

It had been 30 years since we first discovered the alien technology. Centered on the Jovian moon Callisto, it fell like mana from heaven. Eagerly, we sought out the alien plans and copied them, revolutionizing intra-solar travel. A new age of prosperity dawned- or so it seemed. Who could have realized what would happen afterwards?

Outer colonies formed; commercial stations were built and the solar economy thrived. The United Earth League struggled to control its colonies, but ties to Earth became less important. Pirates hidden in the Asteroid Belt attacked more and more and friction between the UEL and the now powerful Mars Consortium hit an all-time high.

A trigger, a spark, was all that was required to plunge us into bitter war...

*Miri Kovacs, Solar News Network Anchor
from her unpublished memoirs, 2197*

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Chapter 1

Getting Started

1.1 Starting Terminus

1.1.1 Windows

There are two ways to start Terminus on the Windows operating system. On the Start Menu, you will find choices for "Terminus," and "Launcher." Choosing "Terminus" will start Terminus immediately; this is the option you will want to use most often.

When you run "Launcher," you will have the option of choosing whether you want to use Glide or Direct3D rendering, and in the case of Direct3D, which video card you would like to use in Terminus. For most systems, Direct3D is the best choice. However, if you have a Voodoo card, you may prefer to use Glide. The Launcher also allows you to configure and start a console dedicated multiplayer server. Dedicated servers are described much later on page 82.

1.1.2 MacOS

There are two ways to start Terminus on the MacOS operating system. In the Terminus folder, you will find icons for "Terminus," and "Launcher." Choosing "Terminus" will start Terminus immediately; this is the option you will want to use most often.

When you run "Launcher," you will be able to configure and start a console dedicated multiplayer server. Dedicated servers are described much later on page 82.

1.1.3 Linux

To start Terminus on the Linux operating system, run the terminus binary from the installation directory. If you want to start a console dedicated server, consult the file `config.txt`.

1.2 Configuration

Terminus has many options which affect its performance on various computer systems. If your system meets the following basic requirements, you can generally run the game without changing any configuration options. However, in order to customize the game and optimize the speed at which it runs you may wish to experiment with the game configuration.

1.2.1 Requirements for Microsoft Windows

Terminus will run on the Microsoft Windows 95 and Microsoft Windows 98 operating systems. The following are the hardware and software requirements for this system.

- **Processor** Pentium-II 300MHz or faster
- **Memory** 64MB or more
- **Video** A 3D accelerator card with DirectX drivers, or a 3dfx Voodoo card with Glide
- **Sound** Any sound card with DirectX drivers. A full duplex sound card is required for real-time voice communication.
- **Input Devices** A mouse is required and a joystick is highly recommended.
- **CD-ROM** A 4X (quadruple speed) CD-ROM drive **or** faster
- **Required Software** DirectX 6 or higher

1.2.2 Requirements for MacOS

Terminus will run on the MacOS operating system version 8.6 or higher. The following are the hardware and software requirements for this system.

- **Processor** A G3 400MHz or faster
- **Memory** 96MB or more

1.2. CONFIGURATION

- **Video** A 3D accelerator card with OpenGL drivers
- **Sound** Full duplex support is required for real-time voice communication.
- **Input Devices** A mouse is required and a joystick is highly recommended.
- **CD-ROM** A 4X (quadruple speed) CD-ROM drive or faster.
- **Required Software** Game Sprockets version 1.7 or higher, the Apple OpenGL extensions version 1.1.2 or higher and OpenTransport extensions

1.2.3 Requirements for Linux

Terminus will run on the Linux operating system with a kernel version 2.2 or above. The following are the hardware and software requirements for this system.

- **Processor** Pentium-II 300MHz or faster
- **Memory** 64MB or more
- **Video** A 3dfx Voodoo card with Glide.
- **Sound** Any sound card supported by Linux. Full duplex support is required for real-time voice communication.
- **Input Devices** A mouse is required and a joystick is **highly** recommended.
- **CD-ROM** A 4X (quadruple speed) CD-ROM drive or faster.
- **Required Software** GNU libc version 2.1, Glide version 2 or above, and pthread library 0.8 or above.

