hasn't this happened yet? Or has it happened and we haven't found out about it?

Some philosophers have suggested there is a "Great Filter" in place, some situation or condition we haven't found out yet that stops a spacefaring species from going beyond their planet. Maybe there's an existential risk that destroys them or their civilization before they realize what is happening. And maybe the reason we're not finding any evidence of other species in the galaxy is because none of them is passing the test represented by the Great Filter.

In *Seven Worlds*, mankind has found one alien species, the N'ahili. It is an appropriately bizarre and mysterious species, and has not explained any of the mysteries regarding its origins, despite mankind's repeated attempts to find out.

more sets of jump point coordinates? What do they really want? Adam simply refuses to give Humanity an answer.

Some scientists have said there is no "mystery," and that it is useless to try to apply human standards to fundamentally alien beings. Who says their reasons should make sense to humans? Most likely in the N'ahili's value structure the way they behave makes sense to them. Maybe they live thousands of years and from their point of view "they've just arrived." Maybe we are not doing enough to understand them.

Who knows, maybe they're right.

THE SEVEN WORLDS

In the universe of 2217, mankind has settled seven planets and several minor moons and stations. Each planet has its own history, personality and culture, and a particular role to play in the story of the future.

DISTRIBUTION OF THE SEVEN WORLDS

As of 2217, mankind has ventured just a few dozen light-years from its home planet, Earth. The farthest inhabited world, Nouvelle Vie, is just 29 light-years away from Earth in a straight line. However, the Interstellar Drive's 8-light-year jump limit places restrictions on the route that must be taken to get there. As a result, the trip from Earth to Nouvelle Vie is seventeen jumps and 95 light-years long.

Further complicating matters, human space extends in all three dimensions. This is important: It is sometimes difficult to understand how close some stars are to each other unless one sees them in a 3-D map.

To navigate your way in the Seven Worlds we are providing you with three different maps. These maps are:

- **The 2-D Starmap** of human space shows all 79 star systems currently known by Humanity. This includes main worlds, worlds on the Stellar Communications Network route, backwater worlds (such as Logan's End) and uninhabited star systems. It is the most comprehensive 2-D map of space available.
- **The 2-D Simplified Starmap** of human space is optimized for navigating your way between the habitable worlds, and only shows the main destinations the heroes are likely to visit. This includes all Seven Worlds plus space stations. The positions in the map are not accurate with the real locations of stars. Instead, the map is optimized for ease of use.
- The 3-D Starmap is available at www.sevenworldsrpg.com for many computer, smartphone and tablet platforms, and allows you to see the connections and distances between star systems. You will notice many things within this map that are not immediately apparent in the 2-D Starmaps, and we thus encourage you to try it at least once.

EARTH

The original home of mankind, and the place where more than 98% of Humanity lives, Earth still defines and shapes the future of Humanity even eighty-four years after surviving the worst catastrophe in human history.

HISTORY

It is impossible to understand today's Earth without examining the unimaginable catastrophe of the Doomsday Comet and its consequences.

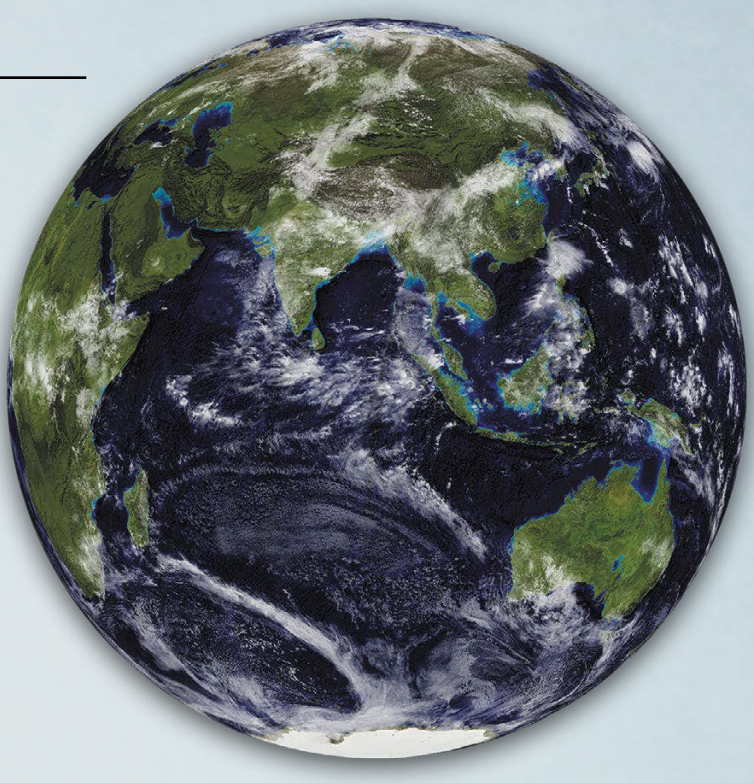
The years leading to the catastrophe of 2133 have been well-documented elsewhere: The invention of fusion technology and the interstellar drive, contact with the aliens known as the N'ahili, the establishment of the first four settled worlds of Zarmina ("Gee"), Apollo, Concordia and Bay Jing, and the creation and rise of organizations such as the Circle Foundation and the Psion Brotherhood.

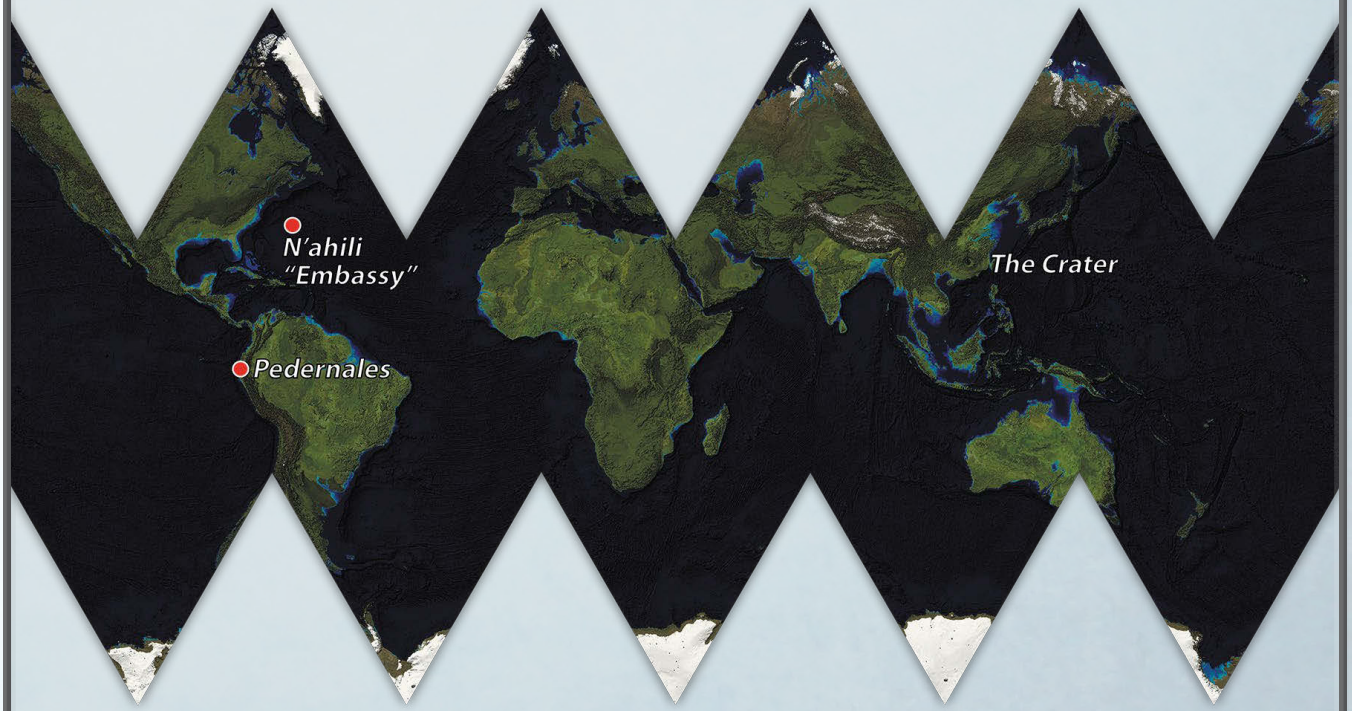
Comet Sol-C/2132 N2, "the Doomsday Comet," was unusual in several ways. First of all, it was a non-periodic comet, a rogue object that had never crossed Earth's path before, and therefore one scientists could not predict. Second, it was huge, with its nucleus being about 16 km across. Third, it was fast, clocking around 40 miles per second on its approach towards Earth. Most unusual of all, despite its size and speed, and despite the fact that we had monitoring stations in several locations throughout the solar system, Sol-C/2132 N2 went undetected until it was a little less than a year away from Earth. Eighty-four years later no one has come up with a convincing explanation of how Comet Sol-C/2132 N2 was missed until it became too late.

Mankind's contingency plans, which had been fine-tuned several times with other non-threatening asteroid approaches in previous years, went into full motion. However, humankind was not prepared for a killer rock of this magnitude. Nuclear bombs, fusion engines, and kinetic projectiles did not cause a noticeable effect, or at most caused the comet to split into (still huge) chunks. Probes equipped with

EARTH
SYSTEM DATAFILE

Star: Sol
Star Class: G2V
Distance from Sun (direct line): NA.
Distance from Sun (jump points): NA.
Mass: 1 sol (1'988,500 × 1024 kg)
Luminosity: 1 sol (382.8 × 1024 W)
Star System: 8 planets (2 rock, 2 habitable, 2 gas, 2 ice)
Habitable Planet: Earth (and Mars)
Distance from star: 1 AU
Perihelion/Aphelion: 0.98 AU/1.02 AU
Axial Tilt: 7.1 degrees
Annual Period: 365.26 days.
Local day: 23.93 standard hours.
Diameter: 40,075 km
Surface Gravity: 1g (9.807 m/s^2)
Density: 1 Earth (5.514 g/cm^3)
Illumination: 100% Earth (98,000 lux)
Temperature: 15°C average (-89.2°C minimum, -56.7°C maximum)
Atmosphere: N_2/O_2, 1 pressure (101.325 kPa).
Water: 70% of planet
Satellites: one moon.
Population: 8.7 billion.
Average Population Growth Rate: 0.059% per year





Coulborne Shields were not powerful enough to slow down the monster, and were destroyed mere seconds after contact. Attempts to deviate it from its path with tethers, both physical and gravity-based, ended in failure.

Although it should be considered a small success that the comet could be splintered into enough pieces so that only a 4-km-across chunk (and several smaller ones) impacted Earth, this is a meager consolation indeed. The chunk of the comet that impacted Earth caused unimaginable damage.

The months previous to the arrival of the comet had been terrifying, the impact on the economy and society devastating. As order collapsed, the Circle used its Settler Ship fleet to evacuate as many people as possible, food and supplies were stockpiled, shelters were created, and an "ark" with specimens of as many species of flora and fauna as could be saved was put in orbit around the planet.

When the impact came, it created a crater 19-km deep and 60-km wide in Southeast Asia, killing millions instantly. In the next few minutes, the fireball created by the impact expanded, igniting everything in its path. Incredibly powerful shockwaves covered the planet, toppling down buildings and trees everywhere. Earthquakes of impossible magnitudes and tsunamis, with waves hundreds of meters high, wreaked unimaginable destruction on the planet. Finally, the crater matter expelled from the Earth by the impact rained back down, running millions of small replays of the large impact. All in all, more than *three billion* people died in the impact and its aftermath.

As if all this were not enough, weather patterns were significantly altered by the impact. A dust cloud covered the Earth's atmosphere, blocking sunlight. As cold and darkness enveloped the planet, flora and fauna died off, triggering mass extinction. This effect lasted for almost three decades and even today some minor effects of the impact can still be seen.

The pain, suffering, death and savagery of the first few years are indescribable. Thankfully, what could have been the end of the human race was averted, thanks to the fact that Humanity was now a space-faring race. All the remaining resources of Humanity were devoted to trying to control the damage by repopulating the planet with lost species and bringing back supply stockpiles, with the support from the other planets in the solar system. Many fusion generators with years-worth of ^{3}He fuel had been saved, and were used to power the recovery of civilization. The Circle played an important part of the recovery, first keeping the skies clean of other chunks of debris which had fallen into Earth orbit (even evacuating Northern Mexico when one of these smaller chunks fell into the Pacific Ocean a few years later), and later with the creation of Project Ascension. The Psion Brotherhood devoted a significant part of its resources to supporting the population by calming down their fears, using their powers to keep hope and optimism alive in the population in the face of the tragedy, and emotionally controlling outbursts of violence. The creation of EarthGov dates from this period.

EARTH TODAY

It took decades, but eventually a semblance of normality was recovered and Earth became a habitable place. Today, Earth is home to 8.3 billion people, and has a level of technology and development roughly equal to that of Concordia or Bay Jing. This in itself, less than a century after the impact, is remarkable; it proves that we as a species are able to survive some of the Universe's greatest threats.

This new Earth is a vastly more vulnerable place, though. It is seen in the burgeoning but small forests that cover the planet, the relatively few species that walk on its surface, and in the insecurity of its population. Although by virtue of its history and population Earth is still the most influential of the Seven Worlds, this is still a diminished Earth.

GOVERNMENT

Earth is currently run by EarthGov, short for Earth Government.

The United Nations, as an institution, kept limping along throughout the 21st and 22nd centuries, fulfilling the role of being a place of interaction between rival nations, and a bureaucratic administrative proxy for activities that needed to be "legally" performed by groups of nations against other nations.

In the months leading to the impact of Comet Sol-C/2132 N2, the frantic leaders of the planet were overwhelmed by the need to respond and plan for a crisis that crossed borders, and for which it was impossible to plan where the worst impact would be. Pressured by the population to have a unified response to the crisis, the UN Security Council became the "Earth Survival Cabinet" in charge of the common pre-impact coordination of activities devoted to the survival of the species.

After the impact and its unimaginably horrendous consequences, the world's surviving leaders recognized the need for a central coordination point for response activities, a point of contact for outside help, a manager for survival efforts and pooling of resources. The survivors of the impact already felt united like never before, with borders and nationalities being irrelevant for the survival of the species. Thus, the planet's surviving leaders gave the Earth Survival

Cabinet special powers to negotiate and manage the recovery on behalf of all countries. EarthGov was born.

EarthGov began functioning as a skeleton distributed organization leading the United Nations. The Circle and the Psion Brotherhood play an important role as advisors to EarthGov, and are the main organizations involved in the rescue and support of the survivors. EarthGov also worked as a caretaker government for all the areas of the planet where a power vacuum had formed, such as the parts of Asia surrounding the crater, and the countries ravaged by earthquakes and tsunamis.

In the coming months and years, as the need for EarthGov as a caretaker government faded, the realization that post-impact Earth could not hope to stand up separately to the newly-grown political power of Concordia and Bay Jing, continued to keep it relevant. Thus in 2150, seventeen years after the Earth Survival Cabinet had been coordinating activities for them, the leaders from the main nations made the power redistribution official, renaming the organization to "Earth Government" (EarthGov). This redistribution also involved reorganizing several rules such as veto power, indirect election to the Planetary Council (previously Security Council), modified representation of individual countries to the Planetary Council, and powers conceded to the organization. Perhaps the most profound change was the specific taxation that all countries transferred to EarthGov, as well as part of each country's army, to serve as official EarthGov military and support forces.

The worst-hit parts of the planet currently are EarthGov protectorates, considered "citizens of the Earth", with passports, IDs, and elected local leaders. Protectorate citizens can belong to EarthGov forces, and can use their passport to visit all EarthGov member countries.

The other Six Worlds have a non-voting seat at the EarthGov's Planetary Council, and can make their opinions heard. It is an important tenet of EarthGov policy to give the other worlds the space and respect necessary to foster integration and a sense of common Humanity between all the worlds.

Institutions such as the Circle and the Psion Brotherhood have rotating forces within EarthGov Security Forces. The EarthGov Security Forces also accept military recruits from the other Six Worlds. There is a limit to how high a non-Earth citizen can rise in the ranks, but EarthGov believes this close contact helps build the conscience of a single species even if a recruit was born outside Earth.

EarthGov currently is also in charge of managing and protecting the Stellar Communications Network (see page 21).

An important symbol of EarthGov's representation of the entire planet is that its headquarters are not located in any specific physical location on Earth. Although the organization has offices in most cities and countries (including its main bureaucratic infrastructure building where the UN Building in New York used to be), its official location is a virtual headquarters in V-World. All delegates meet and meetings are held and recorded inside this V-World. Any citizen on the planet can attend these meetings (with permissions set so that they cannot interrupt the process, of course), thus making EarthGov one of the most transparent government organizations in the Seven Worlds.

THE SPACE ELEVATOR

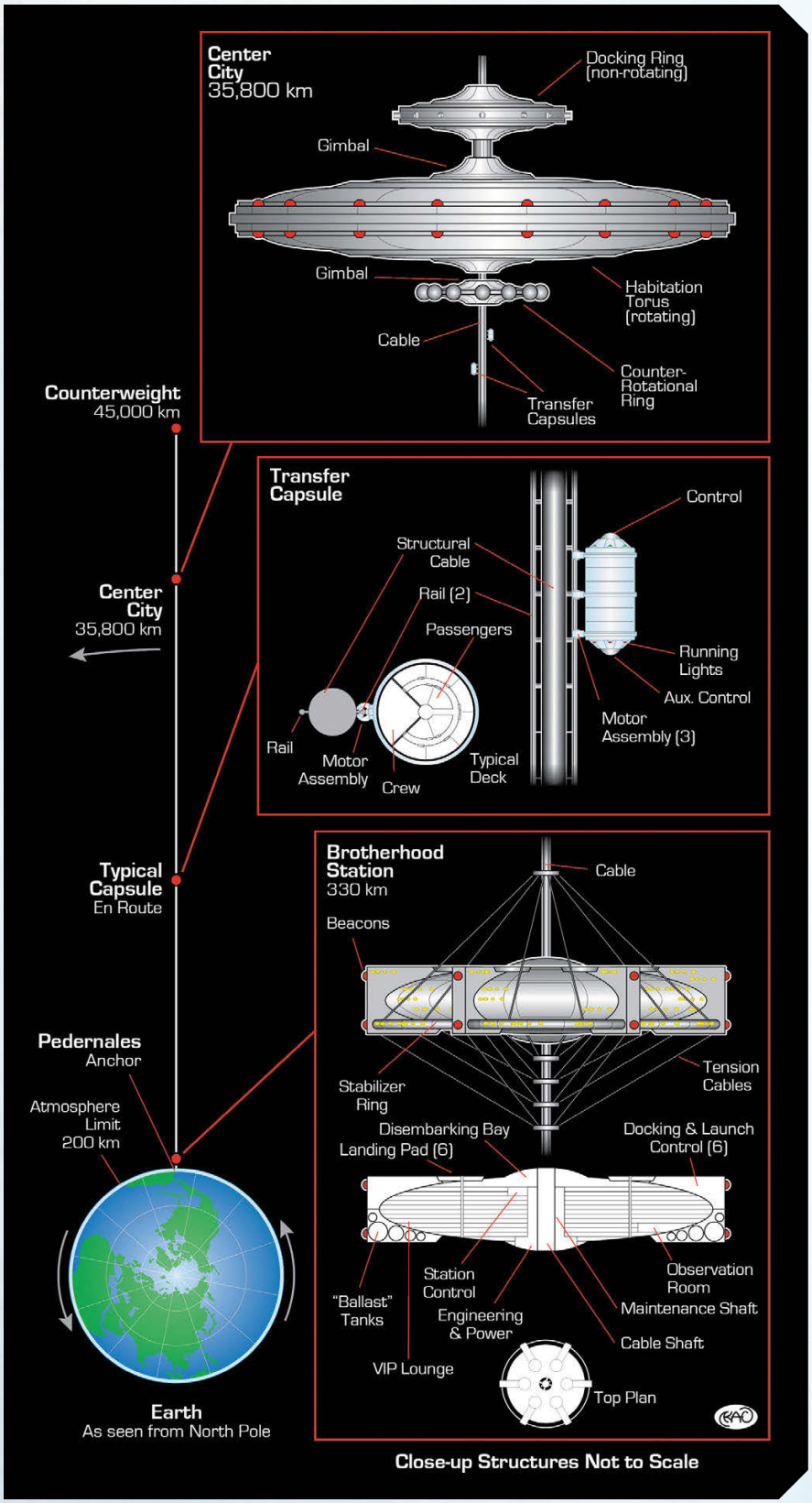
Earth is not unique among the Seven Worlds in having rotovators to transport people and supplies between surface and orbit. Earth is unique in having the only operative Space Elevator, though, at least until the elevators in Concordia and Bay Jing are finished a few years from now.

With a base sitting in Pedernales, Ecuador, South America, and rising to a height of 45,000 kms above the surface of the Earth (almost four times Earth's diameter), the Space Elevator consists of a specially constructed ultra-strong and light nanotube cable that connects Earth to space. Although mainly used as a cheap way to haul cargo to and from Earth, it is also a picturesque way to travel to the stars, and it fulfills a special purpose as a symbolic "evacuation line" for Earth's inhabitants in case something as awful as the Comet impact happens again. Never mind that even with the elevator operating at full load it would take years to evacuate the entire Earth population.

Specially constructed capsules travel from surface to the top of the Elevator and to its various levels. These capsules are pressurized 10-meter-wide containers with space for about sixty passengers each. Each one contains living quarters, environments for dining, recreation (mostly Earth V-World entertainment, to which the capsule is connected via the main Elevator cable) and exercise. Each capsule is run by a human attendant who also performs emergency medical assistance, if necessary. The capsules are connected to rails on the side of the main structural cable by large, strong clamps, and can make the trip to Center City in a bit less than four days. It is worth noting that after the first day of travel, most of this trip is done in micro-gravity. This, in many cases, represents the traveller's first contact with the realities of space.

The two most important stops on the Space Elevator are Brotherhood Station and Center City.

THE SPACE ELEVATOR



BROTHERHOOD STATION

Brotherhood Station, located 330 kms above Earth, is the current Psion Brotherhood headquarters. Travelers that go up or down the Space Elevator can stop and do a tour of the (public) installations of the place. They can visit the Psion Museum, learn the history of the Brotherhood, and see amazing displays of psionic power performed by charismatic, likeable Psion guides. It is all part of the Psion Brotherhood's constant efforts to connect with the population and remove any perceptions of psions as a threat. Travelers are not allowed to enter the private sections of the Station, the area where thousands of psions train and work to develop their skills.

Given that Brotherhood Station is not weightless, building such a large and heavy infrastructure (essentially a city suspended by a thread) required a large feat of engineering. The station is circular, and has an infrastructure of tension cables to give it balance and strength. These cables can be automatically adjusted to compensate for stresses in the elevator cable, and consider the additional weight added by ships landing on one of the six landing pads on the top.

Six "fins" protrude from the station. These have ballast, in the form of tanks near the rim of the station, storing water and other fluids. These can quickly be pumped around the station via a stabilizer ring on its lower part, thus providing a passive stabilization and balancing method. The fins also have small attitude jets at the bottom that react when a ship lands, thus compensating as needed.

At the top of each fin is a landing pad. The landing pads can be "tractored out" to the edge of the fin to "push the ship off the edge" thus minimizing the stresses of

SPACE ELEVATORS AND ROTOVATORS

As has been explained in previous sidebars, leaving Earth's surface is one of the most expensive parts of any space trip. We would need to transport thousands of tons and tens of thousands of people into and out of a planet every day to have a viable interplanetary or interstellar civilization. Although surface-to-orbit vehicles are an option, cheaper and faster ways to transport large quantities of cargo into and out of space are needed. Enter rotovators and space elevators.

A space elevator is a very thin, superstrong cable that rises from a specific point in the Earth's equator up to a receiving station 36,000 kms up, in geostationary orbit around the planet. An object at this altitude around the Earth orbits at the same speed as the rotation of the Earth and thus appears stationary from the surface. Several capsules or "elevators" are attached to this cable, and are used to move people and cargo up or down into orbit. Spaceships could then be tiered to the orbiting station for take-off to other planets.

There are, of course, many technical challenges with this approach. One of the greatest is how to build a cable that is light and strong enough. Today steel and concrete buildings theoretically could go up to a height of 5 kms. Even superstrong Kevlar $ibers have a breaking length of about 100–400 km. Current thinking suggests using carbon nanotubes to create a thin $iber could make a cable strong enough, although some estimates point to a breaking length of about 5000–6000kms so clearly more work is needed. Although this cable would be "dropped" from the sky rather than transported up, the weight of the cable itself is important, given its incredible length.

As to the elevators themselves, they must also be light enough to go up and down the cable while offering life support to humans who use them. At an approximate speed of 400 km/h it would take slightly less than four days for the elevator to reach the top level.

Another challenge to consider is what happens if a micrometeor collides with the structure. Since this is likely in Earth orbit, the cables must include some kind of shielding, protection or backup systems.

Even with these constraints, space elevators are a feasible technology and many believe it will only be a matter of time until Earth has one, and organizations such as the International Space Elevator Consortium are actively researching this technology and promoting it in yearly conferences. In the meantime, however, other technologies to move cargo to orbit have been suggested, including rotovator technology.

A rotovator (or "bolo") is a rotating satellite with a long cable attached at the end of which is a spacecraft-catching device. As the satellite rotates perpendicular to Earth the cable enters the upper atmosphere. If the rotation of the satellite and cable is timed just right so that when the cable reaches its lowest point it is vertically straight to the body of the satellite and swinging backward, it is possible to match its velocity to the Earth's so that the cable appears to be stationary with respect to the ground. At this point a specially built plane could attach the cargo to the lower end of the cable. After a few minutes the cable swings up again, releasing the cargo in orbit outside the atmosphere. Boeing has researched such a concept with a system called HASTOL (Hypersonic Airplane Space Tether Orbital Launch System).

In *Seven Worlds* rotovators are used in a way similar to the HASTOL Model: A high-powered plane (appropriately called a Rotovator Plane) launches from the surface, carrying with it either a smaller ship designed for orbital maneuvering (known as an Orbital Shuttle) or a piece of cargo. The plane releases its cargo so it connects with the rotovator, which sends it into space. In space, the Orbital Shuttle turns on its engines and moves on its own, or the cargo is picked up by an orbital ship. This was the technology used by the Circle Foundation to lift thousands of people off Earth during project Ascension.

take-off. The landing pads are located in spots where the tension cables present the least obstacle.

With about 80% of Earth's gravity, Brotherhood Station is considered a Low-G zone. Superconductive Magnetic Arrays are available, if necessary.

CENTER CITY

Center City is built at the Space Elevator's center of gravity 35,800 kms above the Earth. It is the primary point of entry for cargo vessels going to and from Earth. Some of the large space leisure cruises also depart from Center City. As such, it houses several administrative offices, such as customs, quarantine, and entertainment facilities for ship crew. Center City also works as a huge duty-free zone outside Earth. Crime and contraband gangs work under the surface to control Center City.

The city itself is built as a rotating torus around the Elevator cable, on a structure built of several rotating levels that simulate gravity. Since even a

near-frictionless gimbal would eventually put stress on the cable, the city also has a counter-rotating structure that spins much faster for balance. The structure carries an electric charge, thus generating an Electromagnetic field that helps provide extra shielding for the station. The docking assembly is located in non-rotating separate facilities on the far side of the station, and support about a dozen large ships and many smaller ones.

Although there is a fusion generator in the city, most of the energy for the Elevator comes from specially-built solar panels that surround the city and are also located on the cable itself. These help keep the entire structure working and feed enough energy for the city and the ships, with some left to spare for the surface station at Pedernales.

Another important purpose of Center City is as the main micro-gravity research lab. Several research institutions and pharmaceutical companies have offices, labs, and production facilities in Center City or on small satellites in an orbit parallel to the City. Academic competition and company espionage is a sad fact of life in Center City. Approximately 120,000 people live here.

THE COUNTERWEIGHT

The final end of the Elevator cable extends far beyond Center City, to work as a counterweight to the system. A small military station at the far end of the Elevator works as an Earth defense base in the (unlikely) case Earth is attacked or invaded.

PEDERNALES

On the surface end, the Space Elevator cable is anchored at the Space Elevator Center in Pedernales, on a tract of land originally granted by the government of Ecuador (now supported by EarthGov) as neutral territory. Once a small commune with 46,000 inhabitants, the nearby city of Pedernales is now a sprawling business and cargo destination with three million inhabitants and some of the largest ports on Earth. The imposing view of the Space Elevator rising up to the heavens also makes it a popular destination with tourists. The construction and materials of the Space Elevator have made things such as weather patterns a non-issue for the stability of the structure. The Elevator has been known to close for a few days on extremely bad weather, though. The solar panels that cover the elevator cable itself, as well as the centrifugal force created by its movement, provide a gigantic supply of energy for Elevator operations.

CITIES AND LOCATIONS

The most important cities and locations on Earth in the year 2217 are the same as they were in 21st century Earth, with the exception of several major cities in the Crater region in South East Asia, obliterated by the impact of the comet in 2133; and sections of Northern Mexico, hit by remnants of the comet some time later. Some especially relevant locations are listed below.

- **Pedernales.** Located in Ecuador, South America, Pedernales is the surface stop for the Space Elevator, a fact which makes it one of the most important ports in the world. Now a sprawling business and cargo destination with three million inhabitants, Pedernales is also one of the most luxurious places in the world. Shipping and business billionaires live in sumptuous mansions next to the sea, with the background of the Space Elevator scaling the heavens.
- **Brotherhood Station.** The center of activities for the Psion Brotherhood, Brotherhood Station is the first major stop in the Space Elevator. Approximately 330km above the surface of the planet, Brotherhood Station is the place where thousands of psions work, study and live. Brotherhood Station is also an important PR message itself, part of Ganendra Nathan's popular and successful campaign of integration between psions and non-psions. The public sections of the station are open to anybody, and are a lively and interesting place. The private sections of the station are for Psions and their guests only.
- **EarthGov Headquarters.** EarthGov has located its office on Earth's V-World, so as to be equally close to everybody in the planet. EarthGov Headquarters, therefore, has no physical counterpart (other than the bureaucracy buildings distributed throughout the planet, the largest of which is the old United Nations building in New York). The V-World Headquarters are organized with meeting rooms, conference halls, attendee sections for ordinary citizens, and other virtual environments. The main council room is open (virtually) to any citizen in the planet, in a view-only mode that allows them to assist without interrupting the proceedings.
- **The N'ahili Embassy.** The "Embassy" is actually the spaceship the N'ahili, the first and only sentient beings humans have encountered so far, use as their home on Earth. Floating on the Atlantic Ocean, several hundred kilometers off the coast of North America, it is an unknown place, off-limits to humans. The N'ahili have their own connection to V-World and use virtual projection as well as their

avatar called Adam, to communicate and interact with humans.

PERSONALITIES

- **Norah Reichardt, Secretary General:** The current leader of EarthGov, Secretary General Reichardt is focused on developing the economy and society of Earth. In her opinion, the planet has reached a level of stability that should allow it to overtake Concordia and Bay Jing in a few years and become the unquestioned leading world in human space. She is not obsessive about this, though. She is a canny enough politician to know that short-term results are more important to voters. In general, Reichardt is a good Secretary General, and Earth is improving steadily under her leadership.
- **Kiley Nezat:** As the Circle representative to EarthGov, Delta Officer Nezat is one of the most powerful and respected people on Earth. This makes her a very busy and requested lady. Particularly common are the requests from representatives of the other worlds, eager to have a sponsor with power at EarthGov. While amiable, Delta Officer Nezat is extremely serious and impartial when dealing with others, and tries to keep the Circle's influence with EarthGov as intact as possible by not using it unless it becomes absolutely necessary to do so. One of the few hobbies known about her is her passion for golf: Not only is she an accomplished player, she enjoys the differences in the sport that have surfaced as the game has been played in worlds with different gravities, and when she gets a chance to travel to the other worlds enjoys testing her skills against master players from those worlds, usually in gravities that are foreign to her.
- **General Salvador Bargowski, Chief of the Armed Forces:** The top-ranking leader in the EarthGov military forces, General Bargowski is an old warrior who has seen his share of death and is ready to retire. Having fought in the major engagements of the last fifty years, Bargowski believes in the EarthGov military as a force for peace and



ASTEROIDS, COMETS, AND EARTH IMPACTS

The chances of a large asteroid or comet eventually hitting the Earth and causing untold damage are a cool 100%. Paraphrasing a science fiction show, this has happened before, and it will happen again.

Empty as it seems to us, the solar system is full of hundreds of thousands of flying objects, many of which may be on a collision course with Earth. We encourage you to check out the amazing video in the References section to see the surrounding objects that have been discovered in the solar system from 1988 onwards.

Every day, the Earth is hit by about twenty to forty tons of meteors, but meteors able to do significant damage are few and far between. Earth's atmosphere protects it from smaller rocks, as does its relative distance to the asteroid belt (Mars, in contrast, receives a 1 Megaton impact every three years on average). And Jupiter works as a shield, protecting us from many far-away asteroids. Even so, there have been many catastrophic impacts with our planet. Probably the most well-known is the one that killed the dinosaurs, but that is hardly the only mass extinction event the planet has seen, as the archaeological and biological record shows.

And sooner or later another NEO (Near-Earth Object, by its scientific name) will hit. In the words of the late Carl Sagan, "There is a one in two-thousand chance of an asteroid hitting during an average lifetime. Compare that with a one-in-two-million chance of dying in an airplane crash."

So, what do we do? First, we have to detect any incoming NEOs. Our detection technology has improved significantly in the last decade. New projects from the B612 Foundation, as well as the privately-funded Sentinel Space Telescope which will scour the skies behind the Sun's glare for rogue asteroids, will further improve our detection abilities.

Then we have to figure out how to eliminate an asteroid if we find one hurtling towards Earth. Several options have been proposed, such as nuking it, attempting to change its trajectory with a bomb, or using a "gravitational tug ship" to move the asteroid. Although some of them are feasible, none of them are guaranteed. Besides, we currently do not have the technology or knowledge to perform any of them.

Comets represent another danger besides asteroids. As a comet approaches the sun, the ice in its body melts generating gas vents that push the comet around randomly. This makes it harder to predict the final path of a comet. Besides, since comets don't usually come in the plane of the solar system, they are also harder to detect and may surprise us with little time to react. For example, comet C/2012 S1 was discovered in September 2012. Just one year later, on October 1st, 2013, it came within 10 million km from Earth.

In *Seven Worlds*, it was decided that the object that impacted Earth would be a comet and not an asteroid precisely because comets are more unpredictable than asteroids. Comet Sol-C/2132 N2 was a rare interstellar comet coming from the Hercules constellation that caught 22nd century astronomers by surprise.

Interestingly, NEOs may come in pairs. A double asteroid that hit Mars millions of years ago, at a volcano called Apollinaris Patera, was the inspiration for the double asteroid that colonists found on Bay Jing.

As a final piece of trivia, in 2012 a graduate student at MIT proposed deflecting incoming asteroids using clouds of paintballs. This is definitely not as crazy as it sounds, and we encourage you to follow the link in the References section to find out how it works.

reconciliation. Although he has beefed up the fleet, he prefers solutions that enforce the peace rather than quick solutions that can create carnage. This makes him respected among the pacifist members of Earth. Generals Ruehle and Fang, of Concordia and Bay Jing respectively, believe old age has turned him "soft" and that his position will make it even easier to challenge Earth leadership… someday.

- **Ganendra Nathan:** The Leader of the Psion Brotherhood is one of the most revolutionary leaders this institution has had. He is a fit, attractive, charismatic 48-year-old with strong Indian features. A gifted, charismatic orator, he has connected with non-psions in a way no other psion has since the days of Brotherhood founder Daniel Michaels. His constant public appearances, the strong public relations focus he has given his organization (including things such as opening Brotherhood Station for visits by non-psions), and the help the Brotherhood gives non-psions in a myriad of problems and challenges, have raised the perception of the Brotherhood among the populace. Those who know him well, know he is a driven, focused individual, completely devoted to the Brotherhood. Few doubt his final strategy and goals are aligned towards furthering the position of the Brotherhood and of mankind in general; but what that strategy and goals are is unknown.

DOOMSDAY COMET SIMULATION GAME SPARKS CONTROVERSY

By Kleine Loo. 12 December, 2133
– Melissant, Concordia

A new V-World game that lets players live the final moments of the Doomsday Comet impact on Earth as if they had been there has sparked outrage and protests at its delicate and provocative content.

Released a scant two months after the catastrophe that has killed billions on Earth and caused untold damage to Humanity, "Earth Impact 2133" allows players to take on the role of an ordinary citizen living in any part of the planet and relive in first-person the experience of being struck by the comet. To win (an almost impossible feat) players have to find a way to survive the first twenty-four hours after impact.

The game and its creator, V-Real Studios, have been criticized for trivializing a traumatic experience in a game. Also, the way in which the material was produced, by placing real cameras and sensors in several locations on Earth before the impact and compiling their transmissions from space, has been called "an opportunistic and insensitive way to take advantage of the greatest catastrophe in human history for personal gain" by the Earth Catastrophe Support Foundation in Melissant.

Lilia Scheff, CEO of V-Real Studios, defended the game and its unique production methods. "By doing sensory recordings of the impact live and transmitting them to a satellite in Earth orbit, and from there to our ship, we have made the most realistic and valid simulation of what those final horrifying moments were. We believe it is important for every human being to experience what their brothers and sisters suffered, and develop the empathy needed to share the pain of that traumatic event." Scheff also announced that V-Real Studios will donate fully half of proceeds to a fund destined to the recovery of the Earth after the crash.

Still, many are not convinced.

Dr. Emilio Jeska, head of the Earth Catastrophe Support Foundation, has played the game, and is "appalled" by the reality of the simulation.

"I played the simulation as if I standing on ground zero. Everything around me was chaos, with (simulated) looters and vandals attacking each other, families parted, trying to escape the inescapable. Looking at the sky, I could see this immense object coming towards us, many times larger and brighter than the Earth's sun. I saw the dual shadows cast by the trees and many other objects on the ground. I felt the heat accumulating as the comet compressed the atmosphere in front of it and turned it into a wave of 500,000 F degrees of temperature."

"The last few milliseconds of the impact were played in slow motion, I could see the plasma destroying everything, consuming trees, buildings and people. I could see the atmosphere opening up above me and the vacuum of space rushing towards the Earth to fill it. I experienced the comet succumbing to the density of the trapped air in front of it, now equal to iron, disintegrating everything in its path. The game gave me the option of feeling pain as a human would, or of becoming an incorporeal entity watching the planet and its human beings die. The 'pain' option was designed to feel as realistic as possible, expect that since time was expanded, I did not die immediately, but the pain dragged out unbearably. This is sadomasochistic."

"I saw the remains of the comet create the crater, impossibly big and deep. In Incorporeal mode the brightness and energy couldn't affect me, but their effects were gut-wrenching. I saw death, death, all around me."

"As if all this weren't enough, the game includes the possibility of experiencing the fireball, sonic waves, falling debris, earthquakes and tsunamis created by the impact. There is even a 'drowning' option in the tsunami simulation. How bad can this possibly get?"

Dr. Jeska believes the game will be "paradise" for sadists and would-be suicides, and recommends it be banned immediately and permanently.

"Earth Impact 2133" is currently the top-selling game in the Concordia and Bay Jing V-Worlds, and is a strong candidate for top-selling game of the decade.

ZARMINA ("GEE")

The first interstellar world colonized by humans, Zarmina is also one of the most inhospitable, and the least populated. Its story is the story of the dream of mankind conquering space, and also the realization that few places in space are ready for us.

DESCRIPTION

A tide locked world circling a red dwarf star by the name of Gliese 581, the world of Gliese 581g has the distinction of being the first exoplanet discovered with the potential to harbor human life. After announcing its discovery in September 2010, astronomer Steven Vogt suggested it be called "Zarmina's World," in honor of his wife. Zarmina, a shortened version of the name, stuck for a time. However, everyone calls the planet by its nickname of "Gee" a play both on the planet's scientific name (Gliese 581g) and on the fact that Zarmina's gravity is about thirty percent higher than Earth's.

Among the Seven Worlds, Zarmina qualifies as the most inhospitable as regards to the environment.

On top of its almost unbearable gravity, Zarmina is a tide locked world, a world that always shows the same face towards its star, similar to the Moon facing the Earth. Thus, there is no "night" and "day" on Zarmina, only a "night-side" and a "day-side." Between these two sides stands a narrow band known as the terminator band, located in permanent dark twilight around the sun. All the settlements of Zarmina are located on this terminator band.

The day side of Zarmina is an extremely hot, unliveable desert, where many elements reach the boiling point very fast. The night side is so cold that oxygen condenses in large oceans. The fact that Zarmina has a barely-breathable atmosphere and a magnetic field that keeps everything from condensing on the night side is amazing, but the temperature differences are still extreme.

The closeness of Zarmina to its star means it is constantly bathed in deadly radiation from Gliese 581. Fortunately, Zarmina has a satellite large enough to create tidal gravitational forces that keep its core in a molten state and thus creates a strong magnetic field around the planet. This magnetic field is a "shield" that protects the planet against the worst waves of radiation.

Gliese 581 is a red dwarf, providing Zarmina with the equivalent of only 8% of the total illumination Earth receives. On top of that, most light is in the infrared band. This means Zarmina is a very dark planet. Most people live in underground habitats filled with artificial light; when going or working outside, special infrared lenses are used.

Besides the strong gravity that makes it hard to do much effort, the temperature in the terminator zone of Zarmina is somewhat cold (−4°C). People who venture outside must be adequately clothed.

Although the economy of Zarmina is helped by the prospecting of ^{3}He by energy stations orbiting the red dwarf star, the myriad local chemical compounds used as medical drugs are by far the most curious and unique product the world has. It turns out that there is no local life on Zarmina to speak of, but instead scientists found many types of complex amino acid and carbon chains, which run strange chemical processes that create the large amounts of oxygen that allow human beings to breathe. These unique amino acids, if harvested appropriately, are valuable as drugs for medical purposes on Earth.

There is a very strong corporate presence on Zarmina, mostly by the major Earth pharmaceutical companies intent on researching, growing and exporting particular amino acid chains. This industry so far has been a success, creating several drugs to attack particularly obscure or hard-to-treat conditions.

The need for specialized scientists and researchers means that although Zarmina is not a comfortable world, it has a highly skilled population. The pharmaceutical companies have invested a lot, both on the habitats and cities, and on research centers and institutes. Many scientists come to Zarmina for a few years on particular research projects. Although many among the population are still low-skilled (miners, harvesters of amino acids, oxygen runners, etcetera), this influx of investment and scholars has fostered high-quality education colleges and organizations, and it is becoming more and more common to see Zarmina-born scientists and researchers.

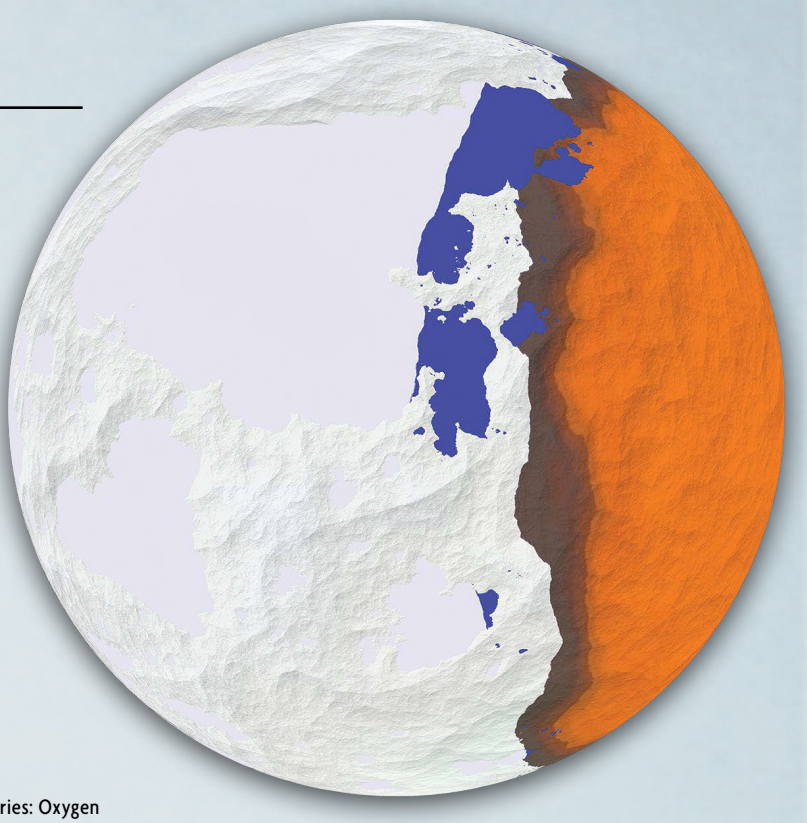
The people of Zarmina feel disappointed by the fact that there is relatively little immigration from Earth to their planet. Barely a thousand people permanently move from Earth to Zarmina each year, compared to the sixty-thousand-people-a-year other worlds such as Concordia and Bay Jing receive. Zarminians believe if they could increase immigration their status, importance and wealth among the Seven Worlds would increase. Pro-immigration policies and subsidies are therefore an important part of everyday politics in the world.

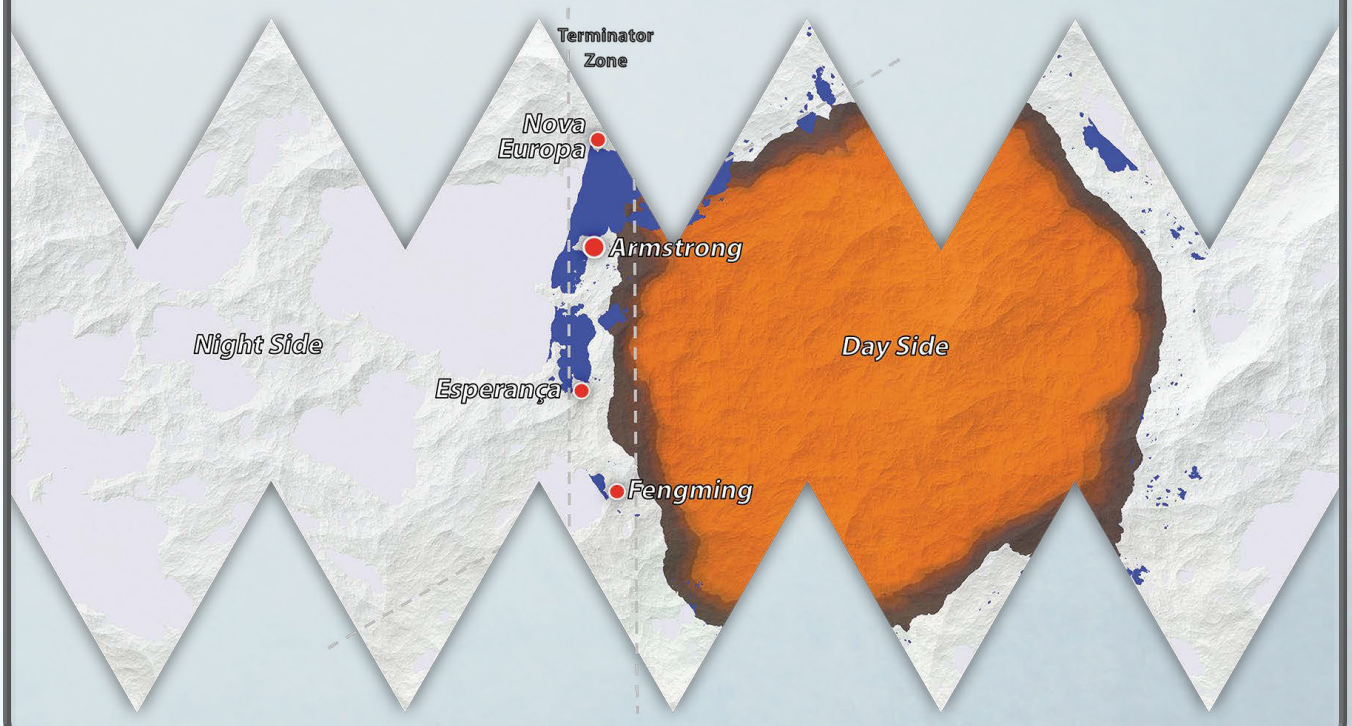
HISTORY

As mentioned before, Zarmina is named after the wife of astronomer Steven Vogt, the original discoverer of the planet back in September 2010.

ZARMINA (AKA "GEE") SYSTEM DATAFILE

Star: Gliese 581
Star Class: M4V
Distance from Sun (direct line): 20.3ly
Distance from Sun (jump points): 7 jumps, 41.2ly
Mass: 0.31 sol
Luminosity: 0.024 sol
Star System: 6 planets (3 rock, 1 habitable, 1 ice)
Habitable Planet: Gliese 581g ("Zarmina", nickname "Gee")
Distance from star: 0.18 AU
Perihelion/Aphelion: 0.16/0.20 AU
Axial Tilt: 20 degrees
Annual Period: 0.134 years
Local day: tide locked
Diameter: 20729 kms (1.6 times Earth)
Surface Gravity: 1.3g
Density: 0.8 Earth
Illumination: 8% Earth
Temperature: -4°C average (20°C in Dayside, -36°C in Nightside, cold)
Atmosphere: N_2, low O_2, 1.4 pressure, dense.
Water: 49% of planet
Satellites: one very small moon, generates large tides.
Population: 1.9 million.
Average Population Growth Rate: 2.13% per year
Present Population Growth Rate: 1.3% per yearIndustries: Oxygen Mining, chemical and pharmaceutical products (external export).

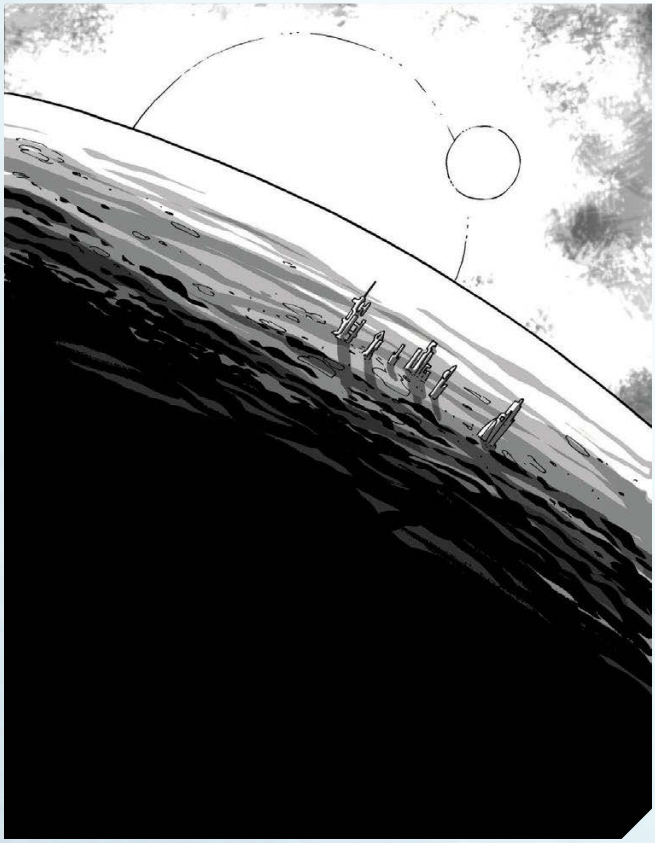




In 2020, as the ability to detect and analyze extrasolar planets improved, scientists discovered that Zarmina's terminator band did have atmospheric and temperature conditions that were appropriate for human habitability.

Although Zarmina had other factors that made it less-than-desirable as a home for mankind (such as its gravity, its inhospitable temperatures and low oxygen), the fact that it was the first exoplanet humans knew could harbor life made it an icon. Countless films and books were written about life on Zarmina, and after a while it was a given that if mankind ever figured out how to cross the huge distances involved, it would be one of the first settled worlds. Scientists devised ways to survive in its environment, harvesting energy from the red dwarf, growing food and accustoming future settlers for the strange environment of the planet.

When the N'ahili arrived in 2091 and furnished us with the jump point coordinates to Gliese 581, among others, Zarmina automatically became the obvious destination for settlement. Not even the fact that Zarmina was seven jumps away, compared with the next potential habitable planet, Apollo, which was just four jumps away, could swerve the decision. Ships at the time did not have enough energy for more than four jumps at a time; it was therefore necessary to first transport ships with energy supplies four jumps away to Gliese 682 (where afterwards Harris Station was founded) so the settler ships could refuel on their way.



In 2101 the first settler ships arrived in Zarmina carrying settlers from the U.S., China, Brazil and the European Nations. They settled different cities on the planet's terminator band and began the painstaking process of building a civilization. At the time, each group of settlers believed, despite the Outer Space Treaty, that they should behave as a colony to their parent nation. Smaller, less powerful countries that had sent settlers carved "neighborhoods" around some of the larger patron cities.

What the first settlers did not count on was the harsh reality of the planet. Gravity was too strong, life was too hard, the world was too strange. It soon became obvious that the only way in which those first settlements would succeed was by coordinating their activities. In those instances where emergency help was needed, the settlers knew they could only count on one another, not on countries available after a fourteen-jump round trip. Thus by 2113 a central coordinating government with a council of representatives was in place, and Zarmina gave the first step towards becoming the world it is today.

CITIES AND LOCATIONS

Most cities on Zarmina are a combination of small surface environments and large underground installations on the planet's terminator zone. Most people live in underground environments, and live and work under the glow of artificial illumination. Living underground also has the side benefit of offering additional protection against Gliese 581's deadly radiation.

It is difficult to keep these underground environments adequately oxygenated. Given the low content of oxygen in the atmosphere, just directing the outer atmosphere inside is not enough to keep people breathing healthily. For this reason, the practice of "oxygen harvesting" from the oxygen oceans on the night side is necessary for the survival of the cities. Oxygen harvesters frequently travel in specially-built rovers and bring oxygen to the cities, which directly insert it into the city flow.

The main cities in Zarmina are listed below.

- **Armstrong**: Founded by the first American settlers, Armstrong currently boasts a population of 540,000. It is where most government business is run on Zarmina. An interesting feature of Armstrong is the Research Institute run by the Psion Brotherhood. Currently the largest office the Brotherhood has anywhere outside Earth, the Institute has hundreds

of scientists studying the impact of the hostile Zarmina environment on psionic powers, and how to take advantage of the native amino acid and carbon chains to improve psionic powers. A rotovator is available close to Armstrong, and is the main connection between the surface and orbit, given Zarmina's high-G.

- **Fengming**: Founded by the Chinese, Fengming has 420,000 inhabitants. After the comet impact on Earth in 2133 destroyed large parts of south east Asia, Fengming and its neighborhoods (mostly composed of immigrants from smaller Asian nations) has become extremely protective and dedicated to preserving the memory and culture of Asia. In the cosmopolitan universe of 2217 it is unusual to see a city so focused on a single set of cultures as Fengming.
- **Esperança:** This Brazilian settlement currently has a population of 312,000. Most of the workers in Zarmina are from here, and dedicate their time to harvesting oxygen, working on ^{3}He mining and transportation from the stations surrounding Gliese 581, or picking up and working with the chemical compounds that are so common here. It is rumored that several crime organizations in Esperança are researching and producing new illegal drugs to sell on Earth using the carbon amino acid chains from Zarmina.
- **Nova Europa:** With 296,000 inhabitants, this city was settled by European immigrants who left Earth looking for an independent lifestyle. Although their original plans for an independent settlement fell apart when the realities of survival forced them to join with the other settlers, Nova Europeans have always considered themselves "special." With several wealthy patrons who have bequeathed important businesses and assets on Earth to the city, Nova Europa feels it could have independence if it wanted to. It is a tough job for most Presidents of Zarmina to handle Nova Europeans appropriately.

PERSONALITIES

- **Rey Kovalaske:** The current President of Zarmina comes from Armstrong. He won the last election based solely on his charisma and promises to ignite a new wave of immigration from Earth by offering 10-year benefits and subsidies. Now in the second year of his government his plan looks a failure. Rey is more interested in enjoying the perks of the office of the President than in making the effort needed to turn things around. As a result, a government crisis looms.
- **Indira Messel:** The president of Oberon Industries, one of the largest pharmaceutical drug companies on the planet, Indira Messel has recently led a major investment initiative into several research centers and labs. She has begun building a large research complex in the night side of Zarmina, close to one of the largest oxygen oceans. This is unusual, to say the least. There is a rumor that Oberon Industries has made a breakthrough discovery, a new carbon and amino acid chain that can create something very valuable. No verifiable facts have surfaced, though, and Indira is tight-lipped when it comes to Oberon Industries' strategy.
- **Crista Beverino:** Crista is the government official in charge of making sure the oxygen harvesting operations run smoothly and without surprises. Although she deals with formal businesses and guilds dedicated to this activity, it is always necessary to hire freelancers to cover quotas or to make ends meet. Crista is therefore always on the lookout for people interested in harvesting oxygen from the oceans of the night-side of Zarmina. She does a great job overstating the profits and understating the risks it entails.

APOLLO

Not many people know the Greek god Apollo is the God of Colonists. When the settlers of the third planet around the star Epsilon Indi arrived at their destination and named it Apollo, they expected fate to grant them luck and prosperity. They did not expect to become what they became: A planet simultaneously financially successful and ethically bankrupt, a hub of crime and corruption in the Seven Worlds.

DESCRIPTION

Apollo is a frozen world, with average temperatures of –13°C, but low temperatures that go much lower. Miles of frozen ice cover most of the world with the exception of a narrow band around the equator, where most settlements are located.

The atmosphere of Apollo is in part maintained by the tidal forces created by its moon, Delphi. Strong tree-like plants grow from the bottom of the frozen ice cover, breaking it. These contribute to the oxygen and carbon mix of the atmosphere, which should be perfectly breathable but actually isn't due to several inert gases that cause a "narcosis" effect on unprotected humans. Dizziness, light-headedness, euphoria and impaired behavior are a problem, and cause several deaths each year. Special masks have to be worn by everyone except those few locals who are extremely resistant.

Given its position as the gateway between Earth and the planets of Concordia and Bay Jing, Apollo is a

WHO OWNS SPACE?

For most of history, when humans have expanded and conquered other territories, they have taken them for themselves. During the colonization of the Americas in the sixteenth century, and the colonization of Africa in the nineteenth, for example, European nations carved the new world into colonies that owed allegiance only to the mother country.

In the middle of the twentieth century, with the Cold War raging, governments recognized that allowing unrestricted colonization of space and the bodies of the Solar System could create a very unstable situation from a military standpoint. Taking this into consideration the governments of the United States, the Soviet Union and the United Kingdom on January 26th, 1967 jointly signed the "Treaty On Principles Governing The Activities Of States In The Exploration And Use Of Outer Space, Including The Moon And Other Celestial Bodies," more commonly known as the Outer Space Treaty. This treaty forms the basis of international space law, and all space-faring nations are a party to it.

Article II of the Outer Space Treaty states that "Outer space, including the moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means." This basically means that no one country can "own" space or any celestial body, and therefore cannot extend the rights it provides to its citizens and companies when colonizing space.

It should be noted, however, that given the 21st century impetus of private enterprise to mine asteroids, a second school of thought believes right of property should be granted independently of whether the country has rights or not, and the country should extend its protection to the individual private rights holder. The topic is heating up: Recently published new meteorite regulations promote government ownership over meteorites and suggest private ownership should flow from the government. Some believe these regulations set a precedent that can later be applied to bodies in space and are a first step towards outlawing ownership by "discovering and settling" space locations.

There is obviously a long way to go before agreement on how to handle private property rights in space is reached. Although the Outer Space Treaty was created to avoid the proliferation of weapons in space, it is to be hoped that it points the way to a more civilized expansion into space when the time comes.

perfect commercial and shipping center. Besides food production and distribution, Apollo handles shipping, orbital shipyard and repair services, storage and space warehouse services and re-fuelling operations, based on both mined fuels and ^{3}He gleaned from collector stations built close to a nearby gas giant. The center of shipping and fuelling activity is Fukuyama Station, orbiting close to the planet in a geosynchronous orbit. Ideally Apollo warrants a Space Elevator, but the infighting within the planet makes agreeing on the investments and usage impossible.

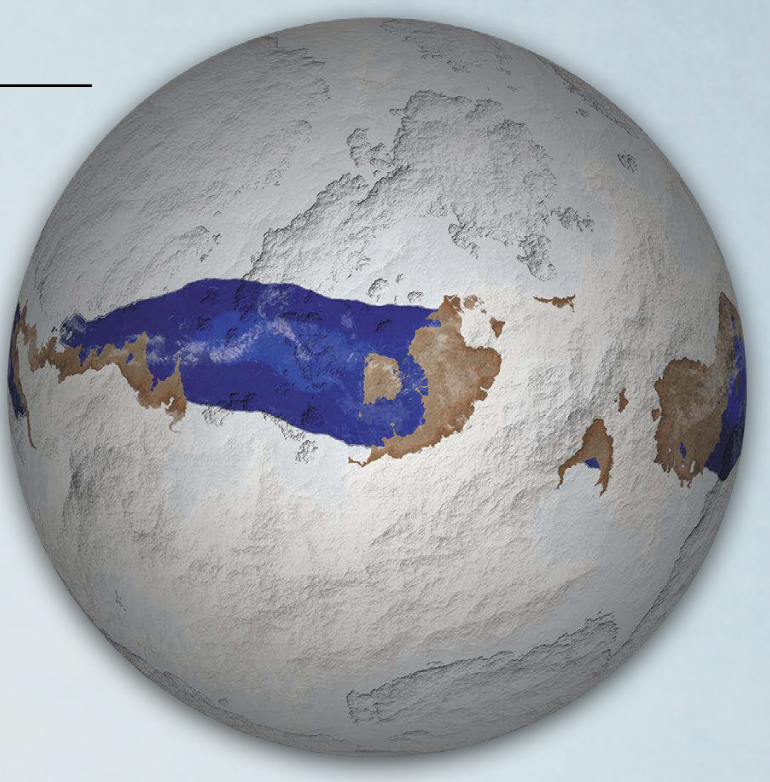
Apollo's main external income comes from fees involved in shipping and fuelling services, as well as business brought by local merchant conglomerates created to take advantage of the planet's location. Given that most other businesses in the planet are small and local, this has created an environment where a few big companies wield enough influence to shape politics and decisions on the planet.

Apollo's twelve million inhabitants live under a culture of graft and corruption, dominated by both clean and dirty in-fighting between the shipping, shipyard, fuelling and merchant conglomerates. A small sub-culture of cartels and criminal factions have sprung to take advantage of the voids of law and the needs these corporations have for illegal activities that do not get their hands dirty, such as espionage and sabotage. These cartels have thrived by taking advantage of the shipping corporates themselves at an activity none of the corporations approve of: Smuggling.

The result is a complex web of powerful alliances and double-dealings between forces both legal and criminal, with most politicians subservient to these strong interests. The current outsider's view of Apollo is as a corrupt, immoral, and dangerous place. Whenever any "clean" leaders have promised to clean out the graft (or out-of-world officials have tried to meddle) ways have been found to ignore, side line, or dispose of them. The population is accustomed to the climate of their dangerous world, where the law is on sale and dirty deals are closed in seedy places.

It should be noted that, although powerful, the business involved with shipping and fuelling is a small part of life in Apollo, with the local population living simple lives based on a small internal economy. As long as they don't mess with the wrong crowd or stray into the wrong place, most citizens are (usually) not in danger. An unwritten rule exists whereby the conflict or infighting must not affect the business of shipping

APOLLO
SYSTEM DATAFILE



Star: Epsilon Indi
Star Class: K5V
Distance from Sun (direct line): 12ly
Distance from Sun (jump points): 4 jumps, 23.2ly
Mass: 0.765 sol
Luminosity: 0.244 sol
Star System: 7 planets (1 garden, 4 gas giants, 1 ice planet, 1 rock planet), 8 moons, 1 asteroid belt
Habitable Planet: Epsilon Indi III (Apollo)
Distance from star: 0.64 AU
Perihelion/Aphelion: 0.62/0.67 AU
Axial Tilt: 2.8 degrees
Annual Period: 0.589 years (220.2 local days)
Local day: 23.4 standard hours.
Diameter: 14,191 kms (1.1 times Earth)
Surface Gravity: 0.89 g
Density: 0.80 Earth
Illumination: 46% Earth
Temperature: -13°C average (-8°C at Perihelion, -18°C at Aphelion, very cold)
Atmosphere: N_2, O_2 with traces of inert gases that cause dangerous effects, 0.89 pressure, marginal atmosphere.
Water: 50% of planet, frozen.
Satellites: One very small rock moon, generates small tides.
Population: 11.9 million.
Average Population Growth Rate: 2.19% per year
Present Population Growth Rate: 1.35% per year
Industries: Commerce hub (to/from Earth), food production and distribution (to other non-Earth systems), illegal activities.



or attending customers that use Apollo's services. Fukuyama Station gives a squeaky-clean appearance, and unless they visit the surface, most travelers do not notice how Apollo really conducts its business.

Usually.

Every once in a while, something breaks. Maybe a particularly dangerous piece of smuggled cargo is discovered, or the splinter of a corporate war spills out and affects a customer. And then everybody has a big clean-up job to perform.

HISTORY

When the N'ahili provided Humanity with their first set of coordinates, there were only two stars with known habitable worlds on the list: Gliese 581, where Zarmina was founded; and Epsilon Indi, a star twelve light-years from Earth. Although closer in jumps than Gliese 581, the first planet in the Epsilon Indi system was the second one to be colonized, in 2106.



Apollo is a cold world, covered in ice except for a narrow band around the equator. Although its gravity makes it a more hospitable planet than Zarmina ("Gee"), Apollo was more neglected than the other, more popular world. This frontier mind set affected the rule of law. Everyone was for him or herself in the fledging cities and settlements of Apollo.

As in Gee, the first settlers on Apollo came from different nations (mostly America and Japan) and with a plan to found separate cities, per nationality. And as in Gee, reality forced the colonists to group together to survive.

With an illumination equal to about 46% Earth's, it took relatively few precautions (compared to Gee) to grow enough food to feed large numbers of people. With enough energy, the temperature problem is easy to solve. Food was produced in special greenhouses and hydroponics gardens, and even cattle could be fed.

The first settlers found a local species of fish-like animal swimming in the cold water in the regions near the equator. This fish-like species, named Ice Trout by the first settlers, is edible by humans after a special biochemical treatment and has a unique taste, and thus is Apollo's contribution to the human species' culinary menu.

In 2117 the planet Concordia was settled, with Bay Jing following the next year. Unlike Apollo, these two were picture-perfect garden worlds, just the place most humans would like to live in. As these two worlds flourished and their communication with Earth increased, Apollo found itself the waypoint between the three largest, most powerful worlds in known space, much like Harris Station on the route to Zarmina. The gradual conversion of Apollo from frontier wasteland to commercial and shipping center changed life for all the settlers. Of course, as Concordia and Bay Jing grew into the powerhouses they now are, the opportunities for business, both legal and illegal, also grew.

CITIES AND LOCATIONS

Apollo's main cities are in the equatorial band, where temperature is relatively mild by the planet's standards, and water stays on the surface in liquid form. Cities are built out in the open with little underground construction, although winter clothing is always needed. By 2217 the many cities, towns and farms form an almost continuous band around the equator. The main locations in Apollo are:

- **Whitehall:** The capital of Apollo, with a population of 5.5 million, is also the center of the power games and the brokering between politicians, corporations and criminal factions. Most of the planet's upper

EXPLORING AND SETTLING SPACE

The exploration and settling of Space is governed by laws and regulations, just like everything else. These keep things relatively orderly, and help preserve peace and civilization.

The legal framework for the exploration of space is the Outer Space Treaty. Originally signed in 1967, in *Seven Worlds* the Outer Space Treaty has been improved several times, with additional detail filled in to avoid ambiguities. Specifically, the UN Universal Declaration of Human Rights was appended as a basic set of rights that applied anywhere, and that any individual or organization would have when in space or a stellar body. Also, several laws and regulations were established to provide for the fact that a colonized planet would have "boundaries" between its settlements, without these boundaries affecting free and open access to the planet by any human being. Finally, several clauses first tested on deep seabed mining agreements in the 21st century were incorporated into the new laws and regulations for space, allowing corporations to securely invest in mining and exploring space objects without having direct ownership over them, and for individuals to continue the concept of property without generating a land-grab.

A critical point to consider is this: Any of the major space-faring nations, such as the U.S. or China, could have openly ignored the treaty if it wanted, and this was attempted several times. Crucially, what kept this from happening was the fact that the main technologies needed to conquer space were created by a private company, (EnergyNeering), and a Foundation independent from any one country (the Circle). The participation of the Circle in most activities, and the savvy and care with which the Circle protected and distributed the technology, made it all but impossible for most major nations to avoid the provisions of the outer space treaty.

Outside the Solar System, Zarmina ("Gee") and Apollo were the first two planets settled by humans, and in both cases the settlement expeditions were organized by country, and the first settlements were by a specific nationality. These first settlers quickly discovered that to survive and move forward they needed to pool their efforts and resources, thus informally creating regional and planetary groups that went beyond the founding countries' original wishes (remember, these were not colonies, but open settlements "sponsored" by a particular country). By the time the coordinates for Concordia and Bay Jing were available, the experience and regulations created in Zarmina and Apollo (with the constant support of the Circle) had already made it clear that space belonged to all. Therefore, most interplanetary and interstellar missions were joint-nation, with the Outer Space Treaty allowing them to simultaneously set up different settlements.

The Circle has sponsored many settlements throughout its history as part of its charter, usually fully or partially funding the expedition, and providing help and expertise. One of the Circle's stated goals has always been to promote heterogeneity in space, whether it be by sponsoring settlements by smaller nations, religious colonies, minority groups, or others. As part of the settlement, the Circle had a non-revocable advisory and support role in most settlements. This is why the Circle is so influential in space.

Besides the rules framework created by the Outer Space Treaty and the Universal Declaration of Human Rights, each settlement and planet created its own settlement laws. After the comet impact of 2133, when most settled worlds could not count on Earth help or support, planetary governments were created or formalized, and their own sets of laws, based on Earth law, were put in place.

In the case of corporations, there are still distant or inhospitable locations in space where private investment is needed. Corporations interested in exploring space and reaping the economic benefits of this exploration can request a special permission from EarthGov, and are subject to the conditions of the Outer Space Treaty, specifically in that they cannot "own" what they find. A corporation can receive preferred rights to mine or harvest the resources it has had a hand in finding or developing, though.

With the advent of advanced, powerful fusion engines and weapons, an additional condition was added to the Treaty, as well as to the UN's Convention on Genocide: No planetary bombardment is allowed, as this can have horrific consequences on the planet as a whole. Even today, there is no greater sin than directly bombarding a planet, and this is a rule that has not been broken by any planetary fleet yet.

middle class lives here, in secure neighborhoods that keep their day-to-day activities isolated and protected from the outside world.

- **Tetsuo:** With 2.9 million people, the second largest metropolis in Apollo is also its food production center, both close to the largest greenhouses, lakes and hydroponics gardens, and the factories needed to process them. Tetsuo has its own internal power struggle between the large farming and food corporations and the Independent Farmers Association, which after many decades has finally managed to get its act together and is trying to stand up on its own.
- **Fukuyama Station:** Most travelers that pass through Apollo only see Fukuyama Station, and it is therefore good business for it to show its nicest possible face. Fukuyama Station has something for everyone: It has clean and brightly-illuminated sections, with parks and routes to stroll, with artificial gravity provided by the rotating environment; luxurious hotels with every comfort; bars and other places to cater to space-sailors' unique needs; and business sections to conduct docking, shipping, trading, fuelling and cargo operations. If there's a word that describes Fukuyama Station's every activity, it's this: Efficient. Apollo has never looked this good.

PERSONALITIES

Apollo's leaders strive a fine line between keeping an appropriate business face for customers and dealing with the many sides and factions in the planet's complex politics. Some of the more important personalities are listed below:

- **Kirari Komatsu:** The current President of Apollo is one of the most successful Presidents in recent times. That is to say, he is one of the most corrupt and weak of the bunch, and thus is the perfect person to stay out of the way of the corporations' and cartels' continuing war.
- **Shaneka Lesneski:** Ms. Lesneski is the CEO of Hariko Shipping, one of the largest shipping services' firms on Apollo. In its constant fight with its competitors, Hariko has recently entered several seedy side businesses, including smuggling. Ms. Lesneski has heard rumors that one of her biggest competitors, Consorcio La Merced, is about to get a huge contract for a multi-year shipping deal with a large otherworld corporation. Since she does not know the details, she has asked her criminal contacts to mount an aggressive espionage operation, and is now coordinating the final stages of its execution.
- **Leon Granberg:** The leader of the Mesh, one of the largest and most dangerous criminal organizations on Apollo. Although Granberg has his fingers in many illegal activities, he specializes in illegal smuggling between the main planets using Apollo as a waypoint, and on selling his services as a fixer to Apollonian corporations in search of some muscle and an illegal way to solve their problems. Although known and feared in Whitehall, Granberg is virtually untouchable due to all the agreements and bribes he handles with most of the politicians and law enforcement leaders in the city.
- **Jude Bungart:** The president of the Independent Farmers Association in Tetsuo, he tries to keep his organization out of the muck while gaining the power needed to help independent farmers live and grow their business. Since getting help for his goals means hitching his wagon to a local interest or other, he is always on the lookout for out-of-planet groups willing to help him for a fee, with no further strings attached.
- **Stephani Mixdorf:** The Chief Administrator at Fukuyama Station, she is the odd person on Apollo in that she is unusually clean and straight for a top-ranking official. Her main concern is to keep Fukuyama Station efficient and working, with trade going smoothly no matter what happens on the planet below. Stephani can be ruthless and direct, but she is not beholden to anyone, and keeps the trains running. Most corporations and criminal syndicates would love to bring her down and replace her with someone more amiable to their interests, but Stephani's reputation as the person who makes Apollo "tick" has made the planet's outside customers ask for her by name. In a word, customers love her and if she goes away, business and planetary credibility will suffer. Even so, this is an unstable situation, and Stephani knows it.

CONCORDIA

Founded in 2117, Concordia is one of the jewels of human space, currently mankind's most advanced world. A benevolent society, proud of its accomplishments, Concordia believes it is the future of mankind, and is ready to take on the leadership of the human species… whether other planets want it or not.

DESCRIPTION

Concordia is very similar to Earth, an idyllic planet with great weather and excellent suitability for agriculture. Many species of Terran flora and fauna have been successfully transplanted to Earth with minimum genetic manipulation. After one century of settlement approximately 66 million people live here, 0.7% of the total human population of the universe. Although most

nations are represented as immigrant population, Europeans comprised the bulk of immigrants to the planet.

Today Concordia is a democracy that gives equal rights to all but simultaneously maintains a powerful upper nobility class. These Lords and Ladies, descendants of the founding families of Concordia, own most land, business and industry in the planet, and take turns being elected President. The Government in Concordia is handled by an elected President, supported by a Council of Lords and a Council of Citizens (a Parliament). The President needs to push his decisions thru the Councils in order for them to proceed. The Villages are also represented in the Parliaments, which works together with the Council of Lords.