1.2.4 Graphics Options

Graphics options are accessible from the Options submenu from the main menu. These options affect how Terminus is displayed on the screen. Setting up the graphics options properly can have a major effect on Terminus game performance. The following is a description of each option on the Graphics Options dialog.

- **Rasterizer** The rasterizer is the current graphics system used to draw everything in Terminus. Systems running the Microsoft Windows operating system have support for two rasterizers: Glide and Direct3D. Under Linux, only Glide is currently supported, and systems running MacOS support only OpenGL. The rasterizer

can only be changed outside the game using the Launcher, or the Terminus command line.

- **Detail Level** The detail level slider represents the complexity of the graphics that will be drawn with the current set of options. The farther to the right the slider is, the higher of the complexity. Moving this slider will affect all graphics options at once. If you find Terminus runs too slow, moving this slider to the left can improve speed.
- **Transparency** Transparency allows you to partially **see** through certain effects. Transparency is also used to draw the HUD in your ship. We recommend you keep this option enabled.
- **Lens Flares** Lens flares are drawn whenever a bright light appears in the game. For example, the sun uses the lens flare effect.
- **Texture Mapping**
All objects in Terminus (including ships **and** bases) are polygonal models. Texture mapping is the process of drawing color and surface texture on those models. We recommend you keep this option enabled.
- **High-Poly Models** Objects in Terminus are drawn with a variable number of triangles based on how far you are from the object. Enabling high-poly models tells Terminus to use many more triangles than it usually would to draw some objects. This creates nicer looking graphics but has a significant impact on the speed of the game.
- **Detail Model** Your ship's detail scanner (see page 31) can display a miniature version of your target. Enabling the detail model option will make this happen.
- **HUD Center Marker** Your ship's center marker on the HUD (see page 23) can be drawn in two different styles. Enabling this option draws the center marker in the traditional style. Disabling this option draws the center marker in a simpler style.
- **Career Colors** Ships allied with either Earth or Mars will be shaded in their respective colors if this option is enabled. Earth ships will be given a bluish tint and Mars ships will be given a reddish tint.
- **Lighting** All objects in Terminus are subject to lighting. This makes parts of an object facing light brighter than parts of an object not facing light. Disabling lighting turns off this effect. We recommend this option stay enabled.

- **Nebula** The nebula option toggles whether or not a nebula-like background is drawn in space. While the nebula looks nice it does have a significant impact on game speed.
- **Specular** Specular is a more advanced form of lighting that makes certain parts of objects look more rounded and shiny. This has a significant impact on game speed.
- **Polygon Planets** Planets and moons in the Terminus solar system can be drawn as 3-dimensional objects. Enabling this option causes objects to be drawn in 3D. This has a significant impact on speed.
- **Velocity Lines** Velocity lines are drawn on the HUD to show which direction your ship is traveling. Disabling this option turns off these lines.
- **Ship Trails** Ship trails are drawn on the HUD to show the path of nearby ships. Disabling this option turns off these trails.
- **Starfield Density** Using this slider you can vary the number of stars that are drawn in the game.
- **Shrapnel Level** This slider adjusts how an object explodes. A high shrapnel level causes many pieces of the object to be ejected into space. Excessive shrapnel may slow down a server, so it may be advantageous to lower this setting.
- **Gamma Correction** This slider adjusts the brightness of all the graphics drawn in Terminus. As the slider moves, there should be an observable change in the brightness of the game. Some video cards do not support this option. See your video card documentation if this slider does not work. There may be another way outside Terminus to change the brightness of the graphics.
- **Capture Gamma** Capture gamma is similar to the gamma correction control, but is only applied to screen shots and AVI exports.

At the bottom of the graphics options dialog are two buttons. The **Ok** button will close the dialog. The **Advanced** button will open the Advanced Graphics options. Changing these options affects some very basic things about how Terminus uses your video card. Only change these options if you are familiar with your video card and know what you are doing. The following descriptions are technical in nature.

- **Depth Buffer** This option toggles depth buffering (or z-buffering). We recommend you leave this option enabled. If you disable this option you will see polygon sorting problems.

- **Bi-linear Filtering** Toggles bi-linear filtering.
- **Tri-linear Filtering** Toggles tri-linear filtering.
- **Anti-aliasing** Toggles anti-aliasing for sprites.
- **Triple-buffering** Toggles triple buffering. On some cards, enabling this option will significantly increase game speed.
- **Mip-mapping** Toggles mip-mapping.
- **Palettized Textures** Some video cards are capable of using 8-bit textures. Using this option saves texture memory.
- **Video Modes** This is a list of available video modes. Terminus is capable of using a higher resolution in game. However, while using any interface screen Terminus will use 640 by 480 resolution. Furthermore, some OpenGL drivers display 16-bit graphics very poorly. If you think you might be experiencing this try switching to a higher bit depth video mode if one is available.

1.2.5 Audio Options

The Audio Options dialog is accessible from the Options submenu. The audio options allow you to set the volume of four different types of sound.

- **Sound Effects** This is the volume of all the general sound effects played in the game and interfaces.
- **Dialogue** During the game, various characters will speak to you, either at stations, or over the comm system. This slider represents the volume of all spoken dialogue.
- **Music** This slider controls the volume of the CD music.
- **Recording Volume** In a multiplayer game you can talk to other pilots during the game. This slider controls our software amplifier for your microphone.

1.2.6 Control Options

The Control Options dialog allows you to configure the keyboard, joystick, mouse and other input devices for Terminus. At the top of the dialog is a list of different categories of actions that can be performed in the game. The middle section of the dialog contains a list of all the actions in the selected category, and the input device (or devices) assigned to each action. At the bottom of the screen there is a slider and a row of buttons.

The slider, labeled Joystick Dead Zone, compensates for joystick "drift." Some joysticks do not center exactly but drift in some direction.

If you find your ship slowly turning in the game while your joystick is centered, try increasing the joystick dead zone.

In general, movement controls, such as mouse and joystick position, can be applied to motion controls of your ship, such as pitch and yaw. On/off controls, such as keys and buttons, are applied to toggles and functions. To illustrate how to make and remove an assignment between an input device and action, two examples are provided.

The first example is assigning a new key to the Fire Weapon action. First, select the Weapons and Targeting category from the topmost list. Then find Fire Weapon from that list of actions. It should be at the top. Click on it. Now go down to the bottom row of buttons a click on Add. A prompt will appear. At this prompt you can press any combination of keys, mouse buttons and joystick buttons. Try holding down the Shift key and pressing F. Now in the list under Fire Weapon, <Shift>-F should be listed. This means whenever you hold down Shift and press F in the game your weapon will fire. A maximum of 4 different assignments can be made to one action. To remove <Shift>-F simply click on it and hit the Delete button at the bottom of the dialog box.

The second example is assigning a new control to yaw your spacecraft. Select Joystick and Mouse from the top list. Find the Yaw action and click on it. Click the Add button. A prompt will be displayed. Now move your mouse left and right. A new prompt will come up stating that you moved your mouse on the X-axis. Click Ok. Now you can turn your ship by moving the mouse left or right. You also have the option of reversing the direction of the axis.

If you bind a single key or control to multiple functions, you will be notified of the conflict. You are free to ignore this warning if this is what you really want, but most often you will want to alleviate the conflict by reassigning one of the controls.

Your control configuration will be saved for you when you quit Terminus. However, if you want to optionally save your control configuration to a separate file, click on the Save button at the bottom of the dialog box. This is primarily useful if you want to share control configurations with other people.

Once you click on the Save button you will be prompted to enter the name of the file you want to save. There is also a list of already existing control configuration files in the save dialog. One of these files is terminus.ct1. This file is a special control configuration file. It is always loaded when Terminus starts up and always saved when Terminus shuts down.