The average standard of living in Concordia is the highest of the Seven Worlds, and Concordia is easily the richest world in human space. This is due to its powerful industry and leadership in most fields of technology. State-of-the-art facilities produce the latest engine and electronics designs, as well as many luxury items which are sold at exorbitant prices in the other worlds. Concordia is in the process of finishing the building of its first Space Elevator, which will make it even easier to handle commerce and communication with the other worlds.

Concordia's largest trading partner (after Earth, obviously) is none other than Bay Jing, with whom a constant rivalry has already caused one war, in faraway Nouvelle Vie. Concordia's challenge is reconciling its constant competition with its neighbor with the commercial and emotional relations between both worlds. This situation has not been helped by the silent war still simmering in Nouvelle Vie, where Concordia and Bay Jing are waging a cold war via their proxy protected nations Jubilee and Dauphin. During the first war, the Circle was crucial for protecting citizens from the violence between the nations.

The noble, formal and proud society of Concordia is looking forward to 2217, when the century celebration of the founding of this mighty planet will take place.

HISTORY

When scientists began investigating the planets around the star of Epsilon Eridani they found that most valuable and improbable of prizes: A twin of Earth, a planet so close to our mother planet that humans could adapt to it with practically no effort. Unfortunately the first set of coordinates provided by the N'Ahili did not include Epsilon Eridani, so mankind had to wait until receiving the second set of coordinates to colonize it. By that time Zarmina and Apollo were already fledging colonies. Concordia's natural advantages meant it would surpass the other two planets almost immediately, though.

Members of the richest and most powerful families on Earth, which could not be bothered to leave their comfortable lodgings on the home planet for the harsh and inhospitable life of Zee or Apollo, jumped at the chance to settle a planet such as this. These powerful families acquired large tracts of land creating a land-owner structure and a "noble" class.

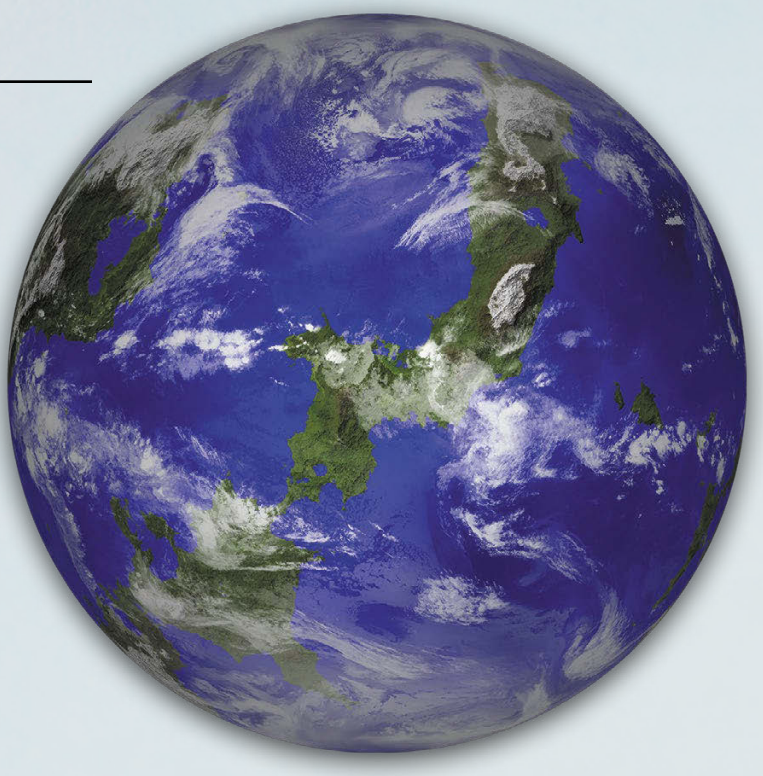
The Circle is crucial to the founding and history of Concordia, having helped with transporting both people and goods, and also settling and taking ownership of important sections of land. The Circle defended civilians during the first war with Bay Jing over Nouvelle Vie, further earning the respect of the population. As a result, the Circle is very popular, and members of this institution are treated with awe and respect. Even the main headquarters of the Circle is located here in Concordia, from where it orchestrated support to Earth after the comet crash of 2133. On the other hand, the Circle is far less popular with the ruling elite, which during the war with Bay Jing expected it to be more partisan towards Concordia. Now, the nobility sees the Circle as an external influencer of its power base and thus a danger. The nobility treats the Circle with respect, though, given its popularity with the people.

CITIES AND LOCATIONS

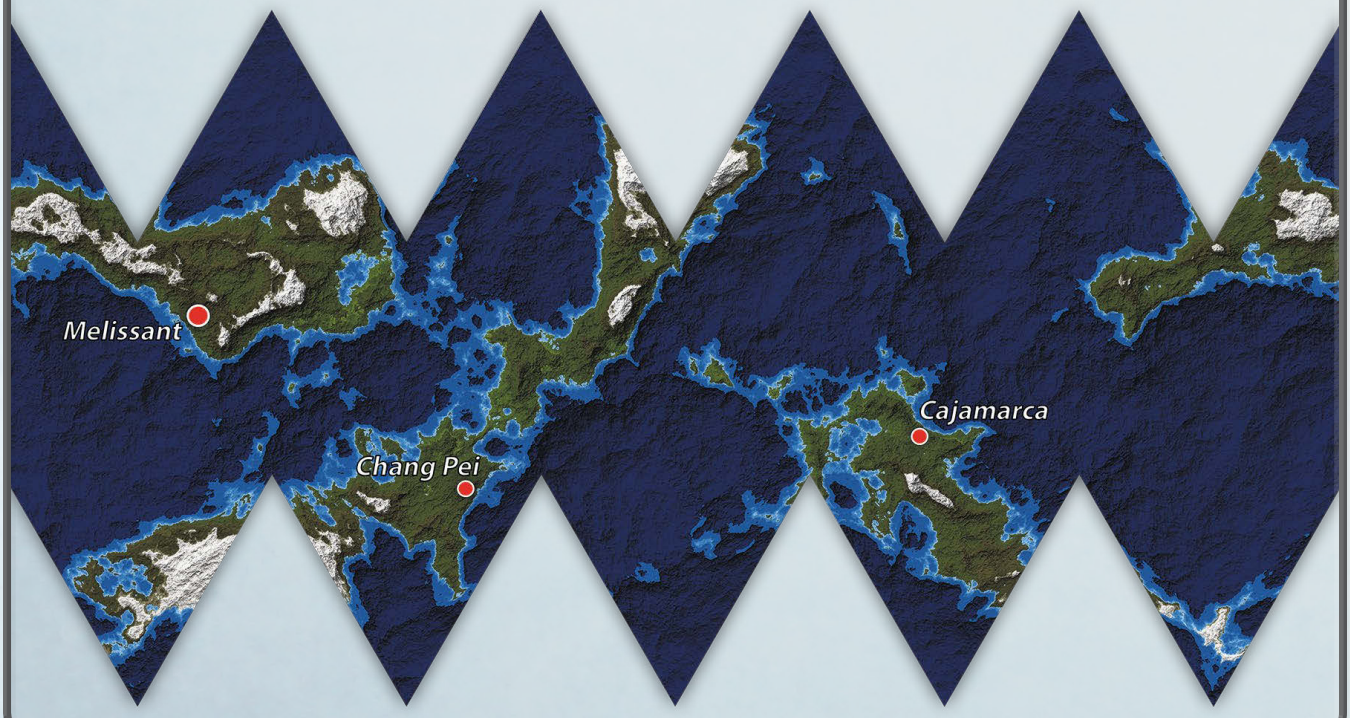
The most advanced cities outside Earth are located in Concordia. Gleaming skyscrapers, sprawling gardens, modern air trains and marvels or architectural design, most cities of Concordia are impressive displays of riches and glamour.

- **Melissant:** The 12-million-citizen capital of Concordia. Named in honor of Melissa Fischer, the woman who influenced both Circle founder William Donovan and Psion Brotherhood founder Daniel Michaels and thus briefly became the most powerful woman in the universe, Melissant is considered a more technologically advanced city than any on Earth. The center of government is located in Melissant, as well as Circle Headquarters.
- **Chang Pei:** A city with an Asian name in a planet known for its occidental, European-named places, Chang Pei is a nine-million-inhabitant metropolis. Other than its name, chosen by the Chinese immigrants who moved to this part of the planet, Chang Pei is very similar to most other Concordian cities, and is in fact constantly trying to best Melissant in any way it can.
- **Cajamarca:** Although the weather is mild in most of Concordia, there are a few places where particular

CONCORDIA SYSTEM DATAFILE



Star: Epsilon Eridani
Star Class: K2V
Distance from Sun (direct line): 10.5ly
Distance from Sun (jump points): 8 jumps, 44.7ly
Mass: 0.9 sol
Luminosity: 0.481 sol
Star System: 9 planets (1 garden planet, 7 gas giants, 1 tiny rock planet), 20 moons, 47 moonlets, 1 asteroid belt
Habitable Planet: Epsilon Eridani III (Concordia)
Distance from star: 0.67 AU
Perihelion/Aphelion: 0.66/0.68 AU
Axial Tilt: 23 degrees
Annual Period: 0.578 years (214.5 local days)
Local day: 23.6 standard hours.
Diameter: 11897 kms (0.93 times Earth)
Surface Gravity: 0.97 g
Density: 1.0 Earth
Illumination: 102% Earth
Temperature: 17°C average (20°C at perihelion, 14°C at aphelion)
Atmosphere: N_2, O_2, pressure 1 atmosphere.
Water: 73% of planet
Satellites: 1 tiny rock moon
Average Population Growth Rate: 2.05% per year
Present Population Growth Rate: 1.1% per year
Industries: Technological devices (mostly to non-Earth worlds; minor very specialized technology to Earth), luxury products (to Earth)
tPresent Population Growth Rate: 1.35% per year
Industries: Commerce hub (to/from Earth), food production and distribution (to other non-Earth systems), illegal activities.



weather pattern anomalies appear. Cajamarca is located on one of these. This city of six million is located in a place where rain and cold are very common. The city is as large as it is mostly because of the Dunlop family, which owns some of the most developed industries in the planet, also located around Cajamarca.

- **The Villages:** Outside the cities there are thousands of villages, connected by high-speed communications links and by sub-orbital flight services. These villages form the heart of Concordia, and while they are currently not the core of its production, the high-margin luxury products each village has specialized in represent what most citizens think of when they think of Concordia. Wines, cheeses, meats, and many other products are made here and have a small but highly-demanding and extremely profitable market in the other planets. Obviously, being in some noble lord's land, these nobles have a lot of pride in the particular specialty of the villages in their land, and take great care in supporting the villages so they succeed.

PERSONALITIES

Most of the leading personalities of Concordia are nobles, powerful lords and ladies descending from the founding families of the planet. They live in a world of luxury, parties and formal occasions, secure of their place in Concordian society.

- **Lord Kenneth Livley**: The current President of Concordia, now in his third non-consecutive term as President. Already 107 years old, Lord Livley looks a kingly 60, with a handsome face and a charming smile. He is a master of compromise, and has made it to President by making sure every faction and noble family is a little bit better off with him as President than with anyone else. He is about to achieve the main ambition in his life: He will be the incumbent during the celebration of the 100th anniversary of the foundation of Concordia. The eyes of all of



human space will be on him in a few weeks, and he will allow nothing to risk the opportunity to portray Concordia as the epitome of human achievement during the celebration. He is delaying taking action on the escalation of violence in Nouvelle Vie as a result, hoping to be able to ignore them until after the celebration. He has even invited to the celebration the Governor of Bay Jing, Sung Selnes, in a display of openness.

- **Lord Dominic McIntrye:** Chairman of the Council of Lords, and Lord Livley's political enemy, Lord McIntrye also wanted to be President during the anniversary. Unlike Livley, though, he is willing to risk the aura of Concordian perfection in order to discredit his opponent. The recent escalation of the conflict in Nouvelle Vie between the Concordian-sponsored state of Jubilee and the Bay Jingnian-sponsored state of Dauphin is giving him that opportunity. He has publicly denounced President Livley's invitation to Governor Sung Selnes as an ill-conceived diplomatic move, and has raised concerns of terrorist activity during the celebration.
- **Kurt Delris:** Chairman of the Council of Citizens, Kurt Delris is more interested in making the case for social mobility than in political rivalries. Kurt is very proud of his world, and of the fact that citizens are respected and taken care for. He is working on a new bill to push for a larger distribution of wealth through social services to ordinary citizens. His proposed "Plan for the Second Century of Concordia" has made him a popular chairman, and has created significant animosity against him in the Chamber of Lords.
- **General Carlo Ruehle:** Leader of the Concordia Military Forces, General Ruehle has been preparing for years for the (in his opinion) inevitable second war with Bay Jing. A decorated hero of the first war, he knows that given how bellicose his neighbors are, it is only a matter of time. Ruehle also carries a personal animosity against General Yuang of Bay Jing, an animosity that began when both participated in opposite sides of several battles during the war. Ruehle knows the main theater for this war will once again be Nouvelle Vie, and finds his strategy challenged by the fact that Bay Jing itself stands between Concordia and Nouvelle Vie. This makes fleet movements and logistics very difficult, if not impossible. There are whispers that Ruehle and the Military Forces have an ace in the hole, a secret plan that might turn the tables in the event of a confrontation with Bay Jing.
- **Epsilon Leader Trevor Antoine:** Current leader of Circle HQ in Melissant, Epsilon Leader Antoine's main challenge is to keep the Circle Foundation out of most political rivalries and as the independent, neutral organization it is. Antoine has been leader of the Circle for two years now, previously having been for twenty-one years second-in-command to former Epsilon Leader Suzanne LaMarche (now retired). This gives him a level of experience and knowledge of Circle business that almost no one else has. An honest, direct man, Antoine is currently worried about the developments in Nouvelle Vie. He has a bad feeling about where things are going, and is very demanding in making sure all Circle members are in top shape and ready to act if they are needed.

BAY JING

If Concordia and Bay Jing are the two jewels of human space, Bay Jing is the black pearl to Concordia's white: A planet with a tough and tragic history, it has bred hard citizens who believe the only reason they still live in a successful paradise of industry and development is that they have paid dearly for the privilege. Bay Jing's strict, authoritarian government is there because that's what its citizens want: The assurance that things will still move forward successfully, if a little roughly.

DESCRIPTION

The fourth world orbiting the star of Omicron 2 Eridani, Bay Jing is a world that looks and feels very similar to Earth, all the way down to its 22 degrees Centigrade of average temperature, and its standard atmosphere. A world 75% covered in water, Bay Jing has irregular tides (by Earth standards), caused by the two moonlets that circle the planet.

Bay Jing is a powerhouse with 66 million inhabitants. A leader in technology and mining, it is also self-sustaining agriculturally, with most harvesting done by machines, not humans. The heavy focus on industry is facilitated by the large deposits of mineral fuel available (including natural gas deposits used to acquire ^{3}He). This allows production of important amounts of energy.

Bay Jing's goal is not specialization, but cheap mass production. This contrasts with Concordia, where being "the best" at some specialized field is highly regarded, and where villagers consider it a privilege to plant and tend the fields themselves.

Bay Jing has an authoritarian pseudo-democracy, where an elected Governor rules with the backing of the Bay Jingnian Security Forces (BSF), the planetary army. This fact, as well as the planet's rough and tragic history, has molded culture into an aggressive society that believes it is their tragic destiny to defend their rights by force. Interestingly, the inhabitants of the planet actively support this tough model of

BAY JING SYSTEM DATAFILE



Star: Omicron 2 Eridani
Star Class: K1V
Distance from Sun (direct line): 16.4ly
Distance from Sun (jump points): 9 jumps, 51ly
Mass: 0.84 sol
Luminosity: 0.456 sol
Star System: 7 planets (1 garden planet, 4 rock planets, 1 ice planet, 1 gas giant), 1 moon, 19 moonlets.
Habitable Planet: Omicron 2 Eridani IV (Bay Jing)
Distance from star: 0.66 AU
Perihelion/Aphelion: 0.64/0.67 AU
Axial Tilt: 16 degrees
Annual Period: 0.579 years (214.6 local days)
Local day: 23.6 standard hours.
Diameter: 11586 kms (0.91 times Earth)
Surface Gravity: 0.99 g
Density: 1.1 Earth
Illumination: 96% Earth
Temperature: 19°C average (22°C at Perihelion, 16°C at Aphelion)
Atmosphere: N_2, O_2, breathable, pressure 1.1 atmospheres.
Water: 75% of planet
Satellites: None
Average Population Growth Rate: 2.05% per year
Present Population Growth Rate: 1.1% per year
Industries: Technology, nano-technology (mostly to Earth)



PARKING LOTS IN SPACE: WHAT IS A LAGRANGE POINT?

Lagrange Points are specific locations of space between two bodies (such as the Earth and the Sun, or the Earth and the Moon) where the gravitational effects of both bodies balance each other out, thus making it inexpensive in energy terms to orbit with them. Every two-body system has five Lagrange Points.

Lagrange points have long been used in science fiction as a location for space stations, a midpoint for stellar missions and as fuel depots, among other things, and they will be crucial locations for space exploration in the coming decades.

In *Seven Worlds,* Lagrange Points are used for small space stations. Most ships, however, have enough energy to go directly to a planet's orbit and back, without depending on Lagrange Points. In the first decades of space exploration, however, Lagrange Points were useful as midpoints to space.

government, as they believe it has saved their colony from destruction in the past.

Bay Jing is obsessed with Concordia, and sees the neighboring star system as the greatest threat to its growth and potential. Most of Bay Jing's external policy is geared towards making sure the state of Dauphin on Nouvelle Vie is a success, as a counterbalance to the Concordia-sponsored state of Jubilee. There are rumors or weapons smuggling to the far away state. Bay Jingnians are eagerly awaiting the N'ahili to provide a new set of coordinates so their society can expand.

HISTORY

After leading the team that discovered the planet in the early 21st century, Dr. Qiang Shui proposed to the International Astronomical Union that the planet be named Bay Jing as an honor to his native city in China. After a few years, the IAU agreed.

Although a planet with a rich ecology, Bay Jing had been impacted by a large double asteroid several decades before humans arrived in 2118. Thus the first settlers found a world that had just come out of a devastating atmospheric winter. As always, the settlers represented most nations on Earth, but this particular batch had the largest number of Muslim settlers of any of the previous settlement populations. Despite the Chinese name for the planet, the number of Chinese settlers in the first expedition was no larger than was usual on any other colony.

The site of the asteroid crash, a huge crater 94-km wide, attracted the attention of the colonists because of the valuable heavy materials created by the impact energies, many with short decay half-lives, that were available for mining. Triumph, Bay Jing's capital and largest city, was founded as close to the crater as possible without risking radioactive contamination. Thus it was that Bay Jing's first commercial activity was mining. Earth species were easily integrated into the ecology with some minor genetic manipulation. Other ancillary activities, such as farming or fishing also grew fast. Life was good.

DISASTER

By 2129 Bay Jing, already with 700,000 citizens, was on its way to becoming a powerful world when disaster struck: A fringe quasi-religious cult whose members believed that mining energy from the asteroid crash was "inviting bad luck" to Humanity, decided to stop the practice by blowing up a minor mining outpost relatively close to Triumph. The saboteurs badly miscalculated the impact their home-made nuclear bombs would have on the delicate minerals under this particular mine, triggering a nuclear explosion that killed thousands and released a radioactive poison cloud that affected tens of thousands. The sickness, lack of edible food, and overall chaos threatened to destroy the entire colony.

Out of this chaos came the Bay Jingnian Security Forces, a citizen-formed militia that imposed order again, captured and executed the crazies responsible for the catastrophe, and slowly rebuilt Bay Jingnian society. But something had been irretrievably shattered in the Bay Jingnian psyche. Citizens understood their paradise could be lost in the blink of an eye. This could not be allowed to happen again. The BSF gave power back to civilian governments as soon as it could, thus cementing its reputation among the population, and in return governments named the BSF the planet's official military force to protect them from both internal and external threats. From then on, the military organization's influence over planetary politics was assured.

When Comet Sol-C/2132 N2 impacted Earth in 2133, local citizens, already well aware of the consequences of such an impact because of the knowledge left behind by their own crater, became extremely worried and restless. The fact that China in general, where the planet's namesake city had been located, had been almost wiped out by the comet, also touched an emotional nerve in the population. General Augustín Zinelli, then the ruthless leader of the BSF, saw in the situation a unique opportunity to bring Bay Jing to the front of human affairs. Under General Zinelli's orders

the BSF took control of the government and announced a program to protect Bay Jing from outer space threats such as these, and to help their brothers and sisters from Earth.

Taking advantage of its significant mineral resources, the BSF launched massive production factories to take the slack of supporting the other worlds while Earth was not able to. Overnight, Bay Jing became the human race's industrial powerhouse. The BSF also strongly supported rescue efforts for Earth with the goal of bringing in as many immigrants as possible to the planet. This brought with it the unfortunate reality of having to collaborate with the Circle, the only organization with enough Settler Ships to run meaningful refugee reallocation activities. But even so, the goal was assured: Within the decade, Bay Jing was not only the most powerful industrial planet in human space, it was also one of the fastest-growing. Only Concordia could keep up.

General Zinelli's political masterstroke was to devolve power to a civilian government, claiming the "emergency" had passed. This civilian government was one with a much more authoritarian bent, and with strong military control of most political activities, thus ensuring the BSF could stay involved in governing the country if necessary.

WAR

As part of their policy to be the first planet in human space, Bay Jing governments quickly realized their closest competitor was Concordia. The rivalry quickly escalated. In 2168, three years after the N'ahili had provided their third set of coordinates to humans, and just one year after Concordia had organized the founding of the nation of Jubilee on Nouvelle Vie, Bay Jing founded the nation of Dauphin on the same planet. It didn't take long for Jubilee and Dauphin to squabble, triggering the first interstellar war between Concordia and Bay Jing in 2178. Some historians speculate this had been Bay Jing's goal all along.

The stalemate that resulted (thanks to the efforts of the Circle, EarthGov and the Psion Brotherhood) hurt the pride of Bay Jingnians, increasing their mistrust against other planets and institutions. It also affected the military's power base, as a stalemate was interpreted by many as a loss. Even today, both the Circle and the Psion Brotherhood are viewed with resentment in Bay Jing.

It was then that another of the unique tragedies that seemed to only happen in Bay Jing struck: The Psion Riots of 2188.

THE PSION RIOTS

Psions had always had a hard time fitting in Bay Jing. The BSF found them very useful as spies and informants (using rogue psions), and extremely dangerous the rest of time (as when dealing with Psion Brotherhood members). Consequently, successive governments had instilled a deep distrust of psions in the population, which also knew that their government used psions to spy on them. This unfortunate situation was the background to what happened in Triumph in 2188.

The chaos began when a deranged, extremely powerful rogue psion began to terrorize Triumph. Some citizens appeared dead, their brains turned to mush; others became crazed, mindless killers. Mothers were made to attack their children; sons and daughters were made to torture their parents. Psion Brotherhood enforcers and Bay Jingnian Security Forces agents worked overtime to find the psion psychopath but were not successful.

When the mysterious psion attacked the local BSF headquarters of Triumph, mind-killing a majority of security agents and sending the few survivors on a crazed citizen-shooting rampage, the city rioted. Bereft of their own security forces, frightened citizens took matters into their own hands and began hunting and executing psions, any psion. The few psions who



RELIGION IN SPACE

Religion and Faith are an important part of Humanity, and will be with us long after we reach the stars. Traveling to other worlds, facing the immensity of the Universe and (maybe) meeting other life forms will most likely put a strain on our beliefs and make Humanity question many things about religion.

An interesting anecdote on this topic (and maybe a preview of things to come) is the story of Sheikh Muszaphar Shukor, an astronaut from Malaysia who in October 2007 traveled to the International Space Station. As a devout Muslim, he faced several problems, one of which was that he wanted to face the *qibla* in Mecca during prayers, as the *Quran* states. But how to face Mecca in orbit? What if Mecca is at the other side of the planet?

The Malaysian space agency convened a council of 150 Islamic scholars for advice. The result of their work was a set of guidelines for performing Islamic Rites while in orbit, which was approved by the National Fatwa Council, and details topics such as praying in microgravity, how to locate Mecca, how to fast, and prayer times, among others. This document allowed Shukor to adequately perform his religious duties, and is one of the first documents that details the issues of religion in space.

As humans go more into space, other religious issues will arise, both concrete and metaphysical. And new solutions to keep religion alive in space will be found.

posed any resistance (usually the Psion Brotherhood enforcers) just exacerbated the situation. All in all, almost a thousand psions died in the riots, and a similar number of non-psion casualties were registered.

The riots lasted a full three days before BSF reinforcements moved in and restored order. The rogue psion psycho who caused this chaos was single-handedly tracked and captured by a young psion student from the Brotherhood, Ganendra Nathan, who overcame the pain of losing his younger sister and family members to the mobs and captured an enemy many times more powerful than himself. Many say that Nathan's rapid ascendance to the position of Leader of the Brotherhood, a position he has now held for the last twenty-two years, is due to this well-publicized act of bravery (see page 42).

Given the power of the Bay Jing Military, it is interesting to note how the riots lasted a full three days. Some say that the military deliberately took their time in restoring order, as they saw in the riots the perfect opportunity to become indispensable for Bay Jingnians. And indeed, military power increased as a result of the riots, and the military now wield almost complete influence on the local elected governments.

CITIES AND LOCATIONS

Although there are several cities in Bay Jing, almost half of the population is concentrated in two large cities, Triumph and Al-Ahsa.

- **Triumph:** The capital of Bay Jing, with 28 million people, is a mega-metropolis with everything one could possibly want. It is a beautiful place for both visitors and residents, as long as customs and rules are carefully followed. Security cameras and sensors are more common in Triumph than in most cities in the Seven Worlds. While officials will usually treat civilians and visitors with respect and deference, there is very limited tolerance for any kind of transgression of the rules. Psions are particularly suspect in Triumph, and can expect special treatment at the hands of ordinary Bay Jingnians. Circle members can expect slightly better treatment, but not much.
- **Al-Ahsa:** Located at the other side of the crater, this city of 10 million people is known for being (currently) the only place in space other than Earth that contains a Muslim holy site. The influx of settlers to Bay Jing from the Middle East and Islamic countries such as Malaysia was larger than usual in other colonies. Historically, it had been hard to determine the *qibla* (the direction a Muslim should pray toward Mecca) when in space. Although several guidelines had been prepared for this situation, when Bay Jing was colonized thousands of Muslim settlers, including a few wealthy and influential ones, made it clear that they wanted a permanent solution to the problem. As a result, a decision was made on Earth to allow a very small piece of the Black Stone from the K'aaba in Mecca to travel to Bay Jing. Devoutly religious Muslims flocked in droves. The controversial policy became a public relations success, and for the last few years there has been talk of doing the same for some of the other worlds.

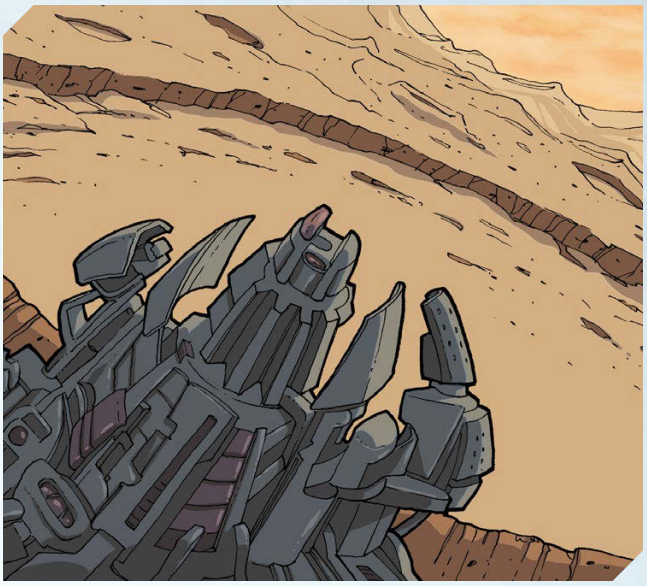
PERSONALITIES

Here are a few of the most important personalities of Bay Jing:

- **Sung Selnes:** The current Governor of Bay Jing is trying to pursue a more pacifist policy than most of his predecessors. Sung believes bridges with Concordia must be built if a second conflict, deadlier

than the last one, is to be avoided. Some time ago, Sung sent subtle, secret hints to Lord Kenneth Livley of Concordia that an invitation to that planet's centenary celebration would be accepted. Now, with the invitation received, Sung Selnes is ready to attend. This has placed him in direct conflict with General Yuang and the leadership of the BSF, which still wields considerable power. Governor Sung is risking his career on this. If the gambit is successful, the Governor plans to return the favor and invite Lord Livley, in 2218, for Bay Jing's centenary celebration.

- **Sakinah Banan Bata:** President of Bay Jing Technology Corporation, the part-government, part private conglomerate in charge of most industrial production in the planet, Sakinah carefully balances politics and business. Currently he is weighing the advantages of opening new markets if the current cold war with Concordia thaws, with the advantages of war production if the conflict escalates. The escalating situation in Nouvelle Vie points towards a failure in Governor Sung Selnes' strategy, and Sakinah is consequently quietly aligning himself with General Yuang and the BSF.
- **General Yuang Fang:** The leader of the BSF (Bay Jingnian Security Forces) is ready for a fight. He has spent years preparing both his military forces and his supply channels to Nouvelle Vie. He hates General Ruehle of Concordia as much as General Ruehle hates him. As the centenary anniversary of Concordia approaches and the sparks between Jubilee and Dauphin in Nouvelle Vie start flying, General Yuang impatiently waits. He has been extremely angry about Governor Selnes' decision to visit Concordia and extend a hand to his enemy and is preparing other members of the government to depose the Governor after his visit to Concordia.
- **Mark Vasquez:** The Psion Brotherhood representative on a planet violently hostile to the Psion Brotherhood, Mark Vasquez has a delicate job to do. The standard services that the Brotherhood provides must be maintained, and the all-important job of screening candidates with psionic potential at an early age must be performed. However, Vasquez's challenge goes further: He needs to figure out how to change perceptions and slowly reinsert the Brotherhood as an accepted part of society, even in Bay Jing. Under his leadership, the Psion Brotherhood is even more active than usual on support and social activities, and is extremely hard on any kind of psionic action that risks the perception or image of the Brotherhood.



NOUVELLE VIE

Nouvelle Vie was supposed to represent the new generation of human joint colonization, a combined effort by the two largest powers of the time to settle a new world. Instead, it has become the human species' focal point for conflict and warfare. Having already caused one interstellar war, the conflict that consumes the planet is by all accounts about to ignite the next one.

DESCRIPTION

The first planet orbiting the Gamma Leporis system, Nouvelle Vie is an Earth-like world, 96% covered in water. There is only one relatively large landmass on the planet, named Landing, and about half a dozen other smaller islands. Approximately fifteen million people live on the planet, fourteen million of which live on Landing.

The temperature on Nouvelle Vie is warm, with an average of 29 degrees centigrade. It is a very bright planet (140% as bright as Earth), and humans usually use special goggles to protect against the brightness.

The main resources in the Gamma Leporis system are the valuable, easy-to-gather minerals in its asteroid belts. There are three of these, two very close to the sun and one between Nouvelle Vie and a faraway gas giant. Today, asteroid mining is a common profession in Nouvelle Vie.

Despite being relatively small, Landing is currently home to two different nations. Jubilee, founded in 2167 by Concordian settlers, was named for the fiftieth anniversary of the settlement of the mother planet. Dauphin, founded the next year by Bay Jingnian settlers, represented in its name the spiritual heir to

the success of Bay Jing. The history and background of these two nations mean they are constantly at odds with each other. In fact, a "Cold War" has been raging for years.

Jubilee and Dauphin do not have official relations and covertly fight against one another. Government-sponsored terrorist groups in both nations frequently run incursions and attacks on civilians and property. The terrorist organizations are funded and daring enough so as to even be able to occasionally hijack ships and cargo in space, as well as the orbital stations and warehouses that store metals mined from the asteroids. In both Emerald City and Dauphin espionage, backstabbing, piracy and violence are relatively common. It is an open secret that both governments and guerrilla groups are also supported by their respective mother planet.

To keep the mother planets from openly interfering whenever violence flares in the planet, both the Circle and EarthGov keep a constant presence in orbit around Nouvelle Vie. The Stellar Comm Network detects the signature of any ship arriving or leaving the system, thus providing an early detection system for ships, as well as an evidence recorder to make it difficult for terrorists to disrupt shipping. Concordia and Bay Jing also maintain permanent battleships and cruisers in orbit, and frequently perform provocative "war games" to flex their muscles in front of their antagonist.

In the midst of this chaos, the citizens of both Jubilee and Dauphin live remarkably similar lives. Both nations are young, weak democracies, with an internal economy mostly based on agriculture production plus extra planetary mining activities, and supported by their mother planet. Cattle herding has been tried with inconsistent results. Most animals died when brought, out of attacks from a local alien bacteria which turned out to be strangely compatible with Earth life forms. Only a few mutated animals survived, so cattle growth has been slow. There is no explanation yet for why human beings have not been affected.

The seas have been very friendly to Earth sea life, and now fishing is becoming a strong industry, too. Specialists worry about the long-term effects on the planet's fragile bacteria-based life, most of which is contained in the oceans.

Nouvelle Vie is a heavily tectonic place, where earthquakes are common, large storms and hurricanes constantly cause havoc, and tsunamis create waves hundreds of meters high that travel thousands of miles across the planet. This is another factor that constantly affects life in the Nouvelle Vie.

Even though Landing is not a very large island, after 39 years both nations have unsettled land within their borders, and colonists continue to arrive to settle it. The only thing both nations request from their new immigrants is a complete commitment to the goals and defense of the respective nation. Although the Outer Space Treaty requires both nations to accept immigrants from any world, immigrants from the mother planet are preferred by the respective nation.

A visitor to either nation finds a paranoid, nationalistic place, where allegiance to the mother planet is openly proclaimed and expected out of any citizen or visitor. Visitors from the enemy world are in for a very rough time. Openly proclaiming allegiance to the other country or world can cost a man his life.

Mining the asteroid belts is still one of the largest businesses in the system. In the last few years, asteroid miners have reported strange sightings in the outer asteroid belt. It is a fact that more than one miner ship has disappeared in the last few years, and survivors telling strange stories of weird ships have been rescued. To top it off, the Comm Network has twice detected unexplained energy spikes from around the locations of the jump points. No explanation has been found for these strange events.

As the 100th anniversary of the foundation of Concordia approaches, Nouvelle Vie has seen an escalation in violence. Attacks on both sides have increased, and Jubilee officials are bracing for the possibility of major acts of terrorism during the anniversary celebrations.

HISTORY

The Gamma Leporis star system had been known to harbor a planet likely to support life since the 2040's. Christened "Nouvelle Vie" (New Life) by its discoverer, it seemed destined to be left unsettled for a long time. Gamma Leporis was 29 light-years from Sol, too far away to be included in either the first or second set of jump point coordinates the N'ahili provided Humanity.

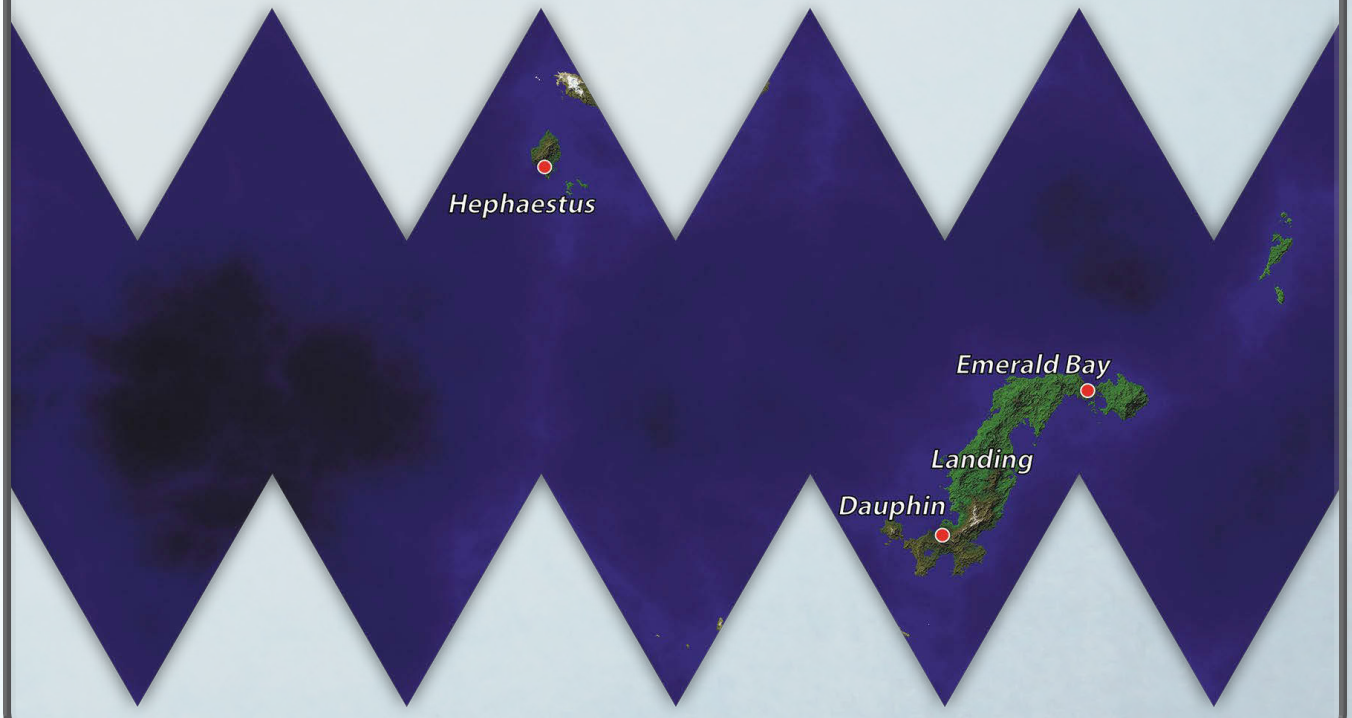
When the N'ahili provided their third set of coordinates, Gamma Leporis was one of the most interesting stars on the list. Seven Jumps away from Bay Jing (and eight from Concordia) it was the next frontier. After initial scouting proved it was indeed amicable to settlement, preparations were made by both Concordia and Bay Jing to create a settlement there. Mussala Station, a refueling waypoint in the Pi 3 Orionis system, was created, and colonization efforts began.

Gamma Leporis's many asteroid belts were one of the first things that called the settlers' attention. Given the relative lack of valuable minerals in the planet itself, it was extremely interesting to find valuable minerals for the colony (and the other worlds) on asteroids in the belts. Several mining stations have been built next to the belts.

NOUVELLE VIE SYSTEM DATAFILE



Star: Gamma Leporis
Star Class: F6V
Distance from Sun (direct line): 29ly
Distance from Sun (jump points): 17 jumps, 44.1ly
Mass: 1.23 sol
Luminosity: 2.58 sol
Star System: 4 planets (1 garden planet, 3 gas giants), 4 moons, 27 moonlets, 3 asteroid belts.
Habitable Planet: Gamma Leporis I (Nouvelle Vie)
Distance from star: 0.19 AU
Perihelion/Aphelion: 0.19/0.19 AU
Axial Tilt: 24 degrees
Annual Period: 1.48 years (466.1 local days)
Local day: 27.9 standard hours.
Diameter: 10437 kms (0.82 times Earth)
Surface Gravity: 0.9g
Density: 1.1 Earth
Illumination: 109% Earth
Temperature: 26°C average (29°C at perihelion, 23°C at Aphelion)
Atmosphere: N_2, O_2, breathable, 1.1 atmospheres.
Water: 96% of planet
Satellites: None
Average Population Growth Rate: 2.79% per year
Present Population Growth Rate: 1.89% per year
Industries: Asteroid Mining.



MINING ASTEROIDS IN THE FUTURE

The asteroids, both in our solar system and presumably elsewhere in the galaxy, contain significant amounts of valuable minerals and elements, such as platinum, cobalt, gold, manganese, nickel, and many others. As supplies for these and other minerals dwindle on Earth, we might want to turn to mining asteroids.

Mining asteroids has similar challenges to other activities in space, mainly: Does the cost justify the effort compared to other alternatives? Other sidebars have talked about the cost and complexity of launching and living in space. In the end, the economic impact of these considerations will define if asteroid mining is a viable business or not.

Several real-world companies have already begun to plan mining missions to the asteroids, however, focused on the market potential of platinum, for example. While these projects look technically feasible, the market implications of them must still be examined. Some detractors mention that the economic estimations for the minerals brought back are incorrect since the additional supply would bring the price crashing down.

In *Seven Worlds*, mining began not as an asteroid operation but as "skimming" the ^{3}He in the outer atmosphere of the gas giants. Although it is not very common in most planets, it has become an interesting option for planets that have fewer natural resources than Earth and more and easier asteroids to mine, such as the Nouvelle Vie solar system.

Nouvelle Vie was mostly occupied by two nations: Jubilee, the protectorate of Concordia, and Dauphin, the protectorate of Bay Jing. From the beginning these two nations were expected to clash, acting as a proxy for the rivalry between Concordia and Bay Jing. And clash they did, competing for everything, from resources and land, to commerce and fishing rights. This competition soon turned to violence between the two groups of settlers. Given the strong national identification with their mother planets, soon Bay Jing and Concordia were pulled into the conflict, igniting in 2178 the first interstellar war known to mankind. The conflict lasted three bloody years, after which a grudging ceasefire was reached, brokered by EarthGov and the Circle.

Today, everything is Nouvelle Vie is shaped by the constant conflict between the two large nations that occupy it.

CITIES AND LOCATIONS

The main locations in Nouvelle Vie are:

- **Dauphin:** This city of 4 million is the capital of the nation of the same name. Located in the only part of Landing that has a mountain range, it is the site of beautiful views of nature and the sea far away. A large lake with warm water (heated by underwater volcanic currents) lies to one side of the city.
- **Emerald Bay:** The capital of Jubilee, with 3.5 million inhabitants, is a monument to the mother planet of Concordia. Many of the official buildings are smaller replicas of the original buildings in Melissant. Most of the food and exotic delicacies of Concordia, brought at great expense are offered at exclusive restaurants and stores. The common citizen extolls the virtues of the mother planet, but seldom has a chance to enjoy these delicacies.
- **Hephaestus:** One of the few small islands outside Landing, Hephaestus has 1 million independent inhabitants clustered in a city built around a large dormant volcano. Founded by a group of renegade Earth workers, it is now mostly the home of families dedicated to asteroid mining, including refugees and exiles from Jubilee or Dauphin who are not willing to stand for the violence and conflict anymore. It is common for most families to have at least one member in space at all times. The council of Hephaestus has pooled the resources of the inhabitants of the island, and currently owns a stake in Clarke Station.
- **Clarke Station:** The largest space station in orbit around Nouvelle Vie, Clarke Station provides everything traders and miners could want: Resources and supplies for mining expedition to the belts, warehouses and storage for materials, and surface-to-orbit services and transportation. Clarke Station has a strict prohibition on violence between Jubilee and Dauphin factions. Anybody found trying to start a fight or do something against the other faction is thrown off the station. Depending on the magnitude of the crime, offenders have been known to be thrown out the airlock. No weapons of any kind are allowed on the station.

PERSONALITIES

Nouvelle Vie's leaders cannot avoid the constant conflict that pervades their society. They may defend one or the other side, or may try to be completely impartial, but the violence in Nouvelle Vie always affects their careers and decisions.

- **Theiling** is the leader of the Dauphin Freedom Foundation, the terrorist group that defends Bay

Jingnian interests. This mysterious figure has never been seen outside V-World, which leads many to wonder whether his avatar (a tall, strong mountain of a man) is a true depiction of who he (or she) really is. Cruel to the extreme, Theiling is responsible for some of the greatest atrocities committed on the planet.

- **Avis Therriault** is the Governor of Jubilee (although an independent democracy, the elected leader takes the position of "Governor" as a reminder of Jubilee's relationship with Concordia). A typical Jubilean, he has reached this position by being extremely xenophobic and aggressive in his political promises when talking about Dauphin. Rumors of corruption in his administration have not been verified.
- **Trish Arriano** is the Governor of Dauphin. Taking the same title as the leader's title in neighboring Jubilee, and for the same reasons, Trish is only interested in hanging onto power for as long as possible. As the Concordia 100th anniversary approaches, she is milking the brewing conflict as much as possible for her own political gain.
- **Rolland Cerverizzo,** Captain of Clarke Station, has the worst job in the Seven Worlds, and always looks like he's enjoying it. A native of Apollo, he has used his (invented) reputation as a ruthless gang leader on his native planet to position himself as someone no one wants to trifle with. He is harsh, and his rulings are draconian, but he is responsible for the continuing stability of Clarke Station.
- **Robt Sardo** is the leader of the Asteroid Miners Guild, an organization dedicated to protecting the rights and business of asteroid miners of Hephaestus. He is also the de-facto leader of the small island. Sardo is devoted to helping miners grow their business and become more successful, without political interference. Unfortunately, the governments of both Jubilee and Dauphin, and even some Hephaestans, tend to see the Miners Guild as yet another tool in the constant battle between both nations. These restrictions in who he does business



with translate in Sardo's eyes into lost opportunity for the miners he represents. He's always on the lookout for a way to expand the business while ruffling as few feathers as possible. Robt Sardo spends a lot of time in Clarke Station, where he believes miner business is a frictionless as it can be anywhere in Nouvelle Vie.

- **Delta Officer Bryce Saucedo** is the Circle representative at the offices on Clarke Station, and is a woman with her hands full. Disliked by the governments of both Jubilee and Dauphin, she has one of the largest concentrations of Circle forces in human space to make sure things stay peaceful. Of course, it is impossible to keep everything bottled up, and it's a rare month when one side doesn't work around the restrictions or find a way to cheat surveillance and attack the other. Delta Officer Saucedo also has to keep the representatives of Concordia and Bay Jing appeased. Both are always complaining about the "favoritism" the Circle is showing the opposite side (sometimes at the same time!), and try to keep Jacinta Matriciano, the incompetent EarthGov ceasefire representative, involved in continuing negotiations. Since the location of many surface terrorist bases is an open secret, and even the signatures of many terrorist ships are known, Delta Officer Saucedo sometimes daydreams about just bombing the place and taking out the terrorists, regardless of her orders. Other days she just dreams about getting re-assigned.
- **Jacinta Matriciano** is the EarthGov Ceasefire administrator, placed here to represent EarthGov as a creator of peace, and to lead EarthGov pacification forces in the system. The main reason EarthGov became involved in the pacification process for Nouvelle Vie was as a way to feel it was still relevant against Concordia and Bay Jing, not because EarthGov sees any strategic importance to this faraway place. Ms. Matriciano knows this, and is frustrated by how irrelevant her role is. Each day vast sums are spent keeping a military force for no purpose other than keeping the dwindling respect of two worlds who are by this point more powerful than Earth. Ms. Matriciano is thus a soured diplomat, and seldom takes an active role in anything. More than anything she misses Earth, and is constantly requesting shipments of food and many other kinds of objects that keep her close to Earth.
- **Brendan Leese** is the Psion Brotherhood representative for Nouvelle Vie. An affable, approachable man, his job is to support members of the Brotherhood in everything they need and to get the Brotherhood involved in whatever the community needs, as part of the Brotherhood's constant efforts in keeping their relations with non-psions healthy. Although Leese's offices are also on Clarke Station, he is seldom there, spending most of his time shuttling between Jubilee, Dauphin and Hephaestus. While there, he also makes an effort to spend as little time in the capital, and as much time as possible visiting the small, forgotten towns and villages in the countryside. This constant risking of his life in such a conflict-torn place does not go unnoticed, and Brendan Leese is held in very high esteem by most people on the planet.

LOGAN'S END

The youngest of the Seven Worlds and the farthest from Sol, Logan's End is in many ways the strangest. A large planet with a strong gravity, hot temperature and diverse flora and fauna, Logan's End is a true frontier world that constantly tests mankind's ability to survive.

DESCRIPTION

Almost the size of Zarmina, circled by a moon slightly smaller than Earth, Logan's End is practically a double planet. It has a gravity of 1.2 times Earth's, making it hard for humans to move. Although its dense atmosphere is breathable by humans, the average temperature is a hellish 49 degrees centigrade. The planet is unusual in that it has many thousands of living species, both flora and fauna. Most of the planet is what humans would call a "jungle", with huge, thick, strange trees and plants covering everything, creating a kind of rain-forest canopy under which the temperature is slightly lower for humans. And many wild and savage beasts, with shapes and habits never before imagined by mankind, prowl the jungle that is Logan's End.

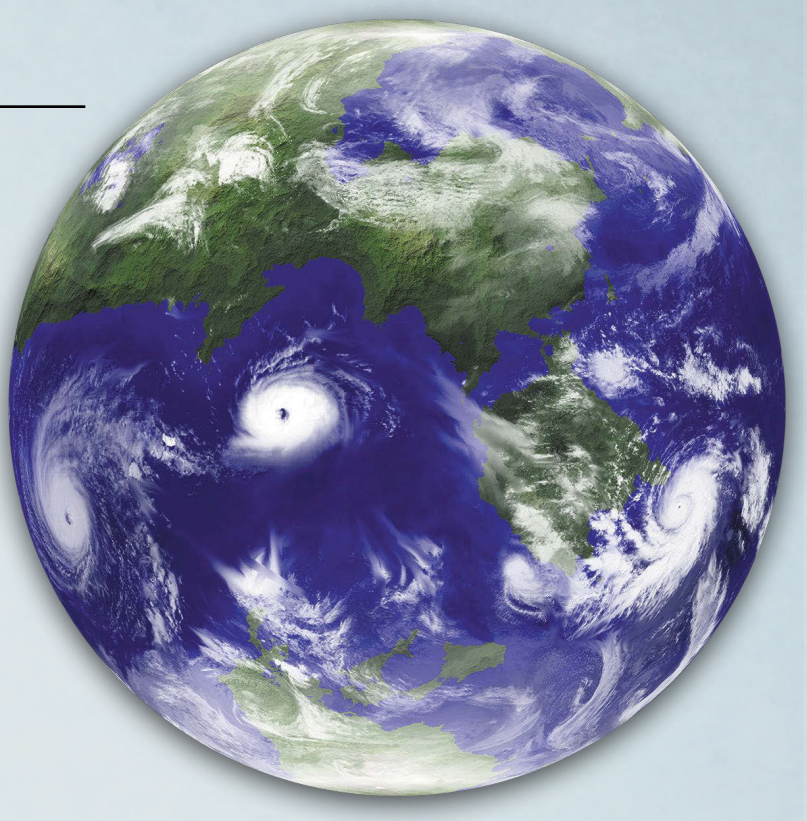
Almost half the planet is covered in oceans, also full of many types of strange and dangerous life. Because of the size of Logan's End's moon (which, by the way, is completely covered in water and sports a non-breathable atmosphere) the tides on Logan's End are several hundred meters high, creating tide zones that are dozens of kilometers wide. Amphibian animals and strange plants have sprung to take advantage of these conditions and live in these zones.

The light arriving from its star makes Logan's End a very bright place, where humans need to wear special glasses in order to keep their eyes undamaged. Fortunately, the jungle canopy balances this, even making for a dim walk through the rain-forests. This poses its own sets of dangers.

Most human settlements were built very close to the poles, which do not have ice caps. These have the

LOGAN'S END SYSTEM DATAFILE

Star: Eta Cassiopeiae
Star Class: G4V
Distance from Sun (direct line): 19.42ly
Distance from Sun (jump points): 15 jumps, 93.7ly
Mass: 0.972 sol
Luminosity: 1.27 sol
Star System: 11 planets (1 garden planet, 2 greenhouse planets, 3 rock planets, 5 ice planets), 7 moons, 2 moonlets.
Habitable Planet: Eta Cassiopeiae A - V (Logan's End)
Distance from star: 1.0 AU
Perihelion/Aphelion: 0.98/1.0 AU
Axial Tilt: 15 degrees
Annual Period: 1.03 years (206.8 local days)
Local day: 43.6 standard hours.
Diameter: 19134 kms (1.5 times Earth)
Surface Gravity: 1.2 g
Density: 0.8 Earth
Illumination: 121% Earth
Temperature: 49C average (53C at periphelion, 32C at aphelion; tropical)
Atmosphere: N2, O2, 1.4 atmospheres.
Water: 50 % of planet
Satellites: one moon.
Average Population Growth Rate: 2.58% per year
Present Population Growth Rate: 1.90% per year
Industries: Light Agriculture, Fauna.





lowest temperatures in the planet (25 degrees Celsius on average) and thus are the friendliest for human habitation. Another advantage of these locations is that the vegetation is less sparse, giving settlers the opportunity to plant and grow crops genetically modified for the planet. Of course, this means that most humans have to deal with very long "days" and "nights", each one lasting about 100 Logan's End's days, the equivalent to 197 Earth days.

In an effort to foster better integration between the north and south poles, several efficient means of communication have been implemented. Since crossing the planet by land is too long and dangerous, and the high gravity makes physical travel expensive, communications are critical. Satellite communication between both poles, and a common V-World, are taken for granted. Coverage is limited to the poles and some research stations, though, so basic communications are the most the average expedition to the jungle can expect.

Today, thirty-eight years after its initial settlement, Logan's End has a total population of 3.6 million people.

In contrast to the other worlds, there is no central government in Logan's End. Technology and planetary settlement knowledge have advanced since mankind first settled space, thus decreasing the need to join politically to survive. Most cities, towns and villages are independent and have local leaders. A planetary council talks frequently over issues of planetary concern but for the most part every settlement is on its own. This loose confederation is ideal for some criminal elements and organizations which take advantage of the structure to smuggle goods across towns and settlements with little fear of the authorities. There is even some gang warfare in Logan's End, among organizations with shady names such as the Dark Claws.

One of these issues of planetary concern is the use of the hydroelectric plants that rim several of the larger oceans closer to the equator. Taking advantage of the huge tides, these generators create large amounts of energy, more than enough to power the cities and villages. Although the challenges of transporting energy from the equator to the poles have mostly been solved (by the use of satellites that bounce energy beams, as well by more physical means of transportation), being a technician or operator in one of these plants, so close to the jungle and in a difficult temperature, is still a risky endeavor. Consequently, the cities are always looking for volunteers or recruits for this hazardous job. Given that the energy created by each is shared by many towns or villages, many planetary council issues stem from energy policies and distribution.

Technologies such as rotovators and space elevators are not an option on Logan's End, since they are most effective near the equator and settlements are located in the poles. Therefore, full surface-to-orbit ships are the only effective option for transportation. Needless to say, transportation to and from the surface is expensive, and the poles are better connected by V-world than by physical travel.

Most towns and cities are self-sufficient, and Logan's End's main business is tourism of the scientific and adventurous sort. Scientists never tire of investigating the planet's strange plants, animals and environment, and there are several research outposts in the jungle. Recently several archaeological teams have begun excavations and research, although no one seems to be sure what they are looking for given that no remotely intelligent species is either known or suspected to have ever lived here until humans arrived. Although orbital surveys of the land have been performed, most of the planet is still unknown and has not been physically visited by humans. This makes Logan's End a favorite of conspiracy theorists, fiction authors and wild adventurers.

Scientists also use Logan's End as a springboard to explore nearby star systems. Some years ago, scientists have established a presence in the nearby star system of Mu Casseiopeiae, investigating effects in that sun's corona. Scientific ships from Earth and other places periodically dock on Logan's End on the way to or from the Mu Casseiopeiae research location.

A profitable adventure tourism industry has sprung up on Logan's End to provide well-heeled people with spare time and a desire for danger with a place to visit. Hunting, safari-like expeditions, and jungle trips are common among adventure-seeking millionaires. This is no amusement park, though: The danger is real, and more than one fearless magnate has died by the fangs of a wild creature in the dim, humid and steamy jungles of Logan's End.

Due to the stronger gravity, most animal and plant species in Logan's End are smaller and stockier than their equivalent counterparts from Earth, with the exception of the big trees with fat trunks that have braved gravity and grow to impossibly large sizes. This does not make the animals any less dangerous or savage.

A particular disadvantage of Logan's End is that even today it does not have a Stellar Comm Network relay connection. It is thus completely disconnected from the rest of Humanity. Although integration to the Stellar Comm Network is a common request and desire from the planet's citizens, the complexity and cost involved has stalled the project. Recently EarthGov and other planets have begun investing significant

amounts of money on the project, and it is expected that Logan's End will be connected within the decade.

A consequence of this is that Logan's End is the only planet significantly affected by piracy. Critical shipments such as specialized medicine and machinery are in constant danger of being waylaid and attacked by powerful criminal ships (romantically termed "pirates" in the press).

Logan's End is a frontier world, and it shows in its high level of lawlessness. Even in Providence, the largest city, people are expected to be able to defend themselves and sometimes take the law in their own hands. Law enforcement is increasing, but old customs die hard.

HISTORY

First reachable by humans when the N'ahili provided their third set of jump coordinates in 2165, and fully fifteen jumps away from Earth, the fifth planet orbiting the star Eta Cassiopeiae was a difficult world to settle. Perhaps this is what attracted Jeffrey Logan, a food and supplies production billionaire and famous playboy and adventurer, to decide to be the first human to explore it. Having spent part of his fortune on sending several stages of fuel ships to get that far and return, Logan was finally able to reach and explore the planet in 2168. His expedition never came back, and it is assumed they fell victim to some of the strange savage beasts living in the planet. It should be said that the safari-loving Jeffrey Logan's last days were probably his happiest.

Although the self-centered Logan planned to lobby the International Astronomical Union to have the planet named Logan's World, the sad truth is that the more apt name Logan's End was the one that informally stuck, and years later was ironically adopted by the IAU.

The fact that it is so far away from more civilized worlds meant that Logan's End would not be colonized for a long time if it were not for the creation in 2177 of Waypoint Station in the Alpha Lyrae/Vega system on the route to the new planet. Designed for the express purpose of fuelling ships on their way to the new frontier, using ^{3}He harvested from two gas giants in the system, Waypoint Station allowed standard ships to reach Humanity's last frontier.

Logan's End was first settled in 2179 by settlers looking to escape from what they thought would be a major interstellar war, as Concordia and Bay Jing fought over Nouvelle Vie and threatened to pull the other worlds with them. These escaping settlers were joined by more traditional ones looking for new life opportunities in the frontier.

PIRATES IN SPACE! REALLY?

By explaining how ships behave in space, other sidebars in this book have made it clear that space piracy is an extremely unlikely occupation in the future.

Key to attacking a ship in the middle of space is surprising it; otherwise the ship will call for help, attempt an evasive manoeuvre, or jettison their cargo. Given that there is no stealth in space (see the Stealth sidebar) there is no practical way for a pirate to surprise an enemy in space.

There is also no practical way for the pirate to escape and hide after its attack. Unless the star system where the pirate ship attacks is completely deserted, the ship will be detected, its destination known, and the ship itself will be identified. Most likely the authorities will be ready to apprehend the pirate at his destination. The Stellar Communications Network in *Seven Worlds*, which constantly monitors activity in the star systems where it is located, automatically takes care of locating, identifying and reporting on all ship activity. In an uninhabited, out-of-the-way star system with no Stellar Comm Network piracy can be much more common.

Then there are issues with actually boarding the captured ship and taking its cargo. Connecting the ships is hard enough and usually needs the help from the captured ship's pilots. Transporting cargo is also difficult, meaning either the pirates take the captured ship too, with a skeleton crew (but how do they keep the ship from being identified?) or they take just the valuables with them.

Given all these variables, it is much easier to rob your victim on a planetary surface than in space. So piracy in space is not a very likely scenario.

What if a nation-state supports pirates, though?

A formal government that supports pirates could defend them against an external authority, even if the pirate is known and detected; it could provide docking, fuel and maintenance facilities for pirates; and it could even give them information on transit and cargos for pirates to use. Although still harder and less profitable than just stealing on the planet's surface, space piracy becomes more feasible when the pirate is not worried about the consequences of being detected or captured.



CITIES AND LOCATIONS

The main locations in Logan's End are:

- **Providence:** The largest city in the planet, Providence has 1 million inhabitants. Although advanced by planetary standards, Providence looks hopelessly behind to travelers from the other worlds. The basic necessities are well covered but anything extremely specialized or fancy is difficult or impossible to find. This North Pole city is growing at a significant rate, taking up the land separated for crops. Providence is the tourism industry's focal point; practically every rich tourist looking for adventure begins at Providence.
- **St. James:** Also located on the North Pole, St. James has two hundred thousand inhabitants. Ironically, the city is mostly inhabited by a mix of refugees from the Concordian and Bay Jingnian sides of the conflict in Nouvelle Vie. The old animosities seem to have been tamed this far from Nouvelle Vie, and most people here now work as part of the same community.
- **Santiago:** The most important city in the South Pole, Santiago has a total population of about five hundred thousand people. Providence has been so successful at building a tourism industry that comparatively little income from tourism arrives here. For almost a decade Erin Amanpour, the ambitious leader of Santiago, has focused on increasing its influence on the planet, and making Santiago the first tourism spot to visit. No success has been achieved yet, though.

PERSONALITIES

Here are a few of the most important personalities of Logan's End:

- **Roland Groys:** The Council Leader of Providence, Roland Groys is the closest thing to a central leader that Logan's End has. A gruff, simple man, Groys outwardly works hard to bring to Logan's End the Stellar Comm Network and thus insert it into the rest of human society. Inwardly, Groys fears that Logan's End's unique culture and lifestyle, already threatened by the constant flux of tourists, will be irrevocably altered by the Comm Network. He is thus a conflicted man, but seldom shows it.
- **Commander Olivia Creeson:** A former EarthGov officer who emigrated to Logan's End to forget some personal past tragedy, Olivia Creeson was hired by Groys to lead Logan's End's rag-tag military defenses. Most of her time is spent keeping order in orbit and looking for contraband inbound and outbound of the planet. Olivia is a competent, professional officer whose talents look wasted in the informal, weak collection of patrol ships that Logan's End has rustled up for her.
- **Delmer Chaix:** Chaix came to Logan's End as an adventurer and ended up staying as a tourist guide. Not that he minds. He gets very well paid by the rich tourists to guide them through the deadliest, most dangerous places the planet has to offer. In reality, of course, Chaix makes sure to take them to well-known places that look dangerous but are actually not as hard or difficult as they seem. If anyone ever came to Chaix and asked to go to a specific place out of his usual path, Chaix would be very nervous indeed.
- **Melonie Ferrato:** The owner of Fearless, the hippest bar in Providence, Melonie Ferrato is here to make sure tourists (and locals who can afford it) have a good time. Fearless is the place to exchange gossip, meet people and customers. Logan's End being what it is, fistfights are also common, as well as the occasional shootout and murder.

- **Joseph Wilkins:** The local representative of the Psion Brotherhood on Logan's End, Joseph Wilkins runs a small office in Providence. He and his team try to be in good relations with most members of the Council, and to be of help whenever help is needed. Joseph used to be a member of Ganendra Nathan's inner circle on Earth, and no one knows how one of the top leaders of the Psion Brotherhood ended in an unimportant, out-of-the-way post on Logan's End.
- **Dr. Lew Mayorca:** About a decade ago Dr. Mayorca arrived at Logan's End, claiming he had found enough evidence to suggest that an ancient sentient civilization once lived in Logan's End, millions of years ago. He has spent the last eight years living in a small research station in the jungle, with a few research assistants, investigating his theory. So far he has been unsuccessful in discovering or proving anything, and in his infrequent visits to civilization to buy supplies he is usually laughed at by the locals, who consider him a quack. No one knows how he has kept his expedition financed for so long.

OTHER LOCATIONS OF NOTE

The Seven Worlds are the main places where humans live, but they are not the only ones. There are several smaller colonies and space stations in human space. The locations that deserve mention are listed here.

MARS

The first permanent human base on Mars was established in 2038 and has grown since then. There was a time when Mars was hailed as the "future next home of mankind." However, with the arrival of the N'ahili and the coordinates they provided to what would become the Seven Worlds, Mars's influence and importance were significantly reduced. On top of that, the ambitious terraforming plans for the planet were not as easy to implement as originally assumed.

Today, Mars Base has a population of about 10,000 people, mostly scientists, researchers and military personnel with their families. The terraforming project has been going on for more than 150 years, and no firm date for visible results has been offered yet.

LIBERTY STATION

Currently orbiting Alpha Centauri, the closest star to our Sun, Liberty Station was established in 2099 as a research station for several purposes. One was purely symbolic: Establishing mankind's first foothold outside the solar system before the century ended was a powerful political message on Earth, and a harbinger of the great years ahead.

Another purpose of Liberty Station was to have a look at our own Sun from afar, and from there extrapolate observations to better understand what we see when we look at other stars light-years away. The spectral and astronomic observations gathered here have helped mankind understand and decode star and planetary configurations far away.

Liberty Station's final purpose was to provide a close jump point location for interstellar ship testing. Back when ships were designed and built exclusively on Earth every jump had its minor effects on the Jump Drive. Liberty Station was the other side of the shipyard testing lane, and became extremely useful in this respect. Even now, with leading shipyards located in Concordia and Bay Jing, the Earth ship industry depends on Liberty Station for its continuing research on jump drives.

The end result is a station that is part scientific and part commercial. Housing approximately 350 people, Liberty Station has also extended its goals to tourism. The "first permanent human presence in space" moniker can bring tourists and money, and station leaders have been quick to take advantage of that.

One of the oldest stations in known space, Liberty Station shows several of the limitations of early station design, such as limited locations with centrifugal gravity and uncomfortable quarters. Visits to Liberty Station are in some ways a throwback to the early times of space exploration.

HARRIS STATION

Harris Station was originally created in 2113 as a convenient waypoint between Earth and Zarmina, given that many ships could not travel seven full jumps without refueling. Orbiting Theria, a small gas giant relatively close to the jump point in the Gliese 682 star system, Harris Station coordinates ^{3}He recollection activities within the nearby gas giants in the system, as well as the storage and sales procedures for the fuel. Add to this shipyards, maintenance facilities and entertainment for crews, and it is easy to see why Harris station is a sprawling human construction housing approximately 5000 people. Only Mussala Station and Waypoint Station approach Harris Station's size and scope.

Unfortunately, Harris Station's importance has diminished as more and more ships can handle seven jumps or more without refueling or maintenance of any kind. Nowadays most ships can manage the Earth-Zarmina route without needing to stop. Responding to this, the businesses in Harris Station have changed their focus from refueling, repair, and other services travelers would "need," to entertainment, gambling and other services travelers would "want" in order to

break the monotony of a weeks-long trip. The change in focus has allowed Harris Station to thrive as the 23rd century begins.

In the last few decades, Harris Station has also found renewed vigor as the first of two waypoints for travelers going towards Logan's End. Although not much shipping or tourism passes through this lane, traffic has been steadily increasing, and the station leaders think the prospects are very good.

Given its age and steadily failing services, Harris Station is due for a major upgrade and refit, if the budget for that is ever found.

HOFFNUNG STATION

When the jump point coordinates to the star Gliese 667 were provided by the N'ahili in 2091, many scientists leapt at the chance. Since the beginning of the 21st century the third planet orbiting the third star in this trinary system, known by the name Gliese 667°Cc, had been a strong candidate for human settlement. Unfortunately, the first scientists that arrived discovered that the atmosphere contained significant amounts of hydrogen sulfide, sulfur dioxide, and sulfur trioxide due to major volcanic activity. This highly toxic atmosphere impregnated everything, even the water, creating a solution of corrosive sulfuric acid. In consequence, special protective suits are required to visit the surface, and even these don't last long.



Approximately eighty years ago a project was created to work on potential terraforming of the atmosphere of Gliese 667°Cc, as well as on research on industrial value for this sulfur factory. Hoffnung station was the result.

Currently housing approximately 700 people, Hoffnung station has made little progress in its goals and the project is in serious danger of being cancelled by EarthGov because of budget considerations.

MUSSALA STATION

The second station built as a way stop for travelers, Mussala station connects Concordia and Bay Jing with Nouvelle Vie. Perhaps aware of the inevitable comparison it evokes to Harris Station, Mussala has always strived for excellence. It is a modern, immaculate station offering first-class refueling, maintenance and entertainment services for travelers at affordable rates. Approximately 4000 people live in the station and take care of all the services it provides. Mussala also manages a manned refueling station orbiting one of the nearby gas giants.

As Nouvelle Vie grows and expands, Mussala sees its business potential only increasing. The main problem with this vision is that the growing rivalry on Nouvelle Vie threatens to make Mussala Station a military stop for Concordian or Bay Jingnian troops. Currently both planets' military fleets are Mussala Station's biggest refueling customers. Even so, Mussala Station has taken a strict neutrality policy, servicing everyone equally. Investments in a private security fleet are being done, in case Mussala needs to defend its independence from either fleet.

HERNANDEZ STATION

Orbiting the Delta Pavonis star system, Hernandez station is a pure research station with a difficult history. Delta Pavonis has several characteristics (such as mass, brightness and radius) which make it a close match to our Sun. However, the star has been affected by significant solar flares of unexplained origin that, if they were to happen in our Solar System, could cause significant damage to Earth. In order to investigate what is causing this phenomenon and whether it could happen on our Sun, a research station was created about ninety years ago.

WHERE ARE THE HABITABLE PLANETS?

Although we have discovered hundreds of planets around other star systems by now, including several "Earth-like" planets, in reality the odds of finding a planet that perfectly fits our description of Earth are extremely low.

As human beings we are the product of our planet. We have evolved to thrive in its gravity, its combination of elements and gases in the atmosphere, its day/night cycle, its temperature highs and lows, its millions of bacteria and germs, and innumerable other things, any one of which if changed could affect our lives. It is extremely unlikely that there will be other planets that exactly mimic all of Earth's conditions.

Earth's conditions themselves were the result of its long, complex history, which includes several fortuitous events. For example, Earth's first atmosphere most likely was heavy in carbon dioxide, but about 50 million years after it formed it was struck by a large planetoid. This impact blew the carbon dioxide atmosphere away and as a side effect formed the moon. Over the next millennia other comet impacts gave Earth its second atmosphere, this time with low CO2 content, allowing life to breathe. This has not happened to several of our carbon-dioxide-rich neighboring planets.

To make things even more complicated, patterns such as the renewal of the soil and the mix of oxygen in the air depend on living beings such as plants doing their work. In other words, practically by definition, if we found a twin of Earth we would also find lots of life in it.

Movies and TV have accustomed us to an image of other planets that look exactly like Earth, but most planets are unlikely to be this similar. Actually, most planets are hostile to human life. In the moon Titan, for example, liquid methane rain falls about once every thousand years; Neptune's winds are about twice the speed of sound on Earth; and the temperature on Mars easily swings 150 degrees Celsius in a single day.

So, where do we find the habitable planets then? In the case of the *Seven Worlds* setting, several of the planets are taken from the targets for a cancelled NASA mission called the Terrestrial Planet Finder, as well as from the list of potentially habitable planets defined by astronomer Melissa Turnbull in 2006. Leaving Earth aside, five of the other six worlds came from this list: Apollo (Epsilon Indi), Concordia (Epsilon Eridani), Bay Jing (40 Eridani / Omicron 2 Eridani), Nouvelle Vie (Gamma Leporis) and Logan's End (Eta Cassiopeiae). Epsilon Eridani was recently considered a good candidate for visit by the Icarus interstellar probe. It was decided that there were no habitable planets at the proposed locations of Alpha Centauri, Pi 3 Orionis and Delta Pavonis, but those stars were still selected as locations for Liberty Station, Mussala Station and Hernandez Station, respectively.

The final planet was chosen from one of the most likely and at the same time controversial exoplanets found to date: Gliese 581g, named Zarmina's Planet by its discoverer, Steven Vogt in honor of his wife. Although there is controversy around whether 581g exists or not, *Seven Worlds* assumes it does. Another existing exoplanet destination, Gliese 667, was selected for Hoffnung Station. Gliese 667˚C is particularly interesting because currently there are three detected exoplanets orbiting it that are located within the habitable zone.

Although Tau Ceti is another prominent candidate for a habitable planet, it was kept mysterious and unreachable in the setting.

None of these planets is expected to be even remotely like an Earth twin.

In 2135 a particularly large solar flare destroyed all life support systems and caused the death of the 350 souls on board. Since Earth had recently been impacted by Comet Sol-C/2132 N2, no mission to investigate what had happened could be mounted until several years later. The station was repaired and reinforced in 2145 and the mission was begun anew, with a much smaller crew of about 100. This means several parts of the station are now closed and unused, and have been abandoned for decades now. Hernandez Station has thus found unlikely fame as the star of drama movies about the tragedy of 2135 and of games and stories about ghosts and strange sightings in the abandoned corridors of the station. Although there is no truth to these stories, sometimes the fiction is too good to resist.

The scientific team at Hernandez Station continues to investigate the flares in Delta Pavonis, and believes it now has a better understanding of how the Sun will behave in the coming millennia. Several research papers have been published, and more are expected to come.

WAYPOINT STATION

Located in the Pi 3 Orionis star system, Waypoint Station is the second stop (after Harris Station) for travelers going to Logan's End. The newest of the large space stations in existence, Waypoint Station

was founded in 2186 in the Alpha Lyrae / Vega system along similar principles to Harris and Mussala stations: Provide a refueling point (based on ^{3}He harvesting of the gas giants of the system), and provide entertainment and maintenance services for travelers. Probably the main difference is that while both Zarmina and Nouvelle Vie were considered large settlement projects, Logan's End has always been a relatively small settlement with less focus and importance. Even now, decades after its founding, Logan's End is treated as a "frontier planet" without such things as a single planetary government.

Consequently, Waypoint Station is not as large or luxurious as the other stations. Services are provided "on the cheap," accommodations are not as comfortable as more refined travelers could expect, and there is a feeling of lawlessness to the station itself. Approximately 3500 people live on Waypoint Station and support its services.

Waypoint Station has been prone to failures and problems, and is frequently having some kind of emergency, be it that the air recyclers are failing or that the structure in part of the station is collapsing. Everyone thinks it is a matter of time before a serious accident occurs in this rickety infrastructure. Most inhabitants view this with resignation, and just get on with their responsibilities.

TAU CETI

Tau Ceti hasn't been visited by humans yet.

For a long time astronomers have known that Tau Ceti harbors several planets, including one that is remarkably similar to Earth. Tau Ceti is 5.5 light-years from Epsilon Eridani (Concordia) and just 1.6 light-years from YZ Ceti, a star system in the route to Concordia and Bay Jing. Having another habitable planet this close is a remarkable piece of luck, and interest in reaching and settling Tau Ceti is high. There is only one problem: The N'ahili have not shared a jump point to Tau Ceti, and humans have not managed to find one yet.

The result is a decades-long treasure-hunt, as several research teams, companies and even military teams constantly comb the nearby stars of YZ Ceti, UV/BL Ceti and Epsilon Eridani for a jump point to Tau Ceti. No success has been met yet. Repeated requests to the N'ahili for jump point coordinates for the system, or at least for a confirmation that they don't exist, have gone unanswered. To make things more frustrating, the specialized telescopes built to look at Tau Ceti have confirmed that the planet in question is a perfect world for human habitation.