To load an already existing control configuration click on Load and select the file you want to load. Terminus includes control configuration

files that mirror (as best as possible) popular space flight combat games. You can load one of these control configurations if you are familiar with another such game. It may help you learn Terminus more quickly.

Pressing **Merge** is similar to **Load**, except the merge function does not remove controls that are currently in use. This allows you to load an additional set of keys and controls for various functions. As an example, you can load a set of mouse bindings for flight control, and allow your keyboard and joystick settings to remain intact. Any duplicate controls that are loaded are thrown out.

1.2.7 Game Options

The Game Options dialog contains several different general gameplay configuration options. They are detailed as follows.

- **Flight Recorder Buffer** This slider controls the size of the flight recorder buffer. See page 96 for more information about the flight recorder. The farther the slider is to the right the larger the buffer and the more memory the flight recorder uses.
- **Mouse Sensitivity** This slider controls how fast the cursor moves across the screen in interfaces and the sensitivity of the mouse in general.
- **Force Feedback Sensitivity** If you are using a force feedback device with Terminus this slider controls the strength of the forces Terminus generates.
- **Menu Animations** The checkbox controls whether or not the menu system is animated.

1.2.8 TCP/IP Options

These options are used only for multiplayer Terminus. The first option, Server Port, is the port number that Terminus communicates on for all game data. The second option is the port that Terminus uses to communicate with GameSpy. See page 87 for more information about GameSpy support in Terminus. If you do not wish to use GameSpy support within Terminus set this port number to 0. We recommend that you do not change either of these port numbers, unless you really know what you're doing.

The final option, Region, is a list of regions around the world. Selecting the region that represents your geographic location will allow Terminus to communicate with the closest possible GameSpy server.

1.2.9 Diagnostics

The diagnostics dialog is accessible directly from the main menu. This dialog can be used when troubleshooting hardware related problems with Terminus. Diagnostics can help when configuring the game. The elements of the diagnostic dialog follow.

- **Version** The version of Terminus that is running.
- **Multiplayer Version** The version of the Terminus multiplayer engine that is running. Generally, to play a multiplayer game all players must be using the same multiplayer version.
- **Processor** The name of your computer's processor.
- **System RAM** The amount of RAM your system has.
- **Rasterizer** The graphics system used to draw the graphics in the game.
- **Joystick** This is a list of joysticks that Terminus has detected and can use. Also listed are the number of buttons and axes that each joystick has.
- **Force Feedback** This box indicates if Terminus has detected a force feedback device on your computer that it is capable of using.
- **Full Duplex Audio** In order to send audio communications to other players in a multiplayer game your sound card must support full duplex audio. This box indicates the status of full duplex audio.

Pull duplex audio must be enabled by your operating system to work properly. Consult your operating system documentation for information on how to configure this feature.
- **Aureal 3D** On machines running the Windows operating system, Terminus supports sound cards that use Aureal 3D sound technology for 3-dimensional sound. This is the status of that Aureal 3D sound.
- **Direct Sound 3D** On machines running the Windows operating system, Terminus supports sound cards that support Direct Sound 3D in hardware. This box indicates whether Terminus has detected and is using such a sound card.

Chapter 2

Basic Game Play

2.1 Game Modes

There are four modes of play in a single player Terminus game. They are Training, Gauntlet, Free Mode and Story. Different game modes can be launched via the New Game/Single Player menu. Each game mode requires you to specify a difficulty and physics setting before actually starting the game.

The highest difficulty setting is considered the most "realistic," as you have no particular advantages over any other character or ship in the game. Lowering the difficulty setting has three effects: First, the lower the difficulty setting, the more effective your weapons are against ships controlled by non-player characters. Second, it becomes harder for your ship to take damage from either weapons or collisions. Third, the performance of the non-player ships becomes poorer. All of these lower the overall difficulty of the game.

The physics setting affects only one thing, the performance of your ship. Low physics settings allow your ship to stop faster and turn without "sliding". Sliding refers to your ship traveling in a one direction while facing another. Players familiar with atmospheric flight simulators or some space combat games may be more at home with a lower physics setting. A higher physics setting allows the player ship to use the full zero-G Newtonian physics model.