The search still goes on. In the meantime, common sense has prevailed and a long-term probe has been sent to the planet. It is expected that the probe will take almost 52 years to traverse the 1.6 light-year distance between Tau Ceti and YZ Ceti, out of which approximately 15 have already passed. Mankind should thus be getting their first live transmissions from the planet in 2253 or so. Assuming a jump point has not been found by then, maybe a long-term human mission, the first of its kind, might be attempted.

LIFE IN THE 23RD CENTURY

Life in the 23rd century is very different from what it was when William Donovan and Daniel Michaels walked the Earth in the early 21st. This section explores some of the most important differences.

SCIENCE, TECHNOLOGY AND INFORMATION

A typical citizen of the 23rd century is surrounded by technology wherever he or she goes. Walls, doors, tables, picture frames, windows, cups and mugs are "smart" digital screens that can be filled with information at a user's whim.

A user is connected with information everywhere: Everyone uses "lenses," special glasses that overlay appropriate information on top of whatever the person is looking at (a technique called AR, or Augmented Reality). For example, when you see a person you can see his or her name, preferences, job or other (non-private) information "floating" in a virtual bubble next to the person.

The frame of the lenses includes small headphones that allow the user to listen to information, either something they request or a message from their Assistant, for example. They also have miniaturized Magnetic Resonance Imaging (MRI) devices that can read a person's basic thought commands and act on them. If the user prefers contact lenses, the headphones and MRI scanners are available as two tiny devices stuck to the ear.

In short, a person's lenses provide a complete AR connection to data and information, and perform such mundane activities as calling someone, translating a conversation, requesting access to a building, and constantly superimposing layers of information on reality with but a thought.

Not only are all objects that surround a person connected, they are also to some basic degree "aware" of their surroundings and able to detect or record information. This fact, coupled with the fact that everyone's implanted IDTags allow the environment

MIND READING AND PSIONIC POWERS

The idea of humans having mental powers beyond what we currently see has been with us for centuries. Although no definitive evidence for the existence of mental powers has been presented, enough anecdotal evidence for ESP and other phenomena has sparked the public's imagination on this topic.

The human brain, the complex and mysterious inner workings of which we still don't fully understand, represents 3% of the body's weight. However, its energy consumption is around 20% of the energy available for the body. The brain therefore is an extremely active part of the human body.

But is it really fully working? For a long time there has been a myth about humans only using 10% of their brain power, and a suggestion that there is something locked in that "unused" 90%. Scientific studies using imaging technology show that over an average day a normal human being uses 100% of his or her brain, just not all of it concurrently. This, however, argues for the fact that there is nothing really hidden from us in our brains.

There is also an issue of power. The human body produces about one-fifth of a horse power, yet the effects we associate with telekinesis, for example, require dozens or hundreds of a horse power to work. So where would this energy come from?

Given all of the above, there does not seem to be a scientific way to have or explain mental powers. Yet scientists are beginning to experiment with using technology to augment a person's powers.

Beginning with reading a person's mind, MRI scans and EEG ways are slowly gaining in detail and sensitivity. As these devices better detect which parts of the brain fire up on which thoughts, and as they become more and more miniaturized, it may be possible to have devices that always read what's going on in a person's mind. By combining these readings with a "thought dictionary" it may be able to decode a person's simple commands and thoughts. Currently several experiments are underway to equip disabled people with tools to control external devices with their minds.

As explained in the Superconductors sidebar, when room-temperature superconductors arrive and tiny superconductor magnets are included in every item and piece of clothing it may be possible to control all these devices with a thought, by having the brain scanners of the future detect the parts of the brain that fired up, pass them through the thought dictionary, and "understand" what the person wanted. This in turn would of course trigger all sorts of physical responses.

In *Seven Worlds*, each person's lenses include the miniature MRI-type devices that scan the brain and decipher its thoughts, which are conveyed to the Assistant, and thus allow for the control of the environment. In the case of Psions, no attempt to explain psionic powers is made.

As an aside, some informal calculations have been made on how much mental energy Yoda has when using the Force. Details are in the reference section, but in short the calculation comes up to about 25 horse power.

to detect a person's location, mean that there are very few secrets in the 23rd century, and very little privacy.

The mountains of information compiled by all these objects are accessible to everyone in that location or around it, with a few security checks to protect information marked as clearly confidential.

COMPUTERS, ROBOTS AND ASSISTANTS

While computers are still not truly sentient, and Artificial Intelligence as we understand it has not been created yet, software is now smart enough to understand and predict many of our needs, and interact with us using visual and audio interfaces so natural that they give the illusion of intelligence.

Assistants are a good example of this. Practically everyone in the 23rd century has an Assistant, a specialized program that makes it easier for the user to interact with the environment. An Assistant is basically a program with a virtual human shape, a tailored personality that talks to the user, knows his or her preferences, and does errands for him or her. Assistants communicate with their users in plain spoken language.

Assistants are everywhere. They are our personal interface to the world. They appear to us in the screens of any house, building or starship, or overlaid on our lenses; they talk to us, know what we like, act as our answering machines and valets, receive our commands, order our food, coordinate with our cleaning robots, fill out forms and information before asking us to review them for mistakes, and many other things. But, as natural and human as they seem, they are just amazing pieces of software that do a great job understanding and processing requests, communicating in everyday language, and making people's lives easier. They are not intelligent in the sense that they can create independent, original thought.

Besides Assistants, many other types of software programs interact with humans on a daily basis. Automated doctors, officers, attendants and receptionists handle our basic needs, and refer to humans when more complex interactions are needed. Virtual doctors, for example, handle most people's needs for a medical diagnosis, referring the person to a human doctor only when the symptoms stop fitting standardized diagnoses.

Many of the things surrounding humans are also automated computers and "robots": doors, tables, and cars take orders and act automatically. Small

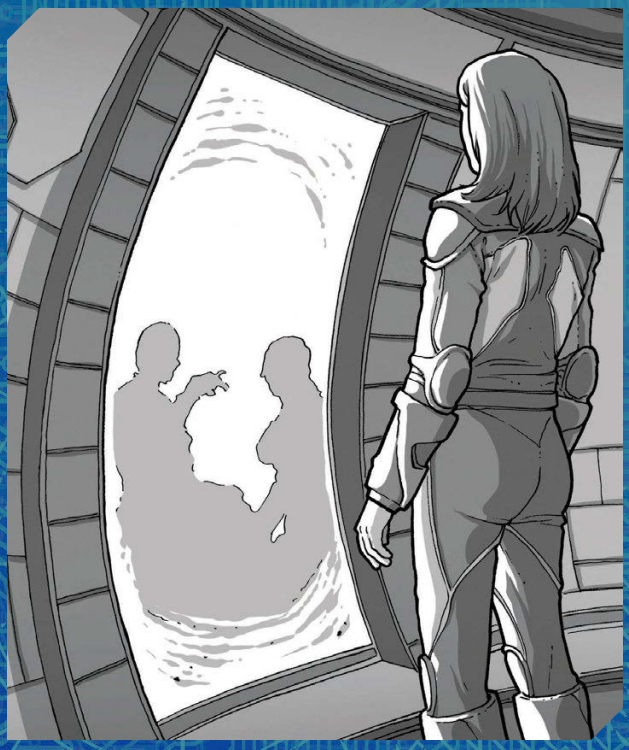
AN EXAMPLE: INTERACTING WITH A DOOR IN THE FUTURE

It may be hard to imagine what it must be like for a citizen of the future to interact with his environment. Here's an example to make things easier to understand.

Suppose you're walking down a corridor when you see a door on a wall. In the present these are some of the things you could do:

- Knock on the door.
- Listen to the sounds behind the door, if any.
- Try to open the door, either by pushing it or turning the doorknob.
- Use a key to open the door.
- Pick the door's lock, if you know how.
- Attempt to break down the door.
- Just ignore the door and continue walking down the corridor.

In the future the door itself is aware, and behaves in ways you may not expect. For example:



- Long before you've reached the door your lenses may have been showing you an overlay map of the location you are in. You could have known a door was there even before walking into the corridor.
- Just as you know about the door before you reach it, the environment has detected your embedded IDTag, and thus the door knows you're here before you reach it. If someone behind the door wants to be alerted when anyone approaches, the alert has already gone off.
- Since the door already knows who you are, if you are walking directly towards the door and have the appropriate permissions the door will open automatically. A different variation would be that the door specifically requires you to touch it in order to open. In all cases, the people behind the door will know you're outside before the door opens.
- The door itself is a screen. If you have permissions, as you approach the door it might light up as a screen and list who's inside and what they're doing, whether they are in a meeting, at what time they can be disturbed, and other information. It may also become a semi-transparent screen (actually, just a projection) so you can see what they are doing, or only their silhouettes. By the same token, when you approach the door it may become semi-transparent from the inside so the occupants can see who you are and what you're doing.
- If you stare at the door for too long, it may consider your behavior suspicious and alert the people inside.
- There is no lock to pick, and no key to insert. Either you have permissions to enter or you don't. And if you don't, you can always either request them, or require a password or some other mechanism.
- Even if you ignore the door and continue down the corridor, the environment will remember you were there. Afterwards, when the person who owns the room behind that door arrives, he will immediately know you were there and that you walked next to the door.

Now imagine every object around you behaves like this, and you begin to get an idea of how different the world of the future is... and of the opportunities and challenges it provides.

machines clean, organize, garden, and do many other menial chores.

One thing that never caught on is humaniform robots and androids. Besides the obvious technological challenges in creating an artificial being with the human shape, the population has been proven to react negatively to them, bringing ideas of "slavery" and "oppression" into the conversation. Instead, today humans interact with dozens of specific-purpose robots with utilitarian shapes. It is rumored that some government security services have designed and built humaniform robots for basic undercover jobs, but such rumors are unproven.

Another ancient fear that proved unfounded is fear of the "rise of the machines." In reality, 23rd century devices and networks are as threatening to a typical human as a mobile phone or a kitchen are to a 21st century person. So far technology is at the service of mankind and not the other way around.

MORE ON ASSISTANTS

Assistants are arguably the most important component of the average person's interaction with the world.

Because of how Assistants work, a user can only have one Assistant at a time. Usually users are allowed to have an Assistant when they turn fifteen, and they usually keep them for life. During their lifetime, people sometimes modify their Assistant as they want to see it "age" with them, or because their needs change significantly.

New Assistant Programs are available when people want to upgrade their Assistants with new functionality. Since the key characteristic of Assistants is the emotional bond they have with their owners, being able to transfer the Assistant's "personality" intact to the new program is crucial.

Because of their ubiquity, an Assistant can never be lost, as a backup copy of it is available with the user's profile. A concerted, organized effort would need to be executed to effectively wipe an Assistant (or any other piece of digital information) from existence everywhere.

Every Assistant's "personality" contains the following:

- **Name and Gender:** A male or female first name, at the user's preference. This is how the Assistant is summoned or called. Both the Assistant's visual appearance and its voice depend on its gender.
- **Appearance:** The user usually selects from a wide set of Assistant visual appearances, and can customize them to their preferences. Since the Assistant is in many cases the user's representative in V-World (some meetings and processes are even handled by the Assistant in the user's name), the appearance of the Assistant should be appropriate for public viewing and consumption.
- **Personality Template:** Personality templates help humanize the Assistant and make it more "real." The user can select a personality template for their assistant. Maybe the Assistant is helpful, grouchy, sarcastic, dry, speaks like a pirate, or anything else its owner likes and that makes it distinctive.
- **Skill Module slots:** An Assistant program has several skill module slots, which are used for storing specific skill programs the owner wants the Assistant to specialize in.

Given the large amount of information sources available on most planets, such as cameras, geolocation devices, detectors, weather sources, and many other things, Assistants can make it easy to consolidate and bring this information. Some people even find Assistants useful during combat, when the Assistant can bring up-to-date information on the battlefield, helping soldiers understand the tactical situation they find themselves in.

AN INTERSTELLAR INTERNET?

The idea of an "Internet" spanning planets or even stars seems ludicrous at first, given the constraints of the speed of light. However, the problem is already being tackled. Several alternative protocols that support long-term asynchronous communication over planetary distances are being currently proposed, with acronyms such as DTN (Delay-Tolerant Networking) and BP (Bundle Protocol). Championed by Vint Cerf, one of the original creators of some of the protocols of the current Internet and currently Chief Internet Evangelist at Google, BP has more tolerance for failures and disconnections, and recognizes the difficulty in making multiple round-trips between planets to resolve Internet addresses.

None of this reduces the length of time communications will take, though; they only make communications possible. Thus, a space station in the orbit of Saturn will still have to wait hours on their "browser" to get an answer from an Earth site. But these rudiments of communication and synchronization will allow the network to expand from Earth into space.

ID TAGS AND IDENTIFICATION

Identification is a critical part of life in the 23rd century. What fingerprinting was in the 21st century, DNA scans and detection is in the 23rd. However, people are also identified even when they are not touching anything. To do this, when a person is born he or she is implanted with a minuscule, dot-sized device called an IDTag. This device can be read wirelessly and carries a person's identification code, based upon the person's DNA, which is also scanned at birth. This code identifies every human being for his or her entire life.

Originally, governments gave numeric identifications to their citizens, but early in the 21st century every human being ended up with a digital ID given for free as a consumer service by corporations who offered services with the ID, such as electronic email, social networking, and others. In the digital economy it soon became easier to identify and interact with a person by using their Digital ID than with any national code or identification. Later advances in DNA identification forced the unification of identity and its aligning with each person's unique DNA code.



Originally there were four major technology companies offering these kinds of IDs, effectively competing with governments for IDs. With time, the companies' systems merged into a hybrid registrar system that kept IDs within the scope of each company, but imposed regulation on the use of the IDs and the degree of interoperability between them, thus creating the current ID system. The system has proven extensible enough to keep working effectively as Humanity has expanded into space.

When a human being is born, its parents decide what registrar to create the ID in. Then the appropriate IDTag is embedded into the human's skin, with the user's identification based on the initial DNA reading.

The ID is just an index that accesses the individual's profile and information. This information is encrypted in every registrar's datacenters which are then replicated to the other worlds using the Stellar Communications Network (see page 21). A person's lenses usually carry an offline backup of the person's profile and his or her critical and valuable information.

As for authorization, the process that allows the individual to prove he is who he says he is, the embedded IDTag takes care of it. Several alternative methods exist for when it is necessary to double check, such as the individual's full DNA chain stored as part of his profile, or physical information such as fingerprinting and eye scans.

V-WORLD

On top of Augmented Reality, humans have access to an impressive number of services via Virtual Reality.

Now known as V-World, the "Internet of the Future" represents an alternative way to interact with information. While AR projects information on screens around users or on their ubiquitous lenses, V-World creates entire new virtual worlds for people to visit. Although the same information can be seen either way, V-World's more immersive experience is uniquely appropriate for specific uses, which makes it very popular.

The most common way to interact with V-World is via a person's lenses. With a command these become completely opaque and present a three-dimensional virtual environment that the user can interact with.

The most immersive way to visit V-World is through a V-World pod, a small enclosed environment that simulates sight, sound and touch. A special helmet stimulates and reads brain waves to make the person feel he is moving his arms and to make the person feel the universe is responding to his or her actions. The pod also simulates the effect of touch by positioning electrons at a sub-atomic level in such a way that the quantum effect of exclusion repels the person's hands



and skin, and thus projects the illusion of reality. There are V-World pods in most houses, and there are public "communications booths" available for rent in most cities in the Seven Worlds.

V-World is composed of many "sites," and a person decides which site to visit. Most companies and government institutions have their own sites, small simulated 3-D environments where the person can interact with the appropriate program or authority. This is particularly convenient when ships arrive at an orbital station around a planet, as most private and public services are available to individuals via V-World without having to go down to the surface of the planet. Face-to-face meetings can be had, and deals can be closed with a handshake between someone on the surface of a planet and someone in orbit. Assistants can also visit V-World, and are on hand to help during conversations or negotiations. In fact, V-World is one of the few places where humans and their Assistants can interact face-to-face as if they were two human beings.

Of course, gaming sites are the most popular destinations on V-World. Ranging from dark cities of mystery to epic medieval worlds of adventure full of magic and monsters, there are always interesting things to do in V-World. Each site has its own internal rules, such as maybe the existence of "magic", different gravity, powers, or anything else.

Legally speaking, every site and virtual environment in V-World is under the real-world law of the particular planet where the environment is located. Any site in V-World that does not follow its real-world planet's laws and regulations is termed an "illegal site." There are always some of these, hidden away so that only someone who knows how to get to them and how to access them can reach them.

While V-World allows free interaction between people anywhere on the surface of a world and between people on the surface and people in orbit, it is not possible for people farther away to interact. Communications more than one light-second away (for example, to and from a spaceship in the outer system, or to another planet) are not practically feasible due to lag. The Stellar Communications Network (see page 21) takes care of synchronizing and replicating V-World content between the different planets in the Seven Worlds. Special sites, both for work and play, have been designed for interaction between worlds, and are usually based on turn-by-turn interaction.

For security reasons, V-World reads a user's IDTag when the user enters, and thus users are never anonymous. Several (illegal) hacking techniques



have been devised to bypass this and falsification or impersonation of another's identity, while infrequent, is not unheard of.

AVATARS

When a person enters V-World, he or she takes the form of an Avatar, a virtual representation of the person.

Standard Avatars are taken from the user's profile, and look exactly like the person looked in the real world the last time the person was scanned (usually when entering a V-World Pod). All business meetings and interactions are performed with these standard Avatars. Some sites specifically require that the visitor use his or her standard Avatar when visiting.

In some sites, specific people have authorization to use Enhanced Avatars, or Avatars with improved strength, powers or other particular characteristic. Most police officers or security officials in V-World, for example, have an enhanced Avatar that allows them to overwhelm a criminal or unauthorized visitor, maybe with "powers" that only apply in V-World. Most game environments also allow visitors to design their own Enhanced Avatars for a better gaming experience.

Finally, V-World games allow visitors to use Alternate Avatars, or an Avatar designed from scratch by the user. This Avatar may have nothing to do physically with its user; maybe it has superhuman strength, special skills or incredible magic powers. Of course, all Avatars must conform to the particular rules of the V-World site they are visiting. Experienced hackers have been known to create Alternate Avatars and use them in official V-World environments to impersonate people without their knowledge, but this is very difficult.

There is a one-to-one relationship between time in V-World and time in the real world. In other words, when a minute passes in V-World, a minute has passed in the real world. While it is illegal (and disorienting) to have it any other way, it is technically possible to have a V-World site where time flows at a different speed than in the real world. Some sites have used this to their advantage, but it is mostly unused since accelerating time in V-World has been found to have negative consequences to a person's concentration and well-being.

SECURE V-WORLD ENVIRONMENTS

Not all V-World sites and environments can be entered and abandoned freely. Some of them, such as private sites or highly secure corporate extranets, require specific permissions to enter.

To maintain a degree of control over visitors and avoid hacks, these environments require administrator-level access to the physical equipment used to connect to them, be it a user's lenses or the V-World Pod.

As part of the connection phase, these secure V-World environments download specific code to the connecting user's lenses or Pod. This code identifies the place the user is connecting from (for later tracing if it becomes necessary), records everything the user does, and makes it impossible to leave the V-World environment except from specific locations in V-World (the "entrance" and "exit"). Thus secure environments can guarantee that their security policies are in place, and can provide critical security information to locate unauthorized visitors.

All security personnel in these V-World environments are provided with Enhanced Avatars or even Alternate Avatars, imbued with powers or superhuman abilities that allow them to maintain control should a breach happen. Visitors to these environments who break the rules can expect drastic and something terrifying retribution.

Of course, hackers have created ways to circumvent this security, but most casual visitors to these secure environments simply accept these measures as the price of entering them.

OFF-LINE INFORMATION

Most people only interact with information while on-line. Even between planets, information is available on-line via batch synchronization using the Stellar Communications Network (see page 21). However, there are scenarios where it is necessary to take the information off-line. The two most common ways to handle this are data cards and tags.

Data cards allow a user to copy large amounts of information from V-World into a small card, similar to a 21st-century USB drive. It is an easy way to carry and store information, and it is frequently used to exchange data in physical transactions, to store sensitive data away, and to back-up information. Frequent travelers also use it to carry their information between planets, particularly when they travel to worlds not covered by the Stellar Comm Network.

Tags are printed representations of information, similar to 21st-century QR codes. When printed on a page, they look like a hexagon with tiny dots and smudges that represent coded information. This makes it very easy to print them and scan them to get the information back. Most Assistants can read any printed tags and decode the information they contain immediately.

MEDICINE, NANOTECHNOLOGY AND GENETICS

The arrival of genomic medicine, biogenetics and nanotechnology has revolutionized medicine in the 23rd century.

GENOMIC MEDICINE

Genomic medicine means many diseases that might affect a person are detectable very early on, and the probability of having a fatal disease is known from the moment a person is born. By law, no genetic filtering is allowed on the basis of likelihood of death or disease.

With the ability to cure most diseases, perform tissue engineering, prolong treatments and regenerative medicine, and grow cloned parts, most humans live 140 years or more, and aging has been significantly slowed. There are still those, however, who are either immune or resistant to genetic manipulation.

GENETIC MODIFICATIONS

Most genetic modifications revolve around improving a subject's strength, endurance or intelligence and are somatic, in the sense that they are focused on fixing a particular individual's characteristics, rather than the entire future hereditary line's characteristics. While some bizarre modifications have been created (such as rabbit ears, or the power to follow a scent like a hound), these have not been accepted by a society that still at an instinctive level values a specific ideal of Humanity. Rumors exist, however, of secret organizations and military groups that have silenced the myostatin gene in soldiers, creating super-strong soldiers with many abilities.

Probably the most important use of genetic modification technology is to facilitate the acclimatization of humans to different worlds. To make it easier for humans to survive the gravity of Zarmina, for example, or the cold of Apollo, slight genetic modifications are performed to develop the appropriate abilities for each planet. This is why most people of a particular world have characteristics inherited from their homeworld.

NANOTECHNOLOGY

Nanotechnology has become crucial for healing, as it allows for creating "smart medicines." Nanoparticles to cure or prevent many situations can be injected directly into the bloodstream, behaving like "smart bombs" that zero-in on the medical problem to solve it.

There are also nanoparticles available for external application. A good example is the Bloodstopper, a salve that can be applied in just a few seconds during combat on anyone. The nanoparticles in a Bloodstopper quickly detect and cover a wound, strengthen the surrounding tissue and muscles, and reduce or eliminate the pain felt by the wounded person.

Also during combat, medics and surgeons carry Portable Healing Kits. These small cases contain several types of nanoparticle compounds that the medic can apply in seconds to heal minor wounds.

Hospitals, starship sickbays and other locations with more infrastructure have even more advanced health technology, such as Healing Pods. These are completely enclosed devices where significant amounts of biotechnology, under the command of a knowledgeable medic or surgeon, perform the careful job of repairing an individual's body after a battle. Patients are enclosed inside the Pod, usually asleep, for at least 24 hours, during which the Pod performs the necessary repairs and corrections.

Experience has shown, however, that the application of too many bio- and nanoparticles can negatively affect a person's body. In the case of Bloodstoppers, for example, too many of them in too short an amount of time can cause sickness or even death.

Also, even in the 23rd century, not all diseases have been eradicated. Diseases mutate very fast, and there are too many of them. The very fact that most humans live surrounded by (and depend) on thousands on bacteria and viruses for their existence means that disease will still exist long after humans are gone.

MANUFACTURING

Nanotechnology has also revolutionized industry and manufacturing in the 23rd century. By allowing the manipulation of individual atoms, molecular manufacturing allows Humanity to create materials unimaginable until now. Superconductors with incredible electrical and magnetic properties, as well as superstrong and superlight materials built with carbon nanotubes, are commonplace now.

The discovery and mass production of carbon nanotubes has been critical in the creation of revolutionary devices such as rotovators and the space elevator (see page 37).

Given that it is now possible to create molecular transistors, miniature components of computers just one nanometer in size, computers are everywhere, and power the "smart" devices that surround humans everywhere. Miniature sensors detect most things and conditions, human behavior and needs, and even perform basic medical diagnosis such as by reading DNA on touch.

Even more impressive is the invention of claytronics, or "programmable matter" which can change shape, color and even physical form at will. Grain-sized claytronic atoms can receive commands and change their charges to redistribute themselves and create entirely new objects. With claytronics it is possible to transmit digital files between locations, even between worlds, and to completely build a new object with just its digital description. Claytronics therefore are as close to the vision of the "replicator" as humans have been able to get. Also, claytronics objects can always be turned "new" by fixing or repairing whatever got broken and rearranging atoms to make the device "new" again.

Needless to say, this means that digital design of objects is one of the most valuable aspects of manufacturing, and the sale of designs and concepts is common.

MANUFACTURING AND SOCIETY

The existence of nanotechnology and claytronics might at first glance appear to make commerce irrelevant, and to make the whole concept of "scarcity" obsolete. In reality things are not as simple as that.

Claytronics have one major deficiency: Ironically, the objects created with them are too perfect. The minute imperfections, deviations, and mutations available in hand-made or naturally grown objects have proven impossible to adequately replicate; they are, however, noticeable to the human brain. Thus, for example, a Concordian wine may seem to be atomically identical to a claytronic-created one, but the differences are noticeable to wine-tasters. This means that quality is still important, and that therefore there is still a market for non-claytronic products.

Second of all, while many markets have been completely disrupted by these kinds of technologies, entire industries of "non-claytronic" produce have sprung in their place. The high-price fetched by these items has offset their quantity.

Finally, since the most menial items can now be produced automatically, the time and energy of many human beings has been redirected in ways Humanity never thought possible. Creativity is now the main focus and product of most people. Items and ideas we could never have thought of are now created and valuable, and produce a growing economy that spans the Seven Worlds. Innumerable new products, both physical and digital, launch and trade in each of the Seven Worlds every year, increasing prosperity and bringing new opportunities to everyone.

LANGUAGES

Practically every major Earth language is still spoken in the 23rd century. The two lingua-franca languages, English and Chinese, are widely spoken either as a first or second language. This makes it easy for people to understand each other, even across planets. The number of particular dialects and accents of the main language has increased, though, particularly on the new planets.

Even when two people happen to speak different languages, the availability of real-time translator software embedded into lenses means that communication is seamless. The translation software automatically flashes the appropriate translation on the other party's lenses. Technology has made language barriers practically disappear.

RELIGION

Practically every 21st century religion still exists somewhere in the 23rd century. Some of them have prospered and even evolved to keep with the times and Humanity's new found place in space. A good example of this is the piece of the Black Stone from the *k'aaba* in Mecca now in the city Al-Ahsa in Bay Jing (see page 60).

The evolution of Humanity into a space-faring species has changed religion in two ways.

On the one hand, religion has been somewhat weakened by the immensity of space. Religions have been faced with the existence of billions of stars and galaxies, and of inconceivable distances between them, as well as of scales of time unimaginable by humans. This has forced many to deal with the fact that Humanity is either very special, or not special at

all. The arrival of the N'ahili, an alien species obviously more advanced than us, has forced a lot of inward questioning about the place of man in the universe. Religious beliefs have had to change to accommodate these concepts.

On the other hand, religion has been strengthened. The appearance of psionic powers, and science's inability to properly understand their secrets and workings, has awakened the idea that there's more to the universe than just what we as humans know and perceive. Astral and metaphysical views of religion have surfaced anew, and have been quietly incorporated into most religions. The "great unexplained mystery" of energy still inspires all manner of religious theories and moves millions everywhere.

COMMERCE AND TRADE

The huge distances between star systems would at first glance make interstellar trade a very uncommon affair. In truth, interstellar commerce is minuscule when compared to interplanetary trade in most of the Seven Worlds. However, that does not mean that there is no commerce between the worlds.

Many products fetch a high value just by virtue of where they are made. For example, few things are more coveted, exclusive, or expensive than wines from Concordia. Other products have been made in locations that have dedicated so much time and effort to specialization that there simply is no other way to acquire products of such quality and price, even after adding transportation costs. Some examples are medicines and nanotechnology health products from Zarmina, or industrial products from Bay Jing. The governments of most worlds are eager to foster such trade, and thus different subsidy systems have been implemented and are available.

Then there is human transportation, both of settlers and tourists. As space becomes more and more accessible it becomes cheaper to travel to space. There is not a single citizen of Earth that does not dream of visiting space at least once in their life; there is not a single citizen of any of the other worlds that does not wish to see the marvels of the mother planet, hundreds or thousands of years old. Space tourism will be a business opportunity for a long time to come.

CURRENCY

Some things never change. Take macroeconomics, for example.

Although several attempts have been made by starry-eyed visionaries to create a single, all-encompassing human currency, the realities of distance and competition have consolidated human economies into five major currencies, one for each of the five major planets: Earth, Concordia, Bay Jing, Apollo and Zarmina. The nations in Nouvelle Vie use the currency of their parent planet; and smaller nations in Nouvelle Vie, as well as all the cities in Logan's End, use a mixture of all currencies.

Each planet has its own central bank and monetary policies, which are used to protect its markets, increase competitiveness, and sometimes spearhead political projects, depending on what each planet is trying to achieve in the big scheme of things. On the other hand, technology and automatic money exchange means anyone's currency is freely and transparently accepted in any planet. While each planet would prefer their citizens to talk about money only in their local currency, the EarthGov Dollar is the lingua franca currency for transactions. Most prices are available in the local currency, but the average is expressed in EarthGov Dollars.

Currency exchange rates are therefore always in flux, and the Stellar Comm Network performs a critical job in keeping financial communications and transactions alive and open. Places without Stellar Comm Network access always place a premium on exchange rates to protect against sudden changes in the value of money that take a long time to reach them.

CRIME

Wherever there are valuables there are people willing to take them for themselves, and space is no different. Given the challenges of attacking a ship in space, such as lack of stealth, detection and recording by Stellar Comm Network probes and combat from long distances (see page 21), by far the easiest way to steal valuable cargo is to take it on the surface of the cargo's source or destination planets, or to bribe someone for it. However, a few adventurous souls still try to hijack ships in space.

As explained on page 23, the only possible places for this kind of illegal activity are on routes not protected by Stellar Comm Network satellites, such as the routes to and from Logan's End, Hernandez Station, Hoffnung Station or Waypoint Station.

Nouvelle Vie is a special case in that both Dauphin and Jubilee give protection to criminals who attack each other's shipping in orbit and then fly back to the surface of their country or to a protected orbital station belonging to the country. This "letter of marque" policy has created a niche industry of pirate and criminal activity. Several transport ships have taken matters into their own hands and actively mounted defenses against these attackers, with varying degrees of success.

PIRATE SHIPS

In order to successfully hijack ships in space, pirates need specially prepared vessels. Specifically, pirate ships must be fast enough to catch fleeing prey or to outrun authorities or victims who put up a fight; sturdy enough to be able to resist most enemy attacks via an extra-powerful Coulborne Field, as well as able to store and radiate heat fast; and deadly enough to intimidate most enemies with their lasers and missile batteries. Unfortunately this means that most pirate ships do not have much cargo space left to carry spoils or booty. Therefore pirate ships attempt to force their enemy to surrender and then either capture the enemy ship itself or kidnap a valuable passenger for ransom.

If they capture a ship and its contents, pirates keep the captured crew alive but asleep with special compounds until they can return them to civilized space. It is critical to keep the crews alive, since no crew would surrender if they knew they are going to die. By the same token, pirates make a point of killing any crews that don't surrender immediately. When the pirates' goal is to kidnap a passenger or steal something small but valuable, they modify the captured ship's computer so it doesn't track or record them for a week or two, thus giving them time to safely leave the system.

Pirates take advantage of the fact that most ships' computers allow remote control when at a distance of one light-second or less. For obvious reasons, this feature is disabled by default but is included since it is usually needed in emergency situations. When crews surrender the pirates will usually ask for the remote control feature to be enabled. At the very least this allows them to disable the captured ship's engines and weapons and thus make capture easier. It can also allow the pirates, in some cases, to remotely pilot the ship to make the approach and docking easier.

PSIONS AND THE PSION BROTHERHOOD

Many of the changes Humanity has experienced in the last two hundred years stem from its conversion into a space-faring species. There is one change, however, that comes from within Humanity itself: The birth of psionic powers and the organization that now concentrates psions, the Psionic Brotherhood.

HISTORY

Although stories about ESP and paranormal abilities have been with us for a long time, the first documented, verifiable case of unexplained "superhuman" powers in history was Daniel Michaels.

Michaels was born in 1973 in a small town in Arizona, where he became a school friend of William Donovan, founder of the Circle and the other major figure of his time. Much has been made of Michaels' early years in Edmonton High School with Donovan and Melissa Fischer, his (and later Donovan's) companion, but most of it is rumor or supposition. The fact is that while Donovan left Edmonton for a brilliant scientific and entrepreneurial career, founding EnergyNeering in 1996 and becoming a billionaire just a few years later, Michaels kept a low-profile life, obtaining an entry-level position at the CIA right after graduating from college. There he slowly worked his way up the ranks until by 2012 he was a trusted high-level operative.

While historians suspect that Michaels' psionic powers manifested in his late teens or early twenties, the first recorded use of them occurs on April 17th, 2012. That day, Michaels convened a special meeting with the CIA Director and his staff and told them about his powers. He read their thoughts, lifted objects in the room, and performed even stranger feats, all the while explaining that for reasons he did not understand these strange powers had manifested in him. Michaels also told them that although he was the first of his kind, he certainly would not be the last.

It was only the implicit trust that Michaels had nurtured at the CIA that made them believe him. A cautious CIA initiated a secret study and detection program to be in the lookout for other psion manifestations. Just as Michaels had predicted, by 2013 there were several dozen documented cases of people manifesting psionic powers. Fortunately, the CIA was ready to detect and recruit the newly-found psions, and to keep the story secret.

In 2014 Michaels quit the CIA and began a surprisingly successful career in politics, becoming, just six years later, a U.S. Senator and one of the most popular politicians in the country, known for his tireless support and work for the rights of the oppressed and disenfranchised. Given what we now know about early CIA psion programs it is extremely unlikely that the CIA would have allowed their first and most powerful psion to quit his job to become a politician. Some people believe Michaels' political career was a CIA ploy all along; others believe it is the result of Michaels using his powers on his own bosses at the CIA to get what he wanted.

The fact is that by 2020, when the rate of psion manifestation became too high for the CIA and other countries' government institutions to hide, Senator Michaels had the political resources and public credibility to take control of the situation. In a carefully staged press conference he publicly confessed to being a psion, and announced the creation of an organization

dedicated to study and help these individuals, and to integrate them in a useful way with the rest of Humanity. This organization, not affiliated to any country, would make sure psions were respected and protected as the minority they were, and that Humanity was reassured against all the fears these newcomers created.

The truth is that the first psions did not have an easy life those first years, feared and hated at the same time. Only a well-liked and trusted person in a high place of power, with access to the resources needed to control the situation, could have swerved public opinion in the psions' favor. In hindsight, Michaels' genius was figuring out who he needed to become in order to ensure safety to psions. And only by integrating government institutions into the plan, such as the CIA, could a way forward be found against the opposition of other governments. By 2025 the Psion League (afterwards renamed to Psion Brotherhood) was a full-fledged institution with complete UN support, offices in every country, and thousands of registered psions under its banner. And Daniel Michaels, now having left his Senator position, was Leader of the Psion Brotherhood.

PSIONIC POWERS

THE PSION GENE

Even now, more than two hundred years after their appearance, we still do not know how psionic powers work. We know that they are genetically inherited, passed on through mitochondrial genes from mother to daughter. The set of genes common to all psions has also been found and isolated. However, not everyone with the specific gene has manifested psionic powers, and no explanation for this discrepancy has been found.

It has been established that this particular genetic mutation (now colloquially known as "the Psion Gene") appeared approximately three thousand years ago, which means hundreds of millions of people carry it today. There is therefore no explanation for why psionic powers began manifesting themselves in the early 21st century. Genetic manipulation in the lab has also failed to produce psionic powers.

DETECTING PSIONS

Since the psion gene can be detected and is hereditary, it is possible to know who might manifest the powers but a true psion can only be detected by performing frequent tests during the early years. Therefore, families that carry the genes have to undergo frequent testing. Most psions manifest their powers by the age of ten, which means the early years are the most important for testing. If an individual with psionic powers is detected, he or she is assigned to the closest Psion Brotherhood office for induction and training.

Although screening people with the gene is an almost guaranteed way to detect psions, every once in a while a psion goes by undetected. These are known as Rogue Psions. Since a psion without training runs the risk of developing psychosis or violent behaviors, rogue psions are tracked and captured as soon as they are detected. The tragedy that caused the Psion Riots in Bay Jing in 2188 (see page 59) is the most somber example of how dangerous rogue psions can be. Some rogue psions have lived their entire lives hiding from the Brotherhood.

HOW PSIONIC POWERS WORK

As to how the powers themselves work, scientists have figured out that psions have the power to convert thoughts into energy waves emitted by their brains, waves that can affect subatomic particles. How powerful a psion's powers are depend directly on how many subatomic particles need to be affected



in order to generate the desired effect. For example, reading or influencing another person's thoughts requires affecting a few million subatomic particles in the other person's mind, and is thus a relatively easy power to use. This is called a "mental manifestation." The hardest powers to use are called "physical manifestations" and are those that cause effects such as moving objects in the air or pushing people. These require trillions of subatomic particles to be affected in the target object, and thus require large amounts of mental energy to use.

Since psionic powers ultimately affect the physical world (even if it is by affecting subatomic particles in another person's mind) several types of crude "psionic shields" have been developed. Powers with a physical manifestation are stopped by armor of the same type as when protecting against a knife or a bullet; powers with a mental manifestation can be stopped using specially-built psionic helmets, made of a substance so dense and tight that psionic energy has trouble crossing it and affecting the subatomic particles in the person's mind. These helmets are uncomfortable and still experimental.

As far as we can tell, powers with mental manifestations have no effect on any species other than humans. Tests with animals have not been successful in achieving any effect. Therefore we can assume only the human brain is affected by these powers.

THE BROTHERHOOD TODAY

SIZE AND INCOME

Today, the Psion Brotherhood is an established, respected organization with more than six million members among the Seven Worlds. It is sustained in part by a budget received by EarthGov, and in part by fees obtained for all services provided to humans by psions. Psions, for example, help local law enforcement solve cases; make interrogations easier and fair; Help keep business and political negotiations transparent; help patients traumatized by terrible situations; and many other things. Psychologist psions have become very common and effective in helping the population, and their success has accelerated their acceptance.

Confidentiality during these transactions and services is assured. All psions swear a special vow, called the Psion Vow (see below) that becomes a contract between the psion and society. Even so, after a psion gathers sensitive information in the course of their job (for example, after finishing a delicate negotiation), psions are themselves subjected to a touch from another psion to make them forget what they have seen and learned, if it is appropriate or necessary.

The Brotherhood supplements the income from these activities by also owning many businesses and services in industries where being a psion does not pose a perceived unfair advantage.

With the income it generates the Brotherhood pays for the upkeep of all its members, keeps its offices in working order, maintains its small fleet, and finances large amounts of research.

INFRASTRUCTURE AND ORGANIZATION

The headquarters of the Psion Brotherhood are housed in the aptly-named Brotherhood Station (see page 38). Located on the space elevator on Earth, 330 kilometers above the surface, it is the center of Brotherhood activity.

The Brotherhood also maintains offices in all worlds and in most large cities within them, and is constantly involved in humanitarian and development activities. The Brotherhood also has several research stations to further investigation on psionic powers.

The Brotherhood also has a small fleet of ships to support its activities in the Seven Worlds. However, psions for the most part are encouraged to travel in standard transports to stay more in touch with non-psions.

The Brotherhood is structured in several levels, with local leaders reporting to regional, planetary and finally central leadership. At the top of the structure stands the Leader of the Brotherhood. The Leader answers to EarthGov and to the leaders in all the planets, and his main goals are to keep the relationship between psions and non-psions healthy. The current leader of the Brotherhood is Ganendra Nathan, considered one of the most charismatic and successful leaders in Brotherhood history. His tragic history during the Psion Riots of Bay Jing in 2188 (see page 59) has only contributed to his legend.

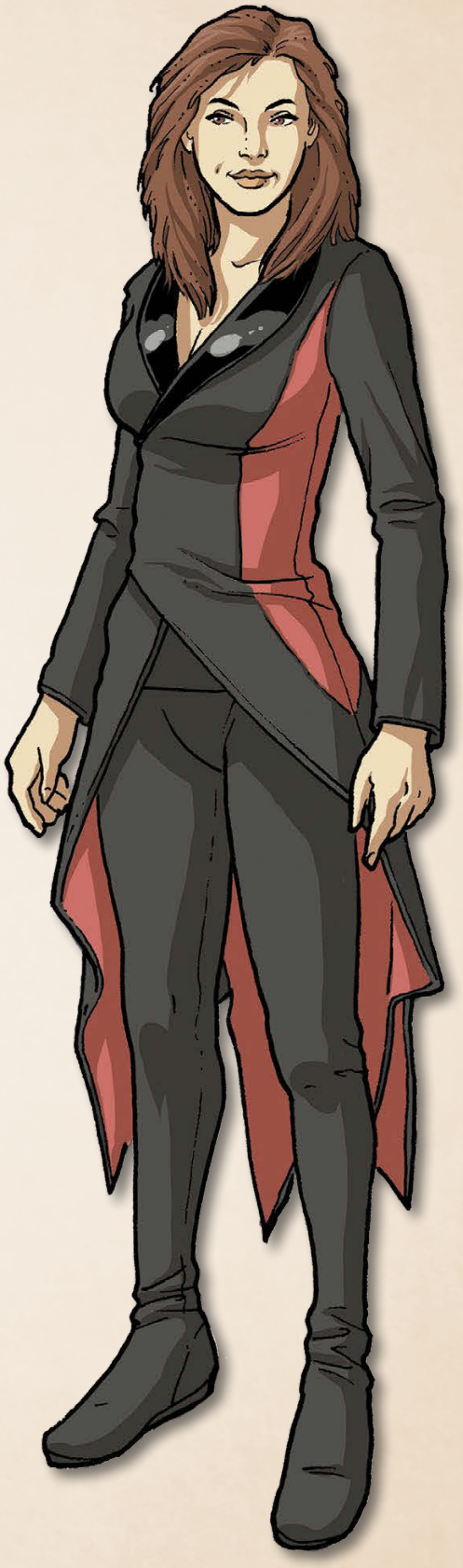
DAY TO DAY ACTIVITIES

Although psions must belong to the Brotherhood all their lives, pains are taken to ensure they are still an involved part of non-psion society. Psions still interact and frequently visit their friends and families, even if they are non-psions, and are expected to work strongly to gain their trust and be patient and approachable with them. Every psion knows that keeping the relationship with non-psions alive, healthy and free of mistrust is crucial to the development of human society.

Although psions on duty wear the official Psion Brotherhood white-and-light-blue uniforms, in day-to-day situations psions are encouraged to wear casual clothing appropriate to their location and culture, in order to make it easier for them to integrate

seela

Spoiled brat turned stealth thief
turned charming diplomat.



Seela Atherton was born in the heart of Melissant, capital of Concordia, to a very wealthy and politically connected family. She was the eldest of Lord Atherton's two daughters. The Atherton family was practically an institution in Concordia: An Atherton had been one of the leaders of the colonizing expedition to the planet, and thus had the choice of the best lands in the planet. Over the coming decades, the Athertons would only increase their power and influence. In short, Seela was powerful even before being born.

Lord and Lady Atherton knew how to play "The Game", as they called it: The complex mix of diplomacy, manners, social activities, and charm that allowed them to be in the center of things and connected with the most powerful and important people on the planet.

Into this exclusive world came Seela, and she arrived gifted with everything she could possibly want: A very attractive girl, with a sharp mind, lithe and athletic, and endowed by nature with a disarming charisma and social skills. Just the daughter Lord and Lady Atherton wanted. Of course, it didn't hurt that her parents could afford the very best genetic improvements for their children.

Seela, while a mischievous, active girl within her family, was perfectly comfortable keeping up her role, playing up the model child in social gatherings and formal dinners, charming the adults with disarming smiles and appropriate comments, displaying perfect manners, remembering every name. As a teenager and then a young woman, as her beauty bloomed, her splash on the social scene could only grow. Her ability to convince anyone of almost anything, while always keeping a smile, was the best display of negotiation skills her father had ever seen. The future looked bright for young Seela, and Lord Atherton began to think that his young daughter could take the Atherton family to even greater heights, possibly to interstellar importance.

Then came Aaron.

Seela first met Aaron when she was seven and Aaron was nine. He was the son of one of the stable hands in one of her family's summer houses next to the little village of Albigny. She had gone there on vacation for a few weeks, and had escaped the house to explore a river when she slipped and fell into the turbulent waters. Aaron came out of nowhere and pulled her out. Aaron was the only person Seela had known who

did not seem intimidated by who she was They spent the next few hours playing, then talking, and by the end of the evening, when one of the housekeepers finally came looking for her, they were already fast (secret) friends. He darted between the trees before the housekeeper saw him, but not before gifting her one of the orange-green daffodils that grew around the woods, one of the many mutated flowers brought from Earth.

Every single day in what was left of the vacation, and on every vacation afterwards, Seela found ways to escape her protectors and spend time with Aaron. He showed her a world that had been totally foreign to her. She learned to disguise her identity, change her clothes and way of walking and talking so she wouldn't be recognized as she visited Albigny and other nearby villages with Aaron, pretending to be just another village girl. She invented excuses to forget her lenses at home, or to disable them, and password-protected Chloe, her Assistant, to keep her from spilling out what she was doing. With Aaron she learned to fish, to feed pigs by hand, to swipe warm loaves of bread when no one was looking, to jump from tree branches and to climb house walls. Most of all, she learned how the world really worked, away from parties and diplomatic and social meetings, as she grew, Seela discovered she was different, Aaron had made her different. She of course kept on playing "The Game," as she was so good at it. But the thrill of misbehaving, of being someone else besides Seela Atherton, was too strong a pull. She kept going "on vacation" to their summer house (and to Aaron) as frequently as she could. And, before long, she was also walking the streets of Melissant, under an assumed name and identity, and mingling with whom his father would call "her inferiors." She particularly enjoyed sneaking into or out of places, sometimes by lying about her age to a security guard, or sweet- and fast-talking the muscle at a night-club, and sometimes by just walking up the ceiling and into a window, the way Aaron would. Her newly-acquired skills in disguising her digital identity and IDTag were invaluable during these escapades.

Space knows what would have happened if these reckless escapades had been discovered. Fortunately, she was talented enough to never be discovered and, who knows, maybe she could have kept at this for a long time. But when she turned nineteen things came to a head.

One day Chloe brought her urgent news from Aaron's feed, where she secretly followed Aaron, as he followed her. Aaron had been arrested in Albigny. It should not have been a big deal (out of curiosity he had broken into a house to steal a bowl of a delicate, expensive dessert about to be exported to Earth; nothing she couldn't have procured for him with a snap of her fingers, had he asked), but by the time he was discovered things took a turn for the worse that ended with several wounded guards and a burned-down shop. Now he was sure to go on trial and to jail. Seela immediately went to help him and in doing so broke the unspoken but sacred rule in her family: Don't make a scene. She, practically a Princess of Concordia (if such a thing existed) got involved pulling favors, using her name, charms, skills and money to get some unknown low-class boy released from jail. While she got what she wanted, she was not able to control the uproar or the gossip, and soon enough the Athertons became the kind of news they had always worked hard to avoid. Why had the daughter of Lord Atherton done that? Who was the boy? Is there some juicy, embarrassing secret here?

Lord Atherton did what he did best to control the damage: He pulled in favors from press, media, politicians and celebrities, and silenced the media with nothing but a rumor or two leaking out. Then,

SEELA

Rank: Novice (Alpha-level Officer)
Attributes: Agility d8, Smarts d6, Spirit d4, Strength d6, Vigor d6
Skills: Fighting d4, Investigation d6, Notice d4, Persuasion d6, Hacking d6, Shooting d8, Stealth d8
Cha: +2; **Pace:** 6; **Parry:** 5; **Toughness:** 7 (2); **Mental Toughness:** 4
Hindrances: Zero-G Sickness, Death Wish (Will risk her life to discover what happened to her more-than-friend Aaron), Quirk (Minor): Always needs to look great and clean. Even if dressed in simple clothes, or disguised and undercover, takes pains to make sure her disguise or undercover clothes are immaculate.
Edges: Acrobat, Attractive, Diplomat
Gear: Assistant, Enhanced Autopistol (Range 12/24/48, Damage 2d6, AP 1, Semi-Auto, 20 bullets, can fire 1 explosive round), Explosive round (Damage 2d8, AP 4), Combat Knife (Damage Str+d4), Reinforced Vacc Suit (+2/+4, protects Arms, Legs, Torso; spacesuit); 2 Bloodstoppers.
Notes: Homeworld Concordia (begins with the Diplomat Edge)
Assistant Name and Gender: Assistant Program 3, "Chloe," Female.
Assistant Skills: Persuasion d4, Hacking d6

trembling with rage, he and his wife met their daughter behind closed doors. The conversation was violent and terrible. Now very suspicious, Lord Atherton had ordered his aides to dig up all V-World records for Seela, and pieced together the truth: The visits to Aaron, the fascination with the summer house, the "misplacing" of her lenses, the password-locking of her Assistant and connection records, the geo-positioning information, the secret visits to the underbelly of Melissant, everything. Many of the words said that night could never be unsaid, the damage irreparable.

Aaron, knowing how easy it was for Seela's father to call up a favor from some police big-shot and jail him on any excuse, had vanished as soon as he was set free. However, as Seela walked into her room that night, she found an orange-green daffodil on her pillow, his last thank you and good-bye. At that moment Seela made her decision.

She had many times heard her father and his political cronies talk about The Circle in unfriendly terms. Although the Circle's position and respect among the population was strong, grounded by the history of that institution and its participation in the founding of Concordia, the fact that they took a neutral position in the conflict with Bay Jing a few decades ago still angered the powers that ruled Concordia. Sooner or later they thought the Circle would become a thorn on their side, maybe as the inevitable second conflict with Bay Jing approached.

So the very next day Seela took some simple possessions and jumped on a ship to Earth to join the Circle (Circle Headquarters is in Concordia, but Seela knew she first needed to go beyond her family's immediate reach). She made sure to leave several farewell video recordings to her parents, friends, and important political acquaintances. These smoothly-written messages cheerily explained "the family's decision" to have her join the Circle as a way, requested by her and approved by her father, to learn more about human space to "broaden her horizons and thus the future of her family." The alibi was so skillfully written and acted that it made it very easy for her parents to continue the charade, painting this as a logical family decision. Her mother could roll up her eyes with her friends, commenting on "you know teenagers, how these wild children need to see the world" while the other ladies approved.

Her father was furious, of course, not the least with the fact that she chose to join the Circle specifically to spite him. But she had not broken the sacred rule, and had played The Game to the end. The family's name had been protected. But Seela knew that things had been broken, and she could not return easily.

When she got arrived at Earth the Circle, always in need of officers with negotiation and diplomatic skills, immediately accepted her. She's trained for a few months and finds her new lifestyle liberating and very fitting of her recent rebel ways. Her charisma and talents have allowed her to rise fast in the organization, and she is about to be given her first real missions with her new team.

And yet she knows her travels will take her to Concordia; Circle HQ is there, after all. There will come a time when this lowly Circle officer will have to face the fact that she is heiress to one of the largest fortunes in human space, and to a leading position in the ruling elite of the most powerful of the *Seven Worlds*.

Besides, there's Aaron to think about. He surely must be somewhere.

APPEARANCE

Seela is an attractive brunette about to turn 20. She is a bit taller than normal. She has a thin body, and does not look muscular, but is agile and athletic. She is usually smiling, in full "charm-on" mode. On duty she's usually dressed in immaculate Circle vacc suit uniform, but she has a wardrobe of very expensive clothes for every occasion, which she wears as soon as she disembarks. She does not dress too formally unless it's necessary, and usually prefers clothes that do not step in the way of an emergency romp on the roofs. She never wears anything "inappropriate" or suggestive, even if it could give her an advantage. Even so, because of her taste in clothing and fashion she always looks nothing less than spectacular. Although Circle regulations require her to carry a gun, she usually tries to keep it hidden within her clothes unless it is indispensable to carry it in a visible place.

SEELA'S ASSISTANT: "CHLOE"

Chloe, Seela's Assistant, looks and acts like a "best friend" and confidant attractive girl from Concordian high society. Elegantly dressed, Chloe is extroverted, curious, nosy, and prone to inappropriate comments. She's always advising Seela on how she looks and how she dresses. In the rare occasions when Seela needs it, though, Chloe can become serious and all-business.

with non-psions. They are required to always be easily identified by means of a pin with the Psion Brotherhood symbol (two open hands) or a light-blue sash, so no-one mistakes the fact that he or she is dealing with a psion.

ON-LOANS

For almost two hundred years the Brotherhood has kept a special agreement with the Circle Foundation. Under this agreement, psions can temporarily work within the Circle as temporary members, called "On-Loans." This agreement dates from the time of Michaels and William Donovan, who agreed that psions should always be an involved part of the Circle, but should never belong to it.

No one knows exactly how or when Donovan and Michaels jointly decided this, especially since by the time the Brotherhood was founded they were already less than friends, in part because of their difficult relationship with Melissa Fischer. Lore tells that it was Fischer herself who mediated between them and made them grudgingly reach the agreement. In any case, the agreement has been respected, although psions usually don't want to become "On-Loans" and Circle crews usually don't want psions with them. It is only out of respect for both founders that the agreement still stands and is still periodically used.

THE PSION VOW

The Psion Vow is at the heart of everything psions do when they interact with non-psions. Originally proposed by Michaels as a way to clearly define what psions could and could not do, the Psion Vow is so important that the penalty for breaking it without a very good reason (after a trial) is death.

The Psion Vow says:

> *Psions and Non-psions are together. There is no one without the other, and there never will be. Therefore, I hereby vow that:*
>
> *I WILL NEVER: use my psionic powers against any individual; use my psionic powers without informing all involved parties; or reveal any information obtained using my psionic powers,*
>
> *UNLESS: I see a morally and ethically defensible reason to do it; it has been requested by my authority; AND it has been requested by the individual, or the individual's authority.*

The vow has been carefully worded to include safeguards for both the psion and the target of the psion's powers. Because of this, most suspicions of unauthorized scanning or "thought police" have been minimized, since the psion, the Brotherhood and the target's authority would have to agree that it is needed in order to proceed.

On top of these safeguards, there are a carefully codified scenarios to describe "morally and ethically defensible reasons" and other particular situations. Even so, grey areas always appear, and it is the Brotherhood's job to interpret the Vow and reach a satisfactory agreement for everyone. For example, if a psion is pursuing a fleeing criminal, and can stop him with a psionic power, should he or she do it? The answer is that if a common citizen would have grounds to try to stop the criminal, the psion would have the same grounds.

Despite the risks, the Psion Vow and its promise of protection and restriction to psionic power has been extremely useful in keeping the trust between the non-psion population and the psions in the Brotherhood.

SPACE COMBAT

As Humanity has moved into space, the likelihood of space warfare has increased significantly. In fact, with one interstellar war already under its belt and many day-to-day engagements, space combat is real and dangerous.

What follows is a description of how spaceships engage in combat in the 23rd century.

THE REALITY OF SPACE COMBAT

Space Combat in the 23rd century is significantly different from what people saw in movies and other forms of entertainment in the 21st century.

RANGE

Space battles are fought at ranges of tens of thousands, hundreds of thousands, and sometimes even millions of kilometers. These are not "window port distances" where a captain can look out the bridge window and "see" the enemy ship. There is nothing to see except what the computer simulation screen or V-World combat grid tells the crew.

In most space combats there is a clear line of sight between the adversaries, making exact position and maneuvering less relevant than in other types of conflicts.

At these ranges, the limits imposed by the speed of light become critical. Distances of just a few light-seconds can change the course of the battle, and can sometimes affect a ship's perception of what is going on.

THREE DIMENSIONS

Space is three-dimensional, and not subject to the restrictions of gravity. The enemy can not only attack from the front or back, or the sides, but also from "up" or "down." Therefore, any crew that relies on a two-dimensional screen to plan space combat is prone to losing.

To compensate for this, most crews are connected during combat to a V-World simulation that represents the position of all allies and adversaries in three dimensions and allows them to organize strategy appropriately.

NEWTONIAN PHYSICS

In space there is no air and no atmosphere. Therefore, vessels traveling through space do not behave the way airplanes do on planets such as Earth. There is no swooping, banking, or turning-on-a-dime. In fact, a ship can theoretically accelerate forever until the hard limit of the speed of light is reached.

Ships also do not have to travel in the direction the ship's nose is pointing. They can turn around in space and move "backwards" with no problem at all. Since there is no atmosphere to cause friction, the ship does not need an aerodynamic shape in order to move. That's why most ships in the 23rd century are spherical, so as to maximize their volume while minimizing their surface against attacks.

Since there's no friction, a ship that accelerates to a certain speed in a certain direction can theoretically continue moving forever, without ever stopping. In order to change course or turn around it is necessary to use the engines to accelerate in a different direction in order to change course or stop. For this reason most ships have to be careful to keep some power (called "Delta-V" in technical lingo) available for maneuvering.

UNMANNED SHIPS

The fact that battles can be decided at large distances and with no obstacles to line of sight, coupled with the advances in computing technology, means it is not always necessary to have humans guiding ships. It is more practical to have automated, unmanned ships dedicated to laser or missile fire. These unmanned ships are equipped with claytronic technology (see page 82) to self-repair if possible and appropriate, and can be remotely controlled by a central command unit, maybe a manned battleship or cruiser.

While ships with human crews flying on their own have the appropriate mix of life support structures and weapons, armies and fleets have a more unusual structure consisting of a combination of manned and unmanned ships in a three-dimensional distribution, with the manned ships being at the center (or slightly off-center) of this structure.

Engagement between space fleets many times consists of an interchange of unmanned laser beam fire, with the human crews only getting involved to direct the battle, if repair work is needed (not common), and if the situation has degraded to a point where humans must engage other humans.

HEAT

As previously explained (see page 26), heat accumulation is dangerous for any ship. In space combat, with a ship's engines working at maximum while its powerful lasers fire incessantly and its Coulborne Shield sustains hit after hit from enemy fire, heat accumulates quickly.

Heat radiators are critical for radiating heat into space; however, heat radiators are the most vulnerable part of any ship. For this reason, most ships in combat hide their radiators and instead rely on their Coulborne Shield as a heat sink, thus making heat accumulate

NEWTONIAN PHYSICS AND MOVEMENT IN SPACE

Ships in space do not move the way we are accustomed to on Earth. Specifically, once they reach a certain speed, they keep moving in a straight line at that speed almost infinitely (unless they are affected by the gravity of another object, but these are exceptions).

The two major implications of this are:

- Spaceships don't need to keep their engines on to keep moving. As soon as they reach the speed they want they can turn off their engines and cruise.
- Spaceships can't stop just by shutting down their engines. Instead, they need to decelerate, by using their engines in the opposite direction to their movement until their speed approaches zero.

These two implications make spaceship movement behave less like a zippy jet fighter and more like an 18-wheeler trying to do make a sharp turn. The reason for this is that on Earth we have friction acting against the vehicle: The ground's friction against a car's tires, the sea's friction against a boat's hull, and the air's friction against an airplane. The vacuum of space gives negligible friction against a starship.

even faster. This can cripple or even destroy the ship. Ironically, more than one space combat has been turned on its head when the "victorious" ship has exploded or had to surrender to the "losing" ship because of heat related problems.

STEALTH

Since there is no stealth in space, in most cases it is impossible for a ship or fleet to sneak up on one another. Therefore, most tactics related to surprise are irrelevant in space. Ships know hours or days in advance when and where they will meet their adversary, and usually tailor their strategies to that. For example, some ships accelerate wildly in an attempt to give the enemy just a few seconds to attack, and not enough time to turn around and pursue, turning combat into a "hit-and-run" engagement. Others just attack with long range laser beams trying to end the engagement quickly.

There are two places where stealth may play a part, however: in planetary orbit, and next to jump points.

PLANETARY ORBIT

When ships engage close to a planet, the planet itself may act as cover. Given that ships next to a planet are in orbit around it for gravitational reasons, the tactics for the engagement change significantly, with ships meeting many times as they circle around the planet. Missiles fired from the surface also become a serious risk.

Taking advantage of the protection that the states in Nouvelle Vie give to ships fighting against their enemies, some ships with atmospheric capability perform orbit attacks and then quickly descend to the surface, where they are untouchable and protected by the country itself.

JUMP POINTS

The membrane around jump points to other star systems works as a perfect cover for many attacks. A ship can stay right at the other side of a jump point and blast its enemy as soon as it jumps into range. Since the crew in a ship that has jumped experiences a short time of disorientation, this kind of ambush is even more effective in reducing the opponent.

To protect against this, the Stellar Communications Network (see page 21) performs frequent surveillance on both sides of a jump point, and keeps the ships on one side informed of what ships are approaching on the other side. This leaves star systems without Stellar Comm Network coverage as places where this tactic can work. For this reason, the long route to Logan's End is still a dangerous path, and ships are advised to take their precautions.

About the only bright side for the victim of a jump point ambush is that the opponent doesn't know who is approaching, either. More than one would-be pirate has been reduced by a far more powerful vessel that just jumped.

WEAPONS IN SPACE COMBAT

There are many types of weapons available for spaceship combat. All are deadly. Without a Coulborne Shield to protect them, most ships would not withstand more than one or two attacks by any of these weapons.

In general, space weapons in the 23rd century can be divided into four types: Beam Weapons (both laser and particle), Missiles, Coilguns and Projectile Clouds.

BEAM WEAPONS

Beam weapons work by emitting large amounts of focused energy at a target. This contrasts with weapons such as guns or missiles, where it is the projectile that does the damage (in the case of guns, the projectile is a bullet; in the case of missile launchers, the missile itself).

Beam weapons are useful during space combat because **they are extremely difficult to avoid, even at long distances.** Laser beams travel at the speed of light, meaning that hitting a target 300,000 kilometers away takes just one second. Plus, by the time the target has noticed the opponent has fired, the shot has already hit. Plasma beams are slightly, but not significantly, slower.

Another point in favor of beam weapons is that **they inflict a lot of damage.** Since beam weapons can focus energy on a single small point, that energy beam is very powerful. For example, a typical 23rd century laser can burn through one millimeter of hull of an enemy shield per second, 160,000 kilometers away!

Finally, beam weapons **can be focused to cover a large enemy area if necessary.** In this scenario, beam weapons do far less damage (since their energy is distributed in a wider beam), but still can cause medium burns to enemy systems, such as sensors.

Laser beam weapons can also be used as defense mechanisms against missiles, projectile clouds, and other types of attacks. When a laser is used in this way it is called a **Point Defense Laser Battery** (see the section on Defenses below)

Unfortunately, beam weapons have several disadvantages. First, **beam weapons generate large amounts of heat.** In an environment in which getting rid of heat is critical and difficult, having weapons which generate more heat than can be radiated is problematic. Also, **when a beam weapon overheats,**

it may stop working until it cools down. This may be fatal during a space battle.

Second, **beam weapons require large amounts of energy.** Many other ship functions, from engines to shields, require energy. Having weapons that consume a lot of energy may mean the ship has fewer defensive or movement options.

It was mentioned above that laser beam weapons could be used as defensive mechanisms. A disadvantage of doing this that since it's the same laser beam that's used as an offensive or defensive weapon, it cannot be used for both attack and defense simultaneously. During the heat of battle the use of a laser as an offensive or defensive weapon must be carefully weighted by the crew.

TYPES OF BEAM WEAPONS

There are two main types of beam weapons: Laser Beams and Particle Beams.

Even though their name comes from their ability to "fire light" (the acronym Laser means *Light Amplification by Stimulated Emission of Radiation*), Laser Beams can emit almost any kind of electromagnetic energy, from infrared rays to X-rays and beyond. Laser beam cannons are designed with a specific frequency of energy in mind. Most modern laser cannons currently emit X-rays, which means their emissions are invisible to the human eye.

Particle beams are different in that they release particles with mass. Particle beams can cause even more damage than laser beams, and penetrate deeper into the hull. However, they have a much shorter range than lasers since the particles disperse faster.

Most current starships have at least one laser or particle beam weapon. Having one becomes a necessity when your opponent has one and thus can cripple you from light-seconds away. Currently the only defense that truly works against laser beams are Coulborne Shields, which absorb most of the beam's energy and turn it to heat which can be radiated at a later time.

A few truly daring gunners have devised a different kind of counterattack against laser beams: They wait until the enemy is ready to fire their laser and then beat them to the punch, shooting their beam straight into the barrel of the enemy's (open) laser beam generator. This overloading could generate a titanic explosion and could even destroy the enemy ship in a single blow. This mythical shot (nicknamed the "Crazy Lazy" by cadets at the Academy) is so difficult to achieve, though, that there are only a handful of recorded instances where it has been successful. It is much more likely that this counterattack is the reckless gunner's last.

MISSILES

Missiles are weapons propelled by their own rocket engines. While missiles may look weak compared to beams, they can be just as deadly when used correctly.

Missiles are useful weapons for space combat because, unlike beams, **missiles can change direction and speed to follow the enemy.** This makes a difference when dealing with an enemy that is actively trying to avoid your attacks.

Every missile carries a payload, which inflicts most of the damage. The fact that missiles can carry different types of payloads means **missiles can cause a variety of effects on enemy ships, depending on their payload.** Smart crews use this to their advantage by crippling enemy ships in different ways to make them more vulnerable to their attacks.

Finally, **missiles generate very little heat for the ship to radiate.** Since most of the propulsion needed by the missile is generated by the missile's own engine, heat radiation from the ship itself is minimal. The combination of less energy and less heat means ships can shoot far more missiles during combat than they can use beams.

On the other hand, missiles have several disadvantages when compared to other weapons. Perhaps the most important one is **that missiles are significantly slower than beams.** While a beam can cover hundreds of thousands of kilometers in a second, a missile moves as fast as its engine allows it. As an example, a missile that tried to approach the speed of a beam would need to accelerate for more than eight straight hours to do it! This is obviously more than enough time for an enemy ship to avoid the missile. Because of this, **missiles can only be used at relatively short range** from enemy ships.

Taking advantage of these speed limitations, enemy ships have several defense systems to stop missiles. The most common ones are Point Defense Laser Battery systems (laser beams used as defense rather than as weapons) and Mine Cloud Defenses. Both of these are explained in more detail in the sections below.

Finally, since missiles occupy space, **there is a limit to how many missiles a ship can carry.** This means missiles must be used wisely and carefully to gain the most advantageous effect.

MISSILE PAYLOADS

As stated above, missiles can carry several different types of payloads.

Kinetic Missiles are missiles where there is no payload other than the missile itself. There are many scenarios where this is more than enough. At high enough speeds the impact of these heavy missiles can

cause large amounts of damage due to kinetic energy. Kinetic missiles are attractive because they are the cheapest missiles available but can still do significant damage. Given that kinetic missiles cannot be easily distinguished from missiles with other payloads, many leaders like to send volleys of kinetic missiles mixed with other types of missiles to confuse the enemy and dilute their defensive activities.

Nuclear Missiles are missiles with a nuclear bomb as a payload. In the 23rd century, most nuclear missiles are powered with fusion bombs, capable of causing large amounts of damage. When they hit the enemy ship, nuclear missiles generate large amounts of energy, most of it in X-rays (which the Coulborne Ship partially absorbs). Nuclear missiles are extremely dangerous to the ship and crew. Due to their particular configuration, no more than one or two nuclear missiles may be fired simultaneously.

Neutron Missiles are missiles equipped with special fusion-fission thermonuclear warheads especially designed to generate large amounts of neutrons. These do not cause a lot of damage, but can penetrate the Coulborne Shield and the ship's hull and cause high levels of radiation exposure, poisoning the crew. This may incapacitate the ship from within. More than one battle has been won not by destroying the ship but by killing the crew inside.



Non-Nuclear Electro Magnetic Pulse (NNEMP) Missiles carry payloads designed to disable or damage the electronics that control the ship. Combining chemical explosives and special electronics, NNEMP generators create a pulse that fries most electronic devices, crippling or paralyzing enemy ships. Modern ships have redundant electronics and emergency automated repair procedures against such attacks, but the seconds or minutes lost repairing the ship may mean the difference between life and death.

COILGUNS

Coilguns solve some of the limitations of missiles by making it possible to launch large projectiles at enemy ships at very high speeds.

A coilgun consists of a series of doughnut-shaped electromagnetic coils arranged in a straight line. A projectile built out of a material affected by magnetic fields is inserted into the coilgun. As the projectile passes one of the coils, the coil is charged with a magnetic field that repels it; simultaneously, the next coil is charged in such a way as to attract the projectile. When the projectile passes this coil, its charge is reversed so that it repels it and the next coil attracts it, and so on. This process continues with every coil in the gun until the projectile is ejected at a very high speed at the other end. It should be noted that the projectile never touches any of the coils, it just hovers between them, thus experiencing negligible friction.

Coilguns are an interesting alternative to missiles since **coilguns can deliver much larger payloads than missiles.** Since the projectile does not need to devote space or mass to engines or fuel, practically the whole projectile is payload. This means projectiles launched by coilguns cause significantly more damage than missiles. Coilgun projectiles can contain any of the types of payloads missiles can handle (see the section on missile payloads above).

Another advantage of a coilgun is that **projectiles launched by coilguns are so fast that the enemy finds them hard to avoid** when compared to missiles. This advantage is somewhat diminished with the fact that coilgun projectiles travel in a straight line compared with missiles, which can change course to follow and hit a target.

The greatest disadvantage that coilguns have is that **they consume large amounts of energy, thus generating significant heat.** This means that the attacking ship must be ready to radiate a lot more heat, or use coilguns with less frequency to keep the ship from overheating. Also, coilguns can jam because of overheating, this becoming temporarily unusable.

Due to the length of the barrel needed to shoot projectiles effectively, **coilguns can only be mounted**

STEALTH IN SPACE

One of the many things that makes space battles unique is that it is simply not possible to hide in space. Spaceships in TV and the movies perform many tricks to hide and sneak up on their enemies, such as turning off their engines and cruising, hiding behind an asteroid, keeping their distance from the enemy or turning on their "cloak." These don't work in reality.

The first problem is that space is cold, and ships are not. The exhaust of a ship can easily be seen from far away. The Space Shuttle's maneuvering thrusters could have been seen from the Asteroid Belt, and its main engines could have been seen all the way from Pluto. The Voyager 1 probe can be picked up by Earth telescopes in one second, despite being 18 billion kilometers away and sending just a 20-watt signal, the equivalent of a fridge light bulb. Now imagine the immensely powerful fusion engines of the future, millions of times more powerful than the Space Shuttle's. Barring the time lapse of the speed of light, they could easily be spotted from another star system.

Then there's the fact that heat is detectable, if not in the visible light spectrum, then in infrared. Even if a ship had no exhaust from its engines, the 20-degree Celsius temperature needed for humans stands in contrast to the -270° Celsius of the vacuum of space.

But can a complete sweep of the sky be done fast enough? With current technology scientists estimate a complete sweep of the sky could be done in about four hours, far less time than it would take an enemy ship to get close enough to attack. In the future we can expect this detection technology to become even better and faster.

When a ship's exhaust plume is detected, the rules of physics allow the defender to learn many things about the enemy ship: Its exhaust velocity, engine mass flow, engine power, thrust, acceleration, mass and course. Given all this information, the defender could deduce what type of ship the enemy is. In fact, this makes it very difficult to use decoys to simulate the ship isn't there, as the decoy would have to have practically the same physical characteristics (and cost) of the original ship.

What about hiding? It is possible for a ship to hide behind a planet and some other appropriately large body? The problem is leaving the hiding place close enough to the enemy ship to be able to attack it before being detected. This is practically impossible given planetary sizes. In movies and TV sometimes ship hide behind or inside nebulae, but in reality these are so thin and faint they wouldn't even be seen when up close.

So in short: No stealth.

In *Seven Worlds* the only possible place to hide is right next to a jump point. Since the enemy ship appears instantaneously it can be surprised by a ship waiting just at the other side, ready to ambush. That's why the Stellar Communications Network is so important as a detection and protection system. Also, the Coulborne Shield does not provide stealth; its energy can be detected from far away.

on the largest spaceships. Typical standard ships usually are too small to equip a coilgun.

Projectiles launched by a coilgun can only be avoided, or stopped by Point Defense Laser Battery systems. Mine Cloud Defenses are ineffective against coilgun projectiles because of the projectile size.

PROJECTILE CLOUDS

A Projectile cloud is a weapon composed of between thousands and millions of small projectiles simultaneously aimed at the enemy. Any small fragment of the cloud can only do moderate damage, given its kinetic energy; but there are so many of them that it is very difficult for the enemy to shoot them all down before some of them hit. Clouds, therefore, have become an effective method of overloading and counterattacking a ship equipped with powerful lasers.

The main advantage of this weapon is that **projectile clouds have the potential to saturate even the most powerful Point Defense.** Beam weapons need to be recharged and overheat easily; destroying thousands or millions of tiny projectiles takes time, and some projectiles will inevitably escape and hit their target. Sometimes random fragments in the projectile cloud have some kind of payload that makes the cloud itself even more dangerous.

Projectile clouds are useful to the attacker even if they are destroyed, as **the debris from the fragments can act as a shield against counterattacks.** The debris just piles up, acting as cover to the ship and slightly reducing the line of sight advantage.

Finally, **projectile clouds generate very little heat.** When compared to alternatives such as beam weapons, projectile clouds are not much more than a bunch of lumps of mass, moving towards their enemy at relatively high speeds.

On the other hand, **projectile clouds inflict less damage than other weapons.** Even considering the kinetic energy of the cloud, each fragment has less mass than a missile, and significantly less energy

than a beam. If many fragments impact an enemy ship damage may still be significant.

Also, **projectile clouds are only effective when used at the appropriate range.** Launch the projectile cloud too far away from the enemy and they will have enough time to shoot down most or all the fragments before they hit. Launch it too close, and the projectile cloud will not have enough time and space to expand, thus presenting comparatively few targets for the enemy to shoot down.

The most effective way to counter projectile clouds is via Point Defense Laser Battery systems. These do the job of bringing down as many fragments as possible in as little time as possible. Mine Cloud Defenses are also useful in stopping fragments, but not as effective. Both of these types of defenses are explained in more detail in the sections below.

EMP AND HOW IT WORKS IN SPACE

An Electro-magnetic Pulse (or EMP) is a short burst of electromagnetic energy that known for its propensity for frying electronics and electrical equipment.

People normally assume EMP is generated by a nuclear bomb that explodes in the high atmosphere of the planet and generates the deadly pulse. While this is correct, it should be noted that this kind of EMP (known as a High-Altitude EMP) requires the nuclear explosion to occur in a magnetic field and an atmosphere. In the vacuum of space, therefore, nuclear missiles will not generate an EMP when they explode.

To generate an EMP effect in space, it is necessary to use an e-Bomb, a bomb equipped with special chemical explosives. This is called a Non-Nuclear EMP (NNEMP) and is orders of magnitude weaker than its nuclear counterpart, but still can cause significant electronic damage.

More and newer sources of EMP are sometimes discovered. Recently scientists have begun suspecting that micro-meteoroids in orbit are being turned into plasma when they hit a satellite, releasing a radio-based EMP that fries satellite electronics. This may explain satellite failure rates because of electronics failures.

In *Seven Worlds*, nuclear based EMP is not used for obvious reasons. Instead, NNEMP missiles explode very close to the target, thus maximizing EMP damage to enemy ships.

Projectile clouds are usually kinetic, that is, they have no special payload. However, some projectile clouds contain fragments equipped with nuclear payloads, neutron payloads or NNEMP payloads. The effects of these payloads are similar to those described in the missiles section above. It should be noted that the damage inflicted by these payloads is smaller than in the case of missiles, given that fragments are much smaller than missiles.

DEFENSES IN SPACE COMBAT

No ship can hope to withstand an attack by the powerful weapons described previously without equally powerful defenses. Crews of 23rd century starships who want to die of old age should always keep in mind the First Rule of Space Combat: Don't get hit.

Being able to avoid as many enemy attacks as possible is crucial to surviving a space battle. With laser beams that travel at the speed of light and ultra-fast missiles this is in most cases impossible. But it should always be attempted first.

What follows is a description of the main defense mechanisms available to spaceships in the 23rd century.

POINT DEFENSE LASER BATTERIES (PDLB)

Given how fast and powerful laser beams are as an offensive weapon, it would only make sense to take advantage of them as a defensive weapon, too. Although effective against missiles and coilgun projectiles, PDLBs are at their best against projectile clouds. In fact, they are the only defense that stands a chance against projectile clouds.

When a laser beam is configured as a Point Defense Laser Battery, it's firing pattern changes. Instead of focusing a long beam on one or two spots, it starts firing dozens or hundreds of beams per second at as many detected targets as possible. The goal is not to destroy few targets but to disable as many targets as possible.

As explained in the section on beams, Point Defense Laser Batteries generate significant amounts of heat. This makes them a defense that must be used carefully.

Point Defense Laser Batteries can be used against projectile clouds, missiles or coilgun projectiles. They are ineffective against enemy laser beams.

MINE CLOUD DEFENSES

Mine Cloud Defenses are similar to projectile clouds, but have a different purpose: Instead of being designed to fly towards the enemy and cause damage,

ARE SHIELDS POSSIBLE?

Shields are a staple of science-fiction shows and movies, but have no grounding in reality.

In science fiction a shield behaves like an invisible wall that provides protection against both kinetic weapons (missiles) and energy weapons such as lasers. There are several factors that complicate this in real life.

- Kinetic attacks and energy attacks have to be stopped in fundamentally different ways. For example, a missile might need to be melted, shot at, or simply faced with armor strong enough that makes it explode without any damage. Laser attacks, on the other hand, could be stopped by using a photochromatic surface that deflects the beam.
- Although force fields of different types are possible (think of the field that keeps two magnets from joining) their strength increases as the object approaches the source of the field. Therefore the object is feeling the effects of the field long before it meets its strongest point. In science fiction, a shield behaves like a "wall of energy" that suddenly stops the enemy attack.
- Assuming a shield were possible, the energy needed to stop an enemy attack would have to be higher than the enemy attack itself. Given that the shield covers the entire ship, the energy expenditure for keeping such a shield up would have to be significantly higher than that for the attacking weapon itself. The heat that this shield creates would have to be managed, too.
- A little-talked-about detail of shields is that, since for every action there must be a reaction, when the shield absorbs the force of an enemy missile the defending ship should slow down. If the shield generator is physically attached to the defending ship and the enemy missile is strong enough, the shield generator might even conceivably be torn out of its holding!

Some current ideas of how to build a shield in the future assume a shield will actually be composed of several different layers designed to affect different types of attacks. The outer layer could be a plasma window kept at a temperature that would melt enemy kinetic weapons. The middle layer could be composed of laser weapon arrays to vaporize any surviving projectiles. The inner layer could be an invisible mesh of super-strong carbon nanotubes designed to stop whatever went through the outer two layers. And if this mesh also had photochromatic characteristics, it could change to stop or deflect laser attacks. Needless to say, this multi-layer shield is much more complex than what we are accustomed to in science fiction.

The Coulborne Shield, the shield technology used in *Seven Worlds*, is a non-realistic invention to handle both shielding and heat management. Loosely based on the Langston Fields used by Larry Niven and Jerry Pournelle in their CoDominion novel series, it is a black energy sphere around the ship that absorbs both kinetic and energy attacks, and stores them for later radiation.

they are designed to act as obstacles and deflect as many enemy attacks as possible. This is achieved by configuring the mines in the cloud so that they try to put themselves in the path of enemy missiles or individual projectiles in a projectile cloud, and deflect them by blowing up at the appropriate range.

These mines do not need to touch the enemy missile or projectile to explode; rather, they constantly detect their environment and try to make small adjustments to their position and direction. Whenever one of them detects the enemy projectile at a close enough distance it explodes, hopefully blowing it up or changing its course.

Mine clouds usually coordinate their activities via instant communication. They have smart algorithms that allow them to divide up their targets in the most efficient way possible. For example, mines can independently decide to focus their explosions on a single missile, thus causing a larger explosion that might have a better chance of disabling the enemy. This activity is automatic, without intervention from the crew. Mine clouds also have immediate communication with the ship's computer, so their deflection activities can be synchronized with any evasion maneuvers performed by the pilot.

Mine clouds are very effective against missiles, are partially effective against projectile clouds (due to the number of projectiles) and don't work against coilgun projectiles (the larger projectiles are harder to deflect). They generate small amounts of heat when launched.

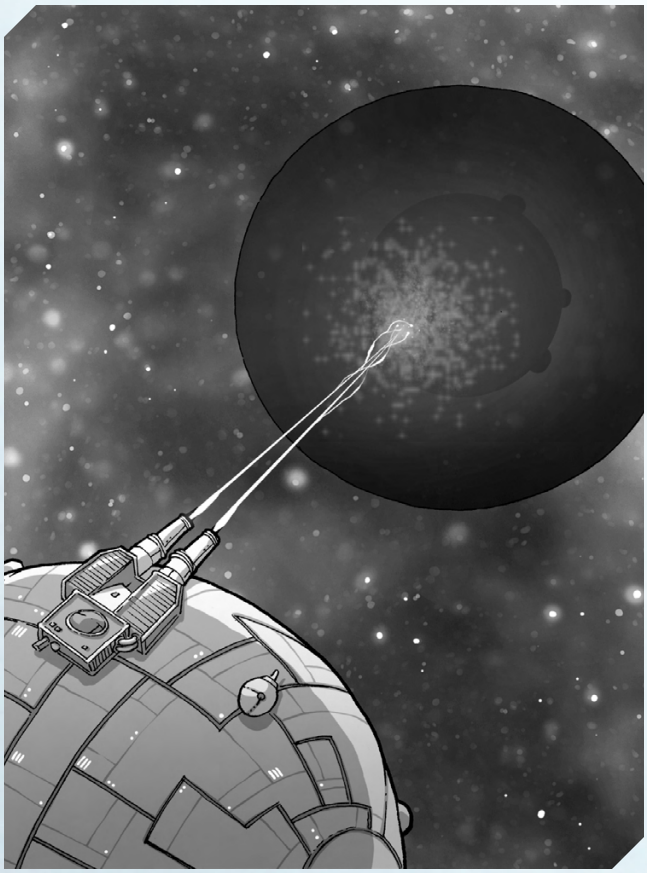
COULBORNE SHIELD

The Coulborne Shield is the next-to-last and most important line of defense against enemy attacks. Originally created as a way to contain fusion reactions to make fusion engines possible, the Coulbourne Shield is now a critical part of space combat defense. Because of its ability to absorb energy, a Coulborne Shield is

usually deployed just before the space battle begins, and in this configuration looks like a giant black sphere of energy that surrounds the entire starship. Whenever an enemy attack hits, the Coulborne Shield attempts to absorb all or most of the energy (kinetic, nuclear, X-ray) of the attack. Coulbourne Shields also behave as a "heat sink," meaning they temporarily store the enormous amounts of heat received and generated during battle without destroying the ship. As energy and heat accumulates in the shield, the sphere's color begins to change, from black to red all the way to blue.

The Coulborne Shield is synchronized with the ship's weapons and defenses so that when one of them fires the shield flickers out for a few milliseconds and then flickers in again after the shot has gone through. There are also periodic openings of parts of the shield so that the cameras and sensors can see what's happening outside. As small and short-lived as they are, these holes weaken the Coulborne Shield's defenses, and are the reason why ships in combat usually receive some damage, even with the Coulborne Shield on.

During combat the crewmember in charge of the Shield (known as the Coulborne Engineer) can fine tune it for different uses depending on how the battle is going. These are called Shield Effects. For example, it is possible to tune the shield to absorb more energy from enemy attacks, or to concentrate on absorbing the energy emitted from the ship itself when it receives an attack. Another interesting trick is to move the sphere of the Shield so its center does not align with the center of the ship. When done skillfully, this may confuse the enemy ship as to exactly where inside the sphere the ship is, and thus reduce the possibility of damage.



If the Coulborne Shield accumulates too much heat, it may go down (thus leaving the ship defenseless) or simply blow up, destroying the ship. To avoid this, the Coulborne Engineer keeps careful tabs on how stressed the Shield is. Sometimes it is necessary to manually turn the Shield off during battle to radiate heat for a few moments. This is an extremely risky tactic, since the enemy may take advantage of this opportunity to attack, but sometimes it is better than the alternative.

When a Shield is so loaded with heat and energy that it is about to explode, the engineer has no alternative but to bring it down. When ships reach this state they usually sue for peace immediately, since without the Shield they will most likely be destroyed in seconds.

Coulborne Shields are effective against most types of energy, with one exception: Neutrons. For this reason, some armies prefer to carry neutron missiles, which may not harm the ship, but may harm or even kill the crew.

Even with the disadvantages listed above, Coulborne Shields are the single most important defense any ship may have. Without one, a ship would explode the first or second time it is hit.

HULL

If the enemy weapon survives all previous obstacles, the ship's reinforced hull is the final barrier to overcome. The materials that make up the hull must offer basic protection against the immense amounts of heat and energy emitted when the enemy weapon hits the ship. Most outer hulls use an element called boron, a relatively scarce material valuable because it can take more energy than most other materials before vaporizing. Even so, and even considering a ship's hull is at least several centimeters thick, a ship that only depends on its hull would be destroyed in one or two hits, so powerful are the weapons of the 23rd century. For this reason, Coulborne Shields are a necessity in space combat.

AFTER THE BATTLE

BOARDING

When the battle is over there is usually only one ship standing. In some situations, however, the crew of

the victorious ship might want to board or capture the enemy ship. This requires boarding the ship. Any boarding or capturing action requires the boarded ship to have its Coulborne Shield off. This usually happens when the enemy ship surrenders, or when its Shield goes down after overheating.

Ships are almost never standing still in space, as their inertia keeps them moving at speeds of thousands of miles per hour in three-dimensional space. The pilot of the boarding ship needs to make some careful maneuvering to match both ships' direction and speed. This may take a long time, usually several hours or more. Ships have been known to crash or scrape during boarding maneuvers, suffering considerable damage. If the boarding ship has remote control of the target ship (possible at distances of one light-second or less, if the target ship's pilot allows it), things get slightly easier.

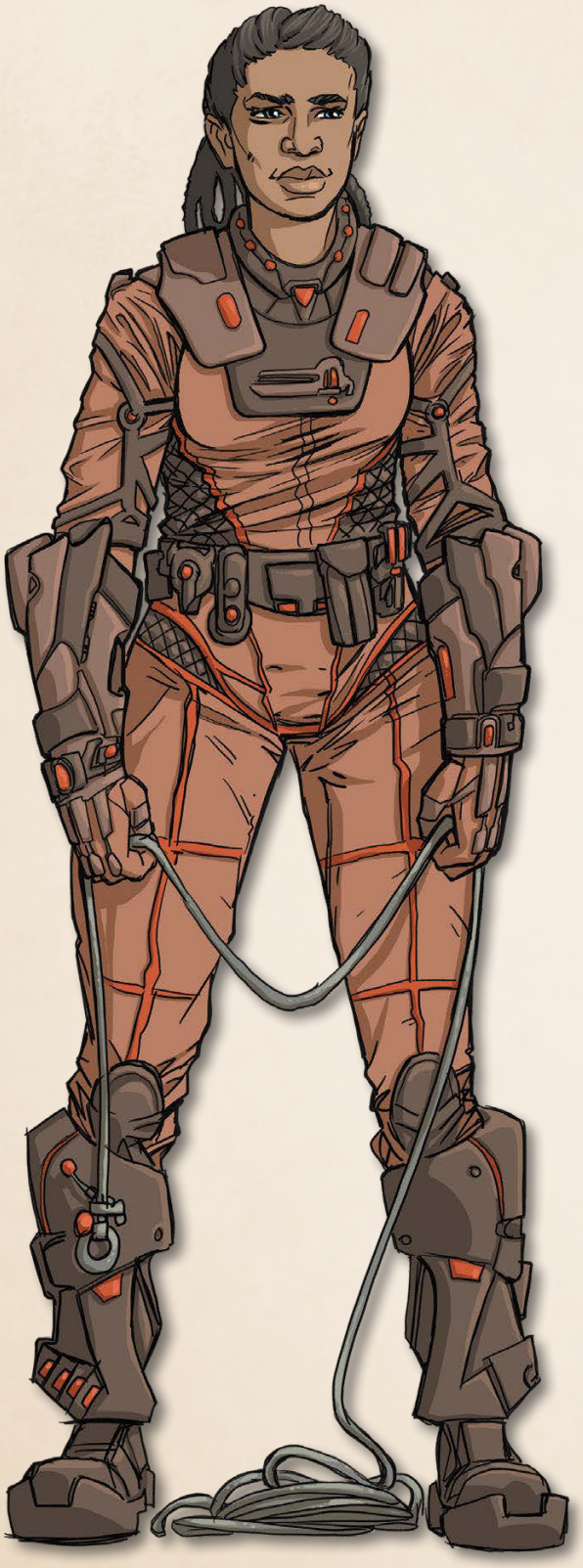
Once the ships are connected, the boarders need to gain access to the other ship. This is done by connecting a flexible transport tube between both ships' hatches. Usually the crew of the surrendering ship just opens the hatches, but maybe this is an appropriate time for them to stage a surprise counterattack.

REPAIRS

Few things are as dangerous and lethal to human beings as damage to a spaceship. Radiation, exposure to the vacuum of space, death by heat, cold or starvation, are all terrible ways to die. Fortunately, thanks to Claytronics (see page 82), it is possible to repair a ship's systems in space.

By focusing programmable matter on creating spare parts for ships, or on strengthening or "renewing" specific sections of the ship, an engineer can, in a few hours, repair and control many types of damage. Detailed schematics of every part and section of the ship are stored in its memory banks, allowing the engineer to rebuild the part using a supply of Claytronic atoms on demand.

Even with this technology, repairing ships in space is difficult and not always successful. Taking the ship to a qualified shipyard, usually in orbit around a major planet, remains the best and fastest way to fix a ship.



maricelle

Tough Miner Girl with a Painful Past.

Maricelle Al-Zeid comes from a Bay Jing family with two defining characteristics: Mining and tragedy.

Maricelle is the daughter of a proud mining family from Bay Jing. Maricelle's great-grandfather, one of that world's first settlers, had been involved in the mining operations around Triumph and lost his life in the mining sabotage of 2129. Maricelle's grandfather, a boy of six at the time, had survived the tragedy and continued the Al-Zeid family tradition as a miner when he grew of age.

Maricelle's father was the youngest of her grandfather's seven kids. Born in 2158, and also a miner, he finally found the love of his life and married in 2188, the year of the Psion Riots that so completely affected Bay Jingnian society. Having had one of his new relatives on his wife's side killed by the actions of the rogue psion, and worried After the Psion Riots, worried about the future prospects for his family should he stay in Bay Jing, Maricelle's father moved with his wife to Dauphin, in Nouvelle Vie, and in 2188 became one more settler family trying to make a living in the frontier. It was here, in a small village on the wilderness of Nouvelle Vie, that Maricelle was born in 2191. Her father found a new job as a farmer and raised Maricelle, her older sister and brother, and her youngest brother.

The violent rivalry between Jubilee and Dauphin, temporarily paused after the war, had begun anew. There were frequent skirmishes, and the entire village was trained in combat tactics. Even so, it was a surprise attack by a particularly nasty and radical Jubilee informal militia that in 2199 successfully invaded and burned the small village. An 8-year-old Maricelle lost her mother and older brother that day, and saw cruelty and death first hand. Her sunny personality changed permanently to the dour, serious disposition she carries now.

Maricelle's grieving father never recovered from the blow. As soon as he could, he moved the remains of his family to Hephaestus, the small island in Nouvelle Vie composed of independent miners. He was determined to keep his family away from the senseless conflict between Jubilee and Dauphin in any way possible. His old miner instincts came back as well, and by 2202 he spent most of his time in the quiet and solitude of space, mining the inner or outer asteroid belts on an old crusty ship he managed to buy with the government's compensation for his personal loss. Maricelle reached

her teenage years growing up in the care of her older sister Nubi (not much older than her).

By the time she was fourteen, Maricelle joined her father's mining operation. In the next few years she learned everything there was to learn about her family's trade: She learned how to discover valuable elements in the asteroids and how to pry them from the rocks in space. She learned how to live and work in microgravity and zero-G. She also became an expert in dealing with the merchants and underworld of Clarke Station. Most of all, she learned how to keep the Hound of Fortune, her father's old rust bucket of a ship, working. She also became an expert pilot and mechanic for the ship.

By the time she turned twenty-four, Maricelle was the de-facto leader of her father's mining outfit. A tough, no-nonsense girl, she was on her way to becoming a minor leader among Hephaestus miners. Then, in 2216 tragedy struck the Al-Zeid family, again.

Maricelle, her father, and her younger brother, Jung, had recently hooked the Hound to a stray rock that had escaped the outer belt many years ago after a collision with another asteroid, and was now close to the dead-end jump point to the uninhabited star system of HIP 23452. Most asteroids behave more like chunks of loose rubble than strong rock, and this one was no exception. Getting to the valuables wasn't easy, but that was part of the job. Their ship had been moored for a few days, and the boring part of the job was beginning to settle in.

On the sixth day of their mission, Maricelle was taking a spacewalk, floating around the far side of the rock when she saw the energy spike on her instruments, and felt the glow of light surrounding her, as if the light were at the other side of the asteroid… next to where her ship was. She tried to contact Papa and her brother over the link, but there was interference all over the comm.

She quickly began her return to the ship. After a minute she finally managed to make it around the asteroid. What she saw looked like a black spiked star, like what an asterisk should look like if it were sparkling black and menacing. There were no obvious engines. And it was huge, dwarfing the Hound by far. Where did it come from? The only possible answer was from the jump point to HIP 23452. But the jump point was still a few hundreds of thousands of kilometers away. As far as Maricelle knew, no ship could enter space that far from the jump point. Yet this one (was it a ship?) apparently had.

These thoughts piled in the back of her mind as fear concentrated in front of her. She could just stare for a few seconds before the energy wave washed right around her. The sensors in her spacesuit, designed to detect increases in radiation and harmful energy, immediately darkened her visor, which saved her from the light. But nothing could keep the immense amounts of energy from penetrating her body and pushing her away.

Fortunately for her, she was pushed back towards the far end of the asteroid, and thus never got to receive the brunt of the attack. But in the silence she felt her body being pushed a thousand ways, being hit by the rock, as everything exploded.

After a few seconds the visor began slowly to clear, and she saw how pieces of rock, debris and metal were flying from the other side of the asteroid, in all directions. She had been irradiated and she knew it, it was just a matter of days before she was dead, but still she managed to float back towards the other side.

The strange object wasn't there anymore. Half the asteroid wasn't there, either, blown away by some unspeakable force. And her ship was just a bunch of floating scraps among the rocks, pieces of it crashing with chunks of rocks in the silence of space. The Hound, Papa, Jungie… all gone.

She barely remembered what happened afterwards. The strange energy surge had been seen from Nouvelle Vie. Her Assistant probably turned on the emergency

MARICELLE

Rank: Novice (Alpha-level Officer)
Attributes: Agility d6, Smarts d8, Spirit d6, Strength d4, Vigor d6
Skills: Fighting d6, Knowledge (Ship Ops) d10, Notice d4, Piloting d6, Repair d8, Shooting d6, Streetwise d4, Taunt d4
Cha: –2; **Pace:** 6; **Parry:** 5; **Toughness:** 7 (2); **Mental Toughness:** 5
Hindrances: Bad Luck (Major), Outsider, Cautious
Edges: Zero-G Training, Miner
Gear: Assistant, Enhanced Autopistol (Range 12/24/48, Damage 2d6, AP 1, Semi-Auto, 20 bullets, can fire 1 explosive round), Explosive round (Damage 2d8, AP 4), Combat Knife (Damage Str+d4), Reinforced Vacc Suit (+2/+4, protects Arms, Legs, Torso; spacesuit); 2 Bloodstoppers.
Notes: Homeworld Nouvelle Vie (begins with the Zero-G Edge)
Assistant Name and Gender: Assistant Program 3, "Papa," Male.
Assistant Skills: Knowledge (Science) d4, Investigation d4, Hacking d4

radio signals, which explains how she was rescued a few days later by a Circle Patrol Ship.

When she finally regained consciousness she was inside a Healing Pod on the Circle ship, flying back towards Nouvelle Vie. A kind face looked at her from the other side of the Pod glass and explained that she had been irradiated, but fortunately would be fine.

The next few days on the way back to Nouvelle Vie were awful. She was interviewed remotely by authorities from Clarke Station about what she had seen, but no one believed her. What was that energy and heat surge that had been detected all over the system? No answer was satisfactory. The fact that her father and brother were dead, and her livelihood was destroyed, did not seem to matter to anybody.

For the entire trip Marcus, the middle-aged medic who had treated her in the Pod, became her only friend and the only person willing to smile and show some sympathy to her. When the hours passed and she refused to speak he told her stories, boring stories about his job, the Circle, what he had seen, why he believed in this organization, and many other things. At some point while listening to him, something changed in her. She wanted his inner peace, the sense of purpose he had and she had just lost. There was nothing left for her in Hephaestus except for her sister, and seeing and living with her now was harder than she could bear. She had dozens of remote cousins in Bay Jing, but they never meant much to her.

When she arrived at Clarke Station, Maricelle immediately went to the Circle offices and signed up. Her future was elsewhere, not here. She made a video call to her sister and said good-bye. Even in the midst of her pain, Nubi told Maricelle she supported her and her decision, and she loved her. They prayed together via the video call, and she hung up, not before promising to visit as soon as she was ready.

Two years have passed since then. Maricelle has become a promising young Circle officer, in high demand because of her engineering skills. It feels good to be needed, and to be treated as part of a large family, even though it's not a family, not really, not like the one she lost. The incident that cost the lives of her brother and father has been classified or forgotten, officially still "under investigation." She has learned this is not the only time this has happened.

She has twice visited her sister Nubi, now married and with a small baby. Whatever happened in the frontier, she hopes the Circle will be there to help protect her sister and her family against it.

The wounds have not healed yet, but Maricelle knows she is on her way to a renewed sense of purpose.

APPEARANCE

Maricelle is a tough-looking woman of twenty-six. She is dark-skinned, has dark hair and is of middle height. Her body is stocky but not fat. She is more plain than beautiful but her strong look and sense of authority and security project a certain charisma and attractiveness. If at all possible she prefers to dress in a used work suit, and cares little about how she looks. It is common to see her covered with dust and grease. Even when dressed in official Circle vacc suit uniform, it looks strange on her, as if she didn't belong in it.

Maricelle talks very little, and does not mingle much. She does not tolerate incompetence or idle talk, but she is efficient, courteous and respectful. When off-duty, she keeps to herself and keeps a serious face. However, most of her fellow officers have seen her smile every once in a while, only to quickly get serious when she notices she's being watched. She has a terrible temper if provoked, and has already found herself on probation twice because she has punched some jokester in the face. She probably will not go to probation again, mostly because now everybody knows better than to mess with her. Besides, her no-nonsense attitude has bought her some admirers in the Circle.

Maricelle often volunteers for missions, when she thinks her skills might be valuable. She particularly likes rescue missions, and her superiors admit her dedication to helping refugees or survivors when this happens.

In her free time, she loves reading and learning about science in general. She particularly likes to check scout and explorer reports from the frontier, although few know what she is looking for when she reads them so carefully.

She does not talk about her past if she can avoid it. She hopes to always be able to avoid it.

MARICELLE'S ASSISTANT: "PAPA"

Maricelle has updated her assistant personality after her traumatic experience. Now her assistant looks and talks in the image of her dead father. Papa usually offers advice, and he is very tender and caring with his "daughter." Papa never gets angry, never challenges or questions her. Maricelle never gives orders to her assistant, she usually asks things of it as if it were her real dad. Unbeknownst to her, the selection of this particular Assistant personality has raised eyebrows in the health department at the Circle, and now Maricelle is under periodic psychological surveillance.

I'M AN OPTIMIST. WE WILL REACH OUT TO THE STARS.

— STEPHEN HAWKING

In this section you will find the rules for playing *Seven Worlds*. Besides these rules you will need a copy of the *Savage Worlds* rulebooks to play.

MAKING HEROES

Making heroes for *Seven Worlds* is as easy as creating characters for any *Savage Worlds* setting. Follow the standard rules for character creation with the following modifications. You can use the standard sheet at the end of this book, also available for download at *www.sevenworldsrpg.com*

Derrick, Duarthe, Seela, and Maricelle, the iconic characters of the setting, are available should the players wish to use them. Their description and statistics are listed throughout the book, and their character sheets are also available for download.

RACE AND HOME WORLD

The only available race for heroes in *Seven Worlds* is human. Humans don't get a free Edge during character creation; instead, they get a particular benefit depending on which home world they are native to.

The physical and social realities of each of the seven worlds influences its citizens. Every player must select his or her hero's home world: The place where the hero was born or has lived most of his life. A hero may only be native to one home world. Each home world gives a particular benefit to the character, as listed below.

Besides the home world benefit, heroes native to a world automatically know its customs, politics and society. They get a +2 bonus to Common Knowledge rolls regarding their world and a +1 bonus to Charisma rolls when dealing with other natives of their world.

ATTRIBUTES

Now it's time to choose your hero's attributes and skills. Your character starts with a d4 in each of his five attributes: Agility, Smarts, Spirit, Strength, and

HOMEWORLD

PLANET	BENEFIT
Earth	**All Kinds of People:** Given its diversity and billions of inhabitants, on Earth there are experts for everything. • Heroes get a free Edge, as per the standard *Savage Worlds* core rules.
Zarmina ("Gee")	**High-G Native:** On Gee people have to become accustomed to the high gravity of the environment. Most inhabitants, even the "weak" ones, are strong when compared to humans from other planets. • Heroes start with a d6 in Strength.
Apollo	**Drowns in Corruption:** Apollonians know how to survive and thrive in a corrupt society dominated by crime cartels. • Heroes get the Scoundrel Edge for Free.
Concordia	**People Person:** Politics, relationships and negotiation are the way of life in Concordia. • Heroes get the Diplomat Edge for free.
Bay Jing	**Used to Repression:** Inhabitants of Bay Jing know what it is like to live in a militaristic state, and are not usually cowed by other, "weaker" authorities. • Heroes get the Strong Willed Edge for free.
Nouvelle Vie	**Breathes Space:** The main business of Nouvelle Vie (mining) means that most if not all its inhabitants have experienced microgravity environments at least a few times. • Heroes get the Zero-G Edge for free.
Logan's End	**Tough Customer:** Inhabitants of Logan's End have to deal with heat and a merciless jungle. • Heroes get the Woodsman Edge for free.

Vigor. You then have 5 points to distribute among them as you choose. Raising an attribute a die type costs 1 point, and you may not raise an attribute above d12.

SKILLS

You have 15 points to buy your skills. Raising a skill by a die type costs 1 point as long as it's no higher than the attribute it's linked to. It costs 2 points per die type to raise a skill over its linked attribute.

All the standard skills are available in *Seven Worlds*. However, the Boating, Driving, Lockpicking, Riding, Survival, Swimming and Tracking skills are of limited use in standard 23rd-century-technology worlds. For example, the Lockpicking skill applies to physical locks, and most "locks" in *Seven Worlds* are electronic and digital security protections that auto-detect the user's identity and can only be hacked by using the Hacking skill (see below). Therefore, heroes who pick these skills won't find much use for them unless they spend time in low-technology locations (like remote towns in Logan's End, for example).

The following new skills (all of them linked to Smarts) are added to *Seven Worlds*:

- **Hacking:** This skill covers all aspects of unauthorized computer use. It allows the user to access information he or she is not authorized to look at, to force devices with electronic protection (such as locked doors) and in general to use V-World in ways it is not meant to be used. It is important to remember that, in the low-privacy world of the 23rd century, physical break-ins will always be detected (for example, since the system always knows where a character is, and cameras are always following everyone). This skill can also be used to disguise the break-in, for example by making the security system believe the character is someone else, faking his or her ID, or other mechanisms. On a Critical Miss, the attempt to bypass security is detected by the authorities, most likely with disastrous consequences for the character.
- **Knowledge (Ship Ops):** This skill covers handling of ship systems, including the Coulborne Shield, heat management and defense pods. It is a critical skill during space combat.
- **Knowledge (Science):** This catch-all skill covers all branches of scientific knowledge. Including biology, technology, astrophysics, etc.

The Knowledge (Battle) skill, the standard *Savage Worlds* skill for mass battles, is available in *Seven Worlds*, and is used for space engagements between fleets or between Capital Ships.

DERIVED STATISTICS

Charisma Pace, Parry and Toughness are derived statistics calculated as per the standard *Savage Worlds* rules

Mental Toughness is a new statistic for *Seven Worlds*, and is equal to 2 plus half your Spirit die type. It is a measure of how resilient the character's mind and psyche are against psionic attacks and interference, and is used to defend against psionic attacks. See page 121 for more information.

EDGES AND HINDRANCES

Heroes in *Seven Worlds* are far more than a collection of skills and attributes. It's their unique gifts, special powers, and tragic flaws that truly make them interesting characters.

You can take one Major Hindrance and two Minor Hindrances. A Major Hindrance is worth 2 points, and a Minor Hindrance is worth 1 point.

For 2 points you can:

- Raise an attribute one die type (you may raise your attributes before purchasing skills).
- Choose an Edge.

For 1 point you can:

- Gain another skill point.

GEAR

All members of the Circle begin play with a Standard-Level Assistant (see page 120) equipped with two A-type Skill Modules. They may select their Assistant's skills immediately. Additionally, each hero receives a Circle vacc suit uniform, an Enhanced Autopistol, and $500 EarthGov Dollars which may be used to purchase additional equipment. A list of gear can be found in the Gear section on page 110.

BACKGROUND DETAILS

Finish your character by filling in his or her history or background. You might want to name and describe two or three NPC friends or relatives of your hero on his or her selected home world. These will interact with your hero whenever he or she visits the home world, and may be an important source of help and support during your adventures.

FINAL DETAILS

If you are playing the main *Seven Worlds* adventure, all characters start as members of the Circle foundation, part of a rookie team. All Psions begin as temporary members of the Psion Brotherhood who are on-loan to the Circle (see page 90). Since all heroes begin as members of the Circle, this is a good opportunity

to decide why your hero joined the organization, and what his or her goals are.

EDGES AND HINDRANCES

The following Hindrances are not available to real-world characters in *Seven Worlds*: Bad Eyes (Major), Blind, Doubting Thomas, Hard of Hearing (Major), Illiterate, One Leg.

The following Edges are not available to real-world characters in *Seven Worlds*: Steady Hands, Adept, Champion, Gadgeteer, Holy/Unholy Warrior, Mr. Fix It, Wizard, Beast Bond, Beast Master, Danger Sense, Liquid Courage, Healer, Sidekick.

NEW AND MODIFIED HINDRANCES

In the 23rd century, genetic medicine has evolved to the point where several physical problems considered common in the 20th century are very rare. The only individuals with these issues are those with some kind of resistance to genetics and nanotechnology, or who for different medical reasons could not be cured by a Healing Pod. In *Seven Worlds*, the following Hindrances are considered Major: Anaemic, Bad Eyes (Minor), Hard of Hearing (Minor), Lame, Obese, One arm, One Eye. These Hindrances also give a –1 penalty to the character's Charisma, because of how unusual they are.

The All Thumbs Hindrance applies to physical technologies, not to electronic or digital ones.

ASSISTANTLESS (MAJOR)

The hero does not like Assistants, or considers them unnecessary. This extreme view causes him all sorts of troubles in a society where Assistants digitally represent humans. In game terms, the hero does not own an Assistant program, nor will he ever buy or use one.

BAD CONNECTIONS (MINOR)

Before joining the Circle your character became involved with an illegal or inappropriate person or organization, and now owes them a favor. At some point in time the person or organization may return to ask a favor of the character, a favor he or she may not refuse without unpleasant consequences. The GM decides when the character has paid the favor, at which time the hindrance disappears.

BAD GENES (MAJOR)

The hero has a basic genetic incompatibility that forbids advance use of nanotechnology to heal grave injuries. In game terms, any permanent injuries the hero receives as a result of combat cannot be treated by Healing Pods, and are truly permanent.

COCKY (MINOR)

Your character just doesn't know when to brag and when to act. The hero's first round in any combat must be spent announcing how great he is, or pronouncing the doom of those who oppose him. If for some reason your hero must act instead, it costs him a Benny:.

A villain with this Hindrance never delivers a finishing blow to a foe. Instead, he leaves them to die, or orders his minions to finish them while he stalks off well out of earshot. Inevitably, these foes survive their wounds, escape the minions, and so on.

DARK SECRET (MINOR)

The character's past includes something so horrible it could alter how he is perceived if it is ever found. If the secret is ever discovered the character receives a –2 Charisma penalty against anyone who knows the secret. If the secret becomes public, the GM should exchange this Hindrance with another one appropriate to the consequences for the secret (Wanted, for example, or Outsider), while keeping the –2 Charisma modifier.

EASILY COWED (MINOR)

The hero crumples easily when pressured or pushed. He or she receives a –2 penalty to Spirit rolls when resisting Intimidation rolls.

SHORT TEMPERED (MINOR)

The hero cannot control him or herself when insulted or made fun of. He or she receives a –2 penalty to Smarts rolls when resisting Taunt rolls.

PSIONICALLY WEAK (MAJOR/MINOR)

The character's mind is particularly sensitive to psions. The minor version of this hindrance causes the character to suffer a –2 penalty to any opposed Psionic roll or roll to defend against Psionic powers. In addition, his Mental Toughness suffers a –1 penalty. With the major version, the opposed roll penalty increases to –4, the Mental Toughness penalty increases to –2, and the character may not take the Arcane Background (Psionics) or Arcane Resistance Edges.

ZERO-G SICKNESS (MAJOR)

The character gets sick when operating in Zero-G or microgravity environments. The character constantly throws up and becomes dizzy. Treat him as Fatigued whenever he is in Zero-G and not restrained in some way.

BACKGROUND EDGES

ARCANE BACKGROUND

Requirements: Novice, Special.

The only valid Arcane Background is Psionics. Heroes who select this Edge are Psions and members of the Psion Brotherhood.

A character who chooses this Edge automatically receives the Soul Drain Edge for free. This represents the fact that a Psion's innate powers are the ability to tap their own energy at will.

Also, a character who chooses this Edge automatically receives the Vow (Major) Hindrance, representing the Psion Vow that all members of the Psion Brotherhood are required to take (see page 90). This Hindrance does not give the player points to purchase additional Edges or other benefits during character creation.

Note that Psion heroes may only belong to the Psion Brotherhood. Rogue psions are not allowed in the main *Seven Worlds* adventure, but the GM might allow them in other adventures that use this setting. The GM might also allow a character that decides to become a Rogue Psion without anyone knowing. This would probably entail the hero taking the Dark Secret Hindrance as well.

ARCANE RESISTANCE

Requirements: Novice, Spirit d8+

The Armor bonus provided by this Edge, as well as by the Improved Arcane Resistance Edge, applies to Mental Toughness rather than normal Toughness.

COLLEGE EDUCATION

Requirements: Novice, Smarts d6+ or Rich

The hero has had the chance to have deep study, and knows many different things as a result. The hero gains 5 additional Skill points, which must be spent on a skill linked to Smarts.

EXPERIENCED OFFICER

Requirements: Novice, member of the Circle, Smarts d6+, Spirit d6+, Vigor d8+, Fighting d6+, Shooting d8+.

This Edge can only be taken at character creation, and with the GM's permission. It represents the hero being older and more senior than his fellows. The hero begins play as a Circle Beta Officer to represent his years of service, and gains the Beta-level +2 bonus to Knowledge (Battle) rolls. Start with a standard Novice character, then give him four Advances.

This Edge has a cost, however, in that the Advancements must be repaid. The next 20 Experience Points the hero earns are forfeited as "payment" for the Edge.

GENETIC MANIPULATION

Requirements: Novice, Either Rich or Noble.

The character has been genetically altered. He may raise two different attributes by one die type each, up to a maximum of d12. This edge may only be chosen once, and only during character creation.

MILITARY FAMILY

Requirements: Novice, member of the Circle.

The hero's father or mother was also a Circle officer who distinguished him or herself with a glorious career. The hero begins the game with a d4 in Fighting, Knowledge (Battle), Piloting, or Shooting (player's choice). In addition, the hero has a +1 bonus to Charisma when dealing with Circle officers because of his father's reputation. Should he ever fail in his duties in an embarrassing way the bonus becomes a –2 penalty to Charisma until he makes it up to himself and to the Circle.

COMBAT EDGES

ACTIVE ASSISTANT

Requirements: Novice, have an Assistant

The character has an Assistant that frequently helps the hero during combats. The hero begins each session with an extra Benny that can only be used to perform combat actions with an Assistant (see page 132).

VERY ACTIVE ASSISTANT

Requirements: Seasoned, Active Assistant

As above, but the hero begins each session with two extra Bennies.

CLOSE RANGE FIGHTER

Requirements: Novice, Agility d8+, Fighting d8+

The character is a deadly expert in hand-to-hand combat. If the character closes in on an enemy and attacks in the same round, he or she receives a +2 bonus to the Fighting and Damage roll.

ZERO-G TRAINING

Requirements: Novice, Agility d8+

The character has been trained to operate in Zero-G or microgravity environments. Rolling a 1 or 2 on any physical trait rolls does not generate a Shaken result because of Zero-G.

ADVANCED ZERO-G TRAINING

Requirements: Seasoned, Zero-G Training

The character is in her element when in Zero-G, Low-G or microgravity environments. On top of any other Zero-G Training benefits, she suffers no penalties to movement, or to physical trait rolls.

PROFESSIONAL EDGES

BUREAUCRAT

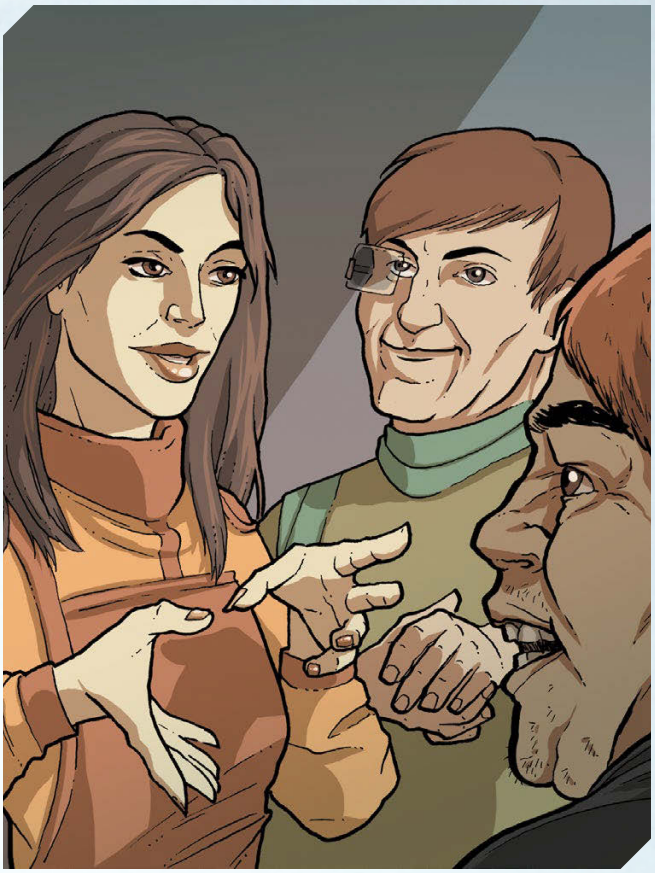
Requirements: Novice, Smarts d6+, Streetwise d6+

Dealing with government services and bureaucracies in the 23rd century is much easier than today, thanks to the existence of V-World and Assistants. However, the skills of an expert in dealing with bureaucracies are still greatly sought. A character with this edge gains a +2 bonus to Investigation rolls when interacting with V-World in the course of dealing with a bureaucracy (filling out paperwork, dealing with red tape, completing a process, among others), as well as to Streetwise and Persuasion rolls when dealing with humans in the course of completing a bureaucratic requirement.

DIPLOMAT

Requirements: Novice, Smarts d6+, Notice d6+, Persuasion d8+

Diplomats are experts at dealing with people, understanding their needs, and getting what they want. They receive +2 to any Persuasion rolls, and also +2 to Notice rolls to read people's body language (detecting if the person is lying, telling the truth, anxious, etc.). Also, Diplomats get +1 to rolls on the reaction table against NPCs.



ENFORCER

Requirements: Novice, Shooting d8+, Tracking d8+, Streetwise d6+

Either because they worked for a police force or for a criminal organization, enforcers are experts at tracking down people. Enforcers have +2 Streetwise and Intimidation in places where they are known, as well as +2 to Tracking when following someone.

EXPLORER

Requirements: Agility d8+, Smarts d8+, Knowledge (Science) d8+

An explorer is an expert at surviving and investigating the far-away places of the universe. He gains +2 on Knowledge (Science) rolls when applied to topics outside colonized human space. Also, as a veteran traveller, he receives a +2 on Survival and Vigor rolls when exploring places and star systems humans have not visited before.

HACKER

Requirements: Novice, Smarts d8+, Investigation d6+, Hacking d8+

A hacker receives +2 to all Investigation rolls when using a computer and +2 on Hacking rolls when hacking a computer.

ASSISTANT HACKER

Requirements: Seasoned, Hacker, have an Assistant

Some hackers are talented enough to hack the code of their own Assistants, to make them faster and more aggressive during combats. Whenever a hero with this edge orders their Assistant to perform a combat action (by spending a Benny, see page 132), the Assistant gets a +2 bonus to its roll.

MECHANIC

Requirements: Novice, Smarts d6+, Repair d8+

The character is good with mechanical and electronic devices, and can more easily figure out how to use and repair them. He gets a +2 bonus to Repair rolls required to use, design, troubleshoot, or repair such devices. With a raise, the Mechanic halves the time normally required to fix the device. For example, if a repair job states that a raise repairs it in half the time, the Mechanic could finish the job in one-quarter of the time with a raise.

MEDIC

Requirements: Novice, Healing d6+

A Medic is trained in the use and configuration of the latest nanotechnology medical devices, and is many times crucial to the survival of the group. The

Medic can operate Portable Healing Kits as well as Healing Pods. See the Gear section for more details on these devices.

MINER

Requirements: Novice, Knowledge (Science) d4+, Spirit d6+, Survival d6+

Being a miner in the 23rd century involves being able to identify and locate precious metals in space and in forbidding environments, and successfully mining or taking them out and transporting them back to civilization. People who choose this life face hardships but the chance of great rewards. Most miners have to have a scientific background in order to figure out how to identify and obtain these precious elements. The Survival skill is used when mining or obtaining elements from planets or asteroids.

Miners gain a +2 bonus to Knowledge (Science) and Survival rolls involved when searching for, identifying, locating and mining minerals or precious elements. They also get a +2 bonus when selling these minerals back in civilization.

PERFORMER

Requirements: Novice, Agility d6+, Persuasion d6+

Even with the existence of V-World and all kinds of real and virtual entertainment, the true skill of a professional performer can move audiences. This edge may be taken multiple times. Each time, the character must choose a particular performance activity such as singing, dancing, acting, playing an instrument, etc. The character gets a +2 bonus to Persuasion rolls made when performing with that particular activity.

SURGEON

Requirements: Seasoned, Healing d8+, Medic

The character receives a +2 to all Healing rolls made to assist characters. This bonus also applies to the use of Portable Healing Kits and Healing Pods. If the Surgeon has to attend to his traveling companions, up to five of them add this bonus to their natural healing rolls as well.

SCOUNDREL

Requirements: Novice, Smarts d6+, Streetwise d6+

The hero is skilled in dealing with people on the edge of the law, getting the info he needs. He has +2 to Streetwise rolls when looking for information in shady places or dealing with unsavory people. He also gets a +1 to Trick rolls.

PSION POWER EDGES

These new Power Edges apply to Psion characters. Due to the extreme effort in specializing in this way, a character may not have more than one of these Edges at the same time.

PSYCHIC SOLDIER

Requirements: Novice, Arcane Background (Psionics), Smarts d8+, Spirit d8+, Psionics d8+

The character is a combat psion, trained to use his mind even when wounded. He gains a +2 bonus to trait rolls when trying to resist disruption to maintained powers.

RANGED PSION

Requirements: Novice, Arcane Background (Psionics), Smarts d8+, Psionics d8+

The character can focus his mind to improve his chances of affecting his targets. If the character does not move in a round, he may focus his mind, gaining a +2 bonus to Psionics rolls with any ranged power.

TOUCH PSION

Requirements: Novice, Arcane Background (Psionics), Smarts d8+, Psionics d6+.

The character can achieve greater results by direct contact with his target. The psion gains +2 to Psionics rolls when touching the intended target.

SPACE COMBAT EDGES

The following Edges apply during space combat between ships.

SPACESHIP ENGINEER

Requirements: Seasoned, Knowledge (Ship Ops) d8+

The character is an expert on most technical activities aboard a spaceship. All non-heat-related Knowledge (Ship Ops) rolls receive a +2 bonus. This includes rolls related to the use and operation of the engines and jumping, Shield Effects, and the Coulborne Shield. Heat rolls do not receive this bonus.

DEFENSIVE PILOT

Requirements: Seasoned, Piloting d10+ or the Ace Edge

In the midst of combat, with Newtonian movement it is easy for computers to calculate optimum intercept and missile paths. However, those few experts in using multiple ship thrusters to turn their ship in hard-to-predict paths are key to surviving a space battle. A Pilot with this Edge receives a +1 bonus to rolls when attempting to evade Missiles, Coilgun projectiles or

ADVANCEMENT TABLE

RANK	LEVEL IN THE CIRCLE	BENEFITS
Novice	Alpha Officer	No special benefit.
Seasoned	Beta Officer	The Officer gains +2 to Knowledge (Battle) rolls.
Heroic	Gamma Officer	In addition to the above, the Officer gains a free Leadership Edge of his or her choice, as long as he or she fulfills all requirements for it.
Veteran	Delta Officer	In addition to the above, the officer rolls a d8 Wild Die for Knowledge (Battle) rolls.
Legendary	Epsilon Officer	In addition to the above, the officer gains another free Leadership Edge of his or her choice, as long as he or she fulfills all requirements for it.

Projectile clouds. This bonus does not apply against Beam attacks, or during the initial lock-on roll made by the attacker to shoot the Missile, Coilgun or cloud.

DEFENSE EXPERT

Requirements: Seasoned, either Defensive Pilot or Gunner, Piloting d8+, Shooting d8+

The character is an expert on using Mine Cloud Defenses and Point Defense Laser Batteries.

When using Mine Cloud Defenses against all incoming missiles, the pilot gets an additional +2 bonus to the evading roll, for a total of +4. If using Mine Cloud Defenses against a single missile, the pilot gets an additional +1 bonus to the evading roll, for a total of +5.

When using Point Defense Laser Batteries, each successful hit made by the character has a 3 in 6 (not 2 in 6) chance of shooting the missile down.

GUNNER

Requirements: Seasoned, Shooting d8+

Being able to take out enemy ships with a well-aimed shot takes training and a good eye. The hero has both. In ship combat, the character may modify his roll on the Critical Hit Table by 1 point either way, as he chooses. He does this after rolling the dice for the Critical Hit.

HEAT MANAGEMENT ENGINEER

Requirements: Veteran, Spaceship Engineer

The character is an expert at managing heat. He gets a +2 bonus on Heat rolls.

SPACE COMBAT TRAINED

Requirements: Seasoned

The hero has been trained and developed experience in acting under pressure during space battles. He can ignore 1 point of Ship Wound or Ship Fatigue penalties, including penalties generated by heat.

VETERAN COMBAT TRAINED

Requirements: Veteran, Space Combat Trained

As above, but the hero can ignore 2 points of Ship Wound or Ship Fatigue penalties.

ADVANCEMENTS

These rules apply when a hero gets an advance.

RANKS AND CIRCLE LEVELS

As explained in the section detailing the organizational structure of the Circle (page 28), members of the Circle have a level that denotes their rank and experience within their organization and chain of command. In game terms, heroes automatically go up in Circle level whenever they advance in Rank (from Novice to Seasoned, from Seasoned to Veteran, and so on). This level shows how experienced and important one is within the organization, and is a great source for role-playing opportunities.

Note that heroes within a ship do not follow a chain of command to make decisions (e.g. there is no "ship captain" in a Circle ship). Decisions are made in a consensus-driven manner between the players, regardless of level.

The table below summarizes the level and benefits a hero receives when he or she increases in rank.

ADVANCING THE PSIONICS SKILL

The Psionics skill is harder to raise than other skills. See "Advancing the Psionics skill" on page 121.

gear

A FEW HUNDRED MILES UP OR DOWN [THE SURFACE OF THE EARTH] THERE ARE NO HUMANS. OUR IMPACT ON THE UNIVERSE IS NIL.

— CARL SAGAN.

This section lists the equipment commonly available in the *Seven Worlds* universe. Gear from other sources may be allowed with the GM's approval

RANGED WEAPONS

Ranged weapons in the 23rd century use different types of technologies. All weapons use closed, sealed magazines specially designed to provide one full load of shots. With few exceptions, ammo is not interchangeable between weapons.

Biodefense Spray: A Biodefense Spray is a small can used to fend off an enemy without causing permanent damage. The nanotechnology chemicals used in the Biodefense Spray attempt to meld to the victim's DNA and incapacitate him or her. If hit on any part of his skin, the target must make a Vigor roll at –2 (–4 with a raise). On a failure, they are Shaken for 1d4 rounds before they can recover and suffer a level of Fatigue. On a result of 1 or less, they suffer two levels of Fatigue. This Fatigue can Incapacitate but not cause death. Each level of Fatigue is recovered every 10 minutes, or every minute if the target has lots of water to wash off the chemicals. When attacking with a Biodefense Spray, a 1 on the Shooting die results in the user being affected as well (though the Wild Die can still succeed). On a critical failure, the user must roll Vigor at –4 as if hit with a raise.

Autopistol: Similar to conventional 21st century guns, the standard kinetic slugthrower uses a chemical reaction to fire solid projectiles at the enemy at high velocity. Propellant and material technology has improved, thus making autopistols more effective and deadly. Recoil has also been reduced and muzzle velocity has increased. This is still the most common type of ranged weapon available, eight-hundred years after being invented.

Enhanced Autopistol: An advanced version of the autopistol. Besides the standard ammo barrel, has an additional barrel that fires explosive rounds, basically tiny grenades. The enhanced autopistol can have one explosive round loaded. Reloading an explosive round takes one action.

Flechette Pistol: Flechette weapons are light weapons that shoot small, magnetically-propelled metallic darts. Taking advantage of superconductor technology, flechettes move magnetically through the barrel at practically supersonic speeds. Movement is initiated by a small battery included in the magazine. Flechette weapons make no noise or flash beyond a short high-pitched whistle, thus providing an advantage in scenarios where silent or near-silent weapons are needed.

Heavy Flechette Pistol: A more powerful version of the Flechette Pistol above, can fire slightly heavier and thus deadlier flechettes.

SMG: The standard high-performance chemical submachine gun, takes advantage of the materials improvements of the 23rd century to create a deadly weapon.

Autorifle: Also known as battle rifles, these have higher muzzle velocity for more damage.

Assault Rifle: Combining the best features of autorifles with full automatic attacks, Assault Rifles are usually used by military organizations for serious engagements.

Accelerator Pistol: Accelerator weapons were created to address the challenges inherent in Zero-G or microgravity combat. They are designed to avoid the effects of recoil that conventional guns generate when there is no gravity. To do this, accelerator weapons fire gyrojet rounds at low velocity. Each projectile has a secondary chamber of propellant that fires as soon as the round leaves the barrel, then acquiring traditional bullet speeds without affecting the shooter. Accelerator weapons are available in both gun and rifle versions. In game terms, an accelerator pistol does not incur any zero-G penalties if the attack die comes up a 1 or a 2.

Accelerator Rifle: Similar to an Accelerator pistol but with a larger barrel, and with gyrojet rounds that can inflict extra damage.

Tangle Gun: Useful as a capture weapon, a tangle gun releases a weighted, compressed nylon net at a single target. If it makes contact, the net wraps around the target, capturing him or her. To escape from the net the target requires a successful Strength or Agility roll (victim's choice) with a –2 penalty. If the roll is failed, the victim is too entangled to escape, and needs help in order to break free. The net is strong, with a Toughness of 7 (cutting weapons only). Used nets cannot be utilized again as ammo.

MELEE WEAPONS

Melee weapons are traditional hand-to-hand combat weapons. New advances in materials have made these weapons harder, and monowire nanotechnology has produced materials just one molecule thick, thus making the edges sharper.

Shock Stick: The standard law-enforcement weapon, shock sticks use low-powered energy to lightly stun targets. This is factored in the damage.

Puke Stick: Similar to a Shock Stick, if a Puke Stick hits with a raise it manages to touch the enemy's skin or other uncovered location, releasing a substance that causes sickness and nausea. In game terms, the victim must make a successful Vigor roll or be invaded by nausea, gaining one level of Fatigue. This effect is not cumulative with further attacks by the Puke Stick, and fades away after 1d4 hours. Puke Sticks are not effective against enemies that are fully covered.

Brass Knuckles: For those who need a rougher and more direct solution to their problems. A hero wearing brass knuckles is considered an Unarmed Attacker.

Combat Knife: Combat knives can be used either as melee or thrown weapons.

Ceramic Knife: Made with monowire materials, a ceramic knife is sharper and deadlier than a standard knife. This type of knife cannot be thrown.

Nunchaku: The traditional martial arts weapon of old gained new relevance when fighting in gravities different than Earth's. The two lengths of polymer joined by a short chain have been carefully weighted to allow for faster moves and actions on particular gravities.

SPECIAL WEAPONS

Sonic Stunner: A Sonic Stunner is a gun-like device that when fired projects a cone of sound energy at a very high frequency range, stunning the target. In game terms this behaves like the *burst* power, with the user's Shooting skill replacing the Arcane skill. Targets are allowed an Agility roll to avoid the effect. All damage inflicted by the Sonic Stunner is non-lethal, with the victims sleeping for 2d6 hours when they reach Incapacitated. Sonic Stunners have no effect in locations where there is no atmosphere, or against targets who are wearing full armor, including airtight helmets.

Frag Grenade: Fragmentation grenades work by spraying many wire threads ("fragments") across the impact zone, literally shredding the targets to pieces.

Incendiary Grenade: Incendiary grenades are even deadlier than Frag Grenades. Because of the flammable material inside it, the ignition of an incendiary grenade allows it to ignore armor when inflicting damage.

Stun grenade: This grenade explodes in a mesh of high-frequency noise, and is designed to disable enemies, not to kill them. All damage inflicted by a stun grenade is non-lethal, with the victims sleeping for 2d6 hours when they reach Incapacitated.

Smart Dust Grenade: A special, high-technology kind of grenade that carries millions of tiny nanoparticles known as "smart dust." When it explodes, the grenade disperses smart dust in a Medium Burst Template. Each grain of smart dust behaves like a tiny sensor floating in the air, effectively giving the attackers sensors for the affected zone. In game terms, the attackers can "see" through cover and behind corners, thus giving them valuable tactical information during the battle. The GM may decide if this also gives bonuses to the attackers for specific actions.

Plastic Explosive: Plastic Explosives, also known as demolition charges, can be set to explode at a specific trigger. In the 23rd century these devices are advanced enough as to be able to contact V-world (if available) and use its information as a trigger.

If the explosives are not connected to V-World, they can be programmed wirelessly at a short distance from the user's lenses. They can be programmed to activate (explode) at a specific time and date, at specific number of rounds into the future, or when something particular occurs within the explosive's detection range (a Medium Burst Template). For example, the explosive can be programmed to trigger "when four or more people walk into the explosive's damage range." The GM is the final judge on whether a particular trigger is accepted by the equipment or not.

If the explosive has access to a V-World network (for example, if it is in a modern urban area) the trigger can also include information provided or detected by the network itself (for example, "blow up the building as soon as our ship leaves planetary orbit").

On the other hand, the detection activities of the explosive's sensors can also be detected. Anyone entering the explosive's range gets to make a free Notice roll to have their lenses detect the explosive. The roll has a –2 penalty if it is not performed in an urban environment with a V-World network; and a +2 bonus if the potential victim carries a Long-range Communicator.

It is for the GM to decide whether detecting the explosive is enough to avoid its explosion (in which case the hero might try to disable the explosive), or if the hero needs to make an Agility check to actively jump and avoid the explosive's deadly range of destruction. Disabling a Plastic Explosive requires a Hacking roll. The difficulty depends on how advanced and professional the programming job was, and is a modifier placed at the GM's discretion.

ARMOR AND SPACESUITS

23rd century armor takes advantage of new materials and nanofibers to create light, resistant covers that protect characters during combat.

ARMOR

The armor listed in this section is designed for combat in locations with an atmosphere, usually on the surface of planets. Most spacesuits in the section below include armor, and can be used in normal surface atmospheric conditions.

Light Vest: A light armor used by law-enforcement officers, the Light Vest covers the wearer's torso and provides light protection against most attacks.

Combat Vest: Designed for all-around combat protection, Combat Vests offer greater protection against bullets of all types. This translates into +4 protection and 4 AP against bullets. Other types of attacks receive the standard +2 protection.

Combat Helmet: A standard helmet for combat protection. It has a 50% chance of offering +4 protection against head shots. It also includes night vision technology that, if enabled, allows characters to halve lighting penalties.

Light Combat Armor: Also called an infantry battle suit, it covers the entire body and provides protection against all kinds of shots. This suit is only available by or through military or law-enforcement organizations.

Psionic Helmet: This experimental helmet has been produced in limited quantities by scientists in the Psion Brotherhood, and is usually only available from the Brotherhood itself, and only for special missions. Powered by a backpack battery, the helmet creates a thin energy shield around the wearer's brain, based on principles similar to the Coulborne Shield. This helmet acts as an Armor bonus to Mental Toughness should the wearer be attacked with a psionic power. Note that the Armor bonus does not apply to normal Toughness. The helmet lasts 6 hours without recharging.

Because of its bulk, size and looks, these helmets cannot be used in social settings. Anyone seen wearing this device has a –2 penalty to Charisma.

SPACESUITS

The following suits of armor qualify as *spacesuits*. When pressurized and enabled, spacesuits become airtight and vacuum-ready, and thus allow the wearer to resist the effects of vacuum. This includes 12 hours of oxygen for breathing, as well as communications equipment. Also, while in a spacesuit the wearer has a +4 bonus to Vigor rolls to resist the effects of heat, cold and radiation for the full 12 hours he is in the suit. After the 12 hours have passed, the suit needs to be recharged for approximately 12 more hours before it can be used again in this fashion. The suit is recharged by plugging it into specially-designed outlets on a spaceship.

If a pressurized spacesuit is punctured, for example when a character is Wounded, advanced nanoparticle-based materials take care of automatically fixing and repairing the damage. The automatic self-healing process takes a number of rounds equal to the number of total Wounds inflicted on the character (after Soaking). If a character is in vacuum when this happens, during this time he is vulnerable to vacuum damage as explained in the Vacuum section in page 127. A hero can still use a Suit Patch to immediately close a puncture (in his suit or in another hero's suit) instead of waiting for the self-healing process to end.

Example: *Duarthe is inside his Vacc Suit fighting in vacuum when he's hit by an enemy shot. He receives two Wounds after Soaking. As explained in the Vacuum rules, for the next two rounds Duarthe has to make a Vigor roll with a +1 bonus (and a –2 penalty for his two Wounds) to avoid receiving extra Wounds because of exposure to vacuum. Since the suit was punctured by two Wounds, on the third round the puncture is automatically closed and Duarthe can forget about vacuum effects for now. He still has his two Wounds, though.*

If Duarthe had not wanted to risk vacuum damage during those two rounds he could have spent one full round and a successful Agility

roll to apply a Suit Patch, thus immediately re-sealing the suit.

Vacc Suit: The standard dress used by crewmembers while traveling inside a spaceship, vacc suits consist of a thin, skin-tight suit, boots and gloves, usually in the colors of the organization they belong to. In normal atmosphere conditions inside a ship, vacc suits are light and comfortable enough for the crew to perform their day to day activities. The suit is made of materials that interact with the superconductive magnetic arrays (see page 126) in the ship corridors, allowing characters to easily hover, float and move throughout the ship.

A vacc suit can be made airtight and vacuum-ready by means of an inflatable plastic hood/helmet. This helmet does not provide any protection against a head shot.

Reinforced Vacc Suit: This is a sturdier version of the standard Vacc Suit. It provides a flat +2 Armor bonus, or a +4 AP 4 Armor bonus against ranged projectiles. Also includes an automatically inflatable plastic hood/helmet if it is necessary to enable it as a pressurized spacesuit. This helmet does not provide any protection against a head shot.

Vacc Suit Helmet: Designed to replace the inflatable plastic hood/helmet in the Vacc Suit and Reinforced Vacc Suit, this hard transparent helmet provides +3 Armor protection against a head shot. It also includes night vision technology that, if enabled, allows characters to halve lighting penalties.

Light Combat Vacc Suit: A vacuum-ready version of the Light Combat Armor. It covers the entire body and behaves like as spacesuit. This suit is only available to or through military or law-enforcement organizations.

This suit can be acquired in one of two different configurations: one is designed to take advantage of superconductive magnetic arrays, and one that is magnetic-neutral. This last one is useful when boarding an enemy ship, for example, as it eliminates the chance that magnetic arrays are used against the boarders (see page 18). It is not possible to change the configuration of the suit.

Combat Armor: A heavy combat spacesuit. It covers the entire body, is magnetic-neutral, and thus does not take advantage of (nor can it be affected by) superconductive magnetic arrays. This suit is only available to or through military or law-enforcement organizations.

Battle Dress: The strongest possible type of armor, this powered suit can work for three days without recharging. It increases the wearer's Strength by 1 die, adds +2 to the wearer's Pace, and allows the wearer to jump 2d6" horizontally or 1d6" vertically. It is magnetic-neutral. If the suit ever runs out of energy it returns to its original weight of 150lb. This suit is only available to or through military or law-enforcement organizations.

MUNDANE GEAR

Mundane gear available is listed in the Mundane Gear Table below. Some items need more detail, these are listed below.

Beacon: A small device used in locations that are not covered by V-World. This beacon broadcasts its location for up to 500 kms approximately one week before losing all power. Note that anyone can receive its location, not only its owner.

Binoculars: These allow the user to see things that are much farther away, with a 200× magnification. Different kinds of filtering are available for the information seen through these digital binoculars, such as Augmented Reality overlays. Binoculars add +2 to vision-based Notice rolls to see things at a distance, and reduce penalties for poor lighting by 1 except in pitch black conditions.

Bioscanner: This device detects organic compounds that may indicate life. It can also analyze samples and break them down into their components. The results are interpreted by the GM, and require the use of the Knowledge (Science) skill.

Breathing Mask: These special masks are needed for planets that allow humans to walk outside unprotected but do not have an appropriate air mix for breathing (such as the planet Apollo, for example). They cover the mouth and nose with a transparent protector, and are connected to a filter that takes care of providing appropriate element mixes for breathing. They need periodic recharging (once every few days) to work.

Claytronics, portable: This substance can be programmed in the field to create practically any kind of 3-D part or component to fix or repair something that has broken. The detailed specifications for the object to be created must be available. Usually the user can wirelessly download the specification to the claytronic mass directly from their lenses. Since the process takes from a few minutes to an hour, depending on the complexity of the object, claytronics are usually not useful during combat. The GM will have the final decision on what objects can be created with the Claytronic mass.

Climbing Gear: Comprised of a small hammer and pick, spikes, and gloves, all designed to support different rock densities and gravities. Rope is available separately. In game terms, it grants +2 to Climbing rolls.

WHERE'S MY LASER GUN?

The laser-based "blaster gun" is one of the classic images of science fiction. We are accustomed to seeing science-fiction weapons with lasers, particles, plasma, and other esoteric technologies for both interpersonal and space combat.

In real life, though, kinetic energy weapons (or KEWs), meaning the standard bullet-based projectiles we all know, are much more effective as carriers of energy than most other technologies, such as lasers. The weapons of the future will most likely be KEWs with better targeting, faster shots, "smart bullets" and other characteristics that make them even deadlier than they are today.

Why not lasers? It turns out that laser guns are not the most effective way to kill people. First, they require significant amounts of energy, out of which by some estimates they only use about 20% on the laser beam itself, and waste the rest. Besides overheating issues, laser weapons would require a large battery pack generator that supplies or produces the required energy for a shot.

Depending on the amount of energy they pack, lasers may not be as instantaneously deadly as one might expect. Although of course the beam would arrive at its target at the speed of light, several seconds or more might be needed for it to do any lasting harm. This is also an unacceptable outcome for users of this weapon.

So, no lasers in interpersonal combat. But what about in space?

Lasers become much more useful in space because of their ability to attack instantaneously (i.e. at the speed of light) and in many frequencies beyond the visible spectrum. Yet, from an energy efficiency standpoint, they pack a much lower damage punch that kinetic missiles. In fact, considering the speeds ships are moving at in space, practically anything a ship fires is a kinetic missile capable of doing untold damage without needing a deadly explosive cargo. It is just a matter of making sure the missile hits, and the kinetic energy will do the rest. This has not stopped weapons engineers from loading nuclear, NNEMP and other payloads to missiles, clouds and other types of KEWs.

Regarding nuclear weapons, it is important to note that although deadly, they are not as deadly as they are within an Earth atmosphere. This is because the atmosphere absorbs most of the x-rays emitted by the nuclear bomb and converts them to the fireball and blast wave. Assuming the defenders can withstand the x-ray assault, the nuclear warhead would have to hit very close to the defender in order to do any significant damage.

There is an interesting dilemma between lasers and KEWs. A ship could just drop as many missiles (or plain mass canisters) as possible, sure in the knowledge that if they hit, they will do significant damage. Yet these KEWs will take time to hit their target; in the meantime the target could use their lasers to accurately burn down all approaching missiles long before they hit; but they would risk overheating or draining their energy supply. On the other hand, the attacker's only other alternative is to deploy more missiles to try to overwhelm the laser defenses, and so on and so on. It should be noted that recent tests performed by the military show that lasers can effectively bring down approaching missiles in about three seconds.

In *Seven Worlds* we have focused on creating deadly kinetic weapons for interpersonal combat, and on portraying the dilemma between lasers and missiles in space battles.

As an aside, some science-fiction authors have theorized on how human waste could be fired into space where it would acquire the appropriate relative velocity to do damage, and thus could be an effective kinetic weapon during space battles. Hopefully it will never be necessary to test this.

Clothing, Cold Weather: Appropriate to places such as Apollo, consists of thermal body clothes, boots, gloves and head cover. Wearing it gives a +2 bonus to rolls to resist Fatigue due to cold.

Clothing, Warm Weather: Appropriate to places such as Logan's End, this special body suit has special nanoparticles that absorb sweat and external heat and help keep the body cool. In game terms, this provides a +2 bonus to rolls to resist Fatigue due to heat. The effect is temporary, as the suit needs to be recharged every three days or so.

Cuffs: Made with special molecular materials, these cuffs are practically impossible to break. In game terms, they have a Toughness of 12.

Data Card: These allow the secure off-line storage (see page 81) of significant amounts of information (unlimited for most practical situations).

Flare: A flare illuminates a Large Burst Template for the equivalent of 20 Earth minutes.

Flashlight: Modern flashlights can be used either in unidirectional or omnidirectional mode. In unidirectional mode the flashlight illuminates a cone template. In omnidirectional mode the flashlight

illuminates a Large Burst Template centered around the flashlight. Changing mode is a free action.

Flashlights can be automatically reconfigured to slightly change light frequency depending on each particular planet, so as to allow the best possible illumination regardless of the color of solar light the planet has.

Glowstick: These small tubes produce light equivalent to illuminating a Medium Burst Template when broken. The effect lasts approximately 10 minutes.

Goggles, anti-glare: These goggles are used to avoid light penalties for planets with a high illumination, such as Nouvelle Vie or Logan's End (see page 127). Natives of very dark planets, such as Zarmina or Apollo, need to use these goggles in practically every other planet but their own to avoid a glare penalty.

Goggles, light: These goggles are used to avoid light penalties on very dark planets, such as Zarmina or Apollo (see page 127). Natives of planets with a high illumination, such as Nouvelle Vie and Logan's End, need to use these goggles in practically every other planet but their own to avoid a darkness penalty.

Habitat Module: This folded tent creates a pressurized module with its own atmosphere, and is useful on long trips on planets with atmospheres such as those in Apollo. The atmosphere and pressure devices need to be recharged in a ship, vehicle or civilized location every six days.

Lenses: Lenses are available in both frame and contact models, and include the hearing aids or earphones, as well as the contact for uploading programs and data while in V-World.

Long-range Communicator: Allows communication over 500 miles in open terrain, or over shorter distances in more dense terrains. Used only in locations where no V-World coverage is available. It not only allows voice communications, but any type of data or video communications. This includes receiving signals from beacons.

Magnetic Clamps: These special clamps allow the wearer to move along a metal surface when in microgravity or zero-G conditions or when the moving effects caused by superconductive walls inside a ship are not available (see page 126). They can also be used to climb metallic walls and grant a +2 bonus to Climbing in such instances (which is not cumulative with other bonuses). Anyone using magnetic clamps moves at half their pace.

It is difficult to remove someone wearing magnetic clamps from the metal surface. With a successful Grapple roll at a –4 penalty, the attacker has managed to remove his opponent from the wall.

Psionic Drug: This very new and experimental drug, not available for sale, affects a psion's concentration and his ability to use Psionic powers. The drug is available as a pill, as a dissolving powder, or as an injection. If the drug is administered in any way, the victim must make a Vigor roll with a –2 penalty or lose all psionic abilities and psionic-related Edges for 2d6 hours. This includes any Edge-or skill-related benefits to the victim's Mental Toughness.

The drug takes several minutes to work, and therefore cannot be effectively administered during combat.

Radiation Counter: This small device measures the intensity of most types of radiation in a 500-foot radius.

Rations: Pre-made food and drink to last seven days.

Rope: Composed of a fiber mixed with carbon nanotubes, this 50-foot rope is extremely hard to break or cut by accident.

Suit Charger: This bulky device allows for recharging of spacesuits so they are vacuum-ready, without the need to plug them into a spaceship or building. The Suit Charger has enough energy for four suit charges (both energy and atmosphere) before becoming depleted.

Suit Patches: Most spacesuits self-heal when punctured but the process takes time (see page 112). When the character cannot wait, a suit patch may be used. When applied, a suit patch releases nanoparticles that automatically seal any puncture made to a suit. It takes a full action and a successful Agility roll to apply a suit patch. With a failure the patch is still usable, but the character must try again. Suit patches can be applied to a character's own suit or to another character's suit.

Water Pack: Usable to carry up to 4 liters of water. Weight is 8 lb full and 0 lb empty.

Water Purifier: On worlds where water is available, this canister-sized device can be used to automatically analyze local water and purify it of bacteria or dangerous components. The process to purify four liters of water takes approximately an hour. The water filtered by the purifier is particularly bland, but safe for human consumption. Note that in particularly dangerous atmospheres water could be infected again after the purifier has finished its work.

HEALING EQUIPMENT

These items help in all kinds of medical situations. Besides these, the Healing skill can be used to attend to a character as described in *Savage Worlds*.

Bloodstopper: This special nanoparticles salve can be applied during combat by any wounded character. It can also be applied on another character. Applying a Bloodstopper takes one full action.

The Bloodstopper's nanoparticles quickly cover the wound, strengthen the surrounding muscles, and reduce the pain felt by the wounded character. In game terms, the character gains the Nerves of Steel edge for the duration of the combat. If the character already has this edge (even if he has it active from a previous Bloodstopper), he gains the Improved Nerves of Steel edge, also for the duration of the combat. If the character also has this edge, the Bloodstopper has no effect.

If a Bloodstopper is applied to a character who is Bleeding Out, its effect is different: Instead of providing the Nerves of Steel edge, the Bloodstopper gives a +2 bonus to Healing rolls to stabilize the bleeding character.

A character who applies more than two Bloodstoppers per day automatically gains one level of Fatigue per Bloodstopper (starting at the third Bloodstopper). This is cumulative and can cause death.

Bloodstoppers can be applied to people inside sealed spacesuits. In this case the Bloodstopper is released directly on to the character's skin from within the suit.

Healing Pod: This item cannot be bought; it is available as part of the sickbay of a ship. These pods use the latest nanotechnology and genetic techniques to repair wounds suffered after combat. These devices can only be operated by someone with the Medic or Surgeon Edges.

The Healing Pod allows the doctor to heal a patient as if he or she had the *greater healing* power, with the doctor's Healing skill replacing an Arcane skill. Each use of the Healing Pod requires the wounded character to lie inside, usually asleep, for 24 hours. In the case of healing Permanent Crippling Injuries, the roll is made with no penalty (instead of the –4 listed in *Savage Worlds*), but it takes about a month of game time, during which the hero is assumed to have undergone Healing Pod treatment several times. If the roll is failed, the injury really is permanent, most likely because of an incompatibility problem with the gene treatment.

Portable Healing Kit: This is a special healing kit based on several sets of nanoparticle salves and compounds, usable only by characters with the Medic or Surgeon edges. The nanotechnology microbes in the Healing Kit quickly repair wounds during combat. In game terms the Kit behaves like the *healing* power, with the doctor's Healing skill replacing an Arcane Skill. Each Portable Healing Kit can be used a maximum of three times.