2.1.1 Training

Training allows a novice pilot to learn the basics of space flight in Terminus. Training is highly recommended for those just starting out.

Training starts at a base. By moving your mouse to one of the doors on the left side of the base screen and clicking, you will be able to go to the mission briefing screen. After you read the mission briefing, you will be launched into space on a training mission. There are 5 total training missions. Once you complete them all you should be an able pilot.

2.1.2 Gauntlet

Gauntlet is the player's proving ground. **Whether you want to pit your skill against some of the toughest AI in the game or you just want to take a new ship out for a test fly, Gauntlet will give you the chance.**

The main goal of Gauntlet is to face down many levels of the finest fighters and emerge victorious. With only one life to live, your only means of survival is your own skill and a cruiser with which you can dock and repair. The levels of gauntlet each have a theme and provide waves of increasing intensity before you advance to the next. Your opponents vary in skill and attack style ranging from the most basic "one-on-one" to the intense "free-for-all" of the final waves.

Can you survive the gauntlet?

2.1.3 Free Mode

Free Mode is a much more complex type of game than Gauntlet. Upon launching a Free Mode game, the career selection screen comes up. After selecting a career, the game starts. You begin at a base with a standard ship. You are free to travel the solar system carrying out contracts, trading items, collecting bounties and much more. Many non-player characters also exist in the solar system. They will be doing some of the same things you are in the solar system. Free Mode can continue indefinitely and has no real end. Only players with some experience should play this game mode. While Free Mode is a rewarding and exciting type of game to play, it requires that the player understand at least the basics of Terminus.

2.1.4 Story Mode

Story mode is the heart of the Terminus experience. In story mode, you become a pilot in the universe of 2197, and experience events as they happen, flying missions, talking on stations, reading the news, and

above all, trying to discover the truth. When the story ends, Terminus transitions to free mode play.

When you start the game in story mode, you are presented with the choice to follow one of four different career paths. Each path is different, and greatly influences your experiences in the game, so choose the one most appealing to your playing style or level.

United Earth League

Recommended for the beginner player, you take on the role of a pilot for the United Earth League Military. As a member of the elite Ursa Squadron, you will be expected to partake in numerous missions. Some of these will be carrying out the needed duties of any military: keeping intelligence gathering operations running smoothly, transporting supplies to bases, and patrolling for suspect ships. However, you will also be called upon to perform in critical League operations, in which your role in the success of the operation is key.

Mars Consortium

Recommended for the beginner player, you become a member of the Nergal Squadron, a highly commended unit in the Mars Consortium Military. Because the Consortium forces are viewed by many as a mere militia, you will often have to confront overwhelming odds. You will partake in routine missions for the military: transporting goods, assisting in intelligence gathering operations, and rapid attack operations on specific targets. You are also charged with completing key missions, risking life and limb in the continuing struggle for Martian Independence.

Pirate

Recommended for the advanced player, the pirate is a blend of roles. You will be required to manage your own assets while being an active member of the Marauder Clan. Your standing among other pirates is key to your continued membership, and any wrong move will get you ousted. Many of your contracts will involve intelligence gathering, the hijacking of cargo, and killing those who have crossed the Marauders. You also have the opportunity to partake in critical sorties, helping to further the plans of the Marauders to gain power and respect in the Solar System. Because of your affiliations, your life is always in danger. Expect to be attacked at every turn.

Mercenary

Recommended for the advanced player, your allegiance as a mercenary is only to yourself. You may ally yourself with whomever you choose, but keep in mind that one false move can put your name on the blacklist of the wealthiest employers in Sol. You will need to constantly monitor your assets and keep abreast of the fluxing socio-political climate. Many of your missions will involve the transportation of goods, spying **for** others, and sometimes even hijacking or killing. You might also be presented with contracts of dubious origin, for which you might fly with other mercenaries to complete your objectives. While the rewards for these dangerous missions are great, the consequences of failure are even greater.