MUNDANE GEAR

ITEM	WT	COST
Beacon	—	60
Bedroll	3	25
Binoculars	2	100
Bioscanner	2	500
Breathing Mask	1	150
Bloodstopper	—	100
Claytronics, Portable	2	250
Climbing Gear	3	50
Clothing, Normal	—	20
Clothing, Formal	—	200
Clothing, Cold-weather	5	300
Clothing, Warm Weather	2	300
Cuffs	2	20
Data card	—	30
Flares (4)	1	30
Flashlight	3	80
Glowstick	—	15
Goggles, anti-glare	1	50
Goggles, light	1	100
Grappling Hook	2	80
Habitat Module	15	300
Lenses	—	1500
Long-range Communicator	2	500
Magnetic clamps	5	150
Portable Healing Kit	2	300
Radiation Counter	2	150
Rations	6	30
Rope	6	100
Suit Charger	18	2000
Suit Patch	—	20
Water Pack	8/0	5
Water Purifier	6	300

RANGED WEAPON TABLE

TYPE	RANGE	DAMGE	AP	ROF	SHOTS	WT	COST
Biodefense Spray *Notes:* See description	1/2/4	Special		1	10	1	150
Autopistol *Notes:* Semi-Auto	12/24/48	2d6	1	1	20	3	200
Enhanced Autopistol *Notes:* Semi-Auto, see description	12/24/48	2d6	1	1	20	4	350
Flechette Pistol *Notes:* Semi-Auto, see description	12/24/48	2d6+1	1	1	36	6	360
Heavy Flechette Pistol *Notes:* Min Str d6, Semi-Auto, see description	15/30/60	2d8	2	1	26	8	450
SMG *Notes:* Min Str d6, Auto	12/24/48	2d6	1	3	32	10	400
Autorifle *Notes:* Min Str d6	24/48/96	2d8	2	1	8	8	400
Assault Rifle *Notes:* Min Str d6, Auto	24/48/96	2d8	2	3	20	10	600
Accelerator Pistol *Notes:* See description	12/24/48	2d6	1	1	8	5	300
Accelerator Rifle *Notes:* Min Str d6, see description	15/30/60	2d8	2	1	6	9	600
Tangle Gun *Notes:* Min Str d6, see description	2/4/8	—	—	1	1	5	500

MELEE WEAPONS

TYPE	DAMAGE	WT	COST	NOTES
Shock stick	Str+d4	1	30	—
Puke Stick	Str+d4	2	80	See description.
Brass Knuckles	Str+d4	1	20	See description.
Combat Knife	Str+d4	2	25	Cutting, piercing. See description.
Ceramic Knife	Str+d6	3	50	AP 1. Cutting, piercing. Cannot be thrown.
Nunchaku	Str+d4	3	100	Parry +1



SPECIAL WEAPONS

TYPE	RANGE	DAMGE	WT	COST	NOTES
Sonic Stunner	10/20/40	2d6+1	3	350	See description.
Frag Grenade	5/10/20	3d6	1	150	MBT
Incendiary Grenade	5/10/20	2d10	1	180	MBT, Ignores armor.
Stun Grenade	5/10/20	3d6	1	120	SBT, see description.
Smart Dust Grenade	5/10/20	—	1	250	MB, see description.
Plastic Explosive	5/10/20	3d6	1	200	MBT, +1" and +1d6 damage per extra charge.; HW, See description.

AMMO TABLE

TYPE	WT	COST	NOTES
AutoPistol Ammo	0.5	5	Provides one full load of shots.
Explosive Round	0.5	50	Damage 2d8 AP 2; SBT; for Enhanced Autopistol.
Flechette Pistol Ammo	0.5	10	Provides one full load of shots. Also applies to Heavy Flechette Pistol
SMG	1	15	Provides one full load of shots
Autorifle Ammo	1	15	Provides one full load of shots
Assault Rifle Ammo	2	30	Provides one full load of shots
Accelerator Pistol Ammo	1	50	Provides one full load of shots
Accelerator Rifle Ammo	2	50	Provides one full load of shots
Tangle Gun Ammo	2	50	See Tangle Gun notes

ARMOR AND SPACESUITS

TYPE	ARMOR	WT	COST	NOTES
ARMOR				
Light Vest	+2	4	80	Covers Torso.
Combat Vest	+2/+4	8	250	Covers Torso, negates 4AP, See description.
Combat Helmet	+4	5	80	50% chance of protecting head.
Light Combat Armor	+6	18	Mil	Covers Entire Body.
Psionic Helmet	+3	10	Special	
SPACESUITS				
Vacc Suit	+1	4	100	Covers Arms, Legs, Torso.
Reinforced Vacc Suit	+2/+4	8	350	Covers Arms, Legs, Torso. AP 4 vs. bullets.
Vacc Suit Helmet	+3	4	100	Covers Head.
Light Combat Vacc Suit	+6	24	Mil	Covers Entire Body.
Combat Armor	+8	30	Mil	Covers Entire Body.
Battle Dress	+12	0	Mil	Covers Entire Body.

ASSISTANT PROGRAMS

ITEM	COST	MODULE SLOT CAPACITY	NOTES
Assistant Program 3	250	3	All heroes begin play with this Assistant Program for free.
Assistant Program 5	750	5	—
Assistant Program 8	1500	8	—

ASSISTANT SKILL MODULES

SKILL MODULES	COST	MODULES	NOTES
Level I	50	1	d4 Skill
Level I Master	100	2	d4 Skill with Wild Die
Level II	150	2	d6 Skill
Level II Master	300	3	d6 Skill with Wild Die
Level III	400	3	d8 Skill
Level III Master	800	4	d8 Skill with Wild Die
Level IV	750	4	d10 Skill

STARSHIP AMMO

TYPE	DAMAGE	COST	NOTES
Kinetic Missile	3d6	5000	
Nuclear Missile	2d10	10000	
Neutron Missile	3d6	7500	See description
NNEMP Missile	3d6	7500	See description
Kinetic Coilgun Projectile	3d10	8000	
Nuclear Coilgun Projectile	4d10	16000	
Neutron Coilgun Projectile	3d10	10000	See description
NNEMP Coilgun projectile	4d8	9000	See description
Kinetic Cloud Projectile	2d4	7000	
Nuclear Cloud Projectile	3d4	12000	Each missile that hits has 1-in-6 chance of being nuclear instead of kinetic.
Neutron Cloud Projectile	2d4	9000	See description; Each missile that hits has 1-in-6 chance of being neutron instead of kinetic
NNEMP Cloud Projectile	2d4	9000	See description; Each missile that hits has 1-in-6 chance of being NNEMP instead of kinetic
Mine Cloud Defense (1)		2000	See description

ASSISTANTS

Every hero begins play with a free Package I Assistant program, unless the hero has the Assistantless Hindrance, as explained in page 105. The use of Assistants is explained in more detail in page 120.

ASSISTANT PROGRAMS

Assistant programs are available in different capacities, which are the number of skill slots each program can manage. Assistant Programs cannot be sold, only replaced. If a hero buys a new Assistant Program, he or she loses his or her current Assistant Program.

ASSISTANT SKILLS

Assistant Skills occupy a certain number of slots and are virtually installed into the Assistant Program selected. An Assistant Program cannot fit more skill slots than it has capacity to carry.

Skills can be transferable to a new Assistant Program should the old one be replaced. Extra Skill modules left after the transfer, if any, are permanently lost.

A hero can change a Skill in the Assistant program by replacing a current Skill module for the new one. Any replaced Skills and Modules are automatically lost. Skill Modules cannot be saved or stored outside of an Assistant Program.

SKILLS

The following skills are available for installing into an Assistant:

- **Investigation:** The Assistant knows how to search and sift through information (databases and databanks, V-World information) to find connections where one may not be obvious. This is the skill used when accessing information in public or open access databases.
- **Knowledge (Science):** With the Knowledge (Science) skill, the Assistant has knowledge on most or all branches of 23rd century science.
- **Hacking:** The Assistant knows how to override security protocols in V-World, hack computers and digital locks, and access secure sources of information (such as location sensors or security cameras). This is the skill used when accessing or modifying information in private or protected databases.
- **Notice:** The Assistant uses the sensors, cameras and geolocation detectors distributed throughout the major cities to proactively detect anomalous movement or behaviors.
- **Persuasion:** The Assistant is particularly skillful in talking and negotiating with human beings (or other Assistants).

Example: *Maricelle currently owns an Assistant Program 3 called "Papa". This program gives her three Skill Module slots to use. Maricelle owns three Level I Skill Modules for it: Knowledge (Science), Investigation and Hacking. Since these three Skill modules are level I, each one of them occupies one Slot, and each one gives her Assistant a d4 die roll with no Wild Die for each of the three Skills.*

If Maricelle decided to upgrade "Papa" to an Assistant Program 8 she would have to spend $1500 to acquire the program and lose her current Assistant Program 3 in the process. Now she has an Assistant program with a capacity of eight Skill Module Slots. She decides to keep her Level I Skill Modules for Knowledge (Science) and Investigation (using one slot each) and also to buy a Level II Master Skill Module in Hacking (spending $300 more), thus providing her Assistant with the Hacking Skill at d6 plus a d6 Wild Die. This Skill Module consumes three skill module slots. Counting the two Skill slots taken by the Level I Skill modules for Knowledge (Science) and Investigation, she is taking up a total of five Skill slots. She therefore has three Skill Module slots free in her new Assistant Program, to use as she wishes. Note that she has lost her previous Level I Hacking Skill Module, as it is non-transferrable.

STARSHIP AMMO

Although starship ammo has a listed cost, military and law enforcement ships (such as Circle patrol ships) are automatically replenished for free whenever they dock at any Circle base in most planets or space stations. Therefore, the heroes should usually not have any need to buy ship ammo, only to periodically go visit a Circle base to reload. The prices are listed for situations in which non-military ships (e.g. a cargo ship) need to acquire ammo.

Heroes can request specific types of missiles according to the weapons in their ship, up to the ship's maximum load.

If characters board and successfully capture an enemy ship after space combat, their ammo can be transferred to their ship, up to their ship's maximum load.

LIKE IT OR NOT, WE ARE PROBABLY TRAPPED IN OUR SOLAR SYSTEM FOR A LONG, LONG TIME. WE HAD BETTER START COMING TO TERMS WITH WHAT THAT MEANS FOR THE HUMAN FUTURE.

— PROFESSOR ADAM FRANK ON THE NEW YORK TIMES, JULY 25TH, 2012

This section describes rules that apply to characters with psionic powers (those with the Arcane Background — Psionics Edge).

PSIONIC POWERS

AVAILABLE POWERS

Only the following powers from *Savage Worlds* are available for Psions: *armor*, *barrier*, *blast*, *blind*, *bolt*, *burst*, *confusion*, *darksight*, *deflection*, *dispel*, *drain power points*, *entangle*, *elemental manipulation*, *fear*, *invisibility*, *pummel*, *puppet*, *slow*, *slumber*, *stun*, *telekinesis*.

The differences between these powers and the standard *Savage Worlds* power, if any, are described below. Several new powers are available to Psions, as described later in this section.

PHYSICAL MANIFESTATIONS

Most psionic powers manifest themselves as a mental effect on the caster, an ally or an opponent. However, some psionic powers have a manifestation that affects or modifies the physical world. Given the immense amount of mass (in atomic terms) involved in modifying the physical world, these powers make a huge drain on a psion's powers, and thus only the most powerful psions can use them. In game terms, psionic powers with physical manifestations have a significantly increased Power Point cost, and usually have weaker effects than their standard *Savage Worlds* counterparts. Psions who use a power with a physical manifestation might discover it's the only power they have enough energy to use for a while.

If a psionic power with a physical manifestation deals damage to a character, that damage is calculated against the enemy's normal Toughness (not its Mental Toughness) since the attack is physical in nature.

Unless otherwise stated, psionic powers with no physical manifestations only work on human beings. This is because the power itself affects the structure of the human mind. Because of this, creatures do not have the Mental Toughness statistic. Psionic powers with physical manifestations work normally on any being, human or not.

The following powers have physical manifestations: *armor*, *barrier*, *burst*, *dispel* (only when used against a power with a physical manifestation that is already in effect), *elemental manipulation*, *ignite*, *invisibility*, *pummel*, *telekinesis*.

MENTAL TOUGHNESS

Mental Toughness is a new derived statistic that measures how resistant the character's mind is to psionic attacks. Since most psionic attacks are mental attacks (with the exception of psionic powers with physical manifestations, see above), a weak-minded character can easily be affected by them, regardless of how strong his or her armor is. To reflect this, all non-physical psionic powers that deal damage use Mental Toughness when dealing it.

The Arcane Resistance Edge bonus to Armor applies to Mental Toughness, not to standard Toughness. No physical modifiers, such as Cover, apply to attacks that target Mental Toughness. Usually (but not always, at the GM's discretion) the psion needs at least line-of-sight to the target, though.

ADVANCING THE PSIONICS SKILL

The Psionics skill is harder to raise than other skills. For starters, the Psionics skill can't be raised unless its linked attribute (Smarts) is higher than the skill itself. So, for example, a hero with Psionics d6 and Smarts d6 needs to raise his Smarts to d8 before being able to raise the Psionics skill to d8.

Second, raising the Psionics skill one die type (up to the same die type of its linked Smarts Attribute) costs a full Advance, rather than half an advance as usual. Thus a hero with Psionics d6 and Smarts d8 would spend a full advance to raise the Psionics skill to d8, and would not be able to raise any other skills in that advance.

"THIS PSIONIC VOW IS A PAIN!"

Players with Psion characters who are acquainted with the Psion Vow (see page 90) may become frustrated or worried that their heroes may not be able to effectively use their powers without getting into trouble.

The fact is that in the *Seven Worlds* psions are viewed with distrust. The Psion Brotherhood forbids any action that may increase the distrust or fear that the average citizen has against psions, and the Psion Vow is a representation of that. Psion heroes should keep this in mind when using their powers.

The Psion Vow explicitly states that psionic powers will not be used unless the following three conditions are all met:

- The psion sees a morally and ethically defensible reason to do it.
- The psion has been requested to use the power by his or her superiors.
- The psion has been requested to use the power by the recipient, or the recipient's authority.

Here are some examples of how to cover each condition:

- **The psion sees a morally and ethically defensible reason to do it:** Intervening to save an innocent from being attacked would qualify here, but assassinating an enemy in cold blood probably wouldn't, depending on the circumstances. Defending oneself would also be morally and ethically defensible.
- **The psion has been requested to use the power by his or her superiors:** This request may be implicit if the psion is doing it as per the goals of the organization. In the example above, both the Circle and the Psion Brotherhood have as their goals to protect the peace and the innocent, so no explicit permission is needed to act. If the psion is on a mission assigned by his or her superiors, and the power is used in pursuit of the mission, then this condition could also be considered met.
- **The psion has been requested to use the power by the recipient, or the recipient's authority:** This is the toughest condition to meet. It keeps the psion from illegally entering and reading people's minds without their permission, for example. In most cases, if the psion uses their powers against someone who is breaking the law on the planet or in the location where the action is taking place, there is an implicit permission to stop the wrongdoer (as that is the law on that planet anyway). However, if things are not so clear cut, the psion may need someone with authority over the recipient to give permission to use the power. For example, if the psion is in Bay Jing and is attacked by Bay Jingnian police, could he return the attack? In theory the psion should not, since the police are the authority itself.

The Psion Vow does not prohibit the psion from returning an attack or performing the action by other, non-psionic means. In the example of the Bay Jingnian police above, maybe the heroes decide to shoot out their way back to their ship, and the psion goes along with that.

But what if the psion feels it is indispensable for him or her to perform the psionic action, even if it breaks the Vow? This is exactly the type of dilemma and conflict that role-playing games are so good at portraying. Players are encouraged to think of a way to frame their actions within the limits of the Psion Vow, to negotiate the permissions necessary to act, or simply to intelligently cover up their actions (depending on their ethical makeup). Remember that there is a Psion Brotherhood representative in every city and planet, with connections to local authorities. They can be very useful in acquiring the permissions necessary to use the power, or in explaining what happened after the fact.

The GM should ensure that breaking the Vow (and being discovered) has interesting consequences for a role-playing game. While avoiding if possible the need to go for a full death penalty trial (which could be an interesting adventure by itself!), breaking the Psion Vow could entail explanations, reprimands, harassment from the locals, embarrassing the Psion Brotherhood, or other things.

Far from being a pain, the Psion Vow should be an interesting source of role-playing opportunities.

MODIFIED POWERS

The following powers are available in the standard *Savage Worlds* book. This section describes any modifications to the power, as well as any particular trappings.

ARMOR

The psion concentrates to improve his body's resistance to pain and harden his muscles, thus making it easier to recover from attacks. This power can only be used on the psion, and affects standard Toughness.

Since this power has a physical manifestation, it now costs 5 Power Points. Maintaining the power costs as normal.

BARRIER

The psion extends his arm and rearranges the atoms around him to create an invisible "wall" that stops attacks. The invisible "wall" cannot be climbed, but it can be broken normally.

Since this power has a physical manifestation, it now costs 3 Power Points per section. Maintaining the power costs as normal.

BLAST

The psion projects a psionic wave that causes immense mental pain to everyone within the target area. The damage from this attack is applied against Mental Toughness.

BLIND

The psion overloads the visual cortex of his enemy's brain, causing him to go temporarily blind. The defender must make a Spirit roll, instead of Agility, to avoid the effect.

BOLT

The psion injects a sharp spike of pain in the enemy's mind. The damage from this attack is applied against Mental Toughness.

BURST

The psion forces the atoms around him to heat, releasing a wave of heat against his targets.

Since this power has a physical manifestation, it now costs 5 Power Points.

CONFUSION

The psion concentrates on creating dizziness and pain in the enemy's mind. The power works as normal.

DARKSIGHT

The psion enhances the parts of his mind that handle his perception senses to process low light. More aware, his brain now detects minute changes even with no light.

DEFLECTION

The psion concentrates on detecting what his enemy's intentions are, and on reacting to them. He thus has an easier time avoiding attacks.

DISPEL

The psion negates the psionic effects that other psions have created or are about to create. If this power is used against a psionic power before it is cast, or against a psionic power already in effect which does not have a physical manifestation, *dispel* costs the normal amount of Power Points. However, if this power is used against a power with a physical manifestation which is already in effect (for example, a *barrier* that is already existing), then this use of *dispel* requires a physical manifestation, and thus now costs 6 Power Points.

DRAIN POWER POINTS

The psion attacks his enemy's mind, and mentally weakens it.

ELEMENTAL MANIPULATION

The psion concentrates on re-arranging the atoms around him to create simple elemental effects. Since this power has a physical manifestation, it now costs 3 Power Points to cast. Maintaining the power costs as normal.

ENTANGLE

The psion creates a mental web that stifles the responses of his enemy's brain to movement functions. This makes the target move sluggishly or not at all. The victim uses its Smarts or Spirit attributes for resisting rolls and breaking free. The skills restrained by this power are still the ones related to Agility and Strength.

INVISIBILITY

This power allows the psion to project a subtle distraction around him. People cease to pay the psion any attention, completely forgetting his presence, becoming temporarily distracted by something else: for the brief duration of the power, the psion becomes, effectively, invisible, edited-out of the short-term memory of those affected.

FEAR

The psion excites the hypothalamus and amygdala, causing fear in his targets. The power works as normal.

PUMMEL
The psion forces atoms in the air to rapidly move, creating a huge air push with his hands. Since this power has a physical manifestation, it now costs 6 Power Points to cast.

PUPPET
The psion takes control of the enemy's brain and free will. This power works as normal.

SLOW
The psion attacks the part of the brain that affects the brain's coordination. This power works as normal.

SLUMBER
The psion causes the victim to lose consciousness. This power works as normal.

STUN
The psion overloads the victims' brains, causing them to become Shaken. Replace the Vigor roll to recover with a Spirit roll.

TELEKINESIS
The psion affects the physical universe with his mind. The range of the power is the psion's Spirit rather than his or her Smarts. Since this power has a physical manifestation, it costs 8 Power Points to cast. Maintaining the power costs as normal.

NEW POWERS
The following psionic powers are new to *Seven Worlds*.

BRAIN LOCK
Rank: Veteran
Power Points: 5
Range: Touch
Duration: Indefinite
Trappings:

This power allows the psion to insert a piece of information inside the victim's mind and then lock it so it can't be accessed by the victim unless the brain lock power is cast again with the unlocking password. The psion needs a successful Psionic skill roll (opposed, if the target is unwilling) to lock or unlock the victim's mind. The password can be a word, phrase, or image.

If anyone tries to use the *read surface thoughts* or probe powers on an individual with locked information and gets a raise on their Psionics roll, they may detect that something is locked inside the victim's mind. The locked information itself, however, cannot be accessed by any means than other this power.

Once the information is locked inside the victim's mind, even the victim forgets he carries locked information in his brain. Unlocking the information makes the target automatically remember it.

FORGET
Rank: Novice
Power points: 2+
Range: Smarts × 2
Duration: Instant
Trappings: Concentration.

The Psion can make his victim forget everything that has occurred in the last 10 minutes, plus an additional 10 minutes per Power Point invested when the power is activated. This requires a successful opposed Psionics roll versus the target's Spirit. The Psion has a –1 penalty to the Psionics roll for every Power Point spent above the base two Power Points.

The impact of the *forget* power is lessened because a target's Assistant remembers everything its user does. Also, V-World sensors log every activity they detect. To keep the target from finding out what he was made to forget, psions usually have to erase both the Assistant's memory and any V-World logs and recordings. Your GM will decide how exactly to do this but we suggest, as a minimum, a Hacking roll with a –2 penalty.

GREATER FORGET
Rank: Heroic
Power points: 4+
Range: Smarts × 2
Duration: Instant
Trappings: Concentration.

Like the *forget* power, but in this case the Psion can make his victim forget everything that has occurred in the last week, plus an additional week per Power Point invested when the power is activated. This requires a successful opposed Psionics roll versus the target's Spirit. The Psion has a –1 penalty to the Psionics roll for every Power Point spent above the base four Power Points.

MIND SHIELD
Rank: Novice
Power Points: 1
Range: Self
Duration: 3 (1/round)
Trappings: Concentration.

With a success, the psion adds +2 to trait rolls to resist opposed psionic powers and acts as if he had 2 points of armor when hit by psionic attacks. This armor bonus applies to the psion's Mental Toughness. With a raise, the bonuses increase to +4. This power

also protects the psion against the effects of the *read surface thoughts* power. However, the opponent will know he has been blocked.

The bonuses from this power do not stack with the Arcane Resistance or Improved Arcane Resistance Edges.

PROBE

Rank: Seasoned
Power Points: 3
Range: Smarts
Duration: Instant
Trappings: Concentration

This power allows a psion to reach deeper into a victim's mind than with *read surface thoughts*. The psionicist must make a Psionics roll opposed by his victim's Spirit. The character must beat his victim's roll and score a success. The exact thoughts obtained depend on how successful the roll was, and are the calling of the GM.

The target knows he has been probed, but not necessarily by whom.

PYROKINESIS

Rank: Novice
Power Points: 6
Range: Smarts × 2
Duration: Instant
Trappings: Clicking fingers, blowing, hard stare.

This simple power, rather than slowly heating an object to its combustion point, does so instantly. Combustible targets automatically catch fire and suffer 1d10 fire damage on the round the spell is cast. Each round thereafter check to see if the fire spreads as normal. Pyrokinesis is a power with a physical manifestation.

READ SURFACE THOUGHTS

Rank: Novice
Power Points: 1
Range: Smarts
Duration: Instant
Trappings: Psionic invasion.

With this power a psion can read the minds of others. With a successful Psionics roll against the target's Spirit, the psion reads the target's current thoughts. Such an intrusion goes unnoticed as the psion is only receiving broadcast signals. If the target is using the *mind shield* power at the time, this power automatically fails. Additionally, the psion will know the target has *mind shield* activated and thus, that the target has psionic powers. This power is commonly used by Psion Brotherhood security officials to detect unauthorized/rogue psions.

TELEMPATHY

Rank: Novice
Power points: 2
Range: Smarts
Duration: 3 (1/Round)
Trappings: Concentration, body reading, change in own body language

The Psion can read surface emotions. With a successful Psionics skill roll, the character learns the emotional state of one target. This information can be used by the psion to influence the target. As long as the power is on, the psion gains a +2 Charisma bonus when dealing with his victim. The victim does not understand the reasons he is feeling so disposed towards the psion, only that he is more open than usual to suggestions from the psion.

TELEPATHY

Rank: Novice
Power Points: 1
Range: Smarts × 2
Duration: 3 (1/round).
Trappings: Trance, concentration, mental image.

The ability to communicate over distances is known as telepathy. It allows thoughts to be transmitted, in the form of mentally-spoken words and images. Once contact is established, communication can be made from psion to recipient only, or bi-directional. For as long as the power lasts, communication occurs as if the characters were talking face-to-face. This includes the possibility of using the Intimidation, Persuasion, Streetwise and Taunt skills.

A single use of this power works simultaneously for as many recipients as the psion wants, as long as all of them are within the supported range.

setting rules

OUR PLANET AND OUR SOLAR SYSTEM ARE SURROUNDED BY A NEW WORLD OCEAN, THE DEPTHS OF SPACE. IT IS NO MORE IMPASSABLE THAN THE LAST.

—CARL SAGAN.

To help create the feel of the Seven Worlds. The following rules apply to characters adventuring in *Seven Worlds* setting.

LANGUAGES

As explained on page 82, most people in the *Seven Worlds* understand each other, either because they speak the same language or because translation software does its work. Therefore, in game terms anyone can talk to anyone else without problems.

It is assumed that all characters speak either English or Chinese, plus optionally an additional Earth language if they are from a particular culture or background. If the GM thinks it will be important to his or her campaign, the Multiple Languages setting rule from *Savage Worlds* can be used.

MICROGRAVITY AND ZERO-G

When the heroes are traveling in space they will usually be in microgravity or Zero-G conditions. The following rules apply to any character who is in microgravity and does not have the help of a special edge or of superconductor magnetic arrays (see below):

- The character's Pace is reduced by half (round down), to a minimum of 1.
- All physical actions have a –2 penalty. Physical actions are those that use Agility, Strength, or related skills, with the exception of Piloting.
- f the character rolls a 1 on his physical trait die, regardless of Wild Die, he has lost control of his body and begins to tumble in three dimensions. Treat the character as Shaken, but he must make an Agility roll (instead of Spirit) to recover.
- When using weapons that are not prepared for Zero-G environments, in addition to suffering the regular –2 penalty, characters who roll a 1 or 2 on their attack die (regardless of Wild Die) become Shaken as above. Accelerator weapons (see page 110) are not affected by this rule.

FIGHTING IN ZERO-G

Some players might interpret the Zero-G rules as just "fighting with a constant -2 penalty." We encourage you to instead look for and take advantage of the different combat styles the situation opens. For example, consider making more Intimidation and Taunt rolls to change the balance of the battle, as well as Smart Tricks. Execute maneuvers that increase the attack roll bonus, such as Aim, for example. Finally, look for opportunities to use Assistants to their full advantage: With few exceptions, they are not tied to the Zero-G rules.

SUPERCONDUCTIVE MAGNETIC ARRAYS

The walls and passageways of modern spaceships are coated with superconductive magnetic arrays which make it easy for characters using spacesuits to "hover" and "fly" at will through the ship (see page 18). The superconductor magnets enable and disable themselves with different polarities, effectively moving the hero through the passageways. The systems inside the ship enable this only for authorized, detected characters. This keeps an intruder or an attacker in a boarding party from taking advantage of this against the defenders. For this reason, enemy boarders usually wear magnetic-neutral spacesuits, to keep the superconductor arrays from pinning them to the walls.

Whenever a character is in a ship or space environment that contains superconductive magnetic arrays in the walls, and the character is recognized by the system as authorized (for example, crewmembers in their own ship, or valid visitors to a space station), and the character is wearing a spacesuit, the following microgravity rules above apply:

- The hero moves up to his or her normal Pace, without any penalties due to microgravity. It is not possible to run, though.
- All physical actions have a –1 penalty. Physical actions are those that use Agility, Strength, or

related skills, with the exception of Piloting. The –1 penalty does not apply to Chases that use Agility as the maneuvering Trait.

- When using weapons that are not prepared for Zero-G environments, a character who rolls a 1 on his attack die (regardless of Wild Die) loses control of his body and begins to tumble in three dimensions. Treat the character as Shaken, but he must make an Agility roll (instead of Spirit) with a +2 bonus to the roll to recover. Accelerator weapons (see page 110) are not affected by this rule.

VACUUM

Characters in space may periodically have to deal with vacuum. This may happen when a hero ventures on a spacewalk outside the ship, or if the atmosphere inside the ship is lost for any reason.

The following rules apply whenever a character is exposed to vacuum or to an environment with a hostile atmosphere:

- If a character is partially or totally exposed to vacuum without appropriate protection (such as that from a sealed spacesuit) then starting on the first round after the breach the character must make a Vigor roll with a +1 bonus every round or suffer a Wound. Starting on the seventh round, and each round thereafter, the character takes an automatic wound. This wound can be soaked. Characters using spacesuits exposed to vacuum because of an attack should note that these usually self-heal after a few rounds (see page 112). Suit patches are also available should the character need to patch a punctured spacesuit in a rush.
- While in a vacuum, double the range brackets of all ranged weapons.
- Explosions work differently in vacuum. While there is no concussive blast (that being the result of air being forcefully expelled from the center of the explosion), shrapnel flies further. To simulate this, increase the Burst Template of the weapon by one step and lower damage by one die. For instance, a regular grenade in a no atmosphere environment would have a Large Burst Template and inflict 2d6 damage. For Large Burst Template weapons, increase the radius by an additional 3".

The above rules are in addition to any microgravity rules, should they apply.

PLANETARY ENVIRONMENTS

Once characters arrive at a planet, they must deal with the environment, gravity, weather and atmosphere of the planet in question. The following table lists the benefits and penalties all characters visiting a particular world will receive. A character's home planet is listed on the left-hand side (the 1st column) and the planet being visited is listed at the top (the 1st row).

PLANET ENVIRONMENTS

PLANET BEING VISITED

	EARTH	ZARMINA ("GEE")	APOLLO	CONCORDIA	BAY JING	NOUVELLE VIE	LOGAN'S END
EARTH	—	TD, HG	CH, SD	—	NC/P	TB	HG, TB, TH
ZARMINA	TB	TD	CH, LG, SD	TB	NC/P, TB	LG, TB	TB, TH
APOLLO	TB	TD, HG	CH, SD	TB	NC/P, TB	TB	HG, TB, TH
CONCORDIA	—	TD, HG	CH, SD	—	NC/P, NL	TB	HG, TB, TH
BAY JING	—	TD, HG	CH, SD	NL	NC/P	TB	HG, TB, TH
NOUVELLE VIE	SD	SD, HG	CH, SD	SD	NC/P, SD	—	HG, TH
LOGAN'S END	SD	SD	CH, LG, SD	SD	NC/P, SD	LG	TH

CH = Cold & Hostile; HG = High-G; LG = Low-G; NC/P = No Circle or Psions; NL = Not Liked; SD = Slightly Dark; TB = Too Bright; TD = Too Dark; TH = Too Hot

The benefits and penalties below assume characters have been exercising during their trip in space, as explained in page 19. If this is not the case, the GM should feel free to apply higher penalties. After a character spends a few weeks on the planet, the character becomes accustomed to its environment. In game terms, he temporarily gains the same bonuses and penalties as a native from the table below.

A short description of each effect is listed below:

COLD AND HOSTILE (CH)

Characters outside cities and without proper protection against the cold should apply the Cold rules in the Hazards section of *Savage Worlds*. Also, because of the tainted atmosphere, characters without a breathing mask must make a Vigor roll every 2 hours (4 hours for Apollo natives) or suffer a level of Fatigue. This can lead to Exhaustion, but never to Incapacitation. Recovery requires 10 minutes of breathing good air.

HIGH-G (HG)

Pace is reduced by half (rounded down) to a minimum of 1. Also, all physical actions have a –2 penalty because of the extra effort involved in moving. If the character rolls a 1 on his trait die (regardless of Wild Die) he has overexerted himself and is Shaken by momentary exhaustion, requiring a Vigor roll to recover. Finally, characters must make a Vigor roll every four hours they are awake or become Fatigued. Fatigue is reduced one level per hour of rest.

LOW-G (LG)

Strength die type is increased by one (maximum of d12) and the Agility die is decreased by 1 (minimum of d4). This does not affect related skills.

OPTIONAL RULE: CURRENCY EXCHANGE RATES

As explained on page 83, although all planets accept EarthGov Dollars, different planets have different currencies and exchange rates that are constantly in flux. As an optional rule, a GM can simulate this by rolling a 1d6 when the heroes arrive at the planet. On 1–2, prices are 10% lower; On a 5-6, they are 10% higher.

If this optional rule is used, places without Stellar Comm Network access, such as Logan's End and some Space Stations, should also have a 10% premium on everything sold to account for risk-covering the delays in financial information.

NO CIRCLE OR PSIONS (NC/P)

All Circle members have a –1 Charisma modifier while interacting with this planet's citizens. All psions (be they rogue psions or members of the Psion Brotherhood) have a –2 Charisma modifier. A Psion belonging to the Circle receives the Psion modifier only.

NOT LIKED (NL)

Character has a –2 Charisma modifier while on the visiting planet.

SLIGHTLY DARK (SD)

Any characters who are in the open and do not have special goggles have a –1 darkness penalty applied to all actions.

TOO BRIGHT (TB)

Unless a character is wearing anti-glare goggles, he must make a Vigor roll. On a failure, the character suffers a –2 penalty to all trait rolls involving sight (including combat). His Parry also receives a –2 penalty. To recover, the character must rest his eyes in total darkness for 12 hours.

TOO DARK (TD)

Any characters who are in the open and do not have special goggles have a –2 darkness penalty applied to all actions.

TOO HOT (TH)

Heroes need to consume 6 quarts of water a day to resist the effects of Heat. All Vigor rolls against Heat are made at –4 (–2 for natives of Logan's End).

ASSISTANTS

As explained on page 75, most characters own an Assistant. This section gives details on how to use them. page 120 in the Gear section explains how to configure or customize Assistants.

ASSISTANTS OUTSIDE COMBAT

Assistants are always available to talk and ask questions, and provide an excellent opportunity for role-playing or for the GM to pass information along to the heroes. Talking to an Assistant is considered a free action.

Assistants are always assumed to be helping heroes when they perform actions, and thus do not perform Cooperative skill rolls. The Assistant's own skills come into play when a hero wants an Assistant to do something by itself.

The owner must order the Assistant to do something specific on its own. The GM decides based on the request which of the Assistant's skills, if any, is

appropriate, as well as any bonuses or penalties to the roll. The GM also decides how long the Assistant's action takes. Depending on the request, the answer may be immediate, take one full round or even more. A hero's Bennies may be spent on his Assistant's roll.

ASSISTANT SKILLS

What follows is a description of how the different skills apply to Assistants.

INVESTIGATION

The Assistant's Investigation skill is used when the owner orders his or her Assistant to search and locate information in public or open access databases, or in the owner's own personal database. There is an incredible amount of information available on just about everything, usually stored in databases in V-World. Also, there are many public, live feeds of cameras, sensors, geographic location detectors, temperature readers, and many other sources the Assistant can query. The Investigation skill represents how effective the Assistant is in locating and acquiring the information.

Whenever a character asks his or her Assistant for information, the GM should estimate how easy or difficult it is to find the requested information and apply an appropriate bonus or penalty to the Assistant's Investigation skill roll. The GM should also estimate how long it takes the Assistant to acquire the information.

With a Success, the Assistant locates the information. One or more Raises may increase the detail or accuracy of the information found. A failure means the Assistant was not able to locate the requested information, although the character may ask the Assistant to try again. A Critical Failure means the Assistant located faulty or erroneous information but did not realize it, and thus the character receives inaccurate information.

Assistants cannot use the Investigation skill to get information that is stored in private or protected databases (that's what the Hacking skill is for), or to interpret information that is so technical or scientific that a layman would not understand it (that's what the Knowledge (Science) skill is for). Also, Assistants can only access information available within the V-World networks the Assistant itself has access to. This usually includes the character's personal database, ship's databases, and public V-World databases. Information stored in V-World databases on a different planet that is off-bounds (and that is not replicated locally) needs to be requested through the Stellar Communications Network, and thus may take days to arrive.

Example: *While in combat with a bunch of thugs, Jon suspects there's something weird about the location the thugs chose to the attack. During his action, while firing at the enemy, Jon mutters at his Assistant, "Audrey, this is weird. Only Grannel knew we'd come to this warehouse, and supposedly he's loyal to us. You saw the face of the leader of these thugs. Run a search on him, see if you can locate him and figure out if he's related to Grannel in any way."*

The GM decides this is a difficult Investigation task so he decides Audrey will take two rounds to figure it out, and needs an Investigation roll at –4. Since Audrey has a Master Skill Module Type C Investigation Program, at the end of the second round Jon rolls a d8 plus a d6 Wild Die for Audrey's skill. Audrey gets a 9, which even with the –4 penalty counts as a success. Audrey tells Jon after a couple of rounds, "good hunch, Jon! These guys are rent-a-thugs, working for a criminal case called Harry the Shark. I've found out that Harry and Grannel were seen together in a local bar a few days ago."

"What are you playing at, Grannel? I'll make sure to leave one of these thugs alive so he can tell me the truth," mumbles Jon before jumping out of cover and firing again.

KNOWLEDGE (SCIENCE)

This skill is used just like the Investigation skill, except it applies to requests for technical or scientific information (on any field) or extrapolations or deductions based on technical or scientific information. The Assistant can not only locate information, but also offer theories or assumptions it is making based on the located information.

Example: *After days of trekking through the hot, humid and dangerous jungles of Logan's End, Duarthe uncovers a small clearing, at the center of which stands a large stone block with curiously regular angles. He investigates the block and concludes it is not natural, but has been made. His Notice roll reveals nothing else, so he decides to ask his Assistant, Dante, to have a look at it.*

The GM decides Knowledge (Science) is the appropriate skill here, a skill the Assistant has. The player rolls Dante's Knowledge (Science) skill and gets a raise. Dante wirelessly takes control of Duarthe's Bioscanner and scans the block. After a few minutes, he reports "Curious. The density of iron in the block is not consistent with the average density on Logan's End. On top of that, there are minute traces of uranium and other

radioactive materials that are not found on the surface of the planet. Duarthe, this block not only has been made by someone intelligent; it has not been made in Logan's End, but has been brought here... and knowing the density and chemical composition of the other bodies in this star system, I have a good idea where it came from."

The Assistant pauses for a few seconds and then adds. "I bet you could not have figured that out just with your weird psionic powers, eh?"

HACKING

This skill is used just like the Investigation skill, except it involves access to databases, cameras or information feeds where access is restricted or forbidden. Depending on the situation, it may simply mean accessing information that requires complex (but legally valid) authentication, or it may mean the Assistant is trying to illegally hack the source of the information.

Using this skill, the Assistant could crack passcodes and security, forge the owner's identity, inject false data into a protected database, access high-clearance security camera or geolocation feeds for which the owner would not have access, change the parameters of a V-World simulated environment, and so on. Depending on the activity, this may be an opposed roll (for example, when trying to outsmart enemy security personnel or an enemy security program). The GM must keep in mind to set bonuses or penalties to the roll appropriately.

The skill can also be used to control feeds without authorization. For example, opening a door, moving a camera around, shutting down a sensor, are all valid uses of the Hacking skill.

If the roll is failed, the hacking attempt fails. On a critical failure, the Assistant executes the hacking attempt so clumsily that it leaves "fingerprints" that could identify its owner; and the alarm is automatically raised.

The Hacking skill can only be used on digital interfaces. It does not apply to physically forcing a lock, for example.

Example: *Jon has infiltrated the Hariko Shipping offices. He thought he knew the way to the underground cells, but unexpectedly has found a large metal door that blocks the way. To make things worse, security agents have closed his way, and are pinning him down with shots!*

While firing back, he desperately speaks. "Audrey!," he mutters, "I need this door opened, fast!"

"This system is very secure, Jon," replies Audrey cautiously, "I'm not sure I'll be able to hack this door."

"Stop talking and do it! Please!," screams Jon while a bullet passes inches away from him.

The GM estimates that hacking the Hariko security system is a Hacking roll with at least a –4 penalty. Audrey's Hacking skill is d6. The GM rolls a d6 and gets a 3. "I'm sorry, Jon, it won't budge" says Audrey after one round. "At least I wasn't detected. You'll have to find another way. Oops."

"Remind me to re-format you when we get back, Aud," grouchily answers Jon as he pulls out a grenade.

NOTICE

The Notice skill represents the Assistant's ability to proactively detect something unusual and report on it. It can be used proactively by the GM to detect something wrong with a particular situation, or to notice an impending attack (remember the Assistant has access to sources of information, such as cameras or location feeds). An Assistant can also use this skill to run a search of a room or of a situation and see if something is amiss.

In the world of the 23rd century there is so much information on the whereabouts of everyone that it is very difficult to be surprised by a particular event. The GM should consider that Assistants have the ability to process large amounts of information, and will most likely notice things (and inform their owner of them) much faster than human beings would.

Example: *Seela is walking down the streets of Emerald Bay in Nouvelle Vie, going to visit an old friend of the Atherton family. Unbeknownst to her, the shady smugglers she and the other heroes have been pursuing have set up a trap for her, placing a hidden plastic explosive triggered to explode when she enters range of her old friend's house.*

Fortunately Chloe, Seela's Assistant, is always on the lookout. Just as Seela is about to enter range of the explosive, the GM rolls Chloe's Notice skill and gets a five. Chloe notices that the scanners in the urban zone, connected to V-World, are detecting the constant polling for the location of Seela, and quickly zones in to the place where the polling is coming from. "Jump, Seela, Jump!," shouts Chloe. Seela barely has seconds to react: She rolls her Agility with a –1 penalty, gets a 7 and somersaults out of the way and into a side

passageway just as the street explodes into a ball of deadly flame.

PERSUASION

The Persuasion skill is used when the Assistant must interact with either humans or other Assistants. This may be to deliver a message, or convince someone to do something. Use of the Persuasion skill uses the standard Persuasion rules, except when used in lieu of the Intimidation or Taunt skills in a Test of Wills (see the section on Assistants in Combat below).

Assistants only rarely interact with other humans unless their owners are already very close (for example, spouses, family or very close friends). When an Assistant talks to a human it is to deliver a message or request, after which the Assistant stays silent until dismissed. It is very difficult for an Assistant to persuade a human of anything given the restrictions it has communicating with others, so such an action usually implies a modifier defined by the GM. Assistants will almost never directly argue with humans.

Assistants usually only talk to other Assistants, and may try to persuade the Assistant to tell something to its owner, or to try to influence him or her in some way. Assistants communicate with each other behind the scenes using standard communication protocols, and thus their "conversation" cannot be eavesdropped by humans.

Example: *Jon wants his Assistant Audrey to arrange a meeting with Shaneka Lesneski, CEO of Hariko Shipping of Apollo. Since Ms. Lesneski will be very reluctant to meet with a member of the Circle she knows is investigating her, Jon has asked Audrey to imply that he might have some confidential information about the investigation that he might be willing to sell for the right price.*

Audrey interfaces with Ms. Lesneski's Assistant and requests the meeting. Audrey will have to be very careful implying that there might be a benefit to Ms. Lesneski granting the meeting. The other Assistant begins the "conversation" as Uncooperative, so the GM decides Audrey needs to improve his reaction by two steps to get the meeting. The GM rolls Audrey's Persuasion d6 persuasion and gets a 5. Audrey gets back to Jon and tells him the meeting request was not successful, and he will have to find another way to get into the Hariko Shipping offices.

USES OUTSIDE THE ASSISTANT'S SKILLS

Besides requests that involve an Assistant's skill, a character may ask an Assistant for many other things. The GM gets to decide whether the request involves a skill roll (and if so, which skill) or if it succeeds automatically. For example, a character might ask his or her Assistant to order food, call the police, play a

INVESTIGATION AND HACKING WHICH ONE TO USE?

At first glance, Investigation and Hacking may seem to overlap. When deciding whether a specific information request requires a roll or not, and what skill to use, the GM should try to think about the equivalent in our 21st century world, using libraries or the Internet as an example. Here are a few examples:

- **What can you tell me about Nouvelle Vie?** This is easy-to-find public information available through a simple search. No roll is required for this.
- **Give me information on Marcel Coban:** Public information on anyone is available, but is not that trivial to find the correct person. An Investigation roll should be needed, with a bonus or penalty depending on how well-known the person is.
- **Where did Marcel study?** This would probably be in Marcel's public profile, and thus should be easy to find provided Marcel's profile has been found (see above).
- **Who did Marcel study with?** This requires cross-referencing Marcel's place of study with that place's student record list. Most likely the record list is not public. Besides, cross-referencing is hard. A Hacking roll at -2 might do it. The GM might also require more than one success, possibly structured like a Dramatic Task.
- **Does Marcel have any important, critical disease?** Medical records are confidential in most civilizations. This definitely requires a Hacking roll, maybe with a -4 modifier.
- **Find me an old picture of Marcel and his schoolmates.** This might require an Investigation roll or a Hacking roll, depending on where the GM decides the picture might be found. Many people post pictures of themselves and their friends in the profile (think about a social network). In this case the Investigation skill should be used. If the picture is hidden or confidential, Hacking is the skill.
- **Let's fake Marcel's profile.** This is a very heavy-duty Hacking skill check, maybe even a Dramatic task. Penalties for failure should be important.

song by their favorite artist on the speakers, or open the room's windows. These and many other requests are usually automatic.

ASSISTANTS IN COMBAT

During combat Assistants can use their skills as described above. Additionally, if a hero spends a Benny, his Assistant can perform one of the actions described below in this round. These actions are available for both friendly and enemy Assistants. **If the Assistant's roll succeeds with a raise, the character gets his Benny back!**

In all cases, the player must explain exactly what the Assistant is trying to do, the Assistant must have the means to perform the action (for example, access to the appropriate computer system), and the GM must approve. The Assistant must still be successful at the appropriate skill roll (plus or minus any GM-set modifiers) for the effect to take place. Extreme ingenuity and creativity are crucial to make this work!

The following Assistant in Combat actions are possible by spending a Benny:

SMARTS TRICKS

An Assistant may attempt a Smarts Trick on an opponent by using the Hacking skill in lieu of Smarts. The player must explain exactly how the Assistant does this.

TESTS OF WILL

An Assistant may attempt a Test of Wills against an opponent by using the Persuasion skill in lieu of Intimidation or Taunt; any bonus obtained benefits the Assistant's owner. The player must explain exactly how the Assistant does this.

GENERATE AN ADVANTAGE OR DISADVANTAGE

An Assistant may control the V-World environment to give an advantage to a hero or a disadvantage to an enemy. In game terms this is equivalent of the Assistant using the *boost/lower Trait* power (see *Savage Worlds*). Since the advantage or disadvantage is based on the sensors, controls and information available on V-World, the GM must rule if the player's explanation for what the Assistant does is acceptable or not. Some examples follow:

- The Assistant might connect the environment's V-World cameras to the hero's lenses, thus allowing him to aim better. In game terms this would boost the hero's Shooting skill.
- The Assistant might dig up some sensitive info on a hero's enemies. In game terms this would boost the hero's Intimidation or Taunt skill.
- The Assistant might hack an enemy's lenses to darken them. In game terms this would lower the enemy's Shooting skill.
- The Assistant might take control of the environment's Superconductive Magnetic Arrays (if there are any) to synchronize a hero's movements with its commands. In game terms this could boost the hero's Agility ability.

Use common sense to decide what traits can be boosted or lowered. For example, boosting Spirit or Fighting using a sensor or V-World information looks very unlikely, but maybe a player will figure out an explanation that convinces the GM to accept it.

The GM must decide what skill the Assistant will use to roll for the *boost/lower Trait* power, as well as what trait the opponent will use to resist (if the case of lowering an enemy trait). If in doubt, use the Hacking skill for the Assistant and Smarts for the opponent. In some instances other skills or traits are more appropriate (Investigation, for example, in the case of digging information).

This effect never lasts more than three rounds.

USE A SPECIAL ACTION

Some battles have special props the Assistant can control to directly attack an opponent. Usually in these cases the GM will let the players know about them. For example, a ship passageway might have fire extinguishers on the ceiling that the Assistant can control and activate, forcing all enemies to make an Agility roll or become Shaken; a battle in a factory may include a worker robot the Assistant can control to physically attack an opponent; and a combat in a warehouse may include a crane that can be used to drop heavy boxes on the enemy.

> **Example:** *Things are looking bleak for Jon during his battle with the security guards at Hariko Shipping headquarters. Cornered and desperate he decides on a gamble: At the start of the combat the GM said there are emergency fire sprinklers on the ceiling that can be controlled by an Assistant. Jon's player tells the GM he's spending a Benny to have Audrey, Jon's Assistant, get involved. "I want Audrey to take control of the emergency-fire sprinklers and turn them on the guards!" The GM decides that's a valid plan, accepts the Benny and asks Jon's player to make a Hacking roll for Audrey. The Hacking roll is successful!*

"Suddenly, with a loud noise, the emergency fire extinguishers on top of the surprised guards come alive, spraying them with a creamy substance! Roll 2d6 non-lethal damage for the guards," says the GM. Jon's player makes the roll and gets a result that leaves all three guards Shaken.

TESTS OF WILLS AGAINST GROUPS

The rules for Tests of Will have been expanded to allow taunting or intimidating multiple enemies. A character can attempt to intimidate or taunt all targets within a Small Burst Template with a –1 penalty to the roll; within a Medium Burst Template with a –2 penalty; and within a Large Burst Template with a –4 penalty. The final modified result is compared against the opposed roll made by each target in the affected area to determine whether the Test of Will was successful against that target or not. This of course assumes the specific taunt or intimidation can be seen, heard or perceived by any targets at the location where the template is positioned.

Example: *Seela turns a corner and finds herself in front of five goons sent by the smugglers she and the team are investigating. The leader of the goons slowly approaches her with a deadly smile on his face and snarls "well, Milady, your friends from the Circle can't save you now!"*

Seela's player notices the goons are all within the area of a Medium Burst Template, and decides to try to intimidate them all at once. Seela returns the smile while drawing a combat knife in each hand. It is impossible to miss the marks of dried blood on the blades of the knives. "Before we begin," she says with a calm, laughing voice, "does anyone want out? Last chance…"

Seela's player makes an Intimidation roll with a –2 penalty and gets a final result of 6. The GM must now make a Spirit roll for each goon and compare it to Seela's final result. Three goons fail their roll and tremble at Seela's evident experience and threat. It looks like Seela won't have a hard time beating her enemies this time.

SPACE TRAVEL AND COMBAT

Adventures in *Seven Worlds* frequently involve crossing the vastness of space, and sometimes engaging in exciting space battles. This section details rules for traveling in space, and handling encounters between ships in space.

SHIP STATISTICS

The statistics for ships follow *Savage Worlds* standards, but include additional information useful for space combat. Here is a stat block for a sample spaceship:

The McKenna: Orbital Patrol Ship
Top Acceleration: 10; **Toughness:** 14 (10); **Handling:** +1; **Heat Radiation:** +1; **Shield Effects:** 2; **Crew:** 1+5; **Jumps:** 8; **Weeks per Jump:** 1
Abilities: Knowledge (Ship Ops) d8, Piloting d8, Shooting d8, Repair d6
Notes: Heavy Armor, Spacecraft
Weapons:

- Light Laser Cannon (Range 4/8/16; Damage 3d6; AP 6; RoF 1; PDLB RoF 5; Heat Points +3; HW)
- 2 × Medium Missile Launchers (Range 1/2/4; RoF 4; Heat Points +1; 4 reloads per launcher, maximum 1 of them is nuclear).
  Available Ammo:
  - 4 Kinetic Missiles (Damage: 3d6; AP: 8; HW)
  - 2 Nuclear Missiles (Damage: 2d10; AP: 12; HW)
  - 2 NNEMP Missile (Damage: 2d8+special; AP: 10; HW)
  - 1 Kinetic Cloud Projectile (Damage; 2d4; AP: 6; HW; takes up one entire launcher payload)
  - 1 Nuclear Cloud Projectile (Damage: 3d4; AP: 6; HW; takes up one entire launcher payload)
  - 4 × Mine Cloud Defenses

Top Acceleration behaves exactly like the "Top Speed" stat in the *Savage Worlds* rules. Theoretically a ship in space can accelerate indefinitely until it runs out of Delta-V or reaches the maximum limit of the speed of light, and therefore there is no practical limit to a ship's speed (making the term "Top Speed" meaningless). In game terms, however, Top Acceleration is an indicator of how fast the ship is compared to other ships. Note that the standard "Acceleration" statistic from *Savage Worlds* is not used in this game.

Toughness is a measure of how hard the ship is to damage. The number in parenthesis is the additional "Armor" generated by the Coulborne Shield, and is already figured into the Toughness. Note that most of the ship's Toughness is due to the armor, not to the hull itself. This means that if the Coulborne Shield fails or is damaged, the Armor bonus is lost. A ship without a Coulborne Shield will quickly be destroyed!

Handling represents how manoeuvrable the ship is, and is applied as a bonus or penalty to all Piloting rolls.

Heat Radiation represents how effective the ship is at radiating heat (see page 135) and is applied as

a bonus or penalty to all Knowledge (Ship Ops) rolls related to Heat management.

Shield Effects lists the number of Coulborne Shield Effects available. These allow the Coulborne Engineer to activate special defensive abilities, as explained on page 141.

Crew is composed of two numbers in an "X+Y" format. The first number lists the minimum number of crewmembers needed to operate the ship; the second number is the maximum number of passengers supported by the ship's life support system.

Jumps describes how many consecutive interstellar jumps the ship can make before having to refuel. The number includes the fuel and energy necessary for the trip between one jump point and the next (typically one week). A ship with enough fuel for 8 jumps, for example, could make up to eight jumps, including the eight weeks of total travel needed in real space.

Weeks per Jump indicates how many weeks it takes the ship to reach a jump point from the previous one. Since all jump points are on average 1–2 AUs away from each other (see page 12), this number allows players to estimate how long it will take to reach their destination. Most ships travel this distance in one week, but some slower ships may take longer.

Abilities describe the skills available to the NPCs in enemy ships. All ships not directly piloted by the heroes have crewmembers with four skills:

- **Knowledge (Ship Ops)**, used to handle the Coulborne Shield and manage heat.
- **Piloting**, used to pilot the ship.
- **Shooting**, used to fire the ship's weapons (and to resolve who goes first when a ship is On Hold, in lieu of Agility).
- **Repair**, for performing in-voyage repairs on the ship.

It is assumed that enemy ships have enough crewmembers to perform one Shooting action for every weapon, one Piloting Action, one Knowledge (Ship Ops) action and one Repair action (in any order) without incurring a MAP, plus any number of free actions. Unless the GM decides otherwise, everyone in the enemy ship acts on the same Action Card, in any order desired. Unless the ship is a Capital Ship (see below), all rolls are made as from an Extra.

If crewmembers have any particular Edge that might apply, such as Ace or Level Headed, it is also listed here.

Notes describe particular characteristics of the ship, and are detailed in the Gear section of *Savage Worlds*. A new characteristic, Capital Ship, means the ship is large enough to have its skill rolls include a d6 Wild Die. Additionally, Capital Ships can never suffer more than two wounds from a single attack, regardless of the damage result.

The **Weapons** section lists all weapons such as Beams, Missiles and Coilguns; as well as defenses such as Mine Cloud Defenses and Point Defense Laser Batteries. These are explained in more detail in below.

SPACE TRAVEL

The following rules explain how space travel works in *Seven Worlds*.

ESTIMATING NUMBER OF JUMPS

To figure out how many jumps a ship needs to make to reach its destination, consult the Simplified Starmap of the *Seven Worlds* (see back cover).

First, add the number of jumps in each route in the path between the source and destination star systems. If this number is higher than the ship's Jump statistic, then the ship does not have enough fuel to make that trip. In this case, it may be necessary to plan a stop in a star system or at a station on the route (if there is one) to refuel.

> **Example:** *The crew of the McKenna wants to travel from Nouvelle Vie to Concordia. Consulting the Simplified Starmap they see making this trip will take nine jumps: Three jumps from Nouvelle Vie to Mussala Station, five jumps from Mussala Station to Bay Jing, and one more jump from Bay Jing to Concordia. Since the McKenna has a Jump statistic of 8, it does not have enough fuel to make the entire trip. It will be necessary to stop and refuel either at Mussala Station or at Bay Jing.*

ESTIMATING TRIP DURATION

Moving between jump points in a star system takes time, measured in weeks. All ships are assumed to carry enough provisions to handle their maximum number of jumps.

To estimate how much time the trip takes, multiply the number of jumps by the ship's Weeks per Jump statistic. This is the total number of weeks the trip will take. Of course, the pilot can decide to fly slower, and thus take longer, if he or she wants to. Arrangements must be made in this case to carry enough food and provisions for the trip.

If the ship needs to stop to refuel, the stop takes one extra week.

> **Example:** *The McKenna has a Weeks per Jump statistic of 1. Therefore, it should take nine weeks for the ship to reach Concordia from Nouvelle Vie. However, since the McKenna needs to stop*

during the trip to refuel, the trip will take a total of ten weeks.

If the McKenna were escorting a slower ship, such as a Settler Ship (with a Weeks per Jump statistic of 2), the trip might take twenty weeks. Since this is an escort mission, its pilot decides to move slower and take the full twenty weeks. Extra food will be needed.

JUMPING

When a ship reaches the jump point, the ship's engineer must activate the Interstellar Drive to perform the jump. This is usually automatic and handled behind scenes, but in some situations (for example, when trying to jump while escaping an enemy attack) a successful Knowledge (Ship Ops) plus all appropriate modifiers is required. Failing the roll means the ship cannot jump for 2d6 minutes or (if the ship is in combat) for two rounds.

Once a ship has performed a jump, it needs to wait at least an hour before jumping again.

JUMP DISORIENTATION

Each time a ship jumps, the entire crew experiences jump disorientation, which manifests in a few minutes of dizziness. In most cases this has no effect and is handled behind the scenes, but in some situations it may be important to know whether any character is affected (for example, when the ship jumps into an ambush and is immediately attacked). In these cases, have every passenger make a Spirit roll. Those who fail are automatically Shaken as a result of jump disorientation.

This cannot cause a wound.

SPACE COMBAT

These space combat rules differ slightly from the Chase Rules in the *Savage Worlds* rulebook, and are customized for *Seven Worlds*.

SPACE COMBAT SETUP

To set up the table for space combat, first get a token for every spaceship participating in the engagement. The direction the ship is moving is important, so each token should have its front side clearly marked.

Place ten counters (such as gaming stones) on the table in a straight line. The distance between any two counters is called a "Space Unit", or SU for short, and represents a few hundreds of thousands of kilometers of separation between ships.

Place the leading ship on the first marker, and the other ship(s) an appropriate number of counters behind the leading ship. Remember that the direction each ship is facing is important. A ship must point either "forward" or "back" in the line of counters.

During combat one hero, usually the one with the highest Piloting skill (we'll call him the "Pilot"), should handle Piloting duties, which include steering the ship and evading enemy missiles. The other heroes can perform any other activities in the ship, such as firing any weapons, managing heat and Coulborne Shields, and making Repair rolls. We will call the heroes working stuff that needs the Knowledge (Ship Ops) skill "Ship Engineers," and the heroes using the weapons the "Gunners." Note that since any task can be performed from any console, heroes can switch roles at any time or even perform multiple tasks at once, taking into account multi-action penalties.

CAN I GO FASTER?

Some of the fastest ships available in *Seven Worlds* can move much faster than what their Top Accelerator statistic indicates. However, as explained in the sidebar on Gravity on page 23, there is a limit to how much acceleration the human body can take. In this game this limit is assumed to be below 6.5 gees, which very loosely equates to a 14 Top Acceleration. Even in the 23rd century, we cannot avoid the limits of our own body. A ship with 10 or 12 Top Acceleration flying at maximum power for long periods of time is going to create a very uncomfortable experience for its crew.

HEAT

Heat management is one of the most important new features of space combat in *Seven Worlds*.

Heat is a critical resource to manage during space battles. Most actions performed on the ship, as well as all attacks sustained, generate heat that must be stored or radiated. If the ship accumulates too much heat it may become unresponsive, malfunction or even explode. In game terms, a ship can accumulates **Heat Fatigue**, which works just like character Fatigue: Each level of Heat Fatigue a ship has applies a cumulative –1 penalty to all character rolls.

Many types of actions heroes perform on a ship, as well as enemy attacks, generate **Heat Points** that are added to a **Heat Pool**. We suggest you use tokens to keep track of the current number of heat points in the Heat Pool.

If there is at least one heat point accumulated in a ship's Heat Pool, it must be radiated before a full round goes by or it automatically generates one level of Heat Fatigue. To clean the Heat Pool, someone (usually the



Ship Engineer) must make a Knowledge (Ship Ops) roll adding the ship's Heat Radiation modifier, as well as any applicable modifiers from Edges, character and ship Wounds and Fatigue and others, and then **subtracting** as many points as there are in the Heat Pool. In other words, the more points there are in the Heat Pool, the harder it is to succeed at the roll. This roll counts as an action.

If the Ship Engineer rolls a success or higher, no Heat Fatigue is accumulated this round and the Heat Pool is reset to zero. If the roll is failed the ship accumulates one level of Heat Fatigue. Rolling a 1 on the skill die in the case of Extras, or rolling a Critical Failure if there is a Wild Die, counts as failing the roll, regardless of any bonuses to it.

If a full round goes by with no one rolling to store heat, one level of Heat Fatigue is accumulated as if the roll had been failed. The Heat Pool is reset to zero regardless of the results of the roll, or even if no roll was made at all.

If the ship reaches the Heat Fatigue equivalent of Incapacitated, it has accumulated more heat than it can handle, and is in danger of exploding or melting. In game terms this means that:

- The ship's engines go down permanently. The ship immediately stops moving as if it had performed the Steady manoeuvre.
- The ship can no longer fire its weapons or defenses.
- The ship's Coulborne Shield immediately goes down. The ship loses all of its Armor, running Shield Effects, and ability to activate further Shield Effects.
- Every member of the crew must make a Vigor roll or gain a Level of Fatigue because of the internal heat.

When this happens, the ship's computers automatically extend the heat radiators to radiate extra heat, thus keeping the ship (and the crew) alive. These effects last for 2d6 hours after which the ship cools down and becomes operative again. All Fatigue levels coming from Heat are eliminated, but Wounds and other Critical Hits remain. Enemy ships usually take advantage of all this time to either capture and board the ship or blow it to bits.

A particularly suicidal crew could order the systems to stop the heat radiator extension, in which case the ship will melt in a few rounds, taking the crew with it. It may possible to evacuate the ship in spacesuits, at the GM's discretion.

The only way to eliminate Heat Fatigue during battle is to lower the Coulborne Shield. This is a risky manoeuvre, and is explained more fully in the Coulborne Shield section below.

Example: *The McKenna is battling an enemy ship, and has accumulated four points in its Heat Pool. It is now the turn of Judith, the Ship Engineer. Judith knows she has to make a Heat roll this turn or a whole round will go by and the McKenna will accumulate one point of Heat Fatigue. She decides to radiate Heat. This is a Knowledge (Ship Ops) roll modified by the ship's Heat Radiation modifier of +1, the –1 penalty for the Wound the McKenna already has, and the –4 penalty for the four points accumulated in the Heat Pool. She rolls and gets a 9, which modified by the –4 net penalty nets her a success. Judith successfully radiates all the Heat accumulated this round! The Heat Pool is immediately reset back to zero.*

The next round Terrence fires a missile at the enemy, generating one point of heat that goes into the Heat Pool. When Judith's turn comes, she makes another Heat roll, this time with the ship's +1 Radiation Modifier, the –1 penalty for the Wound the McKenna already has, and the –1 penalty for the one point accumulated in the Heat Pool, for a total modifier of –1. However, Judith fails the roll, and she has no more Bennies left to spend. Now the McKenna has gained one level of Heat Fatigue, generating an additional –1 penalty to all future rolls made on the ship. As always, the Heat Pool is reset back to zero.

If the ship gains two more levels of Fatigue it will overheat, with disastrous results: Davril would not be able to pilot the ship anymore (except for the "Steady" action), nor would he be able to evade missiles. Terrence would not be able to fire any weapons. The Coulborne Shield would go down, making the ship's effective Toughness 4 instead of 14. Any Shield Effects running would also go down. And everyone in the ship would have to make a Vigor roll (minus their and their ship's Wounds and Heat Fatigue) or gain a level of Fatigue as a result of the unbearable heat. Hopefully their enemy would be merciful and not blow them up. Judith must not allow this to happen!

INITIATIVE

Once the stage is set, the game goes to combat rounds. A combat round is an abstract measurement encompassing several minutes of game time.

Initiative works as normal, with every character being dealt his own cards, and groups of Extras acting on the hero's card.

MOVING THE SHIP

At the beginning of their turn each pilot gets to move their ship by making a Piloting roll. This counts as an action for the character making the roll.

The character piloting the vehicle with the faster Top Acceleration gains a +1 bonus to this roll. If the vehicle's Top Acceleration is twice or more than the highest of the opposition, the character gains a +2 bonus to the roll instead. Remember to include the character's and the ship's Wound and Fatigue modifiers, if any, as well as the ship's Handling bonus or penalty.

The results of this roll are as follows:

- **Success:** The ship receives one (1) movement unit.
- **Raise:** The ship receives two (2) movement units.
- **Failure:** The ship does not receive any movement units this round.
- **Critical failure or any result of one or less due to penalties:** The ship goes Out of Control.

The Pilot may spend all or part of the movement units gained to move the ship in the direction it is pointing at. Unused movement units are lost. If a ship moves to the same position as another, they are presumed to be side by side, and 0.5 SUs away.

Moving the ship this way adds no points to the Heat Pool.

WHY THESE CHASE RULES?

Space is open, without obstacles and fully subject to Newtonian Physics (see page 93). Although the Chase Rules in *Savage Worlds* make for fast and exciting chases, they tend to work better when the field has obstacles and other difficulties that allow the participants to quickly change their distance through skill, effort, or luck. We have modified the Chase Rules with a more linear structure that allows a better simulation of space combat and of dealing with distance-sensitive objects, such as missiles.

Space Combat is the only situation in which we use these modified Chase Rules. Every other situation in *Seven Worlds* that involves a chase uses the Chase Rules as found in *Savage Worlds*. So the next time you're participating in a foot chase on the streets of Melissant, crack open *Savage Worlds*!

SHIP MOVEMENT

Most role-playing game combat systems that simulate Newtonian Movement involve complex tracking of speed and acceleration parameters. In *Seven Worlds* we decided to remove that layer of complexity and treat movement as acceleration. In other words, ships are always in movement, even if they appear stationary on the track. It is only changes in acceleration that allow them to move forward or backward. This works out well in combat.

The hardest manoeuvre to do in space is turning around. Turning the ship around is a costly and time-consuming manoeuvre that is simulated by a higher-than-normal cost (two or more movement units) and the accumulation of a Heat Point. This makes most crews think twice before trying to turn their ship around!

One special situation to consider is when two ships fly towards each other. If both pilots fail their Piloting rolls it might appear as if the ships are stationary. Although slightly less realistic, in playtesting this has worked better in combat.

In short, you get ship behavior that slightly approximates Newtonian physics, while keeping the benefits of *Savage World's* Fast, Furious, Fun Chase rules.

PUSH THE ENGINES

The pilot may choose to "push the engines" by making the Piloting roll above with an additional –2 penalty. If successful, he gains one additional movement unit. This is the maximum that may be attempted. Pushing the Engines adds one heat point to the Heat Pool.

TURN THE SHIP AROUND

If the Pilot obtained two or more movement units this round, he may use all of the units gained to turn the ship 180° so it points in the opposite direction. Turning around consumes all the movement units gained this round. Turning Around adds one heat point to the Heat Pool.

KEEP THE SHIP STEADY

If the pilot can't (or won't) make a Piloting roll to move his ship this round, the ship stays in its place. In reality it is still moving at its current speed, but it is not accelerating or decelerating. Keeping the ship steady removes one point from the Heat Pool. The Heat Pool can never be below zero points.

Example: *Davril is piloting the McKenna in space combat against an enemy ship piloted by Jubilee terrorists. The McKenna and the enemy ship are facing each other, eight SUs away. Davril immediately alerts Terrence, the ship's Gunner, and Judith, the ship's Coulborne Engineer, about the situation.*

Davril suspects that the enemy will make heavy use of their laser beams, and thus decides to try to close the distance to use his missiles. He decides to Push the Engines and makes a Piloting roll at –2, rolling a seven. Subtracting the –2 penalty for the Push and adding a +1 bonus for his ship's Handling and a +1 bonus for having a higher Top Acceleration than his opponent, he gets a final score of seven. Thus Davril gets one movement unit for the success plus one extra movement unit for the Push for a total of two movement units. The McKenna moves two positions in the track towards the enemy ship. Both ships are now six SUs away. Since Davril performed a Push manoeuvre, one point is added to the ship's Heat Pool, for Judith (the Ship Engineer) to radiate on her turn.

The enemy ship has several weapons, but its heat radiation systems are not that good. Their crew thus decides to flee. The enemy pilot makes a Piloting roll and gets an eight, getting two movement units. The enemy pilot then uses these two movement units to turn the ship around. The enemy ship adds one point to its Heat Pool for the turn. Since the enemy acts on the same card, the enemy Engineer immediately makes his Knowledge (Ship Ops) roll to radiate Heat, with the –1 penalty for the accumulated heat point, and succeeds.

Davril will need at least a success and raise in his next Piloting roll to obtain two movement units and thus move within four SUs of his enemy, the shooting range of his missiles.

ATTACKS AND DAMAGE

Attacks are handled using the normal rules from *Savage Worlds*. Note that all Shooting rolls against ships have a +2 bonus to the roll, because it is almost automatic to aim and hit at enemy ships in space. Since all spaceships have the Improved Stabilizer characteristic, Unstable Platform penalties do not apply in space combat, and the Steady Hands edge is not needed.

The direction ships are facing at is irrelevant when attacking. Any weapon can attack in any direction without restriction.

Each weapon lists a specific heat point cost. Each time the weapon is used, the appropriate number of heat points is added to the ship's Heat Pool.

The Space Combat rules make heavy use of the missile rules from *Savage Worlds*. The GM and players are encouraged to review the official rules on Missiles, Anti-Missile Systems (AMS) and Anti-Missile Counter Measures (AMCMs) from the *Savage Worlds* rulebook.

DAMAGE

Damage works as explained in *Savage Worlds*. Additionally, when a ship is hit (damage equals or exceeds Toughness, considering AP), a number of heat points equal to half its Heat Radiation stat, rounded down, are added to its Heat Pool, for a minimum of one heat point. At least one heat point is added to a hit ship's Heat Pool, even if no Wounds were dealt.

LASER AND PARTICLE BEAMS

Laser and Particle beam weapons are fired with a Shooting roll with a +2 bonus to the roll. Because of the large amounts of energy they consume, laser and particle beam weapons run the risk of overheating. Anytime the gunner rolls a 1 on the Shooting die (regardless of the results of the Wild Die) the weapon has overheated and needs to cool down. The weapon cannot be used either as an attack or as a defense for the entire next round. An overheated laser still adds heat points to the Heat Pool.

Laser beams can be used either as a weapon or as a defense (Point Defense Laser Batteries, or PDLB), but not as both in the same round. See the notes on

defenses below for how to use a laser beam as a defensive weapon.

Example: *The McKenna is six SUs away from its enemy when Terrence decides to fire the ship's Light Laser Cannon. Terrence makes a Shooting roll with a +2 standard attack bonus, and a –2 penalty for Medium Range. He rolls an eight, hitting the enemy with a raise! Terrence then rolls 4d6 for damage (3d6 for standard damage and 1d6 more for the raise) and gets a thirteen. Terrence's Laser attack has caused the enemy thirteen points of damage against the enemy ship's Toughness, not including the Laser Beam's Armor Piercing value of six. Then Terrence adds three heat points to the McKenna's Heat Pool, for Judith to try to radiate in her turn.*

Besides any damage received, the enemy ship accumulates heat points from the successful attack. The GM halves the enemy ship's Heat Radiation stat of 1, rounding down. Since a successful hit always generates at least one heat point, the GM adds one heat point to the enemy ship's Heat Pool.

Note that since the Laser Cannon has been used as an offensive weapon this round, it cannot be used for defense as a Point Defense Laser Battery (PDLB). Fortunately no missiles are flying towards the McKenna… yet.

Later during the battle Terrence fires the Laser Cannon again. He makes a Shooting roll with the appropriate modifiers and gets a final result of six. However, his Skill die came up a 1. Regardless of the successful result, the Laser Beam has overheated, and cannot be used either offensively or defensively until after the end of the entire next round when it cools down. Three heat points are still added to the Heat Pool, though.

MISSILES

All other weapons besides Beams are considered missiles, and use the Missile rules from *Savage Worlds*. The gunner uses his or her Shooting skill (with a +2 bonus to the roll) to lock-on to the target. The difficulty is a standard 4, since it is not possible for the enemy pilot to swerve or avoid lock-on. If the roll is successful the gunner decides how many missiles to release, up to the full payload. Note that some missile types, such as Nuclear or Cloud projectiles, have restrictions on how many of them can be launched at once.

Heat Points are added to the Heat Pool only if missiles are launched, and are independent of the number of missiles launched. A failed attempt to lock-on adds no heat points to the Heat Pool.

PROJECTILE TRACKING SHEET

Given the heavy use of missile rules in *Seven Worlds*, at any given time in the battle there may be many missiles en-route to a particular ship. To help players and GMs we have included a sheet to keep track of each incoming missile, as well as what type of missile and how many rounds away it is.

Whenever a ship in battle successfully fires missiles or coilguns, write down the type and number of projectiles on a row in the sheet for the target ship, as well as in how many rounds the projectiles will hit if they are not eliminated by then. It is easy now to glance at the sheet in order to know how many projectiles are coming and when they will hit, and thus to decide on the best course of action against them. At the end of each round update the number of missiles still on course on each row. The sheet is also useful at the end of each round to calculate damage made by projectiles that hit this round.

Example: *The McKenna is two SUs away from its enemy and Terrence is ready to fire his missiles. He tries to lock-in to the target by making a Shooting roll with a +2 bonus and a –2 penalty for Medium Range, and gets a five. Terrence has locked-on to his target!*

Although the Medium Missile Launcher has a Rate of Fire of 4, and thus Terrence can deploy up to four missiles, he decides to deploy two. Both missiles are kinetic, since that is what was loaded into the launcher. Since the shot was made at Medium Range, the enemy ship has two rounds to evade the missiles.

After firing the missiles Terrence adds one point of heat to the Heat Pool, for Judith to attempt to radiate in her turn.

MISSILE PAYLOADS

Missiles contain several types of payloads. The type of missile payload fired is always automatically identified and known by both sides in the combat. This allows the defenders to apply the most appropriate defensive strategy when evading missiles. In the case of Cloud Projectiles it is possible to know what type of payload was launched, but the exact type of payload that hits the enemy ship is selected randomly, as explained below.

Kinetic and **Nuclear** payloads do damage as normal, only differing in the amount of damage inflicted. Missile launchers have limits on the maximum number of Nuclear missiles they may launch simultaneously.

When a **Neutron** missile hits, it inflicts damage as normal. Additionally, if the damage roll is successful (even if it's just a Shaken result) then every member of the crew must roll their Vigor or gain a level of Radiation Fatigue. This can lead to death. See Radiation in the Hazards section of *Savage Worlds* to see how to remove this fatigue.

Example: *Suppose the McKenna were hit by a Neutron Missile (3d4 damage plus six points of Armor Piercing). The GM rolls damage for the missile and gets a 9. The McKenna has 14 Toughness out of which 10 points are Armor, and thus is hit.*

As the Pilot of the McKenna, Davril has to make a Piloting roll with the ship's Handling and all other applicable modifiers, or have the ship go Out of Control. Additionally, each member of the crew must roll their Vigor minus any Wounds and Fatigue, ship Wounds and Heat Fatigue, or gain a level of Fatigue from the radiation. Since the ship was hit, heat points equal to half the McKenna's Heat Radiation modifier, rounding down, are added to the Heat Pool. This translates to a minimum of one heat point added to the ship's Heat Pool.

When a Non-Nuclear Electromagnetic Pulse (**NNEMP**) missile hits, it inflicts damage as normal. Additionally, if the damage roll is successful (even if it's just a Shaken result), the electronics in the ship are temporarily disabled until the crew makes a successful Repair roll. During this time, the pilot cannot perform maneuvers (other than flying in a straight line with the Steady option), use its communications equipment, jump, or fire its weapons or defenses. The Coulborne Shield is still functioning as a defense and can absorb Heat, but no Shield Effects can be used. For each "wound" inflicted, the crew must wait one additional round before they can attempt the Repair roll. Additional NNEMP damage inflicted before the system is repaired simply increases the delay by one round per Shaken and wound result.

Example: *Suppose the McKenna were hit by an NNEMP Missile (2d8 damage plus eight points of Armor Piercing). The GM rolls damage for the missile and gets a 10. The McKenna has 14 Toughness out of which 10 points are Armor, and thus is hit with a raise, for a ship Wound.*

As the pilot of the McKenna, Davril has to make a Piloting roll with the ship's Handling and all other applicable modifiers or have the ship go Out of Control. Additionally, all electronics in the ship go down until the ship's engineer makes a successful Repair roll. Unfortunately, since the missile also inflicted a Wound on the McKenna, the crew has to wait one full round before being able to try the Repair roll. During this time the McKenna will not be able to fire any weapons or defenses, any active Shield Effects go down, and no additional Shield Effects can be used.

As if all this weren't enough, the hit added heat points equal to half the McKenna's Heat Radiation modifier, rounding down, (one heat point) to the Heat Pool, and Judith still has to make her Heat roll. The McKenna already had one level of Fatigue from Heat from a previous attack, and three more heat points in the Heat Pool from the last time Terrence fired the laser cannon, for a total of four points. Judith rolls her Knowledge (Ship Ops) plus the McKenna's Heat Radiation modifier of +1, a –1 penalty for the previous level of Heat Fatigue, a –1 modifier for the Wound just received by the ship, and a –4 modifier for the Heat Pool, for a total of –5. She rolls a three, so the McKenna gains another level of Fatigue for Heat.

Hopefully Davril will be able to evade the incoming missiles on his own the next round, since he will have no help from the ship's defenses for one full round at least.

Cloud projectiles break up after launch, expanding into clouds of thousands or even millions of tiny projectiles. In game terms, clouds are abstracted as a limited number of small missiles flying towards the enemy ship. As soon as it is launched, a cloud projectile breaks up into four missiles. At the end of the enemy pilot's turn, if any cloud missiles are left, two more missiles are added to it, as the cloud continues to expand. This means the enemy has to destroy or avoid (at most) the equivalent of four (4) cloud-generated missiles at Short Range; six (6) at Medium Range; and eight (8) at Long Range.

Some cloud projectiles contain nuclear or NNEMP payloads. Whenever a missile generated by one of these clouds hits, roll a d6. If the result is 1, the projectile has the special type of payload, otherwise it is a normal kinetic projectile.

Due to its initial size, the entire payload of a missile launch cannot include more than one Cloud projectile in total, regardless of how many missiles the launcher can simultaneously launch.

Example: *Terrence uses the Missile Launcher to fire a Cloud Missile at an enemy ship three SUs away. He makes a Shooting roll with a +2*

base Shooting bonus, a –4 penalty for Long Range, and an additional –1 penalty because the McKenna had previously accumulated one level of Fatigue from Heat, and gets a total of five. Terrence locks-on!

A projectile cloud of four missiles is now on its way towards the enemy ship. Since the launcher was fired at long range, the enemy ship has three rounds to evade or destroy the missiles. After the enemy pilot's first turn, if there are any cloud missiles left, two more missiles are automatically added, for a total of up to 6. After the enemy pilot's second turn, two more missiles could be added for a total of up to 8. Clearly the enemy pilot must try to bring down the cloud missiles as soon as possible!

Additionally, this is a nuclear cloud projectile so for every missile that hits the enemy there is a 1-in-6 chance that it is nuclear instead of kinetic.

Firing the Cloud Missile adds one point to the Heat Pool for Judith to radiate in her turn.

Coilguns behave like missile launchers but run the risk of overheating. If the gunner rolls a 1 on the Shooting die when shooting a Coilgun (regardless of the results of the Wild Die), the weapon has overheated and weapon cannot be used for the entire next round.

DEFENSES

Against the terrifying weapons of the future, space crews have several defenses they can use.

THE COULBORNE SHIELD

The Coulborne Shield is a critical part of any ship's defensive strategy. It acts both as the ship's armor and heat sink. The Coulborne shield opens periodically to let laser beams and defenses pass through. These openings last milliseconds, but may be taken advantage of by the enemy. Attacks already factor in these holes in the Shooting roll.

SHIELD EFFECTS

Each Coulborne Shield has a limited number of Shield Effects. These are represented by tokens or gaming stones that the character in charge of the Shield receives before combat starts. Shield effects are activated with the Knowledge (Ship Ops) skill.

Each Shield Effect can be used in one of three ways, as detailed below. The effects of multiple uses of the Maximum Shielding or Move Shield Center Shield Effects are not cumulative—only the highest modifier applies.

Activating a Shield Effect does not generate heat points.



Shield Effect capacitors recharge at varying rates, but rarely very quickly. Typically, each Shield Effect regenerates after the end of the combat. If the Engineer in charge of the Shield is dealt a Joker, however, immediately recharge one Shield Effect.

Damage Absorption: The Coulborne Shield can focus more energy in one section than in another. As a free action, a Shield Effect can be used to Soak damage inflicted on the starship. It otherwise functions exactly as a Benny for this purpose. The used skill is Knowledge (Ship Ops). Note that Ace can still be used to Soak damage as normal. The Edge represents the pilot's ability to avoid, or at least lessen, damage through his own skill.

If *all* the damage is Soaked, the attack does not add any heat points to the ship's Heat Pool.

Example: *A nuclear missile hits the McKenna and inflicts two Wounds on it. Judith spends one of the ship's Shield Effects to absorb the damage. She rolls her Knowledge (Ship Ops) with the appropriate modifiers and gets an eight, for a success and a raise. She has therefore managed to successfully Soak both Wounds!*

She now has only two Shield Effects left. Since she managed to soak all Wounds, no heat points are added to the McKenna's Heat Pool.

Maximum Shielding: Used in this manner, the Shield Effect temporarily increases the Coulborne Shield's resistance. This functions exactly as the *armor* power, except it cannot be maintained. Activating a Shield Effect in this manner costs an action, as the force field must be carefully calibrated.

> **Example:** *four missiles are on their way to the McKenna, and Judith thinks it unlikely that Davril will be able to evade all four before they hit during the next round. She therefore decides to spend one of the available Shield Effects to temporarily increase ship shielding. She rolls her Knowledge (Shield Ops) and gets a success and a raise. The Coulborne Shield becomes harder and more absorbing, temporarily increasing the McKenna's Toughness from 14 (10) to 18 (14). This effect will last for three rounds.*

Move Shield Center: The Shield Effect causes the Shield to temporarily grow in size and move in such a way that the ship stops being at the center of the Shield. This makes it harder for the enemy to guess exactly where inside the sphere the ship is located. This functions exactly as the *deflection* power, except it cannot be maintained. Against incoming missiles, this modifier is applied to the pilot's Piloting roll to evade as a bonus. Activating a Shield Effect in this manner requires an action to configure the Coulborne Shield.

> **Example:** *The McKenna is under heavy laser beam attack, and on top of that there are still one or two missiles to avoid. Judith spends a Shield Effect to move the ship's Coulborne Shield center. She rolls her Knowledge (Ship Ops) and gets a six. The spherical Coulborne Shield now moves off-center from the McKenna, confusing the enemy as to the exact position of the ship. Now all enemy Shooting rolls have a –2 penalty for the next three rounds. On top of that, Davril's Piloting rolls to evade enemy missiles have a +2 bonus for the next three rounds.*

BRINGING DOWN THE SHIELD

Since the Coulborne Shield accumulates all heat in the ship, a desperate Ship Engineer can attempt to bring it down to remove Heat Fatigue. Since while the Shield is down the ship has no armor (ignore its Armor during combat) this is a very risky manoeuvre, only to be attempted in desperate circumstances. Also, while the Shield is down the ship can't use Shield Effects, and loses any Shield Effects that were operating at the time the Field went down. The Engineer can still make Heat rolls normally, though (the heat is stored in less-efficient internal heat sinks).

Bringing down the Shield counts as an action, and is an automatic success if performed by anyone trained in the Knowledge (Ship Ops) skill. For each full round the Shield is down the ship sheds one level of Heat Fatigue.

Turning the Shield on again also counts as an action, and is also an automatic success assuming the character is trained in Knowledge (Ship Ops).

It is not possible to bring the shield down if the ship is Incapacitated, since by then the Field is down anyway and can't be brought back up until the 2d6 hours pass.

Outside of combat, a ship may stop its movement and extend its heat radiators for 2d6 hours to eliminate all effects of heat.

> **Example:** *Judith decides to take the plunge and bring the McKenna's Coulborne Shield down to allow it to radiate heat. In her turn she automatically brings the Shield down as an action. The McKenna's Toughness goes down to 4 from 14, and any Shield Effects running are lost. Judith also cannot activate any further Shield Effects until the Coulborne Shield is back up.*
>
> *After the first full round (during which Davril does wonders evading missiles) the ship sheds one level of Heat Fatigue!*
>
> *It is Judith's turn now. Judith now has a choice: She can either try to immediately bring the Coulborne Shield up again (an action), thus restoring the McKenna's effective Toughness of 14 (10); or she can trust her and her teammates' luck and keep the Shield down for another full round in the hope that she can shed the other level of Fatigue. She must also consider that she still needs to perform rolls to radiate any Heat accumulated in the Heat Pool, and if she also brings the Shield back up this turn she might generate a MAP.*

EVADING MISSILES

As explained in the *Savage Worlds* Missile rules, pilots have an opportunity to evade incoming missiles, but with a –6 penalty to the Piloting roll (plus other applicable bonuses or penalties). Attempting to evade missiles counts as one action regardless of the number of missiles being evaded, and does not generate heat points. A separate roll is made for each missile (and a separate Benny is spent to reroll any single roll). Missiles that were not evaded in their final turn hit the target at the end of the current round.

Example: *Five missiles are on their way to the McKenna. Davril has two rounds left to evade four of them, and just one round left to avoid the fifth one. He spends an action to evade and makes five Piloting rolls with a –5 penalty (–6 as the standard evasion penalty rules and +1 for the ship's Handling modifier to all Piloting rolls). He succeeds at just one roll, and that for one of the missiles that still had two rounds left to hit. Now only four missiles are on their way to the McKenna: three of them will hit in one more round, and one of them will hit as soon as the current round ends! "Brace for impact!," yells Davril.*

Hopefully someone will bring down the missile before the round ends, otherwise the ship is in for significant damage. On top of that, the other missiles are coming closer. Assuming they're still alive, Davril will have to try to evade again next round.

MINE CLOUD DEFENSES

Mine Cloud Defenses (MCDs) are useful for deflecting enemy projectiles, and use the Anti-Missile Counter Measures (AMCM) rules in *Savage Worlds*. When deployed by the pilot (an automatic, free action), MCDs add +2 to his or her Piloting roll(s) that round only for purposes of evading all incoming missiles.

Before rolling for evasion, pilots can decide whether to deploy the MCDs against a single enemy projectile or against all incoming projectiles. In this last case the pilot picks the projectile and gets +4 to the roll against that projectile only. More than one MCD may be deployed in the same round. For each missile being evaded, only the highest MCD bonus applies.

Firing Mine Cloud Defenses adds one point of heat to the Heat Pool. Mine Cloud Defenses are ineffective against Coilgun projectiles.

Example: *On the next round three deadly missiles are still on their way to the McKenna. This is Davril's last chance to evade them before they hit. Davril decides to deploy an MCD to evade all missiles. He spends an action to evade and makes three Piloting rolls with a –3 penalty (–6 as the standard evasion penalty as per the Savage Worlds rules, +2 as bonus from the MCD, and +1 for the ship's Handling modifier to all Piloting rolls). He succeeds at two rolls, successfully evading two missiles, but one is still en route to the McKenna.*

Davril could have deployed the MCD to focus on one missile more than on the others. In that case, he would have spent an action to make a Piloting roll to evade that missile with a –1 bonus (the –6 standard evasion penalty plus the +4 bonus against a single missile provided by the MCD and the +1 ship's Handling modifier) and also evade the other two missiles with a –5 penalty (again adding the –6 standard evasion penalty and the +1 ship's Handling modifier). He could also have deployed two MCDs this round, one of them focused on a single missile and the other focused on the other two missiles. Since for each missile only the highest MCD bonus applies, in this case Davril would have spent an action to make a Piloting roll to evade the first missile with a –1 bonus, and then make the evasion roll for the other two missiles with a –3 penalty (–6 to evade, +2 for the MCDs and +1 for Handling).

Regardless of whether one or two MCDs were launched, one point is added to the Heat Pool for Judith to attempt to radiate in her turn.

POINT DEFENSE LASER BATTERIES

Point Defense Laser Batteries (PDLBs) use the Anti-Missile Systems (AMS) rules in *Savage Worlds*, but each successful hit has a 2 in 6 chance (not 1 in 6) of shooting down the missile. Note that a Laser Cannon has different Rates of Fire for offensive and PDLB use.

Since PDLBs are laser beam weapons used to fire many short laser beam bursts against enemy projectiles, a laser beam cannot be used both as an attacking and defending weapon in the same round. Also, if a laser beam is destroyed or is disabled (for example, by overheating) then it obviously it cannot be used as a PDLB until it goes back online.

When used as a PDLB, a Laser Beam cannot overheat (nothing happens if the hero rolls a 1 on any of his Shooting dice) but it still adds heat points to the Heat Pool.

Example: *Four missiles are on their way to the McKenna, and Terrence tries to bring them down. He points his Light Laser Cannon at them and begins firing as a Point Defense Laser Battery. When used as a PDLB the Laser Cannon has a Rate of Fire of 5, so Terrence rolls five Shooting dice with a +2 bonus to the roll, plus a Wild Die. Since the Laser Cannon's range is 4/8/16, all four missiles in this case fall in Short Range, so there is no penalty for Range.*

Terrence rolls and gets four successes. He rolls four d6s and gets a 1,2,4 and 6. Two of the four missiles are brought down by the PDLB! Three heat points are added to the ship's Heat Pool.

Since Terrence used the Laser Cannon as a PDLB this round, it is not available for use offensively until the next round.

CRITICAL HIT TABLE

2D6	CRITICAL HITS
2	**Coulborne Shield:** A randomly determined Shield Effect is destroyed. Additionally, the first and second time this hit occurs the Armor Rating of the Coulborne Shield drops by 2 points. The third time this hit occurs the Coulborne Shield is permanently disabled (all Armor is lost).
3	**Heat Radiation Systems:** The ship's Heat Radiation modifier is reduced by 1 each time this Critical Hit occurs, to a minimum of zero.
4	**Fusion Engine:** The fusion drive has been hit. Top Acceleration is halved as normal. A second hit reduces Top Acceleration to one-quarter maximum. A third hit disables the drive, reducing the ship's Top Acceleration to zero.
5	**Magnetic Grid:** The magnetic grid controls on the external surface of the ship are hit, making the robotic devices on top move less effectively. Piloting and Shooting rolls receive a cumulative –1 penalty.
6–8	**Hull:** The starship suffers a hit in the body with no special effects.
9–10	**Crew:** In the case of the heroes' ship, a random crew member is hit. The damage from the attack is rerolled, subtracting the ship's Armor from the damage. Against other vessels, a crew hit reduces the vessel's Piloting, Knowledge (Ship Ops), Repair or Shooting die two steps, to a minimum of d4–2. Roll randomly to determine which crew section. Also, one quarter of the remaining crew (round down) becomes a casualty of the attack. They may attempt to recover later as per the standard rules.
11	**Weapons:** A random weapon of the vehicle that was hit is destroyed and may no longer be used. If there is no weapon, this is a Hull hit instead.
12	**Wrecked:** The starship is wrecked and automatically goes out of Control.

OTHER CONSIDERATIONS

SHAKEN PILOTS

Pilots who are Shaken at the start of a turn make their maneuvering Trait rolls at –2. They may attempt to become un-Shaken on their Action Card as usual. A pilot's ship keeps its position when the Pilot is Shaken.

OUT OF CONTROL

A ship goes out of Control as a result of damage or a risky movement action that went wrong. When this happens, roll 2d6 and consult the following table.

2D6	OUT OF CONTROL EFFECT
2 or 12	Every passenger in the ship gets thrown around and receives collision damage (take half the vehicle's current Top Acceleration and roll that number of d6 in damage). If this is an enemy ship populated by extras, reduce the vessel's Piloting, Knowledge (Ship Ops), Repair or Shooting die two steps, to a minimum of d4–2. Roll randomly to determine which crew section.
Any other Result	The ship moves erratically, causing the pilot to receive a –2 penalty to his next Piloting roll. This penalty does not apply to Piloting rolls made to evade enemy missiles.

COLLISION DAMAGE

To calculate collision damage for the passengers, take half the vehicle's Top Acceleration and roll that number of d6. For more details, see the Collision Damage section of *Savage Worlds*.

CRITICAL HITS

The Critical Hit table, to the left, replaces the table from *Savage Worlds*.

WRECKED

When a ship is Wrecked, its engines, generators, weapons and Coulborne Shield go down. Every crewmember receives 4d6 damage from the attack, explosions and radiation. Since the ship's environment is breached, every surviving crewmember must activate their sealed vacc suits and either escape to the ship's "storm cellar" or leave the ship altogether, either in an escape pod or through an airlock.

Assuming the enemy does not blow the ship up while it is defenseless, the crew might want to repair their wrecked ship. The ship's "storm cellar" includes a basic store of food and air, enough for the crew to

survive a few days while they perform repairs (see Repairs, below).

If for some reason there is still a need to continue the space combat, a Wrecked ship stays drifting at the position it was hit.

REPAIRS

Ships may be repaired out of combat. Repairs in space are possible because of the Claytronics technology (see page 82) that allows engineers to create almost any part needed for the ship, or to use atoms to "renew" any section of the vessel at will.

Ship repairs work as per the *Savage Worlds* rules on vehicle repair. The repair time for spaceships is ten hours for every wound the ship has (regardless of how many are actually repaired). The Repair roll has a –2 penalty if performed in outer space, no penalty if performed while docked at a space station, and a +2 bonus if performed in a qualified shipyard, available in orbit around any of the *Seven Worlds*. The time needed to repair Wrecked ships is 1d6 × 20 hours per wound level repaired.

Example: *The McKenna was victorious in its combat against the enemy ship, but it sustained two Wounds. Now in the quiet of space Judith gets to begin her repairs. It will take her twenty hours to repair both Wounds. She makes a Repair roll (with a –2 penalty, since she's in space, and an additional –2 for the two Wounds, for a total of –4) and gets one success, thus removing one Wound. The time taken is still twenty hours. Judith can now try again for the other Wound.*

If Judith had rolled a raise, she would have removed both Wounds. If she had rolled two raises she would have removed both Wounds and the repairs would have taken just ten hours.

Finally, if the ship had been Wrecked, Judith would have had to repair four Wounds, and each wound would take 1d6 × 20 hours to repair. By rolling four d6s she discovers that fixing her ship in outer space will take her 140 hours or almost four days to repair, at least on her first attempt to do a Repair roll.

BOARDING A SHIP

After the battle ends, it is possible for the crew of one ship to board another one. It is only possible to try a boarding manoeuvre if both ships cooperate. A ship that is actively using its engines to escape cannot be boarded. This is usually not an issue when one of the ships has surrendered or has its engines disabled because of wounds, overheating or being Wrecked.

SCALING SPACE COMBAT DIFFICULTY

If you or your players find space combat too challenging at first (or too easy afterwards) you can easily change its difficulty. To make space combat easier we recommend you increase one or more of these parameters by one point, for the heroes' ship or both the heroes' and the enemy ship:

- **Handling:** Increasing ship handling makes it easier for the pilot to move faster, make 180-degree turns, and avoid incoming enemy missiles.
- **Heat Radiation:** Increasing the Heat Radiation stat allows the players to fire more weapons without worrying too much about heat, and to more easily avoid the Heat consequences of enemy attacks.
- **Shield Effects:** Since Shield effects are essentially "ship Bennies" on steroids, increasing their supply gives the team more defense options to avoid the worst.

To board a ship, the pilot of the boarding ship needs to make a Piloting roll to match the other ship's directions, rotation and speed. If the roll fails, the ships scrape together and both vessels suffer a Wound.

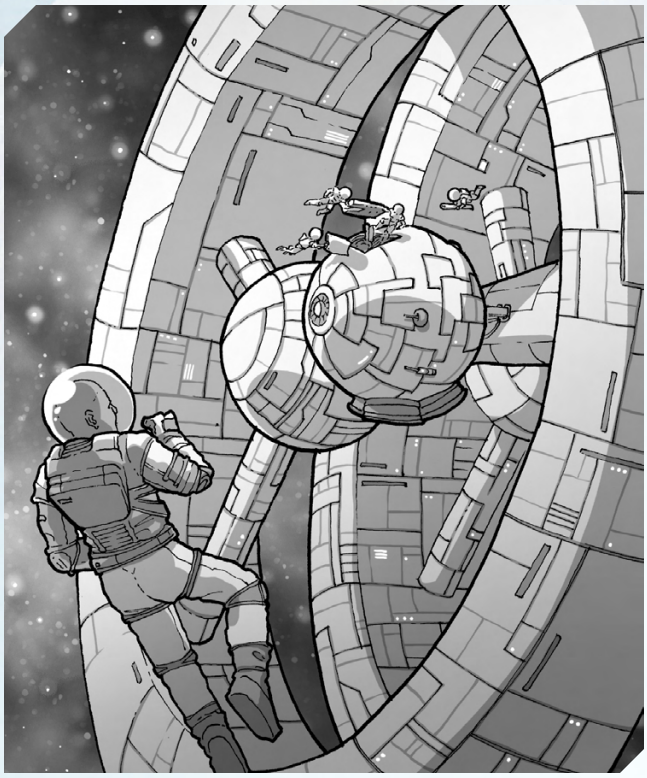
After a successful roll, a flexible tube is connected between both ships' hatches and characters can move freely between both ships.

Example: *The enemy ship is Wrecked, a floating hulk in space. The McKenna decides to approach and board it. Davril makes a Piloting roll applying all modifiers for his ship, including Handling, and gets a success. It takes a few hours, but now both ships are tiered and parallel to each other. As the crew begins boarding procedures, they hope the enemy is dead or wounded, and not waiting for them with their Accelerator Rifles ready…*

SPACE STATIONS

When running combats between ships and space stations some minor modifications to the rules are needed.

- Space Stations use the same statistics as starships. However, since Stations do not move, the Top Acceleration, Handling, Jumps and Weeks per Jump statistics are not used.
- Space Stations use a d6 Wild Die for all their skill rolls.



- The Piloting skill is not used in a Space Station. Space Stations cannot avoid incoming missiles, but can try to shoot them down.
- Space Stations can sustain a total of 8 Wounds before becoming Wrecked. The maximum penalty accumulated for Wounds is –3, though.
- The Critical Hit Table for Space Stations is modified as follows: A result of 4 is treated as a Hull hit; and a result of 12 is treated as a Reactor hit which blows up the entire station. All but 2d6 crew are killed, and Wild Cards take 5d6 damage.

MASS BATTLES IN SPACE

In *Seven Worlds* there is always the chance that fleets will meet and large space battles will ensue. The following rules supplement the standard Mass Battle rules from *Savage Worlds*.

POINT VALUES

No point values are given for starships to estimate relative forces. The GM should estimate the relative strength of each opposing force and then hand the appropriate number of tokens to each side.

HEROES IN MASS BATTLES

As stated in the Mass Battle rules, a hero can decide to risk his life to increase his side's odds of winning. The rules in the **Characters in Mass Battles** section of *Savage Worlds* fully apply, but the only skills a hero can use in this way are Knowledge (Battle), Shooting and Piloting. In all cases the player should come up with an interesting explanation for what their character is doing to try to change the odds.

MORALE

Morale rolls receive the +2 bonus for Major Fortifications (the inside of a spaceship).

OPTIONAL SPACE COMBAT RULES

The following optional rules are available for groups that want even more detail and options in their space battles.

SHIPS MOVING TOWARDS EACH OTHER

When two ships accelerate towards each other, Newtonian physics dictate that their acceleration forces them to approach swiftly. If you wish to simulate this behavior, give a +2 bonus to the movement Piloting roll to every ship that is moving towards each other. Note that this might increase the need for ships to make 180-degree turns to continue the combat.

DISTRACTING THE ENEMY

If the Pilot is within one SU of the opponent, he may try to distract the enemy in lieu of the standard Movement action. Basically the pilot takes advantage of the (relatively) short distance between him and his opponent to change his ship's direction in an unpredictable way, thus forcing his opponent to re-calculate his movement and reposition his ship.

To do this, the Pilot makes an opposed Piloting roll against his target. This roll replaces the normal Piloting roll for this round. If successful, the opponent suffers a –2 to his next Piloting roll. On a raise, the opponent is Shaken as well. This Piloting roll generates one point of heat that is added to the Heat Pool.

The opponent's –2 penalty to his next Piloting does not apply to Piloting rolls made to evade missile attacks.

Example: *Trying to escape their enemy, Davril decides to fly towards his enemy instead of away from him, thus forcing him to turn around if he wants to pursue. Since they are already just one SU away from each other, Davril tries to confuse the enemy by making an opposed Piloting roll. He adds his applicable modifiers, such as Handling, and wins the opposed test. Davril's opponent will have a –2 penalty to his next Piloting roll. Davril adds one heat point to his ship's Heat Pool.*

LASER BEAM COUNTERATTACKS

If the gunner in charge of a Laser Beam is On Hold when the enemy announces an attack with a laser or particle beam, and the gunner successfully interrupts before the attack is completed, a laser beam can be used to destroy the enemy beam weapon (a "Crazy Lazy", see side bar). To do this, the gunner makes a Shooting roll with a –6 penalty (since the enemy beam barrel qualifies as a Tiny Target). Since the +2 bonus to Shooting rolls still applies, this translates to a net –4 penalty. If the roll is successful, the enemy must roll his beam's damage and apply it against his own ship, ignoring Armor. Additionally, the enemy's beam weapon is automatically destroyed.

Example: *Expecting the enemy to attack with its Laser Cannon, Terrence stays On Hold with his Light Laser Cannon. As soon as the enemy tries to fire their Laser Cannon, Terrence tries to interrupt. He is successful in his opposed Agility roll and makes a Shooting roll with a –4 penalty at Short Range. He hits! As the enemy's Laser Cannon explodes, the enemy rolls damage for their own laser weapon and applies it to their ship ignoring all Armor. The enemy's Laser Cannon cannot be used again. Terrence adds three heat points to his ship's Heat Pool.*

CLOUD WEAPONS AND COVER

Since Cloud Weapons litter space between ships with all types of kinetic projectiles, the accumulation of these creates obstacles between ships. Any ship that fires Cloud Missiles three or more times automatically gains a Light Cover bonus against any further attacks. This is a –1 penalty applied to all enemy ships' Shooting rolls. This penalty is also applied as a bonus to the pilot's Piloting roll when evading enemy missiles.

NNEMP AND REPAIR ROLLS

Besides being able to make a Repair roll once the requisite number of rounds have passed, a crew whose ship has been hit by a NNEMP may make a Repair roll before the delay has passed, by applying the remaining delay rounds as a penalty to the Repair roll.

IDENTIFYING A MISSILE PAYLOAD

Instead of allowing every participant in the combat to know the payload of every missile, the GM might want the participants to actively try to identify them. With this optional rule, the specific payload an incoming missile contains is unknown unless a character spends an action to make a Knowledge (Science) roll. With a success, the crew knows what payload one specific missile (chosen by the player) contains; with a raise, the character deduces the payload of all incoming missiles. The character can have his or her Assistant assist by performing the roll by itself.

If this rule is used, the payloads of projectiles launched by Cloud Weapons cannot be identified.

HEAT AND MOVEMENT INSIDE THE SHIP

If as a result of heat the ship accumulates two levels of Fatigue, all superconductive corridor arrays go down as part of the automatic shutdown of non-essential services. This means that the heroes must move through the ship using normal Zero-G rules (see page 126) until the ship goes below two levels of Fatigue again. Any heroes moving using the superconductor array when it goes down must make an Agility roll or crash against a wall, becoming Shaken.

OPEN FOCUS ON LASER BEAMS

As explained on page 92, Laser Beams can be tuned to cover a larger enemy area with less focused power for the attack. This makes it easier to hit the target but harder to damage it significantly. In game terms, a Laser Beam can be used in open focus mode by declaring so and then making a successful Shooting roll to fire (subject to all the laser firing rules above). If the roll succeeds the enemy ship automatically adds one heat point to its Heat Pool, but receives no other damage.

LASER BEAM COUNTERATTACKS

If you decide to use this optional rule, we suggest you add the following Edge as an option for your players:

LASER COUNTERATTACK MASTER

Requirements: Novice, Gunner

If the character tries to use a Laser Beam Counterattack (a "Crazy Lazy"), shooting down the enemy's laser beam by staying On Hold, he gets a +4 bonus to the roll.

gm section

IF WE CRAVE SOME COSMIC PURPOSE, THEN LET US fiND OURSELVES A WORTHY GOAL.
—CARL SAGAN

This section gives details and options for running adventures in the *Seven Worlds*. It is divided into three sections:

In the first section, **New Options**, you will find several alternatives to add more richness for your players, such as rules for spaceship customization, trading, random encounters in space, and more.

Next, in the section titled **Game-Mastering the Seven Worlds**, you will find advice on how to take advantage of the vast possibilities offered by the technology in the setting to run better, more immersive games. Suggestions on how to handle Avatars and V-World, among other technologies, will make you an even better *Seven Worlds* GM.

Finally, in the **Encounters** section you will find dozens of fully-statted NPCs to be used as allies or enemies of the heroes, as well as more than twenty spaceships that roam the space between the worlds that Humanity has visited.

NEW OPTIONS

This section details new additions to the core *Seven Worlds* rules.

TRADING

Trading is an important part of life in the 23rd century. Despite the enormous distances and huge amounts of energy needed to traverse space, there are always products, both natural and man-made, that fetch a good enough price to make a profit.

Although Circle members will usually not engage in trade, other kinds of heroes might want to consider devoting their time to trading. If they do, the following simple system for trading, based on a Streetwise skill roll, should be used.

In this system, buyers and sellers don't get the option of haggling (the roll represents the final results of the players' haggling and negotiation). Once the die is rolled, the characters must accept the purchase and sale price, even if they make a loss on the transaction (although Bennies can always be spent to reroll, of course). Having a high Streetwise die and Charisma bonus can make a difference in matters of trade.

If trading will be an important part of your campaign and you are looking for a deeper system, we recommend the Trade rules in the *Savage Worlds Science Fiction Companion*.

CARGO CAPACITY

The simplest way to handle trading is to assume the ship has enough space to carry as many spaces of cargo as needed. This works well for small merchant ships.

Optionally, you could decide that each ship has a different cargo capacity. The amount of cargo being traded is measured in abstract "spaces," representing capacity of the ship. If you decide to do this, you must give a specific cargo space rating to every ship in the game. You can assume, for example, that the *Voyager* has a cargo capacity of 8 cargo spaces. Other ships the heroes may be looking to acquire may have more or less spaces.

BUYING

Purchasing cargo costs a base $500 per space. A total of 2d6+3 spaces worth of cargo (called a consignment) are available each day on any human installation (planet, space station, etc.). The buyers make a cooperative Streetwise roll once per consignment. Each success and raise on the roll reduces the cost per space by $100 to a minimum of $100. A failure increases the price by $100. A critical failure results in a $200 increase in price per space.

SELLING

Selling a cargo space of goods brings in a base $500 per space. Make a cooperative Streetwise roll once per consignment. Each success and raise on a cooperative Streetwise roll ups the unit price by $100 to a maximum of $700. A failure lowers the price by $100. A critical failure results in a $200 decrease in price per space.

Human locations buy 2d6+3 cargo spaces per day. Goods cannot be bought and resold on the same planet or station.

TRADING ON EARTH

Because of its size and population, Earth is the number one trading partner of all planets. Heroes receive a +2 bonus to all Buying and Selling rolls made on Earth.

CUSTOMIZING SPACE SHIPS

The ships in *Seven Worlds* have been designed by starting with their physical characteristics according to standard rocket design theory, and then applying *Savage Worlds* stats to the result. It is very easy to take the existing ships and tweak their stats to create your own.

What follows are some optional rules and suggestions to customize ships.

SHIP PERSONALITIES

Most science-fiction properties include a beloved ship with a personality of its own. The old battered freighter that is still the fastest in the galaxy, or the sleek ship with a secret Achilles' heel are classic examples. The following optional rules allow the heroes to simulate this in their campaign and lightly customize their ship.

At the start of the game, or when the ship is created, you can assign Ship Hindrances to it. Just like with characters, a Minor Hindrance is worth one point and a Major Hindrance is worth two points. Ships can have at most one Major and two Minor Hindrances.

With the points earned from Hindrances the heroes may buy Edges for their ship. Each Edge costs two points. Ideally there should be no way to remove or buy off the Hindrances without losing the Edges but this is the GM's call.

During game play a character can decide to forfeit one of his or her advances to buy an Edge for the ship. However, if the ship is ever destroyed, the advance is lost. Besides the Edges gained from Hindrances, a ship may have at most two additional Edges. No Edge may be taken more than once.

If this optional system is used, GM's are encouraged to add Edges and Hindrances to important enemy ships.

SHIP HINDRANCES

The following Hindrances are available for ships.

HIGH MAINTENANCE (MINOR)

The ship fails very frequently. Every four months the ship must undergo two full weeks of maintenance at a qualified facility. Otherwise its Heat Radiation modifier goes down by –1.

NEW TRADING EDGE

If you are planning on running a Trading campaign, we suggest you make this Edge available to any characters who may be interested.

MERCHANT

Requirements: Novice, Smarts d8+, Persuasion d8+, Streetwise d6+.

The character understands the mercantile process and the laws of supply and demand. The character gains +2 to Streetwise rolls when buying or selling cargo. In addition, if he makes a successful Persuasion roll, the number of units available for purchase or sale increases by 1d6.

SHIP HINDRANCES/EDGES

If you are using the optional ship customization rules (see below) we suggest you add these trading-related Ship Edges and Hindrances to the game.

SMALL HOLD (MINOR)

The ship's hold can carry smaller consignments than normal. When calculating the size of the available consignment roll 1d6+3 instead of 2d6+3.

If you have assigned a specific number of cargo spaces to the ship, this Edge instead lowers the ship's cargo space capacity by 50% (rounding down).

EXTRA CARGO SPACE

The ship's hold can carry larger consignments than normal. When calculating the size of the available consignment, as well as the number of spaces bought at the destination planet, roll 3d6+3 instead of 2d6+3.

If you have assigned a specific number of cargo spaces to the ship, this Edge instead increases the ship's cargo space capacity by 50% (rounding down).

DAMAGE PRONE (MAJOR)

The ship is susceptible to damaging attacks by the enemy. Once per battle, when the ship suffers a Critical Hit, the firer may modify the result by 1 point higher or lower as it suits him or her.

COMMUNAL QUARTERS (MINOR)

The ship's living quarters are particularly uncomfortable. Halve the passenger capacity, rounding down.

SLOW ENGINES (MINOR)
The ship's engines do not accelerate as fast as they should. Lower the ship's Top Acceleration by –1.

JUST FOR SHORT TRIPS (MINOR)
The ship's fuel capacity does not allow for very long trips. Lower the ship's Jumps statistic by –1.

WEAK FRAME (MAJOR)
The ship's was not built to spec. Reduce its Toughness stat by –2.

DEFECTIVE SHIELDING (MAJOR)
The ship's Coulborne Shield does not work effectively. Reduce the Coulborne Shield (Armor) stat by –2.

HARD TO FLY (MINOR)
The ship is not good at fast, effective maneuvers. Reduce its Handling stat by –1.

OVERHEATS EASILY (MAJOR)
The ship's heat radiators and sinks do not work as expected. Reduce its Heat Radiation stat by –1.

EASY TO HIT (MINOR)
The ship does not respond well to attacks. Reduce its Shield Effects statistic by –1.

SHIP EDGES
What follows are the Edges that can be selected for a ship.

DISCIPLINED CREW
This Edge grants a Benny to the ship's crew for the entire session. The Benny must be used on rolls related to the ship only.

MANEUVERABLE
The ship is particularly manoeuvrable and agile. The ship's Handling is increased by +1.

FOR THE LONG HAUL
The ship has the capacity and stamina for long trips. The ship's Jumps statistic is increased by +1.

HEAT RESISTANT
The ship's heat radiators and sinks are extremely effective. The ship's Heat Radiation statistic is increased by +1.

PASSENGER SPACE
The ship's living quarters are particularly roomy. Increase the ship's passenger capacity by 50%, rounding down.

RAPID FIRE
The ship's weapons are particularly fast. Each round you may reroll one failed ship weapon Shooting roll as if you had used a Benny. Note that this reroll occurs after the failed attack's heat points have been added to the Heat Pool. In other words, if you choose this option you will have to add heat points to the Heat Pool twice.

SWIFT ENGINES
The ship's engines handle acceleration very effectively. Increase the ship's Top Acceleration statistic by +1.

LUCKY
The ship has a remarkable ability to withstand hits. Once per battle, when the ship takes a Critical Hit, you may modify the result by 1 point (plus or minus) as you see fit.

EFFECTIVE SHIELDING
The ship's Coulborne Shield is particularly effective against attacks. Add +1 to the ship's Coulborne Shielding (Armor).

WELL BUILT
The ship has been solidly built and designed. Add +1 to the ship's base Toughness.

HARD-TO-HIT
The ship's defenses are particularly effective. Increase the ship's Shield Effects statistic by +1.

SPACESHIP WEAPONS
What follows is a list of all weapons available to spaceships in *Seven Worlds*. It may be useful to you when creating or customizing spaceships.

ENCOUNTERS IN SPACE
Space is big and empty. Most travels the heroes take through space should be uneventful, but sometimes unexpected things happen. This section gives details on how to create encounters in space.

Encounters in space are entirely optional. Use them only if you think they add something to your game. Most travels through space should be handled off-stage without stopping the adventure. For example, the heroes should depart Apollo and arrive four weeks later in Concordia with just a sentence or two being exchanged between you and the players.

If you decide to run an encounter, focus on making it a memorable experience. Most ships in a star system can be detected as soon as the heroes' ship enters the system, so most encounters in space will begin days away, giving heroes the opportunity to decide how to

SPACESHIP WEAPONS

TYPE	RANGE	DAMAGE	AP	ROF	HEAT	NOTES
LASER CANNONS						
Light	4/8/16	3d6	6	1	3	HW; Can be used as a PDLB with RoF 5
Medium	4/8/16	3d8	10	1	4	HW; Can be used as a PDLB with RoF 6
Heavy	4/8/16	4d8	12	1	6	HW; Can be used as a PDLB with RoF 8
PARTICLE CANNONS						
Light	2/4/8	2d8	6	1	2	HW; +1 to Shooting
Medium	2/4/8	4d4	8	1	3	HW; +1 to Shooting
Heavy	2/4/8	4d6	10	1	5	HW; +1 to Shooting
MISSILE LAUNCHERS						
Light	1/2/4	—	—	2	1	HW; 2 reloads; cannot use Nuclear missiles
Medium	1/2/4	—	—	4	1	HW; 4 reloads; can't launch more than 1 nuclear missile simultaneously
Heavy	2/4/8	—	—	4	3	HW; 4 reloads; can't launch more than 2 nuclear missiles simultaneously
Coilgun	2/4/8	—	—	1	4	HW

proceed. Ships can be detected and messages sent at that distance with just a few light-minutes delay. Give heroes the time to decide what to do and whether they want to meet the other ship or not. Also, most encounters will not involve fighting and combat, but rather conversation and interaction.

On the other hand, it is possible to run an encounter in space as an ambush, most likely as soon as the heroes come out of a jump point. Don't overuse this device or you may spoil the fun of the game for the players.

TRAVEL INTERLUDES

As mentioned above, most trips should be over in a sentence or two. If you wish to have something different for the heroes to do during the trip and don't want a normal encounter, here are a few suggestions.

SAVAGE WORLDS INTERLUDES

The Interludes rules from *Savage Worlds* are an excellent and powerful way to develop the heroes' backgrounds, particularly in the first few sessions of the campaign. They can give you a wealth of information and cool story hooks.

THE VIRTUAL THERAPIST

As explained on page 156, all ships are equipped with Virtual Therapist assistants that can be used to create interesting role-playing situations for the heroes. Take advantage of these when appropriate.

MONTAGE

A variation on the Interludes rules you might want to try is the Montage: Assume the trip is over and the heroes have reached their destination. Then go around the table asking each player to describe a challenge, obstacle or problem the heroes encountered during the trip, and which they overcame. Then ask the player to the left how the heroes overcame the challenge. Each player should get to suggest one challenge and propose the solution to another player's challenge. Help the heroes embellish the descriptions to make the story as heroic and exciting as possible. By the end of the Montage you and the players will have turned a long, uneventful trip into an exciting, danger-filled odyssey!

RANDOM ENCOUNTERS

This section provides a system for randomly creating encounters in space.

To see if there is an encounter in space, draw a card from the deck. If the card is a face card, an encounter occurs. Roll 1d8, applying the following modifiers to the roll:

- If the heroes are traveling between systems not connected by a working Stellar Communications Network, apply a –1 modifier to the roll.
- If the heroes are in a dead-end route to an uninhabited star (either coming or going), apply an additional –1 modifier to the roll.

Consult the table below to see what the heroes encounter.

Note that during and after the events in the epic *Seven Worlds* campaign, the random encounters table will change. Refer to the appropriate modules in the campaign for the updated random encounter tables.

The next section describes what each value in the table means.

RESEARCH SHIP

The heroes meet a research ship crewed by scientists. It may be on its way to a research mission, it may be in trouble, or maybe it has found something the heroes should know about.

MODIFIED DIE ROLL	RESULT
–1	Research Ship
0	Pirate Ship
1	Two Ships
2	Circle Ship
3	Psionic Brotherhood Ship
4	Particle Dust
5	Ship Hazard
6	civilian Ship
7	Military Ship
8	VIP Ship

PIRATE SHIP

The heroes cross paths with a pirate or mercenary ship. Roll 1d6, and if the result is 6 the heroes meet a Medium-size Pirate ship (see page 186) instead of a Small-sized one (see page 185). Then roll another 1d6; if the result is a 6 the heroes meet two Pirate ships instead of one.

TWO SHIPS

Roll as many times as possible on the table with appropriate modifiers until two ships come up. The two ships should be involved in some fashion; maybe one is escorting the other, helping with a technical problem, or battling the other.

CIRCLE SHIP

The heroes cross paths with a Circle Patrol Ship (use the stats for Patrol Ship on page 185). Although most likely it will be friendly towards the heroes, it might have technical issues, be in distress, have a mission for the heroes, or have been hijacked by the prisoners it captured in a nearby space station.

PSIONIC BROTHERHOOD SHIP

The heroes detect a Psionic Brotherhood ship in the vicinity (use the stats for Patrol Ship on page 185). Psionic Brotherhood ships will usually be friendly towards the heroes and may provide clues, support or help during their missions.

PARTICLE DUST

At high speeds, any collision with a particle in space can be very dangerous. If this happens, draw a card and consult the following table. Draw again if a Joker comes up.

The ship's engineer (any player the group decides) gets to make a Knowledge (Ship Ops) roll to soak damage, with the modifier below.

Apply damage and Critical Hits as normal. The damage can be repaired at a space station or other location with the appropriate repair equipment.

CARD VALUE	MODIFIER TO KNOWLEDGE (SHIP OPS) ROLL	DAMAGE (AP)
Deuce	–6	5d6 (12)
3 – 5	–4	4d6 (9)
6 – 10	–2	3d6 (6)
Jack – Queen	–1	3d6 (6)
King – Ace	0	3d6 (3)

SHIP HAZARD

Roll 1d6. On a 1 – 3, the ship has had a problem with its heat radiation equipment and is over-heating, thus lowering its efficiency. On a 4 – 6, the ship has had a problem with its life support systems, including breathing, supplies and others. The heroes can barely breathe and sustain themselves.

In both cases, draw a card and consult the following table: Draw again if a Joker comes up.

CARD VALUE	RESULT
Deuce	–6
3 – 5	–4
6 – 10	–2
Jack – Queen	–1
King – Ace	0

On an overheating problem, have one hero make a Knowledge (Ship Ops) roll with the above modifier. With a failure the ship gains one level of Heat Fatigue. If the result with modifiers is less than one, the ship gains two levels of Heat Fatigue.

On a Life Support Systems problem, have each hero make a Vigor roll with the above modifier. With a failure the hero gains one level of Fatigue. If the result with modifiers is less than one, the hero gains two levels of Fatigue.

The damage can be repaired at a space station or other location with the appropriate repair equipment. Therefore the Heat Fatigue or hero Fatigue lasts until the heroes reach civilization and can repair their ship or rest appropriately.

D6	SHIP FOUND
1	Military Patrol Ship (see page 185)
2	Supply Ship (see page 187)
3	Troop Ship (see page 189)
4	Heavy Cruiser (see page 184)
5	Battleship (see page 183)
6	Unmanned Laser Platform (see page 189; must be accompanied by a manned ship)

CIVILIAN SHIP

The heroes cross paths with a Civilian ship. Roll 1d6. On a 1–5 the heroes meet a Merchant Ship (see page 184). On a 6 the heroes meet a Mark V Settler Ship on its way to a planet. Usually Civilian ships are friendly but sometimes strange things happen.

MILITARY SHIP

The heroes meet 1d3 military ships.

For each ship the heroes meet roll 1d6 and consult the following table:

Finally, roll a 1d10 to see what nationality or allegiance the military ships have, and consult the following table.

The ships will most likely be peaceful and not mess with the heroes, but this is for you to decide.

D10	SHIP FOUND
1–3	Concordia
4–6	Bay Jing
7–8	Earth Gov
9	Circle
10	Psion Brotherhood



VIP SHIP

The heroes meet a ship that transports an ambassador, politician, wealthy individual or other high-level VIP. Use the stats for Patrol Ship (see page 185). You get to decide if the ship is escorted or not, if the VIP is on a leisure trip or work, if he or she is fleeing, and how friendly he or she is.

GAME-MASTERING THE SEVEN WORLDS

This section gives you tips and suggestions on how to run great games in the *Seven Worlds* Setting. But first, let's start with what you already know.

YOU ALREADY KNOW THIS: KEEP IT FUN

You should have already read this hundreds of times, but it's worth repeating: The only goal of the game is for the GM and players to have fun. Change anything you want, without exception, if it means you'll have a fun, engaging game!

Simply put, **focus on fun**. This tip overrides every rule in the book: If there's something in the campaign your players don't like, throw it out. If there's something missing in the campaign that your players love, put it in. Don't worry about keeping it consistent. A player loves playing an alien and must have one? Fine, create an alien species and add it to the game. Another player hates inertial space combat and wants to pilot his own space fighter and do dogfights with noisy explosions in space? Fine, add that in, too. Do you or your players like the setting better than the campaign? Dump the campaign out the airlock. If it makes your players happy, then it is definitely right to add it in.

LEVERAGING TECHNOLOGY IN YOUR GAME

One of the most challenging aspects of running a *Seven Worlds* adventure is correctly handling the role of technology in the game. As the sidebar about the door in page 76 explains (read it again if you haven't recently!), everything is aware. This has major implications for information gathering, stealth activities, and many other things players usually take for granted in other role-playing settings. Heroes who expect to stealthily walk without being noticed are missing the point, and will quickly get very frustrated. It is your job as a GM to handle the challenges of technology as opportunities rather than as obstacles.

A key tool in your arsenal for this is the Hacking skill. We've purposely made it relatively easy to hack systems to either change your identity or modify the way things work, even though hacking things so easily isn't very realistic. We've also allowed Assistants to make rolls for the player, thus not forcing everyone to buy the Hacking skill, and along the way creating interesting role-playing opportunities for Assistants. **The goal is for the players to stop thinking about the door, wall or table as an inanimate obstacle to be overcome and instead see it as an enemy to be outsmarted.** Faking your identity so that every door and corridor believes you're someone else is a good way to do this.

Remember that technology helps (or hinders) the heroes' enemies too. Take advantage of this in novel ways to create a great role-playing experience for the players.

Another interesting consequence of technology is that at any moment (including during combat) a player can use their lenses to "see" any information they want. This includes information on who is around them, research or technical data, maps of the location (in case they can't see where they are), different angles or points of view (to see hidden objects or enemies), and many other things. This use of technology is handled as a request to the hero's Assistant, who brings the information back, and usually counts as an action as specified on page 129. The in-game effect of this is usually a modifier to lighting, cover penalties, or other result that is affected by information. Again, the Hacking skill can be very useful in both enabling this use of information and trying to disable it for the hero's enemies.

What about surprise? Given all these sensors, combat surprise is a very uncommon situation unless the surprising party has taken careful steps to make it possible. This includes faking sensors (since disabling them would alert the enemy to the fact that something's not right) or changing the environment to keep the source of the surprise hidden. Assistants also have to be surprised for the surprise to work. If a Notice roll is necessary, it should usually involve a bonus if technology can detect the situation.

Of course, there are still places where technology is not that abundant (the jungles of Logan's End, for example). In these cases, the effects of technology are appropriately diminished.

What if your players don't enjoy all these new sci-fi challenges posed by technology? Then fall back to the Rule of Fun, and throw technology issues away. It is your game and you know the best way to make it fun for you and your players.

V-WORLD

V-World is your ultimate playtool, the opportunity to simulate every other environment and game within *Seven Worlds*.

In this game the term "V-World" is used for several purposes. V-World is the 23rd century equivalent of the Internet, so everything is either inside V-World or connected to it. V-World also refers to the simulated virtual reality universe that can be accessed for game or simulation purposes, or simply to interact in daily business. This melding of the term is deliberate, as the lines between physical and virtual have blurred until they are almost undistinguishable.

When focusing on "virtual-reality" V-World here are some details you as GM should be aware of.

First, there are no limits placed on V-World other than the limits that you choose. Spells, Weird Science, monsters, edges that don't appear in the main game, can all be used in V-World assuming you decide they fit with the particular VR universe you are trying to run. You will find an example of a fantasy world with spells and monsters, called The Amber Drake Chronicles, in the first module of the epic *Seven Worlds* campaign, *Rumors of War*. Several Fantasy NPCs have also been included in the Encounters section, below.

Real world skills and edges could be transferred to V-World or not, depending on what the edge is. Usually skills and edges related to mental abilities can be transferred as-is, but physical skills and edges depend on whether the hero's avatar in V-World is similar to the hero in "real life" or not, and also on whether the rules of physics apply equally in V-World.

As a rule, psionic powers should not be available in V-World, unless the V-World simulation has been specifically designed to support them.

Bennies should be awarded and treated equally in V-World and the real world, unless you have an overriding reason not to. Since they are a metagame element roughly representing "luck," Bennies could apply to either world. Therefore, a Benny earned in V-World should be kept in the real world.

It is important for the players to have a reason to go into V-World. While it sounds fun to "go to a medieval setting for this session," players lose interest if they are not making a difference in the "real" world. Besides plot elements that should be tied to the V-World part of the adventure, Benny rewards are a good way to make players make an effort within V-World. You might even decide to award more Bennies in V-World than in the real world to make V-World visits more interesting.

AVATARS AND V-WORLD

Some campaigns may want to focus on adventures with Avatars and V-World. Or you may be looking for a setting with more of a cyberpunk feel. There are roughly three different approaches to Avatars to consider in these cases.

The first approach is to treat the Avatar as digital representation of the character itself. In these kinds of V-World simulations the avatar is as powerful (or weak) as the character. This is the simplest avatar to handle as its stats are the same stats the character has. The main difference is the character is now virtual instead of real.

The second approach is to treat the Avatar as an enhanced version of the character. In this case some of the characters attributes, skills and Edges increase or decrease by one die type or more. We recommend you focus only on modifying physical attributes, since in V-World a character's intelligence will be the same as in the real world. An ignoramus in science in the real world will not become the world's greatest scientist by going into V-World. On the other hand, you could simulate the character has the skills when playing a "virtual game" or similar in V-World.

The last approach is to treat the Avatar as a completely new and different version of the character. In this case you should prepare a character sheet for the Avatar just as you do for the "real-world" character, and manage it similarly. This is applicable for very detailed V-Worlds, or when the differences will be so significant that they justify the extra effort.

ASSISTANTS

Assistants are one of the trademarks of the *Seven Worlds* setting, and help give the game its unique feel. If you have ever played or run a fantasy campaign before it may be easiest for you to imagine an Assistant as a 23rd century "Familiar," and run it accordingly.

Here are some suggestions for integrating Assistants into the campaign.

ROLE-PLAYING ASSISTANTS

First, make sure that each Assistant has a unique personality that makes it an interesting part of the campaign. Players can decide on the personality for each Assistant or you can use the Ally Personality table from *Savage Worlds* as a guide. You, of course, have final approval over the personality template for an Assistant proposed by the players. After all, you will most likely have to role-play the Assistant during the game!

Assistants are a great way for you to insert fun, wit, and commentary during the game. Players who like to role-play may find it interesting to deal with an unruly or sardonic Assistant. Since the Assistant is basically a floating presence, he can see and comment in ways an Extra couldn't. If your players enjoy this kind of role-playing, go for it!

As an option, you might want to consider having each player role-play another player's Assistant. This can give a very interesting feel to the game for groups that enjoy their role-playing. In this scenario, give each player an Assistant Sheet filled out with another player's Assistant stats, and let them role-play among themselves. Before exploring this option, make sure the owner of the Assistant is OK with who is going to role-play his or her Assistant.

GIVING INFORMATION THROUGH ASSISTANTS

Whenever you have to read a long description to the heroes, or describe a location, take advantage of Assistants to turn a third-person reading into a conversation. Maybe the Assistant says something like "we are approaching Apollo. Would you like a short refresher of the planet, its culture and its challenges? I think it would be useful to you!" and if the heroes agree, it's the Assistant (rather than the GM's disembodied narrator voice) that describes the environment. This also allows for bi-directional conversation and a more interesting game.

Assistants can help you nudge the heroes in the right direction or point opportunities they may have missed

without "breaking the invisible wall" between GM and player. You could, for example, announce that Jasper the Assistant says "hey, do you always like to be shot in the back while you fight? Or should we do something about the guy with the autopistol behind that rock this time?" There are many other situations where an Assistant's comment at the right moment can mean the difference between life and death.

When using Assistants to give information to the heroes, don't fall for the temptation of having the Assistant solve the puzzle for them. While Assistants are incredibly clever pieces of software, they are not truly sentient. They can give hints or suggestions that nudge the game along but should not make the big plot breakthroughs that would take the spotlight away from the heroes.

OVER-RELYING ON ASSISTANTS

In a world filled with sensors, smart devices, and information it may be tempting for the players to solve the problem by just asking their Assistant to look it up in V-World or manipulate the environment to put the problem aside. Since this is first and foremost a game, remember the GM's Golden Rule of Technology: When in doubt, it doesn't work. Maybe the system has a problem, or the camera shut down, or there is overload. Pick the appropriate reason but don't short-circuit the adventure just because technology is available.

ASSISTANTS DURING COMBAT

The fact that a player must spend a Benny to make his Assistant do something battle-worthy (see page 132) keeps battles with several heroes from slowing down because all Assistants behave like Extras each round.

Ideally the Assistant should be used to play a complementary activity that raises the excitement of the battle, such as trying to unlock a door the heroes need to open in order to escape. Another way to make Assistants more relevant in combat is to include props that can only be used by Assistants. This forces heroes to rely more on their Assistants to win the battle.

When a player spends a Benny to make their Assistant do something impactful during the battle go easy on the players, and make sure the Assistant has a fair chance of being successful. Piling penalties on an Assistant roll may be "realistic" in certain situations, but it's almost certainly not fun for a player who's spending his hard-earned Bennies to make his Assistant do something cool.

Finally, remember that enemy Assistants can participate in combat, too! Use the same guidelines for enemy Assistants, and spend one of your own Bennies when you want their Assistant to do something that significantly affects the heroes.

VIRTUAL THERAPISTS

A Virtual Therapist is a special type of Assistant that is mentioned in page 151. Virtual Therapists are also Assistants, and a good tool for you as a GM during ship trips. Design the Therapist's personality yourself and create scenes between a hero and the therapist whenever you need one (after all, heroes are obligated to have periodic meetings with their therapist, probably a first in role-playing games). These roleplaying scenes between hero and therapist can be used to ask hard questions about what the hero is thinking, force interpersonal or internal conflicts with the hero, and seeing where it leads. It is also a good tool to spice long interstellar trips.

OPTIONAL RULE: ASSISTANT BENNIES

Use this optional rule if you want to increase the heroes' use of Assistants in combat.

Besides standard Bennies, all heroes receive a supply of special "Assistant Bennies." These work just like standard Bennies but may only be used on Assistants, as per the Assistant rules. The rules for awarding Assistant Bennies are similar to the rules for standard Bennies.

Manage how many Assistant Bennies you give per session depending on how much participation you want the Assistants to have during combat.

TIPS FOR RUNNING THE SEVEN WORLDS CAMPAIGN

The best way to experience this setting is by playing the epic *Seven Worlds* Campaign. Here are some suggestions for running this campaign that also apply perfectly to any other campaign you might want to run.

MANAGING THE FLOW IN A LINEAR CAMPAIGN

A linear campaign like the official *Seven Worlds* campaign allows you to tell epic, overarching stories that may change the fate of the galaxy. However, care must be taken to manage and carefully customize the story in order for things to work and avoid "railroading."

Several ways to handle the linearity have been built into the *Seven Worlds* setting. For example, you can take advantage of the fact that the heroes in the campaign belong to the Circle, a quasi-military organization. This allows you to structure missions as "orders" coming from the heroes' superiors. Don't force

things, but use this fact to guide the action in a direction both you and the players are comfortable with.

One of the biggest problems with running a linear campaign is that the process of discovering that there is only one option available can be extremely frustrating for the players.

Let's suppose that the heroes are surrounded by bad guys and the GM has decided they have to be captured for the adventure to proceed. From the GM's point of view this is easy, just have one of the NPCs order the heroes to surrender or die and then send infinite goons at them until the players "get the message." From the players' point of view, however, there are dozens of things they can try to avoid being captured. In fact, some players might even conclude (wrongly) that the goal of the scenario is not to be captured, and to interpret their inevitable capture as a failure on their part. This does not lead to fun.

The most important thing to remember in these scenarios is to defuse that frustration beforehand. Be upfront with the players about situations that for plot reasons will end in only one possible way, explain that the situation is temporary and will not cause lasting harm to them, and give them chances to afterwards turn the situation to their advantage. Chances are your players will have a much better time if they know this is temporary.

Finally, reward them with something, such as an extra Benny or two, and give them a chance to use them afterwards in interesting ways.

GET THE HEROES INVOLVED

The campaign will be most rewarding for the players if the heroes have a personal stake in what happens. For example, try to identify each hero's family or loved ones and put them on the spot. Having some hooks in each hero's background that you can latch on during the campaign to make it personal will help a lot. Leverage the selection of character backgrounds during the character creation process. As the universe shifts under the heroes' feet, bring their loved ones into the campaign. Have them say goodbye, try to save them, or learn of how they fell. Whatever it is, find a way to make it personal by tying the heroes' background into the campaign.

If you decide to use the pre-generated characters included in this book, you'll find we've already done the background work for you.

Use connections with important support characters to get the heroes into the story. Epsilon Leader Antoine, in the main campaign, is a good example of this. He has been built as a friendly mentor to the heroes, who supports and protects them. You should try to build the relationship between him and the heroes, and make them feel protected.

Remember the heroes are at the center of the story. NPCs should come to them. Danger should go to them. The story should follow them. If they don't know what to do, have the story go to them and let them decide if they want to follow it or not. Everyone likes it when NPCs talk about them. Stroke the player's egos a bit.

Finally, make it abundantly clear what will happen if the heroes fail. The danger must be such that the players will want to continue the plot rather than go on the side. Don't let the heroes forget that terrible things are happening around them. When possible, try to describe what's going on elsewhere and how the heroes' decisions affect the lives of millions.

GET THE PLAYERS INVOLVED

When running a campaign such as this, getting the players involved is as important (if not more important) than getting their characters involved. Since players experience the game through their characters, the previous section on getting heroes involved will also help with your players. However, there are a few extra things to consider with the players themselves.

First, understand what makes each player "tick" and identify what rewards, incentives and carrots will work well with each one. Then add them to the game. Character sheets are of course a good reflection of what the players want. Read each sheet carefully and make sure most sessions include good ways to show off their skills and Edges. Also don't be afraid to ask what your group expects from the game. Try to work their wishes into the campaign and be upfront when that isn't possible, then talk about possible solutions.

Periodically ask for input from the players and use it to keep the game flowing in the right directions in future sessions. You do not want to enter a linear multi-session part of the campaign and find out that your players are not willing or interested in it. Much better to have a chance to tweak it, modify it or (in the worst case) throw it out and try something else than risk desertion or revolt in your ranks.

Sometimes players will surprise you mid-session with requests or desires you had not planned for, or they may out-right refuse to follow the path you have set for them. In these cases, be flexible. If things go off the path and you don't know what to do, call a short break to think things over for a bit. Don't paint yourself into a corner if you're not good at improvisation. Better to take a few minutes to think things through and decide on a course of action that keeps the campaign moving.

Finally, if you and the players decide you need your space, create your own small sandbox everywhere you go and let the players explore it until they are ready to continue. Planets, ships and space stations are ready

to be used and extended into sandbox environments where the heroes can have many adventures before continuing their mission. As you will see when you review the modules comprising the *Seven Worlds* campaign, care has been taken to provide the time for you and the players to stop and run mini-adventures or campaigns for a few weeks before moving on. This allows you to fit the schedule your heroes prefer.

HANDLING HERO DEATHS

The key to story-driven adventures is drama, and heroes dying without purpose kills drama. If at all possible, avoid killing heroes in meaningless situations, and stay away from deaths caused by one unlucky die roll. Much better to use the Incapacitation rules and give them a crippling injury. If it becomes necessary for a hero to die, or the player wants to retire the character, you can use one of the many supporting characters that have been placed at different points in the campaign and turn him or her into a full-fledged hero. Of course, the players can also create their heroes from scratch.

OTHER CAMPAIGN TYPES

Besides the epic *Seven Worlds* Campaign, you can use the setting to support many other types of campaigns. Although almost any type of science-fiction campaign can fit in *Seven Worlds*, some campaigns are a better fit than others. Campaigns and adventures that involve dozens of worlds and hundreds of alien races, for example, would require significant tweaking to the setting to be effective.

Each of the *Seven Worlds* has its own situation and hooks, and can be used to run different types and flavours of campaign. Check out the description for each world for ideas and inspiration.

If you want to run a typical science-fiction campaign with a merchant free trader that goes from world to world having adventures, you can. Besides the seven main worlds there are many other space stations and environments that the heroes might want to visit. Our own Solar System is, by 2217, full of research and mining stations on almost all the planets. These require security, protection and trading. You have great leeway to add locations and details as necessary.

Another interesting campaign could be focused around crime, smuggling and law and order. These campaigns could center around Apollo and its criminal organizations, with heroes being on either side of the conflict.

Intrigue and rebellion campaigns can take advantage of the eternal conflict in Nouvelle Vie, or between Concordia and Bay Jing. The heroes' actions here can cause a war or avert it.

Finally, there are many "dead-end" routes known to Humanity, where no habitable planets have been found. This does not mean all these solar systems have been appropriately investigated. Scouts to do detailed mapping and investigation are always needed. There may be valuable deposits, strange secrets, ancient artefacts, and maybe another civilization waiting close to Humanity's home planets.

A MYSTERIOUS ENCOUNTER

This section contains *A Mysterious Encounter*, the first adventure in the official *Seven Worlds* campaign, which is further detailed in other modules in the *Seven Worlds* line. This introductory adventure will send your heroes on a mission that will change the course of the *Seven Worlds* and ultimately decide their survival!

Players: Don't read any further than this point!

CREATING HEROES

When your players are creating their characters, keep the following in mind. This assumes both you and your players want your heroes to take maximum advantage not only of this adventure but also of the entire *Seven Worlds* campaign.

- **The campaign requires all heroes to be members of the Circle.** Since the Circle accepts recruits from any age and previous walk of life your players should have no problem creating the kind of characters they want and then inventing a backstory to explain how they ended up joining the Circle. Retired Navy officers, merchants looking to reinvent themselves, and even former criminals changing their ways are all valid Circle recruits. Players who want to play a psion should have their character belong to the Psion Brotherhood and be "on-loan" to the Circle (see page 90). The setting has been expressly designed to support this, too.
- **Character backstories can be useful.** All characters must have a home world. Take advantage of this to encourage them to sketch out any important connections in their character's lives and in their home world. Use this information to tailor the campaign for your players. Family, friends or antagonists for the characters will all be very useful to increase the stakes as everything begins to fall apart later in the campaign.
- **The campaign needs heroes.** Regardless of where they come from, it is assumed that all heroes are basically "good", though, as befits a heroic campaign. If you decide to include dark or ambiguous heroes, be sure to work out their arc to figure out why they would risk their lives on a seemingly hopeless quest to save Humanity.
- **The group starts at Novice rank.** Starting at Novice does not necessarily imply that the characters have to be green, though. Players who want characters with more experience under their belts should check out the Experienced Officer Edge on page 106.
- **Assistants are a big deal:** The campaign assumes all or almost all the heroes have Assistants. Pay special attention to the Assistants your heroes create, and encourage them to create appropriate personalities for them. Jot down the names of each hero's Assistant as well as its personality, as you will use them often when narrating descriptions.
- **Using the Iconics:** The campaign comes with four pre-defined adventurers: Derrick, Duarthe, Seela and Maricelle. Feel free to give these characters to the players if they so wish. They all have pre-defined backgrounds and Assistant personalities, and can easily be tied to the major events of the campaign.
- **Give the heroes a Ship:** In this campaign the heroes need a Circle Patrol Ship. A ready-made ship has already been supplied, and christened the *Voyager*. Most players should be more than satisfied with this powerful, flexible ship. Feel free to allow the players to rename their ship if they so desire.

INTRODUCTION

The heroes begin the adventure on their ship, the *Voyager*, racing across the Gamma Leporis system.

Read or paraphrase the following text to the heroes. Make sure you identify the most appropriate Assistants for the scene. We suggest you role-play the heroes' conversations with them whenever possible.

The year is 2217. The place is the asteroid field close to Gamma Leporis, a bright star system twenty-nine light-years from Earth, home to a frontier planet called Nouvelle Vie (noo-vel-VEE). Jubilee and Dauphin, the two nations that share this planet, are constantly at the brink of war, and covertly fund terrorist organizations to sabotage and attack each other. As members of the Circle, the interstellar organization tasked with keeping the peace, you are the main buffer force to keep things orderly and protect civilians from attacks.

As your brand-new Circle Patrol Ship, the Voyager, *approaches within one light-second of Gardner Station, a small mining outfit located in the asteroid belt closest to the sun, [insert a hero's Assistant's name here] interrupts and asks, "Well, I trust you remember the details of our mission, correct?"*

This is a good opportunity to bring Assistants into the conversation. When the heroes admit they don't know the mission the Assistant sighs and elaborates.

Jubilee police recently raided a Dauphinian terrorist cell inside Jubilee territory and found clues that point to an "imminent" terrorist operation against Jubilee in

CONVENTION PLAY

If you want to fit this adventure into a two-hour time-slot format, to run at a convention for example, we suggest the following changes:

- In Scene 2, skip the Control Room encounter. Duhan is one of the terrorists trying to ambush the heroes in the passageways, and he spills the plan to attack the Governor's daughter right away. After winning this first combat, the heroes can go straight to their ship and blast off.
- In Scene 4, end the session in a cliff-hanger when the alien ship fires on the heroes, ignoring everything from the "Damage from the Attack" section on. Everything "goes dark" when the alien attack hits, and the players don't know whether they are dead or alive. We've discovered most players are pumped up with curiosity at this point.

the next few days. The exact nature of the operation could not be determined, but the clues seem to implicate small, out-of-the-way Gardner Station. Since Gardner Station is owned by a Dauphinian consortium the Jubileans can't enter it, and they are not in speaking terms with Dauphin's government.

To break the stalemate, a few days ago, Jubilee authorities contacted the heroes' superiors at the Circle. As agreed peacekeepers, the organization the heroes belong to has the authority and impartiality to enter Gardner Station and investigate. The heroes' orders are to enter Gardner Station, look for evidence or clues of Dauphinian terrorists or operations, and put a stop to whatever they find.

If the heroes want to know more about their ship, the *Voyager*, now is a good time to give them the description that appears in the ship's handout.

[Insert another Assistant's name] turns up on your lenses. "We're being hailed by Gardner Station. I'm opening audio-visual contact. You're OK with that, I assume?"

Assuming the heroes say yes, after a few seconds the face of a thin man with a white moustache appears, trembling with indignation. The heroes' lenses identify him as Chief Will Cameron, Station Administrator.

Cameron begins by nervously telling the heroes his station is a legal outfit with no terrorist affiliations whatsoever, and that he sees no need to let anyone in to investigate anything. After some back-and-forth with the heroes, he agrees to let them dock, and tells them he will send an escort to meet them at the station docking external rig.

APPROACHING THE STATION

Gardner Station is a 200-plus-inhabitant space hulk, an old-fashioned construction with barely any centrifugal gravity and sparse design, framed as a dark silhouette against the star of Gamma Leporis. The star itself looks huge at less than half the distance from the Earth to the Sun.

After the *Voyager* approaches and docks, the heroes are received by Technician Andrés Orlutti, a wide-chested young man with droopy eyes and a worried face. Orlutti politely escorts the heroes, floating in zero-G through the long docking external rig and into the station. The air smells stale and sweaty, something that happens on older stations that have not seen an atmosphere recycling unit refit in years.

If one of the heroes asks to search for Orlutti's profile in their ship's V-World databanks, his or her Assistant takes a few seconds to find the standard background for a career miner, eight years into the craft, with living parents in a small town in Dauphin. Nothing suspicious.

Orlutti leads the heroes into a conference room, where some refreshments are waiting. The room is designed for zero-G interaction. The furniture is fixed to the floor and all glasses and vases are magnetically attached to the table and closed to keep their contents from floating away. One wall is a "window" into space outside the station (actually a wall screen to avoid radiation and brightness risks).

Orlutti tells the heroes should wait for Administrator Cameron. If the heroes ask, Orlutti knows nothing about terrorists or politics, and is just a miner nervous about being assigned to escort Circle officers into the station.

After the heroes have had a chance to ask a few questions, read or paraphrase the following:

Suddenly the conference room door closes, leaving you and a surprised Orlutti trapped! Alarms blare all over the station, along with several strange sounds coming from far behind the door. [Insert another hero's Assistant's name here] casually says, "maybe spending so much time with you just hones these kinds of skills, but don't those sound like gunshots?"

Another sound, this time a low rumbling and shaking, moves the station. "Now, doesn't that sound like a spaceship leaving?," mumbles [another Assistant] drily.

SCENE 1: TRAPPED!

The heroes and their Assistants' connection to the station's V-World (and to their ship's database and communication equipment) has been severed, and the door does not respond to their commands. This includes even simple commands such as asking the door to show them what's going on behind (see an explanation of how doors work on page 76). However, a successful Hacking roll with a –2 penalty (either by a hero or an Assistant) allows the heroes to hack into the local V-World and override access to the network.

As soon as network access is obtained, one of the heroes' Assistants reports gunfire all over the station. Most of the miners are trapped in the various rooms of the station. There are a few groups, though, floating through the hallways, shooting at anyone who is not trapped. Also, an Assistant can confirm that a transport ship (not the *Voyager*) has indeed departed Gartner Station for an unknown destination.

Questioning Orlutti shows he is just as confused as the heroes about what is going on. He also thought the suspicions of terrorist activity on "his" station were ridiculous, but now he is not so sure.

If a hero wants to know which of the miners are shooting their way through the station, a successful Investigation roll allows him to see a list of their names using their ID tags (have an Assistant suggest this if no hero thinks of it). When Orlutti sees the names of the attackers he realizes they are all miners recruited in the last three months or less. They have all been recruited by the (also new) Station co-Administrator Harlan Duhan. Orlutti believes Chief Cameron knows nothing of this, as Gardner Station is his life, but maybe Duhan is behind all of this.

The door override has been centrally locked but can also be hacked to open. This requires a successful Hacking roll (–2) and takes about 5 minutes. The door is reinforced and cannot be blown away except with explosives.

SCENE 2: THE STATION

Once the heroes escape the conference room, Orlutti suggests going to the main control room. The docking clamps on the ships, including the *Voyager*, are controlled from there. Besides, that's the most likely place for both Chief Cameron and Harlan Duhan to be.

Since the station is in zero-G, explain to the heroes the rules for Microgravity and Zero-G (see page 126). Gardner Station has no Superconductive Magnetic Arrays.

AMBUSH

As soon as the heroes leave the conference room (marked with an "A") several terrorists approach from locations "B," ready to ambush the heroes. You should take advantage of the fact that the terrorists can be traced via the V-World connection to have an Assistant explain to the heroes the benefits of technology in *Seven Worlds*. The heroes should not be surprised by their enemies, and should in fact know their locations before they can see them (their enemies know this too).

This is a good opportunity to involve Assistants in combat (see page 132). Remember that the bad guys also have Assistants!

Besides the standard combat actions Assistants have available, the following special Assistant actions are also available in this battle:

- **Hatch Door:** These doors are at locations "C" on the map. By spending a Benny and making a successful Hacking roll with a +2 bonus the Assistant can close one hatch door, effectively dividing the environment and keeping some of the terrorists from closing in on the heroes. The door can be opened in the same way. Alternatively, the Assistant can "go on Hold" until an enemy crosses the threshold of the door. At that moment the Assistant makes a Hacking roll opposed by the enemy's Agility. If the Assistant wins, the door suddenly closes on the enemy's face, inflicting 2d6 damage and knocking the enemy 1d6" back (because of zero-G). If the floating enemy hits a wall on his way back, he receives 2d6 additional damage.

Any captured terrorists who are interrogated confess they are led by Harlan Duhan. Their mission has already begun (that's the reason the other ship has left). They do not have the details on the mission, though, only Duhan does. He is in the station's main control room.