2.2 Operating Your Spacecraft

Space flight can seem complex at first. But in this section **you will** learn the basics of operating your ship. You'll find out about the instruments used in space travel and combat. You'll also learn about using thrusters to control your ship's movement. Then you can move on to the summaries of ship weapons and combat strategies, and the overview of interplanetary navigation. If at any point things get out of hand, you can press *P* to pause the game, and review this document. You can also press *Esc* to use the in-game menu to change options or exit.

2.2.1 The HUD

Your ship's computer is equipped with a Heads Up Display, or HUD. The HUD organizes the information you need for both flight and combat, and displays this data in a transparent layer over your view of space. Once you become familiar with the HUD, you will quickly grasp your ship's position, speed, condition and many other variables just by glancing at different areas of the screen.

Velocity Lines

Your HUD produces velocity lines on your screen to give you a frame **of** reference in space. When you are still, velocity lines are visible only as stationary dots. But when you are moving, the velocity lines streak past you showing which direction you are moving and how fast. The longer the lines, the higher your speed.

Center Reticle

The center reticle of your HUD provides information **useful primarily** in combat situations (Figure 2.1). When a ship or another object is targeted, the name of that object will appear at the very top of your center reticle. In the example shown, "Razor" is the name of the targeted ship.

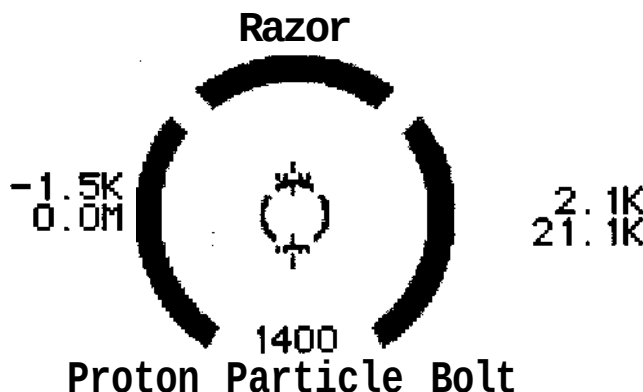


Figure 2.1: The HUD center reticle

Just below the target name on the center reticle is a curved, horizontal bar. This is your surge indicator. As you fire weapons, your surge cells drain. The surge indicator represents this process by filling in less and less of the horizontal bar. When the bar appears empty, your weapons will no longer function properly. Over time, however, your surge cells will recharge, and the surge indicator bar will once again fill-in. Detailed information on surge cells can be found on page 170.

The curved vertical bar below, and to the left of, the surge indicator shows your ship's hull strength. As you take damage, the vertical bar will be depleted in the same proportion as your hull. In figure 2.1, the player's ship has sustained approximately 30% damage.

The curved vertical bar below, and to the right of, the surge indicator represents your target's hull strength. In the example shown, the ship targeted by the player has sustained approximately 10% damage.

On the left of your hull strength indicator are two numbers. These numbers show your current velocity (top number) and acceleration (bottom number) rates. **It is important to realize** these rates **are measured in terms of the direction you are facing**. For the purposes

of these measurements, the direction you are facing is considered *forward*. Therefore, when you are not facing the same direction in which you are traveling, the velocity and acceleration rates for this backward movement will be presented as *negative values of forward movement*. In the example shown, the player is not accelerating forward or backward, but is drifting backward at 1.5 km/s.

On the right of your target's hull indicator are two more numbers. These are your closure rate (top number) and your distance from the current target (bottom number). In figure 2.1, the closure rate shows that the player's ship and the Razor are converging at 2.1 km/s. Because the bottom number in the example indicates that the player is presently 21.1 km from the target, you can deduce that, if the player heads directly for the Razor, impact will occur in about 10 seconds.

When your ship is armed, a weapon name and number will appear at the bottom of the center reticle. This display shows which weapon is currently selected and the amount of ammunition it has available. In figure 2.1, the Proton Particle Bolt has been selected and 1400 rounds of helium are available. Note that the ammunition number refers to the quantity of helium units available, not the number of shots. Because the proton particle bolt uses two helium units per shot, each shot fired will decrease the ammunition count by two (from 1400 to 1398, and so on). You will learn more about specific weapons later.