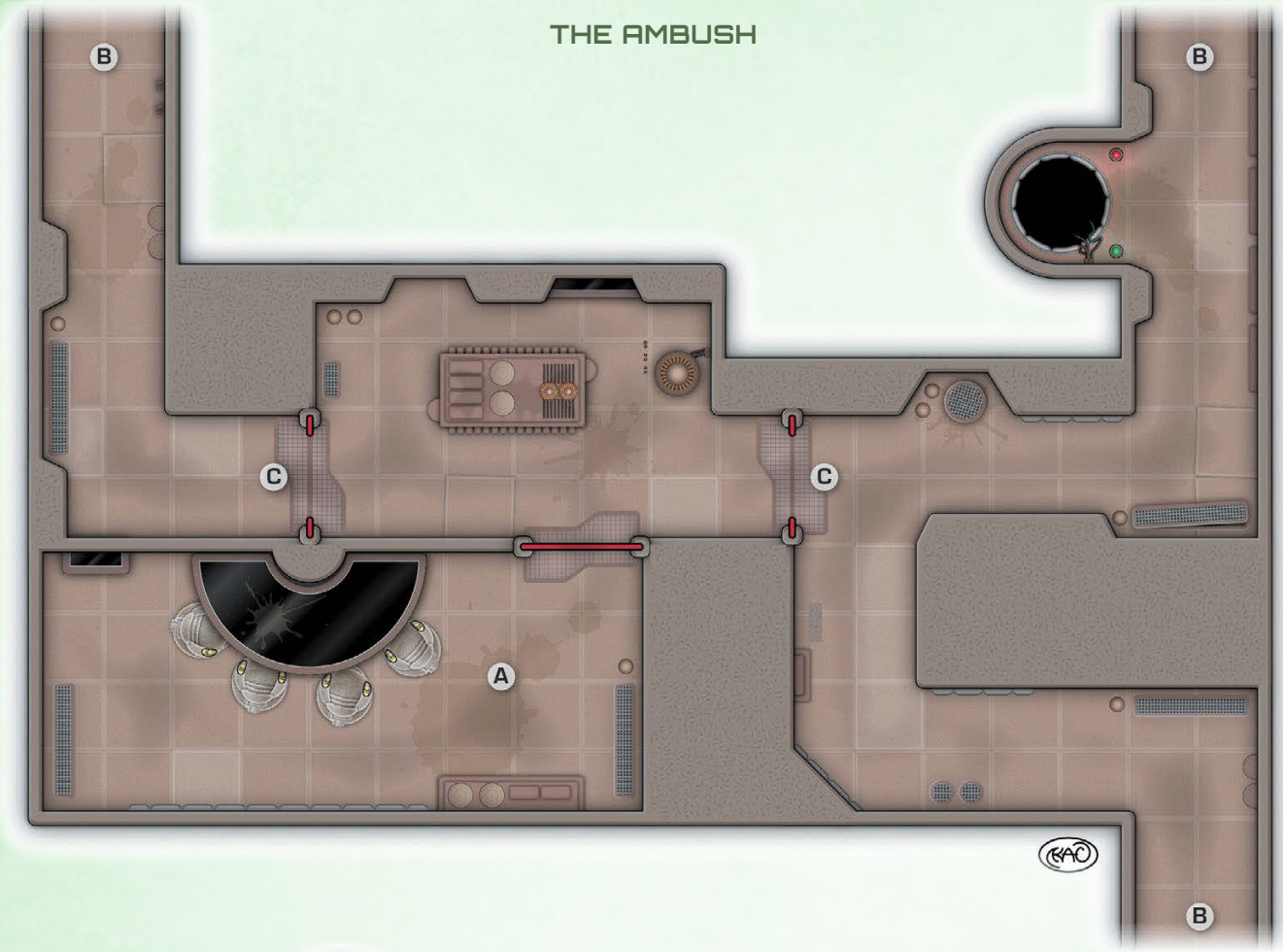
- **Terrorists (1 per hero plus 2, evenly distributed among each location "B"):** Use the stats for Typical Terrorist, Space (see page 181).
- **Technician Orlutti:** Use the stats for Civilian (See page 169).

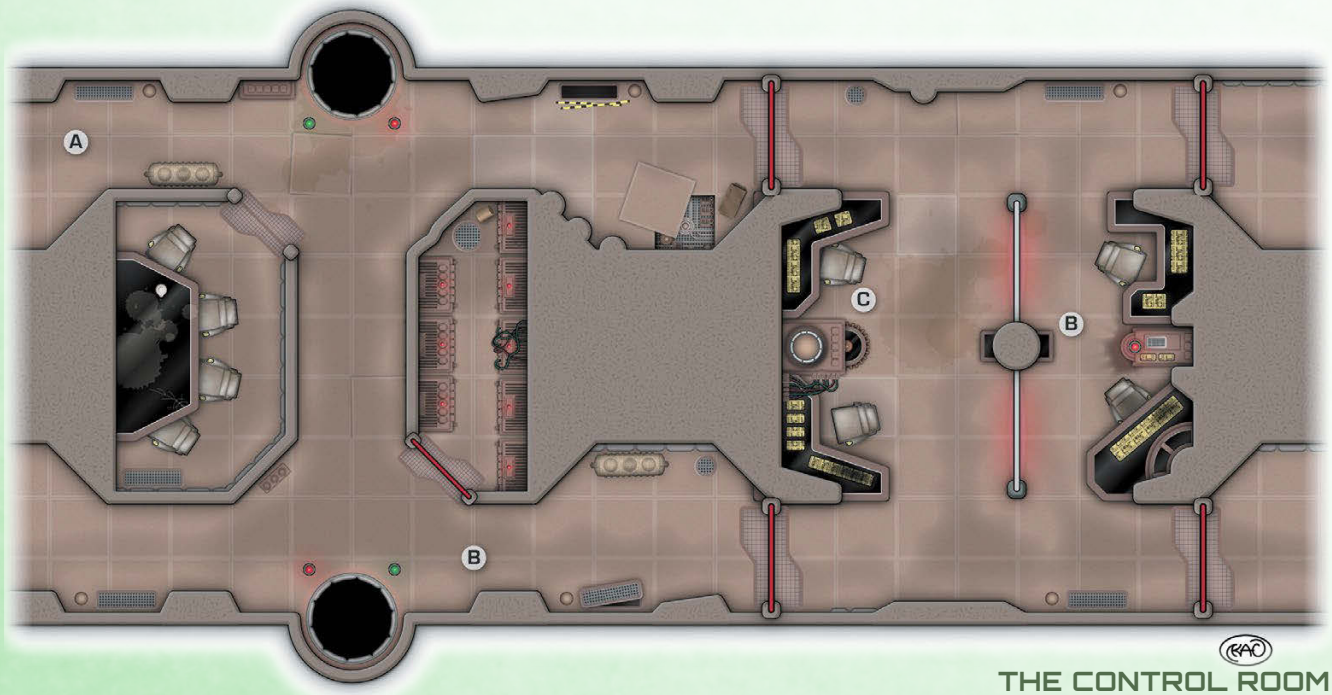
THE CONTROL ROOM

As the heroes float the hallways of Gartner Station they see dead bodies everywhere. With Technician Orlutti's guidance, the heroes finally reach the Station's Control Room.

The heroes approach the Control Room from location "A" in the map. The Control Room is also heavily guarded, and the terrorists, at locations "B", are fully prepared for the heroes.

THE AMBUSH





THE CONTROL ROOM

At this point the heroes enter the part of the station that is under centrifugal gravity, so anyone can walk normally.

Throughout the battle, Harlan Duhan (at location "C") maintains a gloating conversation directly with the heroes through the headphones connected to their lenses. This means they can hear him clearly even through the noises of the fight. This allows him to attempt Intimidation and Taunt attacks directly.

During combat have Duhan explain to the heroes that they are too late to stop the terrorists' plan: A passenger ship carrying the Governor of Jubilee's daughter should have just arrived at the jump point from Concordia. Any ship departing from Nouvelle Vie cannot reach it in time to intercept it, but Gartner Station is closer to the jump points than Nouvelle Vie. The terrorists have launched an intercepting ship that will reach the passenger ship and blow it up before it can be defended by Nouvelle Vie ships!

The following special activities are available to Assistants during the battle:

- **Hatch doors:** Located in front of the entrance to the Control Room. These behave just like the Hatch Door in the previous battle (see page 161), except they start closed.
- **Centrifugal Gravity Control:** By spending a Benny an Assistant may attempt to control the rotation of this part of the station. If the Assistant is successful at a Hacking roll, the rotation suddenly stops! Have everyone make an Agility roll with a –2 penalty (+1 bonus if the character was grabbing on to something; there are handles all along the walls of the hallways). Roll for each Extra separately. With a failure, the character goes flying 4" to the east. If the character hits a wall he receives 2d6 impact damage and is Shaken. If the character does not hit any walls, he falls Prone and is Shaken. The environment is in Zero-G from them on (use the Zero-G rules). An Assistant may spend a Benny to turn the Gravity Control back on. In this case use the same rules as above but consider the characters fly towards the west.

After the battle, the heroes find the body of Chief Cameron inside the Control Room, shot by Duhan while resisting the takeover. It should not take long for the heroes to confirm what Duhan told them: They are the closest vessel that can intercept the terrorist ship before it attacks the passenger ship that carries Governor Therriault's daughter. From the Control Room the heroes (or their Assistants) can easily remove the docking clamps for the *Voyager*. They can then float back through the station to take off in pursuit of the terrorist ship.

- **Terrorists (1 per hero on each location "B"):** Use the stats for Typical Terrorist, Space (see page 181).
- **Harlan Duhan, Terrorist Leader (1, at location "C"):** Use the stats for Veteran Terrorist, Space (see page 181).

SCENE 3: THE CHASE

The heroes can send a warning message to local Circle HQ in Nouvelle Vie, if they want to. Remind them that the message takes about eight minutes to round trip, and that the heroes are still the only ones with a chance to intercept the terrorist ship before it attacks the passenger ship.

Once the heroes are on their way an Assistant tells them that the threatened passenger ship appears to have detected the terrorist ship hurtling towards them. Seeing the route to Nouvelle Vie blocked and with no chance of outside help, the captain of the passenger ship has changed course to fly towards the jump to AP Columbrae, a "dead end" uninhabited star system. Not even this evasion route will be enough to avoid the terrorists, but it can buy some time. Show the players the handout diagram of the situation.

Allow the heroes time to hash a few options and then read or paraphrase the following:

Several hours later you are within laser range of the enemy ship. Both of you are just light-seconds away from the jump point to AP Columbrae, a dead-end star system relatively close to Gamma Leporis. The passenger ship is several light-seconds away from you, giving you a chance to stop your enemy before it's too late.

Of course, you're still tens of thousands of miles away, so you can't see the enemy at all. And your ship does not have windows, anyway; all your views come from the electronic sensors mounted outside the ship. Nevertheless, even at this distance a laser beam can fry the entire ship.

If this is the player's first space battle read or paraphrase the following text to explain to them how space combat works in *Seven Worlds*. If your players are already familiar with the setting either skip this section or have an Assistant explain it to them.

You activate the Voyager's Coulborne Shield in battle configuration and a large dark sphere of energy surrounds the ship. Dozens of small robotic devices start running around the external

surface of the ship, repositioning themselves. They are the ship's engines, thrusters, weapons and defenses, ready to move to the appropriate position during battle.

All of you "fly" along the ship's passageways, eager to get to your posts and prepare for battle. Some of you will take care of piloting the ship; others will handle weapons and defenses; yet others will manage the all-important Coulborne Shield and the ship's heat levels, probably the most critical job of all. Every action you take, every attack you sustain, every weapon you fire, all generate heat; as more heat accumulates inside the Coulborne Shield than can be radiated into space, systems begin failing until a crew faces the ultimate choice: Turn everything off and basically surrender; or stop wondering how melting feels. Space combat is ultimately a contest of endurance, not of power.

Most of you are strapped-in to your consoles, accessing all controls and information for your post through the VR interfaces in your lenses, and having your Assistants ready to support you (in both a virtual and very real sense) in your activities.

SPACE BATTLE

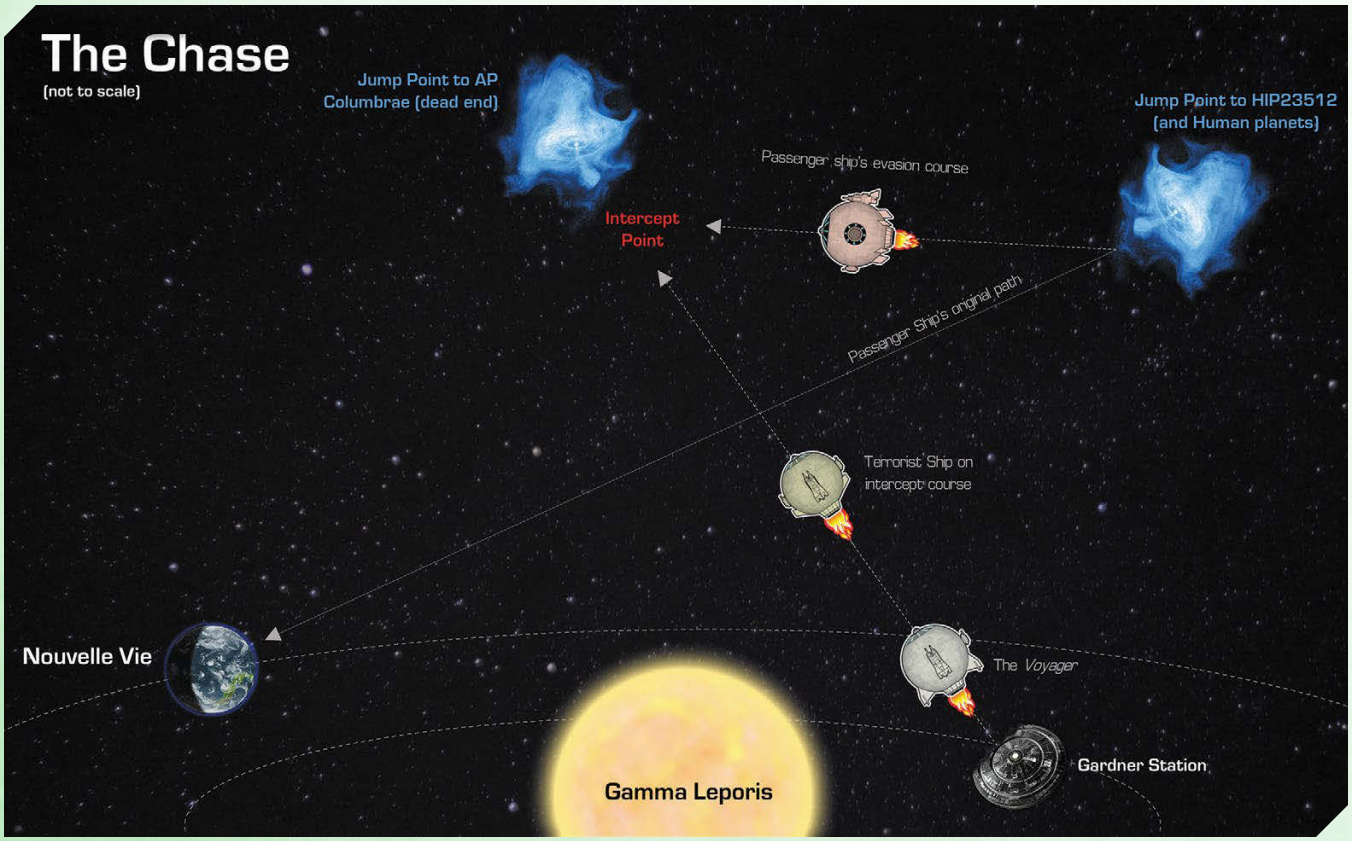
This first space battle is a simple one that the heroes should easily win. Take advantage of this to teach the players the particulars of space combat in *Seven Worlds*, particularly the heat rules.

Set up ten range counters as per the Chase rules. The terrorist ship begins in the first position, pointing away from the *Voyager*, while the heroes' ship chases seven SUs behind, pointing towards its enemy.

The enemy ship's strategy is to attack the *Voyager* with its lasers while attempting the Push manoeuvre to increase movement. As long as the enemy ship believes it has a chance of escaping the heroes and continuing on to its target, it will not turn around. When the situation becomes such that the enemy ship feels it has no alternative but to destroy the heroes' ship, it will turn around and fight until either disabled or overheated. Only then will it surrender.

Keeping the heroes' Assistants involved helps set the mood of the combat. Remember Assistants are a great way to give the heroes basic information or remark on the nature of the combat, and are a constant presence on the ship. Also, make sure the descriptions take advantage of the details of how ships and weapons work.

Ideally, the enemy ship should be stopped but not destroyed. When the battle ends go to the next section.



- **Dauphinian Terrorist Ship:** Use the stats for Merchant Ship (see page 184).

SCENE 4: A SURPRISE VISIT

Once the heroes successfully stop or disable the enemy ship, an Assistant tells them the passenger ship carrying Governor Therriault's daughter is changing course towards Nouvelle Vie. After a minute or so the heroes receive a transmission from the passenger ship with the captain's thanks for their help. Several escorts from Nouvelle Vie have been dispatched to protect the passenger ship, and will rendezvous with it in a few hours.

Have an Assistant comment that of course this will generate yet another diplomatic incident between Jubilee and Dauphin. If the heroes ask, the Assistant explains that Jubilee will accuse Dauphin's government of being behind the attack, while Dauphin will claim it is the work of terrorist elements not affiliated with the government. The politicians and Circle leaders will have their work cut out for them.

A STRANGE ARRIVAL

Both the heroes' and the enemy ship have been drifting steadily closer to the AP Columbrae "dead-end" jump point. Suddenly, as the heroes approach the enemy ship to check for survivors (or just when they're ready to leave), a red alert glow covers their VR view of the ship's dashboard, and an Assistant tells them that something has just jumped from the AP Columbrae star system.

If the heroes ask, their Assistants confusingly reply that nothing's supposed to be at the other side of the deserted jump point. After a few seconds, the Assistant stammers that it doesn't know what the arriving ship is, and requests permission to project a visual on the heroes' lenses.

Assuming the heroes approve, read or paraphrase the following:

What you're looking at looks like a huge, three-dimensional star-shaped object built out of some kind of black diffuse matter, with many slightly sparkling dots. It is definitely emitting energy and heat, but the info overlays on your VR screen show they are both very low, definitely much lower than what a ship of that size should emit.

This thing is definitely artificial, but you've never seen anything like this. It does not look human at all.

The thing begins to move, just slightly at first.

If the pregenerated character Maricelle is a hero in this campaign (see page 100), tell the player controlling her that she has seen this ship before, the day her family's mining ship was attacked.

Allow the heroes a turn or two to talk about what they want to do. Then read them the following:

Suddenly your dashboard goes crazy, as the info overlays fill up with numbers showing a huge spike of energy! You barely have time to register what you've seen before everything goes nuts and explodes in front of you. "We're under att..." you hear an Assistant urgently scream, but you never get to hear the end of the sentence. The last thing you remember is the image of the floating menacing black asterisk floating in space, and then, everything goes dark...

DAMAGE FROM THE ATTACK

The attack automatically hits. Roll 4d8+6 damage against the heroes' ship. After applying the damage add the appropriate number of heat points to the Heat Pool, and then have the Engineer (when he or she regains consciousness) make a Heat roll with the appropriate modifiers. Note that the heroes' ship most likely still has damage and accumulated Heat Fatigue that has not been eliminated yet. The damage could be significant, but you should avoid destroying the heroes' ship at all costs. For the purpose of this attack, treat the mysterious ship as having the Gunner Edge (see page 109), and modify any critical hits so that they give as much repair work to the heroes as possible without actually destroying the ship.

When the heroes' recover their wits (and get their systems back) read them the following:

As your systems come back online, you look at the readings on your screen. Whatever it was, it's gone now, having jumped back from where it came from. You're lucky to have survived that hit, whatever it was. Luckier than the terrorist ship, the burning-red debris of which you can see and detect outside. Now you know, for sure, there are no survivors.

What in the name of the Circle was that?!

If the heroes jump to the AP Columbrae point and follow the strange ship (after repairing their ship, of course) they find no ship and no energy reading to locate it. This is particularly strange since unless many days have passed, the ship's energy emissions should still be visible (see the sidebar on Stealth on page 95). The only likely explanation is that the strange ship has jumped again, but there are no known jump

points in the AP Columbrae system other than the jump point to HIP 33499, and that jump point is several days away. So where did it go?

Approximately half an hour after this strange event, the heroes receive a transmission from Circle Headquarters in Clarke Station. Delta Officer Saucedo orders them to head back to HQ as fast as possible for a debriefing. Round-trip voice communications between the AP Columbrae jump point and Clarke Station take around eight light-minutes; consider that when role-playing the communication.

EPILOGUE

Ultimately, the heroes have to go back to Clarke Station in the orbit of Nouvelle Vie to report to their local superior, Delta Officer Bryce Saucedo. You can find a description of Delta Office Saucedo (see below) in case you want to share it with the players (remember the public parts of her bio are available in V-World for any hero's Assistant to retrieve and share). She's currently in one of her frequent angry moods.

"Alright, what did you do?," Delta Office Saucedo asks, standing away from her desk with complete ease, showing how accustomed she is to the fake gravity created by Clarke Station's centrifugal movement. The thick screen behind her simulates a window, with a beautiful view of blue, water-covered Nouvelle Vie far below. "Congratulations on your mission, you uncovered the terrorists, saved the Governor's daughter, blah blah blah. Good, pat yourselves in the back. Now on to the important stuff. Our sensors captured everything, but I don't know what they've captured. So please explain what you saw."

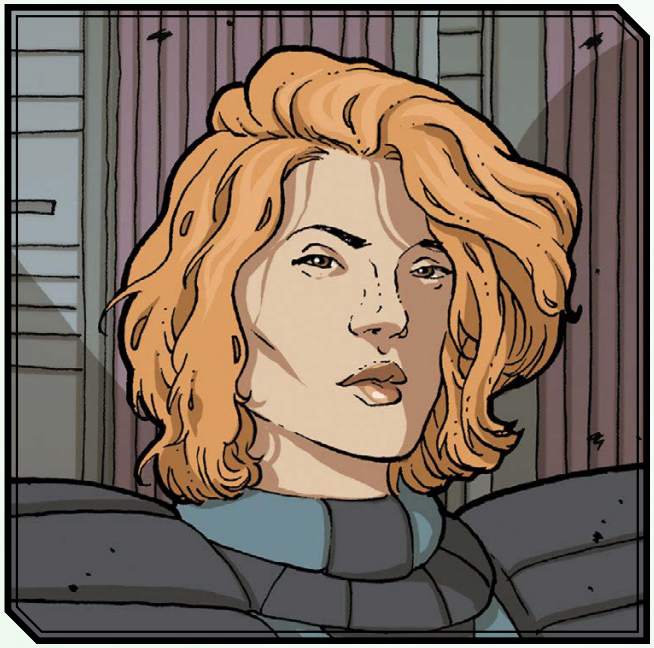
Allow the heroes time to explain in their own words exactly what they saw and did. Delta Officer Saucedo impatiently asks questions to move the story along. When the heroes are finished, read or paraphrase the following:

"Now I'll have to explain to the Dauphinians that no, we're not testing a new secret weapon against space property of Dauphinian companies, even if said property was piloted by terrorists at the time. Then I'll have to tell them that no, we are not allied with the Jubileans against them. I know how this will go. Fortunately, the entire planet saw the energy spikes, and they know what you saw was unique. This is not the first time such a weird thing has been seen in the last few years, you know. People say there's more aliens out there, nasty aliens this time, not N'ahili wussies. Others say it's our secret weapons division. Oh well."

"Anyway, your ship is being repaired. As soon as it's ready, I want you to go to Circle HQ in Concordia and report this to the boss. I'm sure Epsilon Leader Antoine will enjoy your story, and I want you lot out of here before some Dauphinian nutcase tries to take revenge on you. Lucky you, you'll get to see the Centenary Celebration. I've heard the Concordians are sparing no expense."

"Now get out. I've got to tell the EarthGov Ambassador to get off her butt and do her work." With that, you're dismissed.

This might be a good moment to explain who the N'ahili are, if the players ask.



Delta Officer Bryce Saucedo

✹ DELTA OFFICER BRYCE SAUCEDO

Delta Officer Bryce Saucedo's sour, pessimistic demeanour masks an intelligent and capable Circle bureaucrat. Although she wishes she were not in charge of keeping the peace in Nouvelle Vie, she is a professional who works hard to make her assigned mission a success. That is probably why Epsilon Leader Antoine picked her over other, more willing candidates for the position.

Delta Office Saucedo's previous posting was at the Circle offices in Zarmina ("Gee"), where she spent many years. Although she is extremely closed on her

private life, it is an open secret that in Armstrong she met someone who could have been her lifelong partner, but she was taken away from her by a strange disease. Easing her pain was also one of the reasons why Antoine decided to transfer her to Nouvelle Vie.

Attributes: Agility d8, Smarts d8, Spirit d6, Strength d6, Vigor d6

Skills: Fighting d6, Intimidation d8, Notice d6, Persuasion d6, Shooting d6, Taunt d8, Throwing d6

Cha: +0; **Pace:** 6; **Parry:** 6; **Toughness:** 7 (2); **Mental Toughness:** 5

Hindrances: Loyal, Habit (drinks)

Edges: Combat Reflexes, Command, Strong Willed, Diplomat.

Gear: Assistant, Autopistol (Range 12/24/48, Damage 2d6, AP 1, Semi-Auto, 20 bullets), Light Vest (+2).

Notes: Home World Bay Jing (gets the Strong Willed edge for free).

Assistant Name and Gender: Assistant Program 5, "Sudoku", a lithe and athletic ninja type, completely covered in black. Sudoku speaks in Japanese only, which Saucedo understands. Sudoku is therefore useless in interacting or persuading most humans other than Saucedo herself.

Assistant Skills: Hacking d6 (with a Wild die), Investigation d6.

AFTER THE MEETING

The heroes are now free to either begin the nine-week trip to Concordia or start exploring on their own. What happens when the heroes arrive at Concordia is detailed in *Rumors of War*, the first module in the *Seven Worlds* campaign, available separately.

In the meantime there are many things to do and places to explore! Clarke Station and Nouvelle Vie are full of intrigue and conspiracy, as their unending conflict bubbles. And nearby locations such as Mussala Station and Bay Jing itself are full of other possibilities for excitement and adventure.

If any heroes have a background connection to someone in Nouvelle Vie (for instance, if one of the heroes is playing Maricelle), we suggest a short remote conversation with the NPCs before they leave. Having an emotional connection to someone in Nouvelle Vie will help during later stages of the campaign.

Finally, when the heroes begin their trip to Concordia, we suggest you run an Interlude as explained in the *Savage Worlds* rules. Having an Interlude at the start of the campaign will give you more background and details on each character's past, and thus provide valuable information to make the campaign more poignant and interesting to each player as future events unfold.

Above all, have fun exploring the *Seven Worlds*!

bestiary

This is a list of the main creatures found in *Seven Worlds*, both in the real world and in V-World. There are many other transplanted Earth species in worlds with similar atmospheres, such as Concordia and Bay Jing. Planets with more difficult environments, such as Zarmina or Logan's End, will have significantly less Earth animals.

ALLIES AND ADVERSARIES

ARCTIC WOLF

Arctic Wolves are large and dangerous. They are found roaming in packs of between five and twenty wolves.

Found on: Earth.

Attributes: Agility d8, Smarts d4 (A), Spirit d6, Strength d8, Vigor d8
Skills: Fighting d8, Intimidation d8, Notice d6
Pace: 10; **Parry:** 6; **Toughness:** 6
Special Abilities:
- **Bite:** Str+d6.
- **Go for the Throat:** Wolves instinctively go for an opponent's soft spots. With a raise on its attack roll, it hits the target's most weakly armored location.
- **Fleet-Footed:** Arctic wolves roll d10s instead of d6s when running.

AFRICAN WILD DOG

African Wild Dogs are smaller than their forest counterparts, about the size of a dog. In large packs, however these wolves can be extremely dangerous.

Found on: Earth

Attributes: Agility d8, Smarts d6 (A), Spirit d6, Strength d6, Vigor d6
Skills: Fighting d6, Notice d10
Pace: 8; **Parry:** 5; **Toughness:** 4
Special Abilities:
- **Bite:** Str+d4.
- **Fleet-Footed:** Roll a d10 when running instead of a d6 when running.
- **Go for the Throat:** Dogs instinctively go for an opponent's soft spots. With a raise on its attack roll, it hits the target's most weakly armored location.
- **Size –1:** Dogs are relatively small.

BANDITS

Bandits are thieves and criminals, roaming the countryside to raid towns or travelers.

Found in: V-World

BANDIT
Attributes: Agility d6, Smarts d6, Spirit d6, Strength d6, Vigor d6
Skills: Climbing d6, Fighting d6, Notice d6, Shooting d6, Stealth d6, Throwing d6
Cha: –2; **Pace:** 6; **Parry:** 5; **Toughness:** 6 (1)
Hindrances: Greedy, Mean
Edges: —
Gear: Leather armor (+1), short sword (Str+d6), bow (Range 12/24/48, Damage 2d6).

BANDIT CHIEF
Attributes: Agility d8, Smarts d6, Spirit d8, Strength d8, Vigor d8
Skills: Climbing d6, Fighting d10, Intimidation d8, Notice d6, Riding d8, Shooting d10, Stealth d8, Throwing d8
Cha: –2; **Pace:** 6; **Parry:** 8; **Toughness:** 8 (2)
Hindrances: Greedy, Mean
Edges: Block, Combat Reflexes, Command
Gear: Chain mail (+2), short sword (Str+d6), bow (Range 12/24/48, Damage 2d6).

BLACK BLOB

Black Blobs are amoeba-like creatures with an extremely acidic liquid secretion. Usually living hidden in caves, they attempt to surprise explorers by falling on them from the ceiling and trying to envelope them.

Found in: V-World

Attributes: Agility d6, Smarts d4 (A), Spirit d4, Strength d8, Vigor d8
Skills: Fighting d6
Pace: 2; **Parry:** 5; **Toughness:** 6
Special Abilities:
- **Acid:** Roll a d6 every time a weapon is used to strike a black blob. On a 6, the weapon is dissolved by the acidic secretions.
- **Camouflage:** When lying still, black blobs gain +4 to Stealth rolls.

- **Envelop:** If a black blob succeeds in a Fighting roll it has enveloped part of its target. Each round the victim remains enveloped, he or she suffers 2d6 damage. All equipment permanently loses 1 point of Toughness (Protection for armor) per round until it reaches zero, at which point it is destroyed. Trying to escape from this grapple requires a Strength roll at –6. A black blob may only envelop one foe at a time, regardless of its size.
- **Pseudopod:** A black blob can extend a single pseudopod out to 1". Damage 2d6.

BLACK LIZARD

Native to the swamps of Logan's End, and named after its resemblance to an Earth crocodile, Black Lizards are aquatic creatures with legs, flippers and a long tail. Their snout has several layers of teeth, all curving towards each other to maim enemies in a single bite. Black Lizards live in swamps close to the surface, and change location with the huge tides that periodically affect Logan's End.

Found on: Logan's End

Attributes: Agility d10, Smarts d6 (A), Spirit d8, Strength d12, Vigor d10
Skills: Fighting d8, Notice d6, Stealth d8, Swimming d12
Pace: 4; **Parry:** 6; **Toughness:** 11 (1)
Special Abilities:
- **Aquatic:** Pace 12.
- **Armor +1:** Thick hide.
- **Bite:** Str+d6
- **High-G Creature:** +1 to Toughness because of stocky build.
- **Large:** attackers are +2 to attack rolls because of the beast's size.
- **Shake:** If a Black Lizard scores a raise on its attack it has secured a strong grip. On subsequent rounds it proceeds to shake its head violently, allowing its teeth to saw through its prey. This causes 3d6 damage and no attack roll is required. Escaping requires an opposed Strength roll.
- **Size +2:** Black Lizards measure 14'

BODYMOUTH

These terrifying creatures, native to the jungles of Logan's End, have four stocky legs and a tail. Their maw, filled with rows of razor-sharp teeth, protrudes from a "neck" in the center of its torso. Next to this neck extend four small clawed arms. Bodymouths begin their attack by stabbing their victims with the clawed arms and then biting.

Found on: Logan's End

Attributes: Agility d6, Smarts d6 (A), Spirit d10, Strength d12+2, Vigor d10
Skills: Fighting d8, Intimidation d10, Notice d6, Stealth d4
Pace: 8; **Parry:** 6; **Toughness:** 11 (2)
Special Abilities:
- **Armor +2:** Thick, leathery hide.
- **Bite:** Str+d8.
- **Claws:** Str+d6. Although the bodymouth attacks with all four of its claws, it makes a single attack roll with a +3 gang-up bonus.
- **Size +2:** Bodymouths stand over 6' tall.
- **Stab and Grab:** A bodymouth scoring a raise with its claw attack has impaled its foe. The beast may then attack with its bite, gaining +2 to attack.

CENTIPEDE

These huge monsters are about eight meters long and live underground, waiting for their prey. They are extremely hard to damage, and their mandibles can penetrate most types of armor.

Found in: V-World

Attributes: Agility d6, Smarts d4 (A), Spirit d6, Strength d10, Vigor d8
Skills: Fighting d6, Notice d6, Stealth d6
Pace: 6; **Parry:** 5; **Toughness:** 13 (3)
Special Abilities:
- **Armor +3:** Thick chitinous armor.
- **Bite:** Str+d8, AP 4.
- **Large:** Attackers add +2 when attacking a giant centipede due to their size.
- **Poison:** Victims must make a Vigor roll at –2 or suffer an automatic wound.
- **Size +4:** Giant centipedes grow up to 24' long.

CIVILIAN

Most civilians in the 23rd Century live normal lives, focusing on their trade or skills.

Found in: Everywhere

Attributes: Agility d6, Smarts d6, Spirit d6, Strength d6, Vigor d6
Skills: Piloting d6, Knowledge (One specific trade) d6, Notice d6, Shooting d4, various other skills
Cha: +0; **Pace:** 6; **Parry:** 2; **Toughness:** 5; **Mental Toughness:** 5
Hindrances: Varies

Edges: Varies
Gear: Assistant (skills and personality vary), tools of the trade.

CROCODILE

The typical swamp-dwelling reptile from Earth.

Found on: Earth

Attributes: Agility d4, Smarts d4 (A), Spirit d6, Strength d10, Vigor d10
Skills: Fighting d8, Notice d6, Swimming d8
Pace: 3; **Parry:** 6; **Toughness:** 9 (2)
Special Abilities:
- **Armor +2:** Thick skin.
- **Aquatic:** Pace 5.
- **Bite:** Str+d6.
- **Rollover:** Crocodiles can grasp their prey in their vice-like jaws and roll over and over with their flailing victims in their mouth. If a crocodile hits with a raise, it causes an extra 2d4 rollover damage to its prey in addition to its regular Strength damage.

DARK TERROR

Security Managers in protected sections of V-World have long ago learned that the trick to beating intruders who infiltrate their domains is not only to have their guards be stronger, but also more terrifying. More than once intruders have been captured because they froze in terror at the sight of the changed body of a security guard.

At their worst, dark terrors look like a large, powerful, muscled humanoid with a strong carapace that acts as armor. Their legs and arms extend into black mucus-covered slime tentacles that give them reach and stick to their enemies, thus making it more difficult to escape.

Security Guards are trained in handling their new, powerful body, and in using it to achieve maximum effect on their enemy.

Found in: V-World

Attributes: Agility d10, Smarts d8, Spirit d10, Strength d12, Vigor d10
Skills: Fighting d10, Intimidation d10, Notice d8, Shooting d10.
Pace: 8; **Parry:** 7; **Toughness:** 13 (4)

Special Abilities:
- **Carapace +4:** Dark Terrors are covered with a strong skin.
- **Combat Reflexes:** +2 to recover from Shaken.
- **Fear (–2):** On seeing a Dark Terror for the first time, characters must make a Fear check at –2.
- **Powers:** Dark Terrors have 20 Power Points, and know the following powers: *blast*, *entangle*, *slow*.
- **Size +2:** Dark Terrors are usually the size of a bear.
- **Spores:** Dark Terrors can shoot a small, high-speed spore from the tip of their fingered tentacles. This is handled with a Shooting roll with range 4/8/16. With a success the spore explodes into an acid bomb, dealing 2d6 damage.
- **Tentacles:** Str+d6, Reach 4. The Dark Terror suffers no multi-action or off-hand penalty, and each tentacle may take independent actions.



DART PLANT

Native to the jungles of Logan's End, Dart Plants wait until they are touched. When a creature touches it, even if brushing it, the Dart Plant launches many poisonous needles at the victim, usually killing it. The animal predators that feed on the dead flesh leave droppings and other remains that feed the Dart Plant itself.

Found on: Logan's End

Attributes: Agility d4, Smarts d4 (A), Spirit d6, Strength d6, Vigor d8
Skills: None
Pace: 0; **Parry:** 2; **Toughness:** 9 (2)
- **Armor +2:** Dart Plants are protected by thick skin.
- **Plant:** Called shots do no extra damage. Bullets, arrows, and other piercing weapons inflict half damage. Not subject to Tests of Will.
- **Poison (–1):** Anyone Shaken or wounded by the needles must make a Vigor roll or die in 2d6 rounds.
- **Size +1:** Dart Plants are taller than an average human.
- **Thorns:** A Dart Plant can fire a volley of thorns each round. Center the Large Burst Template on the dart plant. All within the template are hit and suffer 1d6 damage.

DEATHFLY

Native to the jungles of Logan's End, deathflies are dangerous insects. Moving only in swarms, their bite also secretes a special kind of poison that makes it hard for wounds to heal.

Found on: Logan's End

Attributes: Agility d6, Smarts d6 (A), Spirit d6, Strength d8, Vigor d6
Skills: Fighting d8
Pace: 8; **Parry:** 8; **Toughness:** 5
Special Abilities:
- **Poison:** Deathflies inject a compound into wounds to keep them bleeding. All Healing rolls (including natural healing) suffer a –2 penalty.
- **Bite:** Swarms inflict hundreds of tiny bites every round to their victims, hitting automatically and causing 2d4 damage to everyone in a Large Burst Template (victims in completely sealed suits are immune).
- **Swarm:** Parry +2; Because the swarm is composed of hundreds of creatures, cutting and piercing weapons do no real damage. Area-effect weapons work normally, and a character can stomp to inflict his damage in Strength each round.

DIRE WOLF

Dire wolves are larger than common wolves. They are used by orcs as pets and mounts.

Found in: V-World

Attributes: Agility d8, Smarts d4 (A), Spirit d6, Strength d8, Vigor d8
Skills: Fighting d8, Intimidation d8, Notice d6
Pace: 10; **Parry:** 6; **Toughness:** 6
Special Abilities:
- **Bite:** Str+d6
- **Go for the Throat:** Wolves instinctively go for an opponent's soft spots. With a raise on its attack roll, it hits the target's most weakly-armored location.
- **Fleet-Footed:** Dire wolves roll d10s instead of d6s when running.

DOG

In the 23rd century, dogs and cats are still beloved pets. Genetic modification has made them more resistant to the rigors of space and other planets, but they are basically the same as always.

Found in: Everywhere

Attributes: Agility d8, Smarts d6 (A), Spirit d6, Strength d6, Vigor d6
Skills: Fighting d4, Notice d8
Pace: 8; **Parry:** 4; **Toughness:** 4;
Hindrances: —
Edges: —
Special Abilities:
- **Bite:** Str+d4
- **Fleet-Footed:** Dogs roll a d10 when running instead of a d6.
- **Go for the Throat:** Dogs instinctively go for an opponent's soft spots. With a raise on its attack roll, it hits the target's most weakly-armored location.
- **Size –1:** Dogs are relatively small.

DRAGON, BLACK

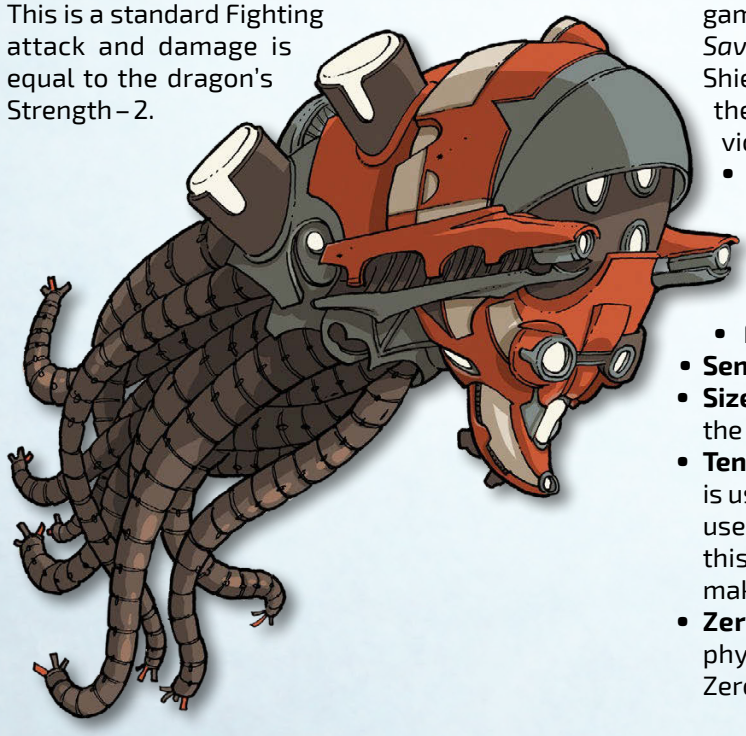
Black Dragons inhabit dank swamps and marshes, and breathe noxious acid clouds.

Found in: V-World

Attributes: Agility d8, Smarts d8, Spirit d10, Strength d12+9, Vigor d10
Skills: Fighting d10, Intimidation d12, Notice d12

Pace: 8; **Parry:** 7; **Toughness:** 19 (4)
Special Abilities:

- **Acidic Breath:** Black Dragons breathe acid using the Cone Template. Every target within this cone may make an Agility roll at –2 to avoid the attack. Those who fail suffer 2d8 damage. Additionally, the gas from the acid cloud inflicts a further 2d6 damage the round after it was breathed, then it neutralizes. A dragon may not attack with its claws or bite in the round it breathes acid.
- **Armor +4:** Scaly hide.
- **Claws/Bite:** Str+d8.
- **Fear (–2):** Anyone who sees a mighty dragon must make a Fear check at –2.
- **Flight:** Dragons have a Flying Pace of 24", with an Acceleration of 6".
- **Hardy:** Dragons do not suffer a wound from being Shaken twice.
- **Huge:** Attackers add +4 to their Fighting or Shooting rolls when attacking a dragon due to its massive size.
- **Improved Frenzy:** If a dragon does not use its Acidic Breath Ability, it may make two Fighting attacks with no penalty.
- **Level Headed:** Dragons act on the best of two cards.
- **Size +8:** Dragons are massive creatures. This version is over 40' long from nose to tail, and weighs well over 30,000 pounds.
- **Tail Lash:** The dragon can sweep all opponents in its rear facing in a 3" long by 6" wide area. This is a standard Fighting attack and damage is equal to the dragon's Strength – 2.



DRONE, GUARD

Found in: High-security military installations

Although combat robots are not common in the *Seven Worlds*, guard drones might be an exception. These two-foot-long squid-like contraptions have the ability fly and hover, as well as to quickly move and swerve when attacked.

Drones are usually programmed in advance to detect and identify who their "allies" are, thus reducing the chance of the robot attacking an ally by mistake. The drone assumes everyone else is an enemy and should be shot. This means drones can be dangerous in situations where it is not easy to see who is an enemy and who isn't, or where the tactics involved are more complicated than a simple "kill the enemy."

Attributes: Agility d8, Smarts d4 (A), Spirit d6, Strength d6, Vigor d8
Skills: Notice d8, Shooting d8, Stealth d6
Pace: 0; **Parry:** 2; **Toughness:** 7 (2)
Special Abilities:

- **Armor +2:** Extra-strong plating.
- **Accelerator Rifle:** Range 15/30/60, Damage 2d8 AP 2, ROF 1, 48 shots. Does not incur any zero-G penalties if the attack die comes up a 1 or a 2.
- **Charge:** If it ever runs out of ammo, a guard drone is programmed to attack the enemy with its body, even if that means killing itself in the process. In game terms this works like the Push manoeuvre in *Savage Worlds*, with the drone always choosing the Shield Bash option. The damage inflicted is equal to the drone's Strength+d8, and applies both to the victim and to the drone itself.
- **Construct:** +2 to recover from being Shaken; Immune to poison, disease, and suffocation; No additional damage from Called Shots; Piercing weapons cause half damage.
- **Fearless:** Immune to Fear and Intimidation.
- **Flight:** Pace 10"; Climb 3.
- **Sensors:** +2 to Notice.
- **Size –1:** About the size of a basketball, not counting the tentacle tail.
- **Tentacles:** Str+d6. Although the drone's tentacle tail is used mostly to move through the air, it can also be used in melee attacks. If the drone does not move in this round, it may attack with several tentacles by making a single attack roll with a +3 gang-up bonus.
- **Zero-G Ready:** No penalties for movement or physical trait rolls in Zero-G (like the Advanced Zero-G Training Edge).

EXPLORER

Explorers visit uninhabited star systems to acquire scientific knowledge, do research, map other systems, and search for valuable materials. They need a mix of scientific and survival skills.

Found in: Everywhere

Attributes: Agility d6, Smarts d8, Spirit d8, Strength d6, Vigor d8
Skills: Fighting d4, Knowledge (Science) d8, Knowledge (Ship Ops) d6, Notice d6, Persuasion d6, Piloting d6, Repair d6, Shooting d6, Survival d8
Cha: +0; **Pace:** 6; **Parry:** 4; **Toughness:** 7 (1); **Mental Toughness:** 6
Hindrances: Curious
Edges: Woodsman
Gear: Vacc Suit (+1), Combat Knife (Str+d4), Assistant with at least d6, Knowledge (Science) skill.

FLESHWORM

Fleshworms are tiny creatures that move in swarms through the jungles of Logan's End. When they attack a victim they attempt to burrow through their skin and feed from the inside.

Found on: Logan's End

Attributes: Agility d8, Smarts d4 (A), Spirit d6, Strength d6, Vigor d6
Skills: Fighting d4, Notice d8
Pace: 4; **Parry:** 6; **Toughness:** 5
Special Abilities:

- **Bite:** Swarms inflict hundreds of tiny bites every round to their victims, hitting automatically and causing 2d4 damage to everyone in the template (victims in completely sealed suits are immune).
- **Feeding:** A swarm scoring a raise on a Fighting roll means that several dozen of the creatures have burrowed beneath the victim's skin. Fortunately human flesh is not adequately digested by these worms, so damage is reduced. Victims suffer an automatic wound every three days. Removing the worms requires complex surgery, usually involving a Healing Pod.
- **Swarm:** Medium Burst Template; Parry +2; Because the swarm is composed of hundreds of creatures, cutting and piercing weapons do no real damage. Area-effect weapons work normally, and a character can stomp to inflict his damage in Strength each round.



GLIDER

Native to the jungles of Logan's End, a Glider is a local arachnid about 6" across, with a set of large bat-like wings extending from their back. Taking advantage of the fact that due to the high gravity many life-forms don't fly, gliders patiently wait on trees and glide down, landing on their prey's back.

Found on: Logan's End

Attributes: Agility d10, Smarts d6 (A), Spirit d8, Strength d6, Vigor d6
Skills: Fighting d6, Notice d8, Stealth d10
Pace: 4; **Parry:** 5; **Toughness:** 3
Special Abilities:

- **Backbiter:** If a glider has surprise, it flies onto its opponent's back. The victim suffers an additional –2 penalty to attack the monster. Any attacker rolling a 1 on his attack die (regardless of the results of his Wild Die) hits the victim instead of the glider.
- **Bite:** Str+d6.
- **Gliding:** Gliders can glide with a base Pace of 8, descending 1" vertically for every 2" moved horizontally. A Flying roll during a round in which the glider glides allows it to stay level for that round. A raise allows them to climb 1", but sacrifices 2" of horizontal distance.

- **Poison (–2):** Any creature Shaken or wounded by a bite must make a Vigor roll or suffer the effects of the glider's venom. At the start of each subsequent round, the victim suffers 2d4 damage as the venom dissolves his flesh and muscle. A Healing roll at –2 neutralizes the poison.
- **Size –2:** Gliders are 6" across.
- **Small:** Attacks are –2 to attack rolls against these creatures do to their small size.

HYENA

Hyenas hunt in packs. Besides their bite, their recognizable laughing bark acts as a Taunt in game terms.

Found on: Earth.

Attributes: Agility d8, Smarts d6 (A), Spirit d8, Strength d6, Vigor d6
Skills: Fighting d6, Intimidation d8, Notice d10, Taunt d8
Pace: 8; **Parry:** 5; **Toughness:** 4
Special Abilities:
- **Bite:** Str+d8, AP 2.
- **Fleet Footed:** Hyenas roll a d10 when running.
- **Size –1:** Hyenas are relatively small creatures.

ICE WORM

Native to the cold regions of Apollo, Ice Worms are about 5' in length and covered with a strong, flexible skin that allows them to push and slide in the snow. These creatures attack anyone walking on the snow surface by "swimming" towards them and spitting a dangerous venom that paralyzes all movement in the victim. Given their ability to "swim" through the snow, Ice Worms sometimes sneak through into human-made ice compounds and installations, and are difficult to detect.

Found on: Apollo

Attributes: Agility d6, Smarts d4 (A), Spirit d10, Strength d8, Vigor d8
Skills: Fighting d6, Notice d8, Shooting d6, Stealth d10
Pace: 6; **Parry:** 5; **Toughness:** 7
Special Abilities:
- **Bite:** Str+d6.
- **Extra-strong Body:** Toughness +1
- **Paralysis (+0):** Range 3/6/12. Anyone not wearing a sealed body suit (such as a spacesuit) struck by the poison must make a Vigor roll or be paralyzed for 2d6 rounds.

JUNGLE TERROR

Not all the dangerous native species in Logan's End have been identified. The species nicknamed "Jungle Terror" has eluded detailed study due to its lethality. Data gained from cameras and recordings recovered from the location of dead expeditions have allowed scientists to identify a two-legged creature with a thick bone body, extendable jaw and claws, and a barbed tail. To date no one has met a Jungle Terror and survived to tell the tale.

Found on: Logan's End

Attributes: Agility d10, Smarts d8 (A), Spirit d10, Strength d12+3, Vigor d8
Skills: Climbing d8, Fighting d8, Intimidation d10, Notice d8, Stealth d12
Pace: 6; **Parry:** 6; **Toughness:** 9 (2)
Special Abilities:
- **Armor +2:** Thick plates.
- **Bite and Claws:** Str+d6.
- **Fearless:** Immune to Fear and Intimidation.
- **Hardy:** Multiple Shaken results do not cause a wound.
- **Paralysis (+0):** Anyone Shaken or wounded by a tail attack must make a Vigor roll or be paralyzed for 2d6 rounds.
- **Size +1:** Jungle Terrors stand 7' tall.
- **Tail:** Str+d6, +1 Reach.

KNIGHT

Knights have many different types of beliefs, religions and goals, but in the end most of it boils down to heavily-armored fighters with a few extra abilities.

Found in: V-World

JUNIOR KNIGHT

Attributes: Agility d8, Smarts d6, Spirit d8, Strength d8, Vigor d8
Skills: Fighting d8, Intimidation d6, Knowledge (Battle) d6, Notice d6, Riding d8
Cha: +2; **Pace:** 6; **Parry:** 7; **Toughness:** 9 (3)
Hindrances: Code of Honor
Edges: Command, Noble
Gear: Corselet (+3), chain arms and legs (+2), closed helm (+3), long sword (Str+d8), medium shield (+1 Parry), lance (Str+d8, Reach 2, AP 2 when charging), war horse.

VETERAN KNIGHT

Attributes: Agility d8, Smarts d6, Spirit d10, Strength d10, Vigor d10
Skills: Fighting d10, Intimidation d6, Knowledge (Battle) d8, Notice d6, Riding d10
Cha: +2; **Pace:** 6; **Parry:** 10; **Toughness:** 10 (3)
Hindrances: Code of Honor
Edges: Block, Combat Reflexes, Command, Fervor, Frenzy, Level Headed, Noble
Gear: Corselet (+3), plates arms and legs (+3), closed helm (+3), long sword (Str+d8), large shield (+2 Parry), lance (Str+d8, Reach 2, AP 2 when charging), war horse.

LAVA DEMON

Lava Demons appear as small beings of slightly-humanoid shape, covered in flame. They are able to fly quickly.

Found in: V-World

Attributes: Agility d10, Smarts d8, Spirit d8, Strength d6, Vigor d6
Skills: Climbing d8, Fighting d10, Shooting d8
Pace: 6; **Parry:** 7; **Toughness:** 8 (3)
Special Abilities:

- **Armor +3:** Lava and fire skin.
- **Elemental:** No additional damage from called shots; Fearless; Immune to disease and poison.
- **Flight:** Lava Demons have a Flying Pace of 12", with an Acceleration of 6".
- **Immunity:** Lava Demons are immune to all fire-based attacks
- **Fiery Touch:** Str+d6; chance of catching fire.
- **Flame Strike:** Lava Demons can project a searing blast of lava using the Cone Template. Characters within the cone must beat the demon's Shooting roll with Agility or suffer 2d10 damage, plus the chance of catching fire.
- **Weakness:** Lava Demons suffer 1d6 damage when doused in at least a gallon of water, +2 per additional gallon.

LAVA GOLEM

Lava Golems look like a stone golem with a bright glow of lava running underneath. Their eyes constantly glow, and their entire body is dangerously hot to the touch.

Found in: V-World

Attributes: Agility d6, Smarts d6, Spirit d6, Strength d12, Vigor d10
Skills: Fighting d8, Intimidation d10, Notice d6, Shooting d8, Stealth d6
Pace: 6; **Parry:** 6; **Toughness:** 11 (3)
Special Abilities:

- **Armor +3:** Magically hardened stone.
- **Construct:** +2 to recover from being Shaken; No additional damage from called shots; Immune to poison and disease.
- **Fearless:** Golems are immune to Fear and Intimidation.
- **Size +1:** Lava golems stand over 8' high and weigh 2,000 pounds.
- **Spit Lava:** Lava golems can spew a glob of molten lava. Range 6/12/24, Damage 2d10, Medium Burst Template. Targets under the Template may make an Agility roll at –2 to escape the glob. Victims have a chance of catching fire.
- **Superheated Fists:** Str+d10.

LOGAN CHAMELEON

This dangerous carnivorous creature, native to the jungles of Logan's End, takes advantage of its chameleonic nature to blend among the patches and colors of the jungle and attack its victim when it is least expecting it.

Found on: Logan's End

Attributes: Agility d8, Smarts d6 (A), Spirit d10, Strength d12, Vigor d8
Skills: Fighting d8, Notice d8, Stealth d8
Pace: 8; **Parry:** 6; **Toughness:** 8 (2)
Special Abilities:

- **Armor +2:** Think hide.
- **Bite:** Str+d6.
- **Chameleon:** If the chameleon is in vegetation and moves half its Pace or less, it gains +4 to Stealth rolls.
- **Claws:** Str+d8, AP 2.
- **Improved Frenzy:** Chameleons may make two Fighting attacks on the same action at no penalty.
- **Pounce:** Chameleons often pounce on their prey to best bring their mass and claws to bear. It can leap 1d6" to gain +4 to its attack and damage. Its Parry is reduced by –2 until its next action when performing the manoeuvre.

LAW ENFORCEMENT

Law Enforcement can be police in cities, corporate security officers in large corporations, or maybe hired guards. They are in charge of keeping order and upholding the law, although in some cases may also

be the elements of force of a suppressive regime or private organization.

Found in: Everywhere

TYPICAL SECURITY

Attributes: Agility d6, Smarts d6, Spirit d6, Strength d6, Vigor d6
Skills: Fighting d6, Intimidation d6, Notice d6, Persuasion d6, Shooting d6
Cha: +0; **Pace:** 6; **Parry:** 5; **Toughness:** 7 (2); **Mental Toughness:** 5
Hindrances: Code of Honor (uphold the law)
Edges: Connections (Police Officers)
Gear: Light Vest (+2), Enhanced Autopistol (Range 12/24/48, Damage 2d6, AP 1, Semi-auto, also fires 1 explosive round for 2d8, AP 4 damage), Shock Stick (Str+d4), electronic handcuffs, Sonic Stunner (Range 10/20/40, Damage 2d6+1 nonlethal, special), Assistant with at least d4 in Hacking skill.

VETERAN SECURITY

Attributes: Agility d8, Smarts d6, Spirit d8, Strength d8, Vigor d6
Skills: Fighting d8, Intimidation d8, Notice d6, Persuasion d8, Shooting d8, Taunt d6
Cha: +0; **Pace:** 6; **Parry:** 5; **Toughness:** 7/9 (2/4); **Mental Toughness:** 6
Hindrances: Code of Honor (uphold the law)
Edges: Block, Combat Reflexes, Level Headed, Marksman.
Gear: Combat Vest (+2/+4, negates 4 AP against bullets), Enhanced Autopistol (Range 12/24/48, Damage 2d6, AP 1, Semi-auto, also fires 1 explosive round for 2d8, AP 4 damage), Puke stick (Str+d4), Sonic Stunner (Range 10/20/40, Damage 2d6+1 nonlethal, special), electronic handcuffs, Assistant with at least d8 in Hacking skill and d6 in Investigation skill.

MAGE

Mages and Wizards harness the power of the arcane.

Found in: V-World

NOVICE MAGE

Attributes: Agility d6, Smarts d10, Spirit d8, Strength d6, Vigor d6
Skills: Fighting d6, Intimidation d8, Knowledge (Arcana) d8, Notice d8, Shooting d6, Spellcasting d8, Stealth d6, Taunt d6
Pace: 6; **Parry:** 5; **Toughness:** 5
Hindrances: Various
Edges: Arcane Background (Magic), New Power, Power Points, Wizard
Gear: Various.
Special Abilities:
- **Spells:** Novice mages have 15 Power Points and typically know *armor*, *bolt*, *detect/conceal arcana*, and *light*.

VETERAN MAGE

Attributes: Agility d6, Smarts d12, Spirit d8, Strength d6, Vigor d6
Skills: Fighting d6, Intimidation d6, Knowledge (Arcana) d8, Notice d8, Persuasion d8, Shooting d8, Spellcasting d10, Stealth d6, Streetwise d8, Taunt d8
Pace: 6; **Parry:** 5; **Toughness:** 5
Edges: Arcane Background (Magic), New Power, Power Points, Wizard
Gear: Various, but at least one magic item.
Special Abilities:
- **Spells:** Veteran mages have 25 Power Points and typically know *armor*, *blast*, *bolt*, *detect/conceal arcana*, *dispel*, *fly*, and *light*.

MANYMOUTH

Manymouths are some of the most bizarre aliens ever spotted by explorers in the jungles of Logan's End. Any name resemblance to a Bodymouth is just that, a resemblance that has nothing to do with how the monsters look or attack. Their round strong body ends in five thick necks with gaping mouths. Manymouths don't move much, but rather wait until their prey approaches to spring and attack.

Found on: Logan's End

Attributes: Agility d6, Smarts d4 (A), Spirit d8, Strength d10, Vigor d8
Skills: Fighting d6, Intimidation d8, Notice d6, Stealth d10
Pace: 2; **Parry:** 5; **Toughness:** 8
Special Abilities:
- **Bite:** Str+d6, +1 Reach.
- **Burrow:** Manymouths conceal themselves in soft earth mounds in the jungle floor.
- **Multiple Limbs:** Each "head" may make one Fighting roll without occurring a multi-action penalty. However, only two "heads" may attack a single foe.
- **Size +2:** Manymouths measure 6' in length, but are 3' in diameter.

MESH SHOCK TROOPERS

The criminal organization known as the Mesh and led by Leon Granberg (see page 52) has trained their thugs to be slightly more orderly and professional than usual. These are used when the Mesh carries out some of their more difficult or complex missions.

Found on: Apollo

TYPICAL MESH TROOPER

Attributes: Agility d6, Smarts d6, Spirit d6, Strength d8, Vigor d8
Skills: Fighting d8, Intimidation d6, Notice d8, Shooting d6, Stealth d6, Throwing d6
Cha: –2; **Pace:** 6; **Parry:** 6; **Toughness:** 8 (2); **Mental Toughness:** 5
Hindrances: Mean
Edges: Combat Reflexes
Gear: Assault Rifle (Range 24/48/96, Damage 2d8, AP 2, ROF 3, Auto), Combat Knife (Str+d4), Light Vest (+2), Stun grenade (Range 5/10/20, Damage 3d6 non-lethal, MBT), Assistant.

VETERAN MESH TROOPER

Attributes: Agility d8, Smarts d6, Spirit d6, Strength d6, Vigor d8
Skills: Fighting d8, Intimidation d8, Notice d8, Shooting d8, Stealth d6, Throwing d6
Cha: –2; **Pace:** 6; **Parry:** 6; **Toughness:** 8/10 (2/4); **Mental Toughness:** 5
Hindrances: Mean
Edges: Combat Reflexes, Dodge, Command
Gear: Assault Rifle (Range 24/48/96, Damage 2d8, AP 2, ROF 3, Auto), Combat Knife (Str+d4), Combat Vest (+2/+4, negates 4 AP against bullets), Combat Helmet (+3, head only), Stun grenade (Range 5/10/20, Damage 3d6 non-lethal, MBT), Assistant with at least d6 in Hacking skill.

OGRE

Ogres usually join orc clans, where they become their most lethal weapon.

Found in: V-World

Attributes: Agility d6, Smarts d4, Spirit d6, Strength d12+3, Vigor d12
Skills: Fighting d8, Intimidation d8, Notice d4, Throwing d6
Pace: 7; **Parry:** 6; **Toughness:** 11 (1)
Gear: Thick hides (+1), massive club (Str+d8).
Special Abilities:

- **Size +3:** Most ogres are over 8' tall with pot-bellies and massive arms and legs.
- **Sweep:** May attack all adjacent foes at –2.

OLD WEST GUNMAN

The bad guy in V-World Old West programs, these men (and women) make a living out of their gun. Wanted in many towns and states, they usually don't live long, and when they die they take a few souls with them.

Found in: V-World

TYPICAL GUNMAN

Attributes: Agility d8, Smarts d6, Spirit d8, Strength d6, Vigor d6
Skills: Fighting d6, Notice d6, Shooting d8
Cha: +0; **Pace:** 6; **Parry:** 5; **Toughness:** 5; **Mental Toughness:** 6
Hindrances: —
Edges: Quick Draw
Gear: Colt Peacemaker (Range 12/24/48; Damage 2d6+1; ROF 1; 1; 6 shots, one full action to reload).

VETERAN GUNMAN

Attributes: Agility d8, Smarts d6, Spirit d8, Strength d6, Vigor d8
Skills: Fighting d6, Notice d8, Shooting d10, Stealth d6
Cha: +0; **Pace:** 6; **Parry:** 5; **Toughness:** 6; **Mental Toughness:** 6
Hindrances: —
Edges: Quick Draw, Marksman, Trademark Weapon
Gear: Two Colt Peacemakers (Range 12/24/48, Damage 2d6+1, ROF 1, AP 1, 6 shots, one full action to reload), Rifle (Range 24/48/96; Damage 2d8, ROF 1; AP 2; 2 shots, one full action to reload, minimum Strength d6).

ORC

Orcs are wild humanoids with disturbingly ugly features. They are smelly, cruel and violent.

Found in: V-World

ORC WARRIOR

Attributes: Agility d6, Smarts d4, Spirit d6, Strength d8, Vigor d8
Skills: Fighting d6, Intimidation d8, Notice d6, Shooting d6, Stealth d6, Throwing d6
Pace: 6; **Parry:** 5; **Toughness:** 8 (1)
Gear: Leather armor (+1), short sword (Str+d6).
Special Abilities:

- **Size +1:** Orcs are slightly larger than humans.
- **Infravision:** Half penalty for poor light versus heat-producing targets.

ORC LEADER

Orcs are extremely tribal, and follow their leaders without question. Sometimes this means bringing down a leader makes the orc soldiers under his command panic and flee.

Attributes: Agility d8, Smarts d6, Spirit d8, Strength d10, Vigor d10
Skills: Fighting d12, Intimidation d10, Notice d6, Shooting d8, Stealth d6, Throwing d8
Pace: 6; **Parry:** 8; **Toughness:** 11 (3)
Edges: Command
Gear: Chest plate (+3), chain arms and legs (+2), battle axe (Str+d10).
Special Abilities:
- **Infravision:** Half penalty for poor light versus heat-producing targets.
- **Size +1:** Orcs are slightly larger than humans.
- **Sweep:** May attack all adjacent foes at –2 penalty.

ORC SHAMAN

Orc shamans control wild magic. While not as powerful as studied arcane casters, Shamans wield knowledge millennia old, and thus are extremely capable and dangerous.

Attributes: Agility d6, Smarts d8, Spirit d6, Strength d6, Vigor d6
Skills: Fighting d6, Intimidation d8, Notice d6, Shooting d6, Spellcasting d8, Stealth d8
Pace: 6; **Parry:** 6; **Toughness:** 6 (1)
Gear: Leather armor (+1), spear (Str+d6, Parry +1, Reach 1).
Special Abilities:
- **Infravision:** Orcs halve penalties for bad lighting when attacking living targets.
- **Spells:** Shamans have 15 Power Points and typically know *armor*, *bolt*, *fear*, and *smite*.

POISONOUS SNAKE

Not all snakes are fast and poisonous, but the one listed here is.

Found on: Earth.

Attributes: Agility d8, Smarts d4 (A), Spirit d6, Strength d4, Vigor d4
Skills: Fighting d8, Notice d12
Pace: 4; **Parry:** 6; **Toughness:** 2
Special Abilities:
- **Bite:** Str.
- **Poison:** Snakes this size do little serious damage with their bite, but may inject deadly venom. A character bitten by a snake must make a Vigor roll. With a success, the bite area swells and becomes numb. The victim becomes Exhausted until healed. With a failure, the victim becomes Incapacitated and must make a second Vigor roll or die in 2d6 minutes.
- **Quick:** Snakes are notoriously fast. They may discard Action Cards of 5 or lower and draw another. They must keep the replacement card, however.
- **Size –2:** Most venomous snakes are 4 – 6' in length, but only a few inches thick.
- **Small:** Anyone attacking a snake must subtract 2 from his attack rolls.

POLAR BEAR

Polar bears seldom get a chance to meet humans, and when they do, they usually are docile unless hungry or messed with.

Found on: Earth.

Attributes: Agility d6, Smarts d6 (A), Spirit d8, Strength d12+5, Vigor d12
Skills: Fighting d8, Notice d6, Stealth d8, Swimming d8
Pace: 6; **Parry:** 6; **Toughness:** 12 (1)
Special Abilities:
- **Armor +1:** Thick fur and fat.
- **Bear "Hug":** Bears don't actually "hug" their victims, but they do attempt to use their weight to pin their prey and rend it with their claws and teeth. A bear that hits with a raise has pinned his foe and attacks at +2 until the foe is freed. The opponent may only attempt to escape the "hug" on his action, which requires a raise on an opposed Strength roll.
- **Claws:** Str+d6.
- **Size +3:** Polar Bears stand up to 9' tall and weigh over 1200 pounds each.
- **Snow Walk:** Polar bears move at their full Pace over snow and ice.

PSION

Psions are individuals born with the power to affect matter using only their thoughts. Most psions belong to the Psion Brotherhood, but some are rogue psions, having learned by themselves how to control the power.

To help you avoid having to keep track of psion Extras' power points during combat, no power points are used for the characters below. Instead, each power

can be used a limited number of times per scene. Powers that normally last 3 (1/round) now last a flat three rounds per activation. For simplicity, assume if the Soul Drain edge is used, the modifier to the Spirit roll is a flat –2, regardless of the power to be used. If the roll is successful, the psion gains one power to cast immediately.

Found in: Everywhere

JUNIOR PSION

Attributes: Agility d6, Smarts d8, Spirit d6, Strength d4, Vigor d4
Skills: Fighting d4, Notice d6, Persuasion d4, Psionics d8, Shooting d6
Cha: +0; **Pace:** 6; **Parry:** 4; **Toughness:** 6 (2); **Mental Toughness:** 5
Hindrances: Vow (Psion Vow)
Edges: Arcane Background (Psionics), Mentalist, Soul Drain.
Powers: 1 × *bolt*, 1 × *deflection*, 1 × *telepathy.*
Gear: Assistant, Autopistol (Range 12/24/48, Damage 2d6, AP 1, Semi-Auto, 20 bullets), Light Vest (+2).

TYPICAL PSION

Attributes: Agility d6, Smarts d8, Spirit d8, Strength d6, Vigor d6
Skills: Fighting d6, Intimidation d6, Notice d6, Persuasion d6, Psionics d8, Shooting d8
Cha: +0; **Pace:** 6; **Parry:** 5; **Toughness:** 7 (2); **Mental Toughness:** 6
Hindrances: Vow (Psion Vow)
Edges: Arcane Background (Psionics), Combat Reflexes, Mentalist, Touch Psion, Soul Drain.
Powers: 1 × *bolt*, 1 × *deflection*, 1 × *entangle*, 1 × *pummel*, 1 × *read surface thoughts*, 1 × *telekinesis*, 1 × *telepathy*
Gear: Assistant, Autopistol (Range 12/24/48, Damage 2d6, AP 1, Semi-Auto, 20 bullets), Light Vest (+2).

RESISTANCE FIGHTER PSION

Attributes: Agility d6, Smarts d8, Spirit d8, Strength d6, Vigor d6
Skills: Fighting d6, Intimidation d6, Notice d6, Persuasion d6, Psionics d8, Shooting d8
Cha: +0; **Pace:** 6; **Parry:** 5; **Toughness:** 7 (2); **Mental Toughness:** 6
Hindrances: Vow (Psion Vow)
Edges: Arcane Background (Psionics), Combat Reflexes, Mentalist, Touch Psion, Soul Drain.
Powers: 1 × *blast*, 2 × *bolt*, 1 × *deflection*, 1 × *entangle*, 1 × *pummel*, 1 × *read surface thoughts*, 1 × *telekinesis*, 1 × *telepathy.*
Gear: Combat Vest (+2/+4, negates 4 AP against bullets), Combat Helmet (+4, 50% chance, head only), Assault Rifle (Range 24/48/96, Damage 2d8, AP 2, ROF 3, Auto), stun grenade (Range 5/10/20, Damage 3d6 non-lethal, MBT), Assistant.

RESISTANCE FIGHTER PSION (VACUUM)

Attributes: Agility d6, Smarts d8, Spirit d8, Strength d6, Vigor d6
Skills: Fighting d6, Intimidation d6, Notice d6, Persuasion d6, Psionics d8, Shooting d8
Cha: +0; **Pace:** 6; **Parry:** 5; **Toughness:** 7 (2); **Mental Toughness:** 6
Hindrances: Vow (Psion Vow)
Edges: Arcane Background (Psionics), Combat Reflexes, Mentalist, Touch Psion, Soul Drain, Zero-G Training
Powers: 1 × *blast*, 2 × *bolt*, 1 × *deflection*, 1 × *entangle*, 1 × *pummel*, 1 × *read surface thoughts*, 1 × *telekinesis*, 1 × *telepathy*
Gear: Reinforced Vacc Suit (+2/+4, negates 4 AP against bullets), Vacc Suit Helmet (+3, head only), Accelerator Rifle (Range 15/30/60, Damage 2d8, AP 2, ROF 1, Auto, special), stun grenade (Range 5/10/20, Damage 3d6 non-lethal, MBT), Assistant.

SOLDIER PSION

Attributes: Agility d6, Smarts d8, Spirit d8, Strength d8, Vigor d6
Skills: Fighting d6, Intimidation d6, Notice d6, Persuasion d6, Psionics d8, Shooting d8
Cha: +0; **Pace:** 6; **Parry:** 5; **Toughness:** 7 (2); **Mental Toughness:** 6
Hindrances: Vow (Psion Vow)
Edges: Arcane Background (Psionics), Combat Reflexes, Mentalist, Touch Psion, Soul Drain.
Powers: 2 × *bolt*, 1 × *deflection*, 1 × *entangle*, 1 × *pummel*, 1 × *read surface thoughts*, 1 × *telekinesis*, 1 × *telepathy*
Gear: Combat Vest (+2/+4, negates 4 AP against bullets), Combat Helmet (+3, head only), Assault Rifle (Range 24/48/96, Damage 2d8, AP 2, ROF 3, Auto), stun grenade (Range 5/10/20, Damage 3d6 non-lethal, MBT), Assistant with at least d4 in Hacking skill.

VETERAN PSION

Attributes: Agility d8, Smarts d10, Spirit d8, Strength d6, Vigor d6
Skills: Fighting d6, Intimidation d6, Notice d8, Persuasion d6, Psionics d10, Shooting d8
Cha: +0; **Pace:** 6; **Parry:** 5; **Toughness:** 7 (2); **Mental Toughness:** 8 (2)
Hindrances: Vow (Psion Vow)
Edges: Arcane Background (Psionics), Arcane Resistance, Combat Reflexes, Command, Mentalist, Nerves of Steel, Ranged Psion, Soul Drain.

Powers: 1 × *armor*, 1 × *blast*, 2 × *bolt*, 1 × *brain lock*, 1 × *deflection*, 1 × *entangle*, 1 × *probe*, 1 × *pummel*, 1 × *puppet*, 1 × *read surface thoughts*, 1 × *slumber*, 1 × *telekinesis*, 1 × *telepathy*
Gear: Autopistol (Range 12/24/48, Damage 2d6, AP 1, Semi-Auto, 20 bullets), Light Vest (+2), Assistant with at least d4 in Hacking skill.

ROGUE PSION

Attributes: Agility d6, Smarts d8, Spirit d8, Strength d6, Vigor d6
Skills: Fighting d8, Intimidation d6, Notice d6, Persuasion d6, Psionics d8, Shooting d8
Cha: +0; **Pace:** 6; **Parry:** 6; **Toughness:** 7/9 (2/4); **Mental Toughness:** 8 (2)
Hindrances: —
Edges: Arcane Background (Psionics), Arcane Resistance, Combat Reflexes, Psychic Soldier, Soul Drain.
Powers: 1 × *blast*, 2 × *bolt*, 1 × *deflection*, 1 × *read surface thoughts*, 1 × *telekinesis*, 1 × *telepathy*
Gear: Assistant, Autopistol (Range 12/24/48, Damage 2d6, AP 1, Semi-Auto, 20 bullets), Combat Vest (+2/+4, negates 4 AP against bullets).

ROCK MONSTER

Rock Monsters are strange underground creatures with sharp diamond teeth and a rocky shell. Although they can't digest meat, they love its taste and eat it whenever they can. They usually curl like a boulder inside a cave, and attack with surprise when explorers walk by them.

Found in: V-World

Attributes: Agility d6, Smarts d6 (A), Spirit d6, Strength d8, Vigor d6
Skills: Fighting d6, Notice d6, Stealth d10
Pace: 6; **Parry:** 5; **Toughness:** 7 (2)
Special Abilities:
- **Armor +2:** Rocky shell.
- **Bite:** Str+d6.
- **Camouflage:** When not moving, rock monsters resemble small boulders. Characters actively searching for danger suffer –4 to their Notice rolls to find them. Undetected Rock Monsters strike with surprise, getting the Drop on their unsuspecting foes.