When a torpedo is selected, you will see a number to the right of the ammo indicator. This number indicates how many torpedoes your computer is capable of tracking simultaneously. When you fire a torpedo, this number will decrease. When you have reached your torpedo limit, you will not be able to fire until one of your previous torpedoes has expired.

Inside the center reticle there is a smaller circle which indicates the exact center of your screen. This center marker is useful in determining exactly where your ship is heading, as well as for targeting objects during combat. Aligning the center marker circle with the lead vector (see below) will improve your aim tremendously.

A ship with weapons also will have one or more small crosses in the center reticle. In figure 2.1, there are two, one just above and one just below the center marker circle. Each cross corresponds to a bay containing one of the currently selected weapons. In the example, the player has two proton particle bolts, one near the top of the ship, and one near the bottom. When a ship is very close to a target, the crosses will move away from the center of the screen, to help with aiming weapons.

The crosses also change color to indicate readiness status. When a cross is white, this means the corresponding bay is ready and will fire

next. If a cross is red, then the corresponding bay will not fire when you pull the trigger. When you hold the trigger, bays will alternate in firing and you will see the crosses alternate from red to white and back to red.

Targeting Indicators

When you target a ship or another object (Page 37), a target box will appear on your HUD surrounding the object. (Figure 2.2) The color of this box gives you information about the targeted object. If the box is red, then the target is out of range for the currently selected weapon. If the box is yellow, then the target may be in range, depending on closure rate and other factors; but neither a hit or a miss can be predicted with certainty. If the target box is blue, then you are in range and a well executed shot will likely hit its mark.

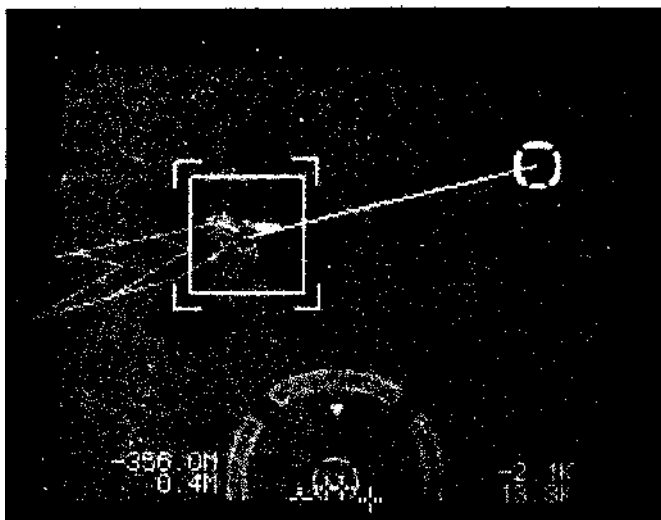


Figure 2.2: The HUD target box, lead vector, and trail

The target box has two components. The inner box always follows the target, but the outer box varies. This outer box is the lock-on indicator. It shows you when there is a trajectory lock for weapons such as torpedoes, the force beam, and others which require it. When you first target an object, the inner box will appear immediately. Then the outer box will begin spiraling inward toward the target. (Be prepared

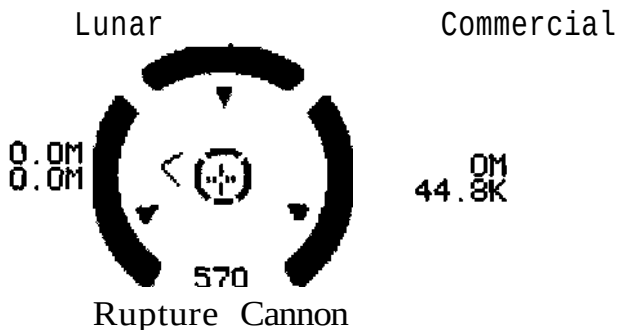


Figure 2.3: Offscreen Target Arrow

for this to take longer when targeting ships with high stealth.) **When** the outer box has completed its inward spiraling, and it looks like the example in figure 2.2, you have achieved weapon lock.