SWAMP SLUG

Swamp Slugs are amphibian creatures native to the swamps of Logan's End. While floating in water they look like quiet, submerged, drifting logs. They lie still and wait until their victims approach.

Found on: Logan's End

Attributes: Agility d4, Smarts d4 (A), Spirit d6, Strength d6, Vigor d8
Skills: Fighting d6, Intimidation d8, Notice d4, Stealth d10, Swimming d4
Pace: 2; **Parry:** 5; **Toughness:** 8
Special Abilities:
- **Amphibian:** Pace 3 in water.
- **Bite:** Str+d6.
- **Dehydration:** A Swamp Slug must immerse itself in water at least one hour out of every 24. Those who don't are automatically Fatigued each day until they are Incapacitated. The day after that, they perish.
- **High Gravity:** +1 Toughness.
- **Size +1:** Swamp Slugs measure 8' in length.

SOLDIER

The typical soldier that represents cannon fodder in most enemy armies.

Found in: Everywhere

TYPICAL SOLDIER

Attributes: Agility d6, Smarts d6, Spirit d6, Strength d6, Vigor d6
Skills: Fighting d6, Intimidation d6, Notice d6, Shooting d6, Stealth d6, Throwing d6
Cha: +0; **Pace:** 6; **Parry:** 5; **Toughness:** 7/9 (2/4); **Mental Toughness:** 5
Hindrances: Loyal
Edges: Combat Reflexes
Gear: Combat Vest (+2/+4, negates 4 AP against bullets), Combat Helmet (+3, head only), Assault Rifle (Range 24/48/96, Damage 2d8, AP 2, ROF 3, Auto), stun grenade (Range 5/10/20, Damage 3d6 non-lethal, MBT), Assistant.

VETERAN SOLDIER

Attributes: Agility d8, Smarts d6, Spirit d6, Strength d6, Vigor d8
Skills: Fighting d8, Intimidation d8, Notice d6, Shooting d8, Stealth d6, Throwing d6
Cha: +0; **Pace:** 6; **Parry:** 6; **Toughness:** 8/10 (2/4); **Mental Toughness:** 5
Hindrances: Loyal
Edges: Combat Reflexes, Dodge, Command
Gear: Combat Vest (+2/+4, negates 4 AP against bullets), Combat Helmet (+3, head only), Assault Rifle (Range 24/48/96, Damage 2d8, AP 2, ROF 3, Auto),

stun grenade (Range 5/10/20, Damage 3d6 non-lethal, MBT), Assistant.

SPIKETAIL

Spiketails are reptilian predators native to the jungles of Logan's End. They have four legs ending with curved claws, and a powerful tail they use for attacking. When hunting, they latch onto their prey and attack it with their powerful bite.

Found on: Logan's End

Attributes: Agility d8, Smarts d6 (A), Spirit d8, Strength d8, Vigor d6
Skills: Fighting d6, Notice d6, Stealth d6
Pace: 8; **Parry:** 5; **Toughness:** 3
Special Abilities:
- **Bite:** Str+d6.
- **Fearless:** Immune to Fear and Intimidation.
- **Maul:** A Spiketail scoring a raise on a Fighting roll has attached itself to its opponents. Each round it remains attached, it gains +2 to bite attack rolls. Removing it requires an opposed Strength roll.
- **Pounce:** A Spiketail can leap 1d6" to gain +4 to its attack and damage. Its Parry is reduced by –2 until its next action when performing the manoeuvre however.
- **Size –2:** Spiketails are only 2' long.
- **Small:** Attackers must subtract 2 from any attack rolls made against the creature because of its size.

TENTACLER

Native to the seas of Nouvelle Vie, Tentaclers are dangerous water predators. Large, long creatures with a mouth covered in tentacles, they frequently attack small boats and coast side villages.

Found on: Nouvelle Vie

Attributes: Agility d6, Smarts d6 (A), Spirit d8, Strength d12+4, Vigor d6
Skills: Fighting d8, Intimidation d6, Notice d8, Stealth d8, Swimming d10
Pace: 0; **Parry:** 6; **Toughness:** 13 (2)
Special Abilities:
- **Aquatic:** Pace 10. Can "run" using a d10 running die.
- **Armor +2:** Thick shell.
- **Bite:** Str+d6.
- **Large:** Attackers are +2 to attack rolls due to the Tentacler's great size.
- **Tentacles:** A Tentacler may make up to four attacks each round. On a raise, the creature has grappled the victim. An entangled victim may only attempt an opposed Strength roll each round to escape. Once grappled, the Tentacler does its Strength damage automatically by crushing with its arms and rending with its beak. A victim killed by a Tentacler's tentacles is usually ripped in half.
- **Size +6:** Tentaclers are 40 feet long.

TERRORIST

Terrorists, or Freedom Fighters (depending on who you ask), are ruthless and committed to their cause.

Found in: Everywhere, but mostly on Nouvelle Vie

TYPICAL TERRORIST

Attributes: Agility d6, Smarts d6, Spirit d6, Strength d6, Vigor d6
Skills: Fighting d6, Intimidation d6, Notice d6, Shooting d6, Stealth d6, Throwing d6
Cha: +0; **Pace:** 6; **Parry:** 5; **Toughness:** 7/9 (2/4); **Mental Toughness:** 5
Hindrances: Loyal
Edges: Combat Reflexes
Gear: Combat Vest (+2/+4, negates 4 AP against bullets), Combat Helmet (+3, head only), Assault Rifle (Range 24/48/96, Damage 2d8, AP 2, ROF 3, Auto), stun grenade (Range 5/10/20, Damage 3d6 non-lethal, MBT), Assistant with at least a d4, Hacking skill.

TYPICAL TERRORIST (SPACE)

Attributes: Agility d6, Smarts d6, Spirit d6, Strength d6, Vigor d6
Skills: Fighting d6, Intimidation d6, Notice d6, Shooting d6, Stealth d6, Throwing d6
Cha: +0; **Pace:** 6; **Parry:** 5; **Toughness:** 7/9 (2/4); **Mental Toughness:** 5
Hindrances: Loyal
Edges: Combat Reflexes
Gear: Reinforced vacc suit (+2/+4, negates 4 AP against bullets), Vacc suit Helmet (+3, head only), Accelerator Rifle (Range 15/30/60, Damage 2d8, ROF 1, AP 2, does not incur Zero-G penalty if attack die comes up 1 or 2), Assistant with at least a d4, Hacking skill.

VETERAN TERRORIST

Attributes: Agility d8, Smarts d6, Spirit d6, Strength d6, Vigor d8
Skills: Fighting d8, Intimidation d8, Notice d6, Shooting d8, Stealth d6, Throwing d6
Cha: +0; **Pace:** 6; **Parry:** 6; **Toughness:** 8/10 (2/4); **Mental Toughness:** 5
Hindrances: Loyal

Edges: Combat Reflexes, Dodge, Command
Gear: Combat Vest (+2/+4, negates 4 AP against bullets), Combat Helmet (+3, head only), Assault Rifle (Range 24/48/96, Damage 2d8, AP 2, ROF 3, Auto), stun grenade (Range 5/10/20, Damage 3d6 non-lethal, MBT), Assistant with at least a d6, Hacking skill.

VETERAN TERRORIST (SPACE)

Attributes: Agility d8, Smarts d6, Spirit d6, Strength d6, Vigor d8
Skills: Fighting d8, Intimidation d10, Notice d6, Shooting d8, Stealth d6, Taunt d8, Throwing d6
Cha: +0; **Pace:** 6; **Parry:** 6; **Toughness:** 8/10 (2/4); **Mental Toughness:** 5
Hindrances: Loyal
Edges: Combat Reflexes, Dodge, Command, Zero-G Training.
Gear: Reinforced vacc suit (+2/+4, negates 4 AP against bullets), Vacc suit Helmet (+3, head only), Accelerator Rifle (Range 15/30/60, Damage 2d8, ROF 1, AP 2, does not incur Zero-G penalty if attack die comes up 1 or 2), Assistant with at least a d6, Hacking skill.

THUG

Thugs are usually the muscle that works for the underworld, and will do anything for the right price. The more experienced a thug is, the more ready he is for tough missions and to act on his own.

Found in: Everywhere

TYPICAL THUG

Attributes: Agility d6, Smarts d4, Spirit d6, Strength d8, Vigor d8
Skills: Fighting d6, Intimidation d6, Notice d6, Shooting d6
Cha: –2; **Pace:** 6; **Parry:** 5; **Toughness:** 6; **Mental Toughness:** 5
Hindrances: Mean
Edges: —
Gear: Autopistol (Range 12/24/48, Damage 2d6, AP 1, Semi-Auto, 20 bullets), Brass Knuckles (Str+d4), Combat Knife (Str+d4), Assistant.

VETERAN THUG

Attributes: Agility d6, Smarts d6, Spirit d6, Strength d8, Vigor d8
Skills: Fighting d8, Intimidation d6, Notice d8, Shooting d6, Stealth d6, Throwing d6
Cha: –2; **Pace:** 6; **Parry:** 6; **Toughness:** 7 (1); **Mental Toughness:** 5
Hindrances: Mean
Edges: Combat Reflexes
Gear: Autopistol (Range 12/24/48, Damage 2d6, AP 1, Semi-Auto, 20 bullets), Brass Knuckles (Str+d4), Combat Knife (Str+d4), Light Vest, stun grenade (Range 5/10/20, Damage 3d6 non-lethal, MBT), Assistant.

TIGER

The typical feline predator. These stats represent one of the larger varieties.

Found on: Earth.

Attributes: Agility d8, Smarts d6 (A), Spirit d10, Strength d12+1, Vigor d10
Skills: Climbing d8, Fighting d8, Notice d8, Stealth d10
Pace: 8; **Parry:** 6; **Toughness:** 9
Special Abilities:

- **Bite or Claw:** Str+d6.
- **Improved Frenzy:** Tigers may make two Fighting attacks each action at no penalty.
- **Maul:** A tiger that succeeds in a grapple attack has knocked its prey to the floor and may make a Fighting attack with no multi action penalty. So long as the victim remains prone, subsequent attacks are made at +2.
- **Pounce:** Tigers often pounce on their prey to best bring their mass and claws to bear. It can leap 1d6" to gain +4 to its attack and damage. Its Parry is reduced by –2 until its next action when performing the manoeuvre.
- **Size +2:** Male tigers can weigh over 800 pounds.

TOWNSPERSON

Townspeople are the civilians in V-World, the masses who are usually cannon fodder in most games.

Found in: V-World

Attributes: Agility d6, Smarts d6, Spirit d6, Strength d6, Vigor d6
Skills: Knowledge (One specific trade) d6, Fighting d4, Survival d4
Cha: +0; **Pace:** 6; **Parry:** 2; **Toughness:** 5
Hindrances: Varies
Edges: Varies
Gear: Tools of the trade.

VEHICLES AND SPACESHIPS

What follows is a list of the vehicles and spaceships available in *Seven Worlds*. See page 149 for ideas on how to customize spaceships.

BATTLESHIP

The most powerful type of warship, battleships are designed to carry a massive amount of firepower. They are not, however, the frontline. They usually work as the back line with unmanned laser and particle cannon ships being the front line of the battle.

Battleships have eight full fusion engines and forty thousand tons, making them formidable adversaries. Even without front-line unmanned ships they are a force to be reckoned with.

Top Acceleration: 6; **Toughness:** 70 (50); **Handling:** –2; **Heat Radiation:** +26; **Shield Effects:** 4; **Crew:** 200+77; **Jumps:** 8; **Weeks per Jump:** 1
Abilities: Knowledge (Ship Ops) d8, Piloting d8, Shooting d8, Repair d8
Notes: Heavy Armor, Spacecraft, Improved Stabilizer, Capital Ship, 96 Healing Pods
Weapons:

- 4 × Heavy Laser Cannon (Range 4/8/16; Damage 4d8; AP 12; ROF 1; PDLB ROF 8; Heat Points 6; HW)
- Coilgun (Range 2/4/8; ROF 1; Heat Points 4).
  Available Ammo:
  - 10 Kinetic Coilgun Projectiles (Damage 3d10; AP 12; HW)
  - 4 Nuclear Coilgun Projectiles (Damage 4d10, AP 14; HW).
- 2 × Heavy Missile Launcher (Range 2/4/8; ROF 4; Heat Points 3; 4 reloads per launcher, maximum 2 can be nuclear).
  Available Ammo:
  - 6 Kinetic Missiles (Damage 3d6; AP 8; HW)
  - 6 Nuclear Missiles (Damage 2d10; AP 12; HW)
  - 2 Neutron Missiles (Damage 3d6+special; AP 10; HW)
  - 2 NNEMP Missiles (Damage 3d6+special; AP 10; HW)
  - 2 Nuclear Cloud Projectiles (Damage 3d4; 8; HW; Each missile that hits has 1-in-6 chance of being nuclear instead of kinetic. If nuclear, damage is 3d4 AP 6; each one takes up one entire launcher payload)
- 10 × Mine Cloud Defenses (+2 bonus to Piloting roll to Evade against all projectiles; +4 against one projectile).

BEETLE

Beetles are fat VTOL, dual-rotor ships equipped with a movable engine. They are used to fly around Logan's End's difficult terrains and land and takeoff on its high-gravity surface. The side walls of the Beetle can be opened if necessary to attack or defend. If the side walls are opened the Beetle provides Medium Cover to the driver and passengers.

Acc/Top Speed: 25/100; **Toughness:** 14 (2); **Handling:** +1; **Crew:** 1+12
Abilities: Piloting d6, Shooting d6, Repair d4
Notes: Improved Stabilizer
Weapons:

- 2 × Heavy Gun (Range 12/24/48; Damage 3d6; ROF 1; AP 2, HW)

BEETLE, LIGHT

A slightly smaller version of the Beetle, this ship has one Heavy Gun instead of two, and lower crew capacity.

Acc/Top Speed: 25/100; **Toughness:** 14 (2); **Handling:** +1; **Crew:** 1+6
Abilities: Piloting d6, Shooting d6, Repair d4
Notes: Improved Stabilizer
Weapons:

- Heavy Gun (Range 12/24/48; Damage 3d6; ROF 1; AP 2, HW)

BROTHERHOOD STATION

The headquarters of the Psion Brotherhood has its own defenses, located on its fins, to protect it in the unlikely case it is attacked. This is not something that is commonly known. See the detailed rules for Space Stations on page 145.

Top Acceleration: —; **Toughness:** 40 (20); **Handling:** —; **Heat Radiation:** +6; **Shield Effects:** 2; **Crew:** 40+4000; **Jumps:** —; **Weeks per Jump:** —
Abilities: Knowledge (Ship Ops) d10, Shooting d10, Repair d8
Notes: Space Station, Heavy Armor, Spacecraft, Improved Stabilizer, 200 Healing Pods
Weapons:

- 2 × Medium Laser Cannon (Range 4/8/16; Damage 3d8; AP 10; ROF 1; PDLB ROF 6; Heat Points 4; HW)
- 2 × Medium Missile Launcher (Range 2/4/8; ROF 4; Heat Points 3; 4 reloads per launcher, maximum 2 of them are nuclear).
  Available Ammo:
  - 8 Kinetic Missiles (Damage 3d6; 8; HW)
  - 4 Nuclear Missiles (Damage 2d10; AP 12; HW)
  - 2 NNEMP Missiles (Damage 3d6+special; AP 10; HW)

- 2 Kinetic Cloud Projectiles (Damage 2d4; 8; HW; each one takes up one entire launcher payload)

CRAWLER

Crawlers are closed land vehicles used for expeditions on planets with poor or non-existent atmospheric conditions. They are used to harvest oxygen on Zarmina and other planets.

Acc/Top Speed: 3/5; **Toughness:** 18 (6); **Handling:** 0; **Crew:** 2+8
Notes: Amphibious, Tracked.
Weapons:
- Medium Auto-Cannon (Range 50/100/200; Damage 3d6; 6; ROF 3; HW)

CRUISER, HEAVY

Heavy Cruisers are the perfect combination of speed and strength, and fear nothing except maybe battleships.

Top Acceleration: 6; **Toughness:** 50 (36); **Handling:** –1; **Heat Radiation:** +24; **Shield Effects:** 4; **Crew:** 102+50; **Jumps:** 8; **Weeks per Jump:** 1
Abilities: Knowledge (Ship Ops) d8, Piloting d8, Shooting d8, Repair d8
Notes: Heavy Armor, Spacecraft, Improved Stabilizer, Capital Ship, 46 Healing Pods
Weapons:
- 4 × Heavy Laser Cannon (Range 4/8/16; Damage 4d8; AP 12; ROF 1; PDLB ROF 8; Heat Points 6; HW)
- 2 × Heavy Missile Launcher (Range 2/4/8; ROF 4; Heat Points 3; 4 reloads per launcher, maximum 2 can be nuclear).
  Available Ammo:
  - 6 Kinetic Missiles (Damage 3d6; AP 8; HW)
  - 6 Nuclear Missiles (Damage 2d10; AP 12; HW)
  - 2 Neutron Missiles (Damage 3d6+special; AP 10; HW)
  - 2 NNEMP Missiles (Damage 3d6+special; AP 10; HW)
- 6 × Mine Cloud Defenses (+2 bonus to Piloting roll to Evade against all projectiles; +4 against one projectile).

FORKLIFT

A standard forklift used to carry crates in industrial situations.

Acc/Top Speed: 1/4; **Toughness:** 12 (2); **Handling:** –1; **Crew:** 1

MARK V SETTLER SHIP

Spiritual successors to the ships that evacuated millions of civilians from Earth during Project Ascension in the 2140's, the newest versions of Settler Ships offer vastly improved and more comfortable accommodations, longer voyage capacity, and in general a better experience. The statistics shown are for a typical Settler Ship used to transport settlers in non-emergency situations. A special configuration of Settler Ships allows the ship to support up to 3704 passengers plus crew for emergency situations. Settler Ships also have special facilities to carry several hundred large disposable atmospheric re-entry pods, since in early settler missions it was necessary to move the colonists to the surface without rotovators or surface-to-orbit shuttles.

Top Acceleration: 4; **Toughness:** 20 (12); **Handling:** –2; **Heat Radiation:** +1; **Shield Effects:** 3; **Crew:** 100+2554; **Jumps:** 9; **Weeks per Jump:** 2
Abilities: Knowledge (Ship Ops) d8, Piloting d6, Shooting d6, Repair d6
Notes: Heavy Armor, Spacecraft, Improved Stabilizer, 80 Healing Pods
Weapons:
- Light Laser Cannon (Range 4/8/16; Damage 3d6; AP 6; ROF 1; PDLB ROF 5; Heat Points 3; HW)
- 4 × Mine Cloud Defenses (+2 bonus to Piloting roll to Evade against all projectiles; +4 against one projectile).

MERCHANT SHIP

Merchant ships are the workhorses of space, designed to transport cargo and valuables on long travels. Crews come in all shapes and sizes, but the typical crew is ready for everything… as long as there is money in it.

Top Acceleration: 6; **Toughness:** 14 (10); **Handling:** +0; **Heat Radiation:** +2; **Shield Effects:** 2; **Crew:** 3+8; **Jumps:** 10; **Weeks per Jump:** 1
Abilities: Knowledge (Ship Ops) d8, Piloting d6, Shooting d4, Repair d4
Notes: Heavy Armor, Spacecraft, Improved Stabilizer, 1 Healing Pod
Weapons:
- Light Laser Cannon (Range 4/8/16; Damage 3d6; AP 6; ROF 1; PDLB ROF 5; Heat Points 3; HW)
- Light Missile Launcher (Range 1/2/4; ROF 2; Heat Points 1; 2 reloads per launcher, no nuclear missiles).
  Available Ammo:
  - 4 Kinetic Missiles (Damage 3d6; 8; HW)
- 2 × Mine Cloud Defenses

MILITARY AIR CAR

Air cars are energy-based light transports used in many advanced worlds. Sporting two small dual-rotor engines, they can land and take off vertically (VTOL), and are also capable of high speeds. They are covered with superconductive material to facilitate traveling long distances just a few feet from the ground, if necessary. Air cars have an open top, and their side walls can be lowered if necessary to attack or defend. If the side walls are opened, the air car provides Medium Cover to the driver and passengers.

The statistics below are for an armed and armored military air car.

Acc/Top Speed: 25/100; **Toughness:** 14 (2); **Handling:** +1; **Crew:** 1+7
Abilities: Piloting d6, Shooting d6, Repair d4
Notes: Improved Stabilizer
Weapons:

- 2 × Medium Gun (Range 12/24/48; Damage 3d6; ROF 1; AP 2, HW)

MILITARY MINI-SHIP

These small transports are used to ferry people or items between military ships in a fleet. Most large military ships have a docking bay where these ships are usually docked until needed. Military Mini-ships carry no weapons, and include enough power to travel up to 1AU.

Top Acceleration: 6; **Toughness:** 12 (8); **Handling:** –1; **Heat Radiation:** 0; **Shield Effects:** 2; **Crew:** 3+11; **Jumps:** —; **Weeks per Jump:** —
Abilities: Knowledge (Ship Ops) d6, Piloting d6, Repair d6
Notes: Heavy Armor, Spacecraft, Improved Stabilizer, 0 Healing Pods

ORBITAL SHUTTLE

Orbital Shuttles are the workhorses of space, the little ships that ferry people between starships and space stations, and that connect to planetary rotovators in order to be picked up by Rotovator Planes for take-off and landing. All Orbital Shuttles are also prepared to plane down to the surface once released from the rotovator, although they usually wait for a Rotovator Plane to pick them up.

Although they come in all types and sizes, stats are shown for a typical shuttle. Some military orbital shuttles equip light armament.

If an Orbital Shuttle enters the atmosphere as part of its landing using the rotovator, its Acceleration/Top Speed stat becomes 25/100, and its Handling becomes –2 since it is not designed for agile atmosphere flight.

Top Acceleration: 6; **Toughness:** 10 (6); **Handling:** +1; **Heat Radiation:** +1; **Shield Effects:** —; **Crew:** 2+25; **Jumps:** —; **Weeks per Jump:** —
Abilities: Knowledge (Ship Ops) d6, Piloting d6, Repair d6
Notes: Spacecraft, Atmospheric, Improved Stabilizer, 0 Healing Pods

PATROL SHIP

Patrol Ships comprise the bulk of security forces everywhere, be they military forces, frontier or planetary forces. They take the day-to-day duties of intercepting suspicious ships and keeping order in the space lanes.

Top Acceleration: 8; **Toughness:** 16 (10); **Handling:** +0; **Heat Radiation:** +3; **Shield Effects:** 2; **Crew:** 3+6; **Jumps:** 8; **Weeks per Jump:** 1
Abilities: Knowledge (Ship Ops) d6, Piloting d8, Shooting d8, Repair d6
Notes: Heavy Armor, Spacecraft, Improved Stabilizer, 2 Healing Pods
Weapons:

- 2 × Light Laser Cannons (Range 4/8/16; Damage 3d6; AP 6; ROF 1; PDLB ROF 5; Heat Points 3; HW)
- Medium Missile Launcher (Range 1/2/4; ROF 4; Heat Points 1; 4 reloads per launcher, maximum 1 of them can be nuclear).
  Available Ammo:
  - 4 Kinetic Missiles (Damage 3d6; 8; HW)
  - 2 NNEMP Missiles (Damage 3d6+special; AP 10; HW)
  - 2 Kinetic Cloud Projectiles (Damage 2d4; 8; HW; each one takes up one entire launcher payload)
- 2 × Mine Cloud Defenses (+2 bonus to Piloting roll to Evade against all projectiles; +4 against one projectile).

PIRATE/MERCENARY SHIP, SMALL

Mercenary ships usually began life as merchant ships but have been modified to be effective enough to perform illegal acts in space. These ships must have high acceleration to catch their prey and escape from the law; enough armor and heat radiation capabilities to withstand as much damage as possible; and enough firepower to intimidate their prey into surrendering. Although cargo space is important, the most valuable items are almost always the smallest. These ships are usually owned by people who are also on sale to the highest bidder.

This small mercenary ship has been designed for appropriately small acts of piracy and crime.

Top Acceleration: 10; **Toughness:** 16 (10); **Handling:** +1; **Heat Radiation:** +2; **Shield Effects:** 3; **Crew:** 5+0; **Jumps:** 7; **Weeks per Jump:** 0.75

Abilities: Knowledge (Ship Ops) d6, Piloting d6, Shooting d8, Repair d6

Notes: Heavy Armor, Spacecraft, Improved Stabilizer, 1 Healing Pod

Weapons:

- Light Laser Cannon (Range 4/8/16; Damage 3d6; AP 6; ROF 1; PDLB ROF 5; Heat Points 3; HW)
- Medium Missile Launcher (Range 1/2/4; ROF 4; Heat Points 1; 4 reloads per launcher, maximum 1 of them can be nuclear).
  Available Ammo:
  - 2 Kinetic Missiles (Damage 3d6; 8; HW)
  - 2 Neutron Missiles (Damage 3d6+special; AP 10; HW)
  - 1 NNEMP Missile (Damage 3d6+special; AP 10; HW)
  - 1 Nuclear Missile (Damage 2d10; AP 12; HW)
- 2 × Mine Cloud Defenses (+2 bonus to Piloting roll to Evade against all projectiles; +4 against one projectile).

PIRATE/MERCENARY SHIP, MEDIUM

This is a similar version of the previous mercenary ship, but larger and with more firepower. Since acts of piracy in space usually entail leaving the victims alive and with their ship intact (otherwise its instant death for the prey), these ships focus on stealing as many small valuables as possible, or maybe on kidnapping passengers if the payoff is high enough. Ships like this one are involved when the prey is larger and more firepower is needed to intimidate it.

Top Acceleration: 10; **Toughness:** 18 (12); **Handling:** +1; **Heat Radiation:** +3; **Shield Effects:** 3; **Crew:** 10+0; **Jumps:** 8; **Weeks per Jump:** 0.75

Abilities: Knowledge (Ship Ops) d8, Piloting d8, Shooting d8, Repair d6

Notes: Heavy Armor, Spacecraft, Improved Stabilizer, 1 Healing Pod

Weapons:

- 2 × Light Laser Cannons (Range 4/8/16; Damage 3d6; AP 6; ROF 1; PDLB ROF 5; Heat Points 3; HW)
- Heavy Missile Launcher (Range 2/4/8; ROF 4; Heat Points 3; 4 reloads per launcher, maximum 2 can be nuclear).
  Available Ammo:
  - 4 Kinetic Missiles (Damage 3d6; 8; HW)
  - 2 Neutron Missiles (Damage 3d6+special; AP 10; HW)
  - 2 NNEMP Missiles (Damage 3d6+special; AP 10; HW)
  - 2 Kinetic Cloud Projectiles (Damage 2d4; 8; HW; each one takes up one entire launcher payload)
- 4 × Mine Cloud Defenses (+2 bonus to Piloting roll to Evade against all projectiles; +4 against one projectile).

RENNER STATION (^{3}HE MINING STATION)

Renner Station is a research and mining station located almost 1AU away from Harris Station. It has a central habitat section with long arms protruding from it, at the end of which ships can dock and ^{3}He cylindrical tanks store fuel in preparation for their pickup by transport ships. Also, some of the arms have docking clamps for the skimming mini-ships that bring fuel from the outer atmosphere of the gas giant Icades.

The station has light armament, mostly to protect against asteroids or other random space bodies. This station has been working continuously for decades and is past its prime. It is scheduled to be completely replaced in a decade or so.

See the detailed rules for Space Stations on page 145.

Top Acceleration: —; **Toughness:** 26 (14); **Handling:** —; **Heat Radiation:** +4; **Shield Effects:** 2; **Crew:** 35+126; **Jumps:** —; **Weeks per Jump:** —

Abilities: Knowledge (Ship Ops) d8, Shooting d6, Repair d8

Notes: Space Station, Heavy Armor, Spacecraft, Improved Stabilizer, 31 Healing Pods

Weapons:

- 2 × Light Laser Cannon (Range 4/8/16; Damage 3d6; AP 6; ROF 1; PDLB ROF 5; Heat Points 3; HW)
- Medium Missile Launcher (Range 1/2/4; ROF 4; Heat Points 1; 4 reloads per launcher, maximum 1 of them is nuclear).
  Available Ammo:
  - 6 Kinetic Missiles (Damage 3d6; 8; HW)
  - 2 Nuclear Missiles (Damage 2d10; AP 12; HW)

RESEARCH SHIP

The far edges of space have to be explored if Humanity hopes to expand. Research ships are designed to support life for several months without returning to civilization. They are crewed by tight teams of scientists and explorers with the scientific equipment necessary to detect and analyze most of the things they meet. Even with all this technology, Research Ships disappear now and then, never to be seen again. Being an explorer is a risky business.

Since exploring new worlds may require sometimes landing on them, Research ships usually bring an All-Purpose Surface-to-Orbit Shuttle. This shuttle

is usually connected to the outside hull of the Research ship.

Top Acceleration: 6; **Toughness:** 14 (10); **Handling:** +0; **Heat Radiation:** +2; **Shield Effects:** 2; **Crew:** 3+8; **Jumps:** 12; **Weeks per Jump:** 1
Abilities: Knowledge (Ship Ops) d8, Piloting d8, Shooting d6, Repair d4
Notes: Heavy Armor, Spacecraft, Improved Stabilizer, 2 Healing Pods
Weapons:
- Light Laser Cannon (Range 4/8/16; Damage 3d6; AP 6; ROF 1; PDLB ROF 5; Heat Points 3; HW)
- 2 × Light Missile Launcher (Range 1/2/4; ROF 2; Heat Points 1; 2 reloads per launcher, no nuclear missiles). *Available Ammo:*
  - 4 Kinetic Missiles (Damage 3d6; 8; HW)
- 4 × Mine Cloud Defenses (+2 bonus to Piloting roll to Evade against all projectiles; +4 against one projectile).

ROTOVATOR PLANE

Rotovator Planes are the lower link in the chain that connects a planet's surface with its orbit. They take-off like a plane, carrying an orbital shuttle on their back, and fly until they meet the lower end of a rotovator. There, the orbital shuttle detaches from the plane and connects to the rotovator, which slings it into orbit. The Rotovator Plane also picks up any descending orbital shuttles and brings them back to land.

Acc/Top Speed: 50/200; Toughness: 16 (4); Handling: +1; Crew: 3
Abilities: Piloting d6
Notes: Improved Stabilizer

SKIMMING MINI-SHIP

A two-person space vehicle designed to skim a gas giant's outer atmosphere for ^{3}He, this ship is basically a huge collector net powered by large dual fusion engines to withstand high gravities. Once it has captured its load of the isotope, the ship returns to the station and little by little fills out the ^{3}He tanks.

Skimming Mini-ships do not carry weapons and have light armor and a Coulborne Shield, enough to protect against radiation. Their engines are capable of extremely high levels of acceleration, although if these are maintained for more than a few seconds they can cause permanent injury or death.

Top Acceleration: 12; **Toughness:** 10 (6); **Handling:** +1; **Heat Radiation:** +1; **Shield Effects:** —; **Crew:** 2; **Jumps:** —; **Weeks per Jump:** —
Abilities: Knowledge (Ship Ops) d6, Piloting d6, Repair d6
Notes: Heavy Armor, Spacecraft, Improved Stabilizer, 0 Healing Pods

SNOW HOVERSHIP

Snow Hoverships are nimble covered shuttles designed to transport small numbers of personnel across the inhospitable cold and snow of Apollo. Although usually driven slowly, Snow Hoverships can be very fast if needed.
Acc/Top Speed: 6/30; **Toughness:** 12 (2); **Handling:** 0; **Crew:** 1+10
Abilities: Piloting d6, Shooting d6, Repair d4
Notes: Max Height 10", Improved Stabilizer
Weapons:
- Medium Gun (Range 12/24/48; Damage 3d6; ROF 1; AP 2, HW)

SUPPLY SHIP

Supply ships are built with a cargo space of approximately 10,000 tons or 40,000 m^3 of equipment. They handle logistics duties for space fleets, from fuel to food and weapons. They also transport smaller ships connected to an external ship bay.

Supply ships are not built for attack, and are extremely slow, but they have enough weapons to mount a decent defense if it becomes necessary.

Top Acceleration: 4; **Toughness:** 24 (14); **Handling:** –1; **Heat Radiation:** +2; **Shield Effects:** 2; **Crew:** 30+0; **Jumps:** 8; **Weeks per Jump:** 2
Abilities: Knowledge (Ship Ops) d8, Piloting d8, Shooting d6, Repair d8
Notes: Heavy Armor, Spacecraft, Improved Stabilizer, 5 Healing Pods
Weapons:
- 2 × Light Laser Cannon (Range 4/8/16; Damage 3d6; AP 6; ROF 1; PDLB ROF 5; Heat Points 3; HW)
- 2 × Light Missile Launcher (Range 1/2/4; ROF 2; Heat Points 1; 2 reloads per launcher, no nuclear missiles). *Available Ammo:*
  - 4 Kinetic Missiles (Damage 3d6; 8; HW)
- 4 × Mine Cloud Defenses (+2 bonus to Piloting roll to Evade against all projectiles; +4 against one projectile).

SURFACE-TO-ORBIT SHUTTLE (EARTHLIKE WORLDS)

StO Shuttles can travel on their own from the surface of an Earth-like planet to orbit and back. They look like airplanes with extra-large advanced chemical engines, side tanks, and manoeuvrability thrusters.

They have to be refueled after each take-off and landing. Because of the cost of directly shuttling all the way to orbit, StO Shuttles are much less common than the more standard Orbital Shuttles, which can not only travel between ships and stations in orbit but can also connect to planetary rotovators in order to enter the atmosphere. StO shuttles are used for military operations, VIP transport, and to move people with the means to pay for this kind of transportation.

When an StO Shuttle is in the atmosphere, its Acceleration/Top Speed stat becomes 50/200.

Top Acceleration: 8; **Toughness:** 12 (8); **Handling:** +1; **Heat Radiation:** +1; **Shield Effects:** —; **Crew:** 2+22; **Jumps:** —; **Weeks per Jump:** —
Abilities: Knowledge (Ship Ops) d6, Piloting d6, Repair d6
Notes: Spacecraft, Atmospheric, Improved Stabilizer, 0 Healing Pods

CAPITAL SHIPS AND HEAT RADIATION

At first glance the Heat Radiation stat for Capital Ships seems extremely high ("+26 for a Battleship?"). There are several factors that explain this, though:

- If the ship fires its weapons it eats up most of its Heat Radiation bonus for the round. For example, in the case of the Battleship, firing its four Heavy Laser Cannons means the ship would accumulate 24 heat points this round for the Heat Engineer to radiate. The +26 Heat Radiation minus 24 heat points means the Heat Engineer would have an effective bonus of just +2 to the Knowledge (Ship Ops) roll.
- If the Battleship is hit and the damage exceeds its Toughness (even if no Wounds are inflicted), it accumulates half its Heat Modifier in heat points, or 13 heat points (see page 138). This means even Capital Ships may still overheat really fast.
- Even if the Battleship does not use its weapons and is not hit, a Critical Failure means it accumulates one level of Heat Fatigue, regardless of the bonus.

Note that involved, detailed battles between Capital Ships may take a while. For faster space combat resolution between Capital Ships, consider the alternative Mass Battle rules presented on the sidebar on page 146.

SURFACE-TO-ORBIT SHUTTLE (ALL-PURPOSE)

To land on planets that do not have an Earthlike atmosphere or that have a gravity that is too different from Earth's, special Surface-to-Orbit shuttles are needed. These must be able to land and take-off without taking advantage of an atmosphere (no planing or wings allowed) and must have extra capacity to carry propellant in case they have to be self-sufficient. They must also be able to carry a small rover and equipment to explore the surface.

All-Purpose StOs are usually towed by Research or Military ships. They must be refueled after each landing and take-off, and use fusion engines. This means there is a certain amount of radioactive contamination in the planets they land in, but this can't be avoided. Also, All-Purpose StOs have retractable wings, in case they are used in a planet with an atmosphere and can take advantage of it to fly.

When an All-Purpose StO Shuttle is inside a planet that has an atmosphere (and therefore can fly, instead of only land and take off), its Acceleration/Top Speed stat becomes 25/100.

Top Acceleration: 6; **Toughness:** 12 (8); **Handling:** –1; **Heat Radiation:** +2; **Shield Effects:** —; **Crew:** 1+6; **Jumps:** —; **Weeks per Jump:** —
Abilities: Knowledge (Ship Ops) d6, Piloting d6, Repair d6
Notes: Spacecraft, Atmospheric, Improved Stabilizer, 0 Healing Pods

TRANSPORT SHUTTLE

This utilitarian ship is used to ferry people on interplanetary trips, such as between planets and space stations. Its standard capacity is seventeen passengers plus three crew, but it can also double as an emergency evacuation shuttle. In this second configuration it can support up to 195 evacuees (plus 3 crew) in very cramped, uncomfortable conditions. Transport Shuttles carry no weapons, and include enough power to travel up to 1AU.

Top Acceleration: 6; **Toughness:** 14 (10); **Handling:** –1; **Heat Radiation:** 0; **Shield Effects:** 2; **Crew:** 3+17 (3+195); **Jumps:** —; **Weeks per Jump:** —
Abilities: Knowledge (Ship Ops) d6, Piloting d6, Repair d6
Notes: Heavy Armor, Spacecraft, Improved Stabilizer, 0 Healing Pods

TROOP SHIP

Troop ships use the same hull as supply ships, but are modified to carry up to 639 passengers and crew. Accommodations are simple but serviceable, focused on military transport.

Top Acceleration: 4; **Toughness:** 24 (14); **Handling:** –1; **Heat Radiation:** +2; **Shield Effects:** 2; **Crew:** 30+609; **Jumps:** 8; **Weeks per Jump:** 2

Abilities: Knowledge (Ship Ops) d8, Piloting d8, Shooting d6, Repair d8

Notes: Heavy Armor, Spacecraft, Improved Stabilizer, 101 Healing Pods

Weapons:

- 2 × Light Laser Cannon (Range 4/8/16; Damage 3d6; AP 6; ROF 1; PDLB ROF 5; Heat Points 3; HW)
- 2 × Light Missile Launcher (Range 1/2/4; ROF 2; Heat Points 1; 2 reloads per launcher, no nuclear missiles).
  Available Ammo:
  - 4 Kinetic Missiles (Damage 3d6; 8; HW)
- 4 × Mine Cloud Defenses (+2 bonus to Piloting roll to Evade against all projectiles; +4 against one projectile).

UNMANNED LASER PLATFORM

Unmanned ships are the most powerful weapons in a 23rd century space fleet. Unencumbered by the need to protect a human crew from radiation and high-G, as well as from the mass and cost related to life-support systems, unmanned ships can devote their entire infrastructure to attack and defense. They are thus immense weapon platforms, capable of destroying most enemy ships, both manned and unmanned.

Although Unmanned Laser Ships have computers smart enough to make many tactical decisions, in real-life combat it is usually humans who control and direct them. The most common structure for their use is a wall or fleet of unmanned ships surrounding manned battleships in the back line. In this configuration, not only do Unmanned Laser Ships do most of the attacking and receive the brunt of any counterattacks; they can also serve as shields and defenses for manned ships.

Top Acceleration: 10; **Toughness:** 80 (60); **Handling:** 0; **Heat Radiation:** +48; **Shield Effects:** 4; **Crew:**—; **Jumps:** 14; **Weeks per Jump:** 1

Abilities: Knowledge (Ship Ops) d6, Piloting d4, Shooting d8, Repair d4 (These are all computerized)

Notes: Heavy Armor, Spacecraft, Improved Stabilizer, Capital Ship

Weapons:

- 8 × Heavy Laser Cannons (Range 4/8/16; Damage 4d8; AP 12; ROF 1; PDLB ROF 8; Heat Points 6; HW)
- 10 × Mine Cloud Defenses (+2 bonus to Piloting roll to Evade against all projectiles; +4 against one projectile).

UNMANNED MISSILE PLATFORM

Unmanned Missile Platforms are similar to Unmanned Laser Platforms (see above), but equipped with missiles instead.

Top Acceleration: 10; **Toughness:** 80 (60); **Handling:** 0; **Heat Radiation:** +20; **Shield Effects:** 4; **Crew:** —; **Jumps:** 14; **Weeks per Jump:** 1

Abilities: Knowledge (Ship Ops) d6, Piloting d4, Shooting d8, Repair d4 (These are all computerized)

Notes: Heavy Armor, Spacecraft, Improved Stabilizer, Capital Ship

Weapons:

- Coilgun (Range 2/4/8; ROF 1; Heat Points 4).
  Available Ammo:
  - 10 Kinetic Coilgun Projectiles (Damage 3d10; AP 12; HW)
  - 4 Nuclear Coilgun Projectiles (Damage 4d10, AP 14; HW).
- 6 × Heavy Missile Launchers (Range 2/4/8; ROF 4; Heat Points 3; 4 reloads per launcher, maximum 2 can be nuclear).
  Available Ammo:
  - 16 Kinetic Missiles (Damage 3d6; 8; HW)
  - 24 Nuclear Missiles (Damage 2d10; AP 12; HW)
  - 4 Neutron Missiles (Damage 3d6+special; AP 10; HW)
  - 4 NNEMP Missiles (Damage 3d6+special; AP 10; HW)
- 10 × Mine Cloud Defenses (+2 bonus to Piloting roll to Evade against all projectiles; +4 against one projectile).

the voyager: the heroes' ship

Part of the latest batch of Mark V Patrol Ships, the *Voyager* packs quite a punch. It has been designed to be simultaneously fast and deadly, and to be effective on long trips. Its 6.4-meter-radius body gives it a smallish side but its engines, Coulborne Shield and technology make up for the size. With 246 square meters of liveable space, it is comfortable for its crew but long voyages are still an effort. Fortunately the ship includes "Dr. Phillips", a latest-generation virtual therapist program.

At some point in time a rumor circulated about the *Voyager* having had a bad time while being built at the shipyard. Details vary, but almost all of them concern two ship engineers, an accident, and something else that was lost. Wherever the rumor came from, nothing has come out of it so far.

The *Voyager* has several decks that follow the structure of a concentric sphere. These maximize space and take advantage of acceleration and vector changes. The decks include the "A" Deck (support rooms and services), the "B" Deck (engineering, storage and the emergency room), the "C" Deck (the bridge) and the "D" Deck (cabins, mess Room, engine access and access to the detachable G-Gym). "Up" and "Down" are of course relative to the direction the ship is traveling. Note that in case of emergency, it is possible to go all around "D" Deck through an emergency hatch.

THE *VOYAGER*: CIRCLE PATROL SHIP

Top Acceleration: 10; **Toughness:** 19 (12); **Handling:** +1; **Heat Radiation:** +4; **Shield Effects:** 3; **Crew:** 1+5; **Jumps:** 8; **Weeks per Jump:** 1

Notes: Heavy Armor, Spacecraft, Improved Stabilizer. 2 Healing Pods, 6 V-World Pods. Ship's Locker contains one Light Combat Vacc Suit and one Vacc Suit Helmet for every member of the crew.

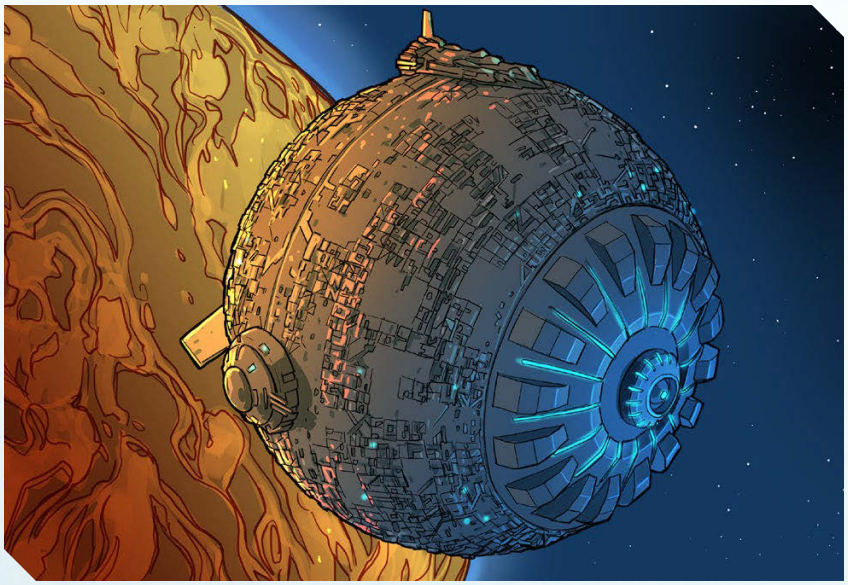
Weapons:

- 2 × Light Laser Cannons (Range 4/8/16; Damage 3d6; AP 6; RoF 1; PDLB RoF 5; Heat Points 3; HW)
- 2 × Medium Missile Launchers (Range 1/2/4; RoF 4; Heat Points 1; 4 reloads per launcher, maximum 1 of them is nuclear).

  Available Ammo:
  - 4 Kinetic Missiles (Damage 3d6; AP 8; HW)
  - 2 Nuclear Missiles (Damage 2d10; AP 12; HW)
  - 2 NNEMP Missiles (Damage 3d6+special; AP 10; HW)
  - 2 Kinetic Cloud Projectiles (Damage 2d4; AP 8; HW; each one takes up one entire launcher payload)
- 6 × Mine Cloud Defenses (+2 bonus to Piloting roll to Evade against all projectiles; +4 against one projectile).

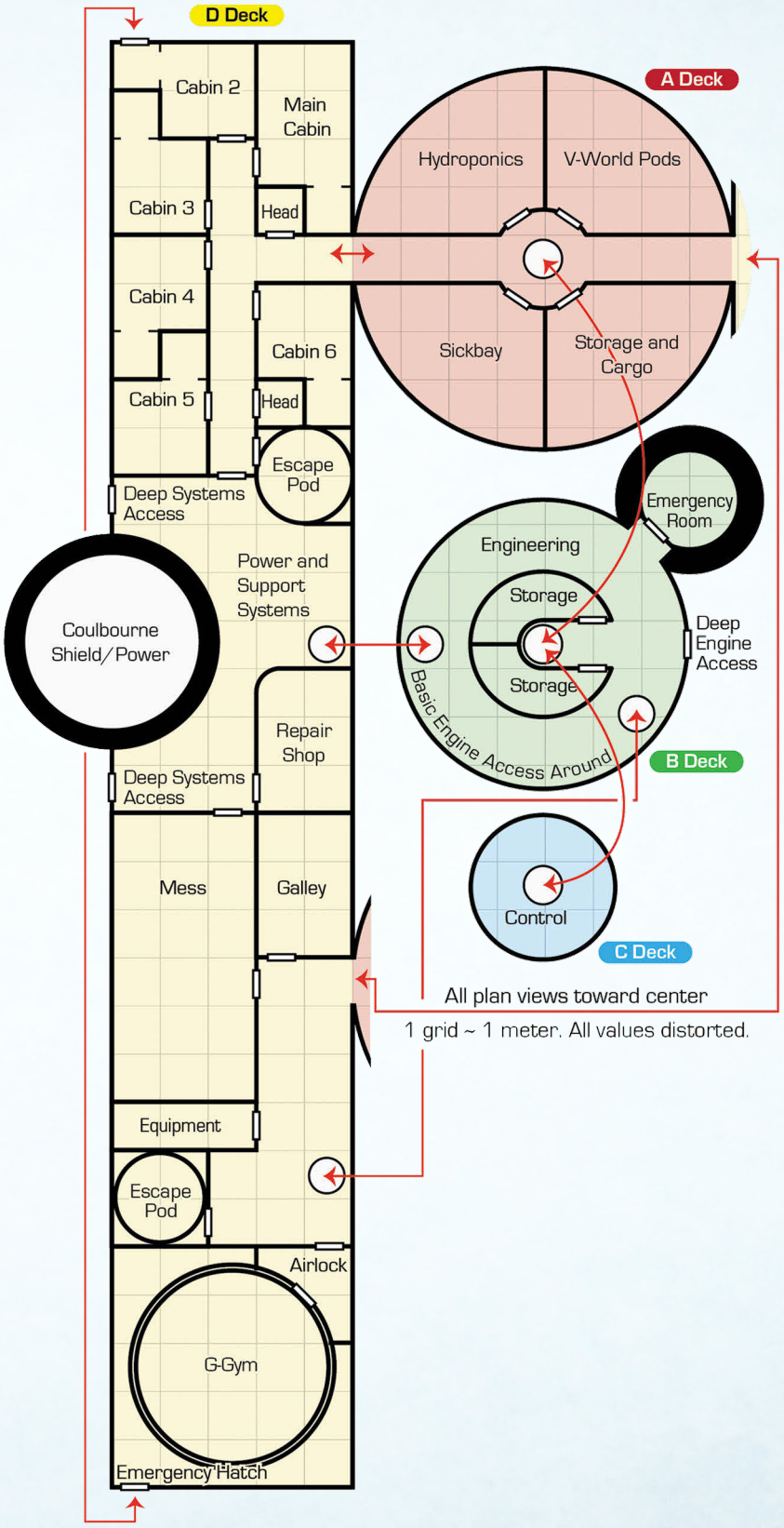
TECHNICAL SPECIFICATIONS

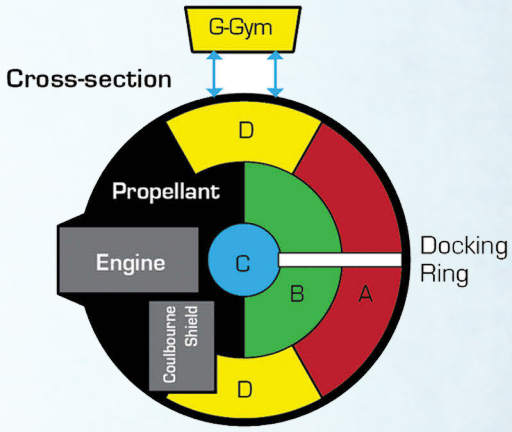
Engine Type: ^{3}He-^{3}He Fusion
Number of Engines: 1
Max Theoretical Exhaust: 15,680 Km/s
Max Theoretical Thrust: 36,000 kN
Engine Effectiveness with current 2217 technology: 65%
Spaceship Mass: 460 tons
Sphere Radius: 6.37m
Average Acceleration: 0.2g
Maximum Acceleration: 5.19g
Total Delta-V: 8,138 Km/s
Propellant Percentage: 55%
Passenger Payload (after Propellant and Engines): 165.6 Tons
Habitable space (after life support): 540 m^3
Habitable "floor" space: 240 m^2

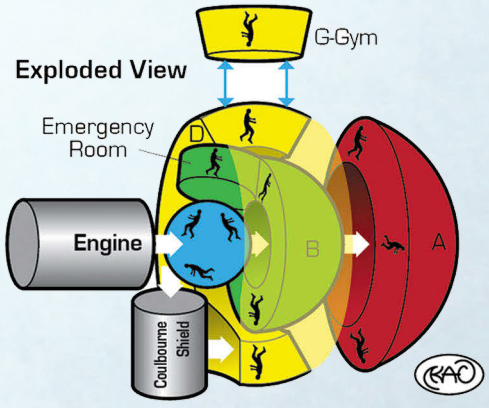


THE VOYAGER

CIRCLE PATROL SHIP







appendix: facts and info for hard sf gamers

Although *Seven Worlds* is first and foremost a role-playing game, we went to great lengths to base it on real science as we know it at the time of writing. We hesitate to call it a "hard SF" setting, though, because of all the expectations that term entails.

This section is written for those who want more detail behind what's scientifically correct and what isn't. We are sure that some readers will find this information incomplete and "not hard enough," and that's OK. We do hope most people find more than enough information here to give the setting an authentic feel should they wish to do that. But first, two disclaimers:

- **Disclaimer Number One:** We absolutely guarantee this book is full of scientific errors, omissions and mistakes. We are gamers, not scientists. This book represents an honest best effort at science, but no guarantees of correct content are attached to it.
- **Disclaimer Number Two:** Although many things in here sound impossibly futuristic, we are, if anything, underestimating the future. Very, very soon this book will be dated, as many of the innovations presented here as things available 200 years from now will actually be available mere years or decades from now. Please remember this is not a treatise on the future; it is a game, and we want our readers to feel comfortable with the depiction of the future they are playing in. A more "realistic" depiction of the future 200 years from now would probably feel so alien it would be difficult for the average player to identify with it. It is weird enough as it is. So, readers from the future, you may accuse this book of being hopelessly dated; but at least you may not accuse it of being unaware of how close the future really is.

GLARING OMISSIONS MADE TO SCIENCE AS WE KNOW IT

What follows is a list of some of the innumerable scientific shortcuts and omissions made in this setting. We are sure readers will find many other sins against science in these pages.

FTL

Simply put, no faster-than-light travel is possible, as far as can currently be theorized. Not only that, relativity tells us there would be significant time continuity problems if FTL travel were possible. However, FTL is such an obvious and accepted cop-out in science fiction that we have just waved it in, just like everyone else. See the sidebar "Is Interstellar Travel Possible?" on page 21 for more.

PSIONIC POWERS

No currently accepted scientific theory supports the existence of psionic or extra-sensory mental powers. They are here because we all like magic in our games. Not only is there no secret unused part of our brains, but our brains produce so little power there is not enough raw energy available to perform what psionic powers would supposedly be able to do. Check out the sidebar "Mind Reading and Psionic Powers" on page 75 for more details.

ENERGY SHIELDS

We currently can theorize of no way to create an "energy wall" shield that can stop lasers, kinetic projectiles, energy, radiation, etcetera. Not only that, if an energy shield existed, it would be subject to the laws of action and reaction and thus could still damage the ship. See the sidebar "Are Shields Possible?" on page 97 for more details.

We decided to include energy shields in the game because given the immense amounts of energy available during space battles, using our parameters for reality these battles would be quick, short and deadly final, and that's not fun. The Coulborne Field makes space combat more interesting and fun, and that's what it is all about in the end.

EARTH-LIKE WORLDS

We have assumed a much higher probability of existence of Earth-like human-habitable worlds than scientists expect in reality. Although recent advances in exoplanet discovery have detected many Earth-sized planets, it is very unlikely they will have all the characteristics necessary for them to support human life without some kind of protection. In this game we have changed things a bit to have more Earth twins than usual.

For example, Concordia is an almost perfect twin of Earth, a planet that could not conceivably exist around a K2 star such as Epsilon Eridani. Concordia in *Seven*

Worlds is modelled assuming Epsilon Eridani behaves like a G6V star with 90% the mass of Sol and 48% of its luminosity. Epsilon Eridani b, the gas giant that scientists suspect really exists around Epsilon Eridani, is simulated in the game at 400 Earth masses.

Tau Ceti is another example. As far as we know the two planets that seem to be in the habitable zone in Tau Ceti do not conform to our expectations for a twin of Earth. See the sidebar "Where are the Habitable Planets?" on page 73 for more information.

ENERGY EFFICIENCY AND FUEL

We have assumed fusion reactions in *Seven Worlds* are extremely efficient. In the case of reactors, ^{3}He production is made via gas deposits separation between ^{3}He and ^{4}He. This is much harder than it sounds. Check out the sidebar "The Energy of the Future" on page 7 for more information.

Speaking of Energy, we decided to focus on ^{3}He mining instead of inventing "unobtainium." To do this, we decided ^{3}He could be harvested and mined, and also would be powerful enough to power the engines. In reality ^{3}He is somewhat harder to find, and there is discussion about whether it is really the best alternative for nuclear fusion, with deuterium and boron reactions also having their proponents and strengths.

SUPERCONDUCTORS

Although no room-temperature superconductors exist yet, we have assumed they have been discovered by the 23rd century, and tiny superconductors are meshed everywhere: Clothes, furniture, walls, etc. There are also vacuum-ready superconductors used in the outer hull of the starships, and they work magnetically just like superconductors in an atmosphere.

GRAVITY

We have assumed current scientific knowledge on long-term gravity simulation, mostly based around the experiences of astronauts on space stations for long stretches of time. However, the fact is we don't know enough about the long-term effects of gravity to assume, for example, what the long-term side effects of using centrifugal force as a gravity substitute will be.

We have also somewhat abstracted the movement of crew within the ship in zero-G using superconductive tunnels.

ALIENS

We have made no effort to explain how aliens think or how their technology works. For all intents and purposes aliens are unfathomable and their technology is simply magic. Readers who need more detail should look up on the Internet a famous quote by Arthur C. Clarke.

IDENTIFICATION AND HACKING

DNA IDs and IDTags will be a way of life in the future. They will be almost impossible to fake and hack, though, unless you're the government. To keep the game interesting and fun we have assumed ID technology is flimsier and easier to fake and manipulate than it will be in reality. The frequent and easy use of the Hacking skill during the game is another example of this.

THE STARMAP

Space is three-dimensional, yet for practical reasons most games show it as a two-dimensional map. One of the goals of *Seven Worlds* is to take advantage of the dramatic opportunities of 3-D maps both to create a deeper sense of immersion and to improve the story.

The challenge with 2-D maps is that it is difficult to use them to navigate if the stars are connected realistically. That's why both the Detailed and Simplified Starmaps in *Seven Worlds* present a logical view of nearby stars without focusing on their real-world location, and that's why we recommend the 3-D Starmap from our web page.

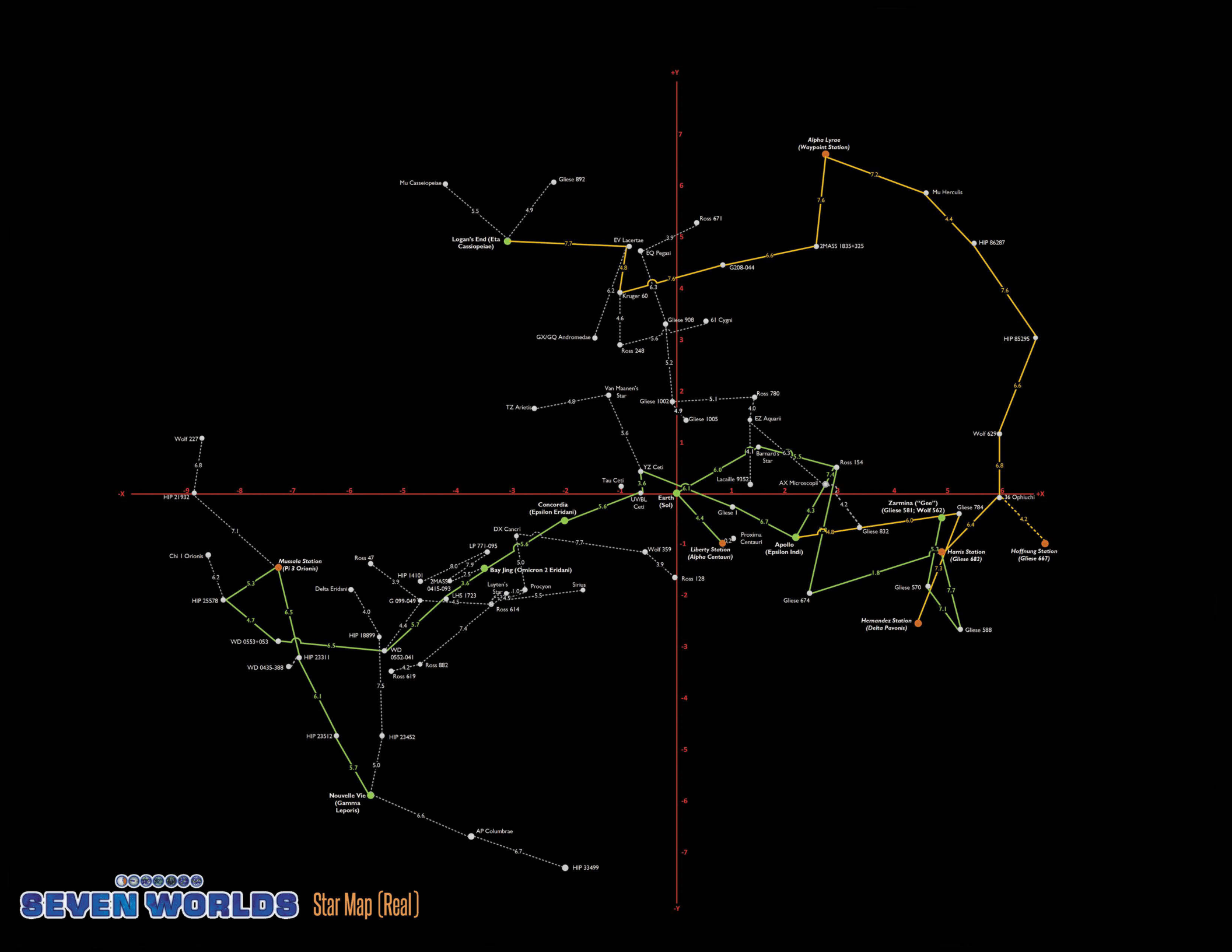
That being said, we are including here a version of the Detailed Starmap with exact star locations. It is included here for readers with a more scientific bent. Hopefully it will reinforce the point that 3-D is the way to go.

SIDEBAR REFERENCES

This section provides references and links for the scientific facts in most of the sidebars of the book. URLs were valid at the time of the writing of this book… but the Internet changes.

THE ENERGY OF THE FUTURE

- Using Fusion to Propel an Interstellar Probe: *http://news.discovery.com/space/private-spaceflight/project-icarus-fusion-propulsion-starship-110405.htm*
- Icarus Interstellar Web Site: *http://www.icarusinterstellar.org/*
- Nuclear Fusion: *http://en.wikipedia.org/wiki/Nuclear_fusion*
- Phil Plait's Google+: *https://plus.google.com/108952536790629690817/posts/QpzayhecezS*
- Lockheed's Skunk Works promises fusion power in four years: *http://www.dvice.com/2013-2-22/*



SEVEN WORLDS Star Map (Real)

lockheeds-skunk-works-promises-fusion-power-four-years
- Helium-3: *http://en.wikipedia.org/wiki/Helium_3*
- The Helium-3 Shortage: Supply, Demand and Options for Congress: *http://www.fas.org/sgp/crs/misc/R41419.pdf*
- The Helium-3 Lunar Chimera: *http://www.googlelunarxprize.org/teams/team-phoenicia/blog/guest-post-helium-3-lunar-chimera-by-james-nicoll*
- Fusion Experiment Breakthrough: *http://www.scientificamerican.com/article/fusion-experiment-breakthrough/*

HOW DO YOU KNOW WHERE YOU ARE IN SPACE?

- International Celestial Reference System on Wikipedia: *http://en.wikipedia.org/wiki/International_Celestial_Reference_System*
- International Celestial Reference System (ICRS): *http://aa.usno.navy.mil/faq/docs/ICRS_doc.php*
- Pulsar definition: *http://en.wikipedia.org/wiki/Pulsar*
- Millisecond Pulsars for Starship Navigation:
- *http://www.centauri-dreams.org/?p=8041*
- Fundamental Physics: Pulsar Navigation:
- *http://www.esa.int/gsp/ACT/phy/pp/pulsar-navigation.htm*
- How interstellar beacons could help future astronauts find their way across the universe:
- *http://www.ras.org.uk/news-and-press/219-news-2012/2111-how-interstellar-beacons-could-help-future-astronauts-find-their-way-across-the-universe*
- Feasibility Study for a Spacecraft Navigation System relying on Pulsar Timing Information:
- *http://www.esa.int/gsp/ACT/doc/ARI/ARI%20Study%20Report/ACT-RPT-MAD-ARI-03-4202-Pulsar%20Navigation-UPC.pdf*
- Using Pulsars to Determine space-time coordinates: *http://arxiv.org/abs/0905.4121*
- Media Material Relevant for Pulsar Navigation: *http://www.xray.mpe.mpg.de/~web/psrnav/index.html*
- Pioneer Plaque: *http://en.wikipedia.org/wiki/Pioneer_plaque*
- Voyager Golden Record: *http://en.wikipedia.org/wiki/Voyager_Golden_Record*
- Reading the Pioneer/Voyager Pulsar Map: *http://www.johnstonsarchive.net/astro/pulsarmap.html*

DISTANCES IN SPACE

- The Astronomical Unit gets Fixed: *http://www.nature.com/news/the-astronomical-unit-gets-fixed-1.11416*
- Astronomical Unit definition: *http://en.wikipedia.org/wiki/Astronomical_unit*
- Light-Year definition: *http://en.wikipedia.org/wiki/Light-year*
- Light-Second definition: *http://en.wikipedia.org/wiki/Light-second*
- Parsec definition: *http://en.wikipedia.org/wiki/Parsec*

THE SEVEN STARS

- Sol: *http://en.wikipedia.org/wiki/Sun*
- Gliese 581: *http://en.wikipedia.org/wiki/Gliese_581*
- Epsilon Indi: *http://en.wikipedia.org/wiki/Epsilon_Indi*
- Epsilon Eridani: *http://en.wikipedia.org/wiki/Epsilon_Eridani*
- Omicron 2 Eridani: *http://en.wikipedia.org/wiki/40_Eridani*
- Gamma Leporis: *http://en.wikipedia.org/wiki/Gamma_Leporis*
- Eta Cassiopeiae: *http://en.wikipedia.org/wiki/Eta_Cassiopeiae*

INTERPLANETARY TRAVEL

- Launch Windows explained: *http://www.nasa.gov/audience/forstudents/brainbites/nonflash/bb_home_launchwindow.html*
- Trip to Mars: Universe Today: *http://www.universetoday.com/14841/how-long-does-it-take-to-get-to-mars/*
- Hohmann Transfer Orbit: *http://en.wikipedia.org/wiki/Hohmann_transfer_orbit*
- Interplanetary Missions: *http://www.projectrho.com/public_html/rocket/mission.php*
- Comparison of Hohmann and Brachistochrone Missions: *http://www.projectrho.com/public_html/rocket/appmissiontable.php*
- Distances between planets in the solar system:
- *http://www.idahoptv.org/ntti/nttilessons/lessons2000/lau4.html*
- Brachistochrone Curve: *http://en.wikipedia.org/wiki/Brachistochrone_curve*
- Castles in Space: a 50-Year Survey of Gravity-Assist Space Travel: *http://www.wired.com/wiredscience/2012/12/castles-in-space-1961-1971/*

THE SCALE OF SPACE AND TIME

- If you don't care about the science below, or have never read or heard Carl Sagan's immortal essay

"Reflections on a Mote of Dust," start here: *http://www.youtube.com/watch?v=8Lm6pEhykhs*

Here are some tools and simulations that allow you to experience by yourself the scale of space and time:

- **The Scale of the Universe:** This nifty interactive animation allows you to compare the scale of humans to both bacteria and atoms and to the universe itself: *http://htwins.net/scale2/*
- **ChronoZoom:** ChronoZoom gives you a perspective on time by allowing you to zoom in and out of particular sections of the Universe's history, and to see humanity's (infinitesimally small) place in it. *http://www.chronozoomproject.org*
- **Timeline: The Age of the Universe:** If you have 14 minutes to spare, you should see this. It shows the evolution of the Universe at a scale of one billion years per minute up until the present. It gives you an idea of how little time humanity has existed. Control your impatience and get a perspective on time: *http://www.youtube.com/watch?v=mxkWa6hUIoY*
- **The entire history of Earth in one minute**. This video is not to time-scale, but never the less it is a good review of Earth's long history: *http://www.youtube.com/watch?v=ZSt9tm3RoUU*

Here are some articles, background and pictures on the scale of space and time:

- Extent of Human Radio Broadcasts (This map of the Milky Way shows how far one hundred years of radio broadcasts have travelled… and the 200-light-year-diameter sphere still looks like a dot. Yet in *Seven Worlds* humanity has travelled less than 50 light-years away from Sol. This shows how little humanity has explored by 2217): *http://static02.mediaite.com/geekosystem/uploads/2011/02/radio_broadcasts1.jpeg*
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vincent furstenberger
Wayne Ligon
Wesley E. Marshall
William Reger
William Walters
Wyse Savage
Xaelvaen

SEVEN WORLDS

Name

Homeworld

Rank and Level

XP

ATTRIBUTES

AGILITY

SMARTS

SPIRIT

STRENGTH

VIGOR

BASE STATS

PACE

CHARISMA

PARRY — Half Fighting +2

TOUGHNESS — Half Vigor +2

MENTAL TOUGHNESS — Half Spirit +2

HINDRANCES

EDGES

N
5
10
15
S
25
30
35
V
45
50
55
H
65
70
75
L
90
100
110

WOUNDS: -1 -2 -3 INC

FATIGUE: -2 -1

Permanent Injuries

SKILLS

GEAR

ARMOR

Head:

Torso:

Arms:

Legs:

EQUIPMENT

Total WT:

WT Limit:

Penalty:

ASSISTANT

Name:

Gender:

Program:

Personality:

Skill Modules:

WEAPON	RANGE	ROF	DAMAGE	AP	WT	NOTES

PSIONIC POWER	COST	RANGE	DAMAGE/EFFECT	DURATION

SEVEN WORLDS

SHIP STATS SHEET

BASE STATS

Ship Name: _____ Top Accel: _____ Handling: _____
Shield Effects: _____ Crew: _____ Heat Radiation: _____
Jumps: _____ Weeks per Jump: _____
Abilities: _____

Toughness

Coulborne Shield

FATIGUE WOUNDS

-1
-2
-3
Wrecked
-2
-1

NOTES

WEAPONS AND DEFENSES

#	Weapon	Range	Damage	AP	RoF	Heat Points	Notes

SEVEN WORLDS

PROJECTILE TRACKING SHEET

Ship Name: _____

Use this sheet to track the number and type of projectiles approaching your ship as well as how many rounds are left until each batch of projectiles hits. For each batch of fired projectiles, note the number of incoming projectiles in the box corresponding to their initial firing range. Cross out the boxes to the left. Each round after the ship performs defensive actions write down remaining projectiles on the next box to the right. If you run out of boxes to the right, the remaining projectiles hit!

Projectile type, if known. (Kinetic, Nuclear, Neutron, NNEMP, Coilgun, cloud, etc)	Number of Incoming Projectiles per range / round			Damage inflicted by any projectiles that hit	Comments
	Long Range	Medium Range	Short Range		
	Long Range	Medium Range	Short Range		
	Long Range	Medium Range	Short Range		
	Long Range	Medium Range	Short Range		
	Long Range	Medium Range	Short Range		
	Long Range	Medium Range	Short Range		
	Long Range	Medium Range	Short Range		

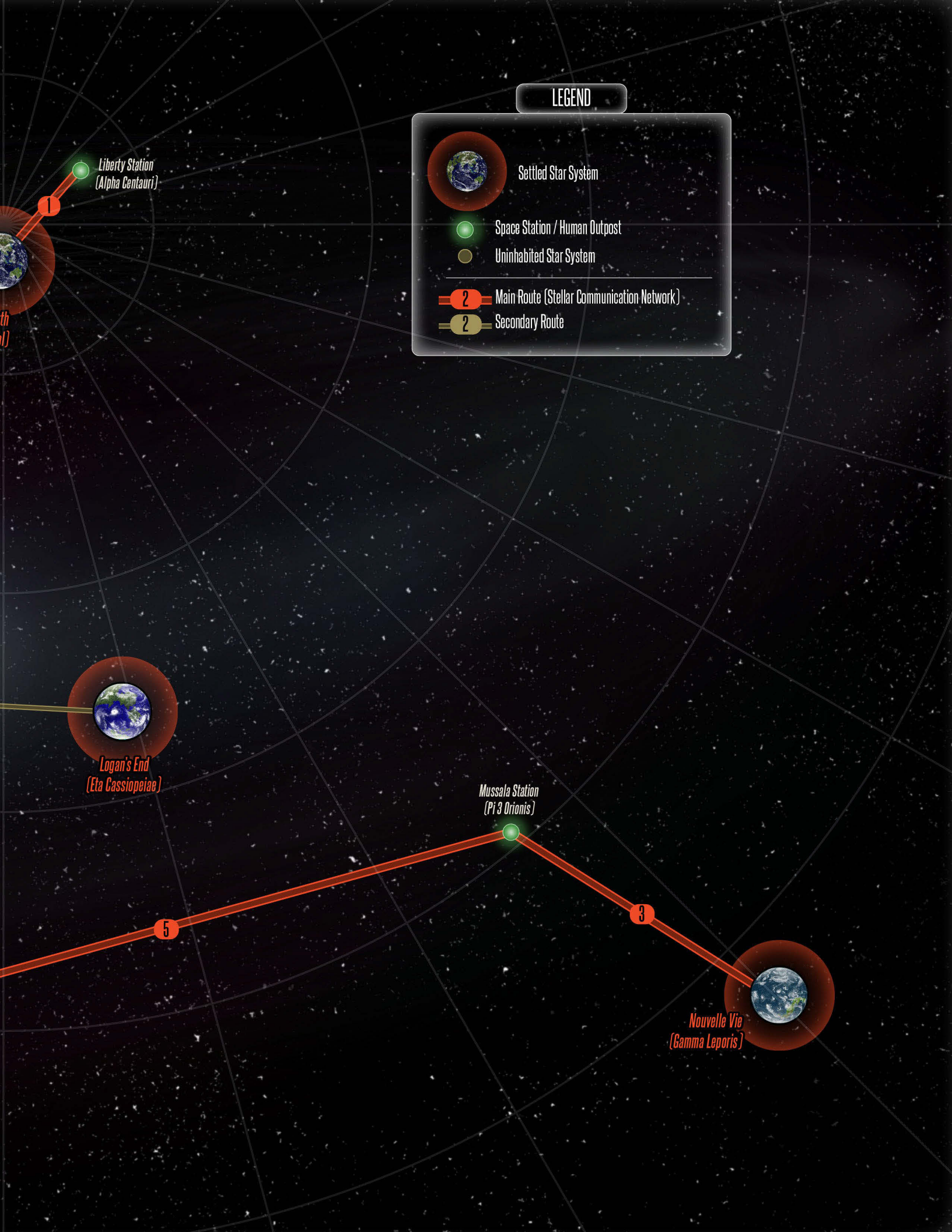


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Ross 154
2
Ear
(Sc
2
2
Harris Station
(Gliese 682)
3
Zarmina ("Gee")
(Gliese 581;
Wolf 562)
Apollo
(Epsion Indi)
1
36 Ophiuchi
1
Hoffnung
Station
(Gliese 667)
5
3
Waypoint Station
(Alpha Lyrae/Vega)
5
Hernandez
Station
(Delta Pavonis)
4
Concordia
(Epsilon Eridani)
1
Bay Jing
(Omicron 2
Eridani)
SEVEN WORLDS


LEGEND
Settled Star System
Space Station / Human Outpost
Uninhabited Star System
2
Main Route (Stellar Communication Network)
2
Secondary Route
Liberty Station
(Alpha Centauri)
1
Logan's End
(Eta Cassiopeiae)
Mussala Station
(Pi 3 Orionis)
5
3
Nouvelle Vie
(Gamma Leporis)

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— Halfway Station

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— Roleplayer's Chronicle

"[THE SEVEN WORLDS CAMPAIGN] WOULD MAKE A PRETTY GOOD TV SERIES."
— Halfway Station

"THE SPACE COMBAT SYSTEM IS DIAMOND-HARD... TOP-NOTCH WORK!"
—Atomic Rockets

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