If your target is not visible on your screen, your HUD will not show a target box. Instead, you will see a small red arrow in your center reticle (See figure 2.3). This arrow indicates which direction to turn to bring your target on-screen. If the arrow blinks red, then the target is behind you, and you will have to turn more than 90 degrees to get it on-screen.

The HUD also creates a lead vector on your screen as another aid for aiming weapons. A lead vector is a line projecting forward from the very center of your target and ending with a small circle. The circle shows you where to aim your weapon to hit the target, assuming both you and the targeted object continue moving at the same velocity. As mentioned before, aligning the center marker circle of your center reticle with the circle at the end of the lead vector is the best way to hit the target. In the example shown in figure 2.2, the player must aim above and to the right to hit the targeted ship.

There is one last indicator which does not deal particularly with targeting, but can be important for identifying ships. A special white diamond-shaped indicator will appear around a non-player ship that is sending you a message. This will help you determine who is talking as you play story mode.

Scanner

At the bottom center of the HUD is your scanner. The scanner helps you track other ships and objects in the area. Every object within your

scanner's range, and which your scanner can detect (ships with high stealth may be invisible to your scanner), are represented as a dot on the scanner. The color of the dot corresponds to the career of the ship or object. Projectiles are colored yellow, and objects with no career (such as vortex gates) are purple. The dot on your scanner corresponding to an object you have targeted will have a small square, similar to the target box, surrounding it.

Any object on the same plane as your ship (that is, neither above nor below you) will be represented by a dot inside your scanner's oval. For an object outside of your plane, there will be a line extending from the imagined surface of your scanner's oval either up or down to the dot representing that object. By doing this, the scanner allows you to determine the location of objects, relative to your ship, in all three dimensions. The lines through the center of the scanner's oval indicate the center of your scanner and the location of your ship.

Displayed below your scanner is your current scanner range. This is the maximum distance within which an object can be detected by your scanner. You can increase or decrease your scanner range with the *equals* (=) and *minus* (-) keys. But remember that increasing your scanner range will not guarantee detection of all ships within that range since the stealth barriers of some crafts may keep your scanner from registering them.

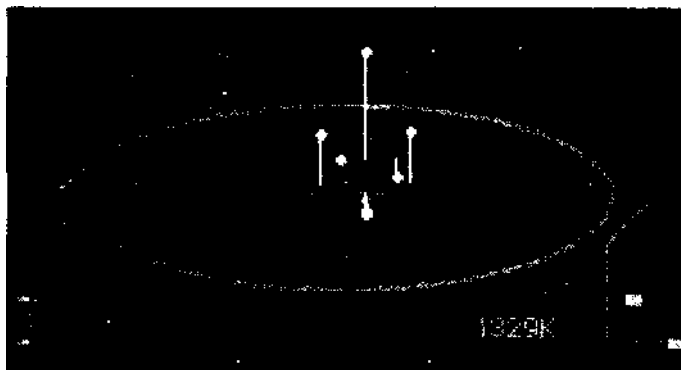


Figure 2.4: The Scanner

For any ship which is unable to see you due to your stealth, the other ship's weak scanner, or a combination of the two, its corresponding dot on your scanner will have a small number next to it. That number, which will range from 1 to 100, indicates how close that ship is to locating you.

As long as that number remains below 100, that ship cannot see you. Therefore, if a ship has a small 90 next to it, you will know that you probably can't get much closer without being detected. But if a ship has only a 10 beside it, then you can get much closer before being noticed. When this small number disappears completely, that ship will then be able to see you on its scanner.

Ship trails

Your HUD also creates "trails" marking the path of every ship visible on your screen. These trails help you locate other ships and see their current trajectory. The color of a ship's trail corresponds to its career in the same way as scanner dots. This makes it easy to assess a combat situation, even from a distance, by looking at the trails of all the ships involved.

One important point to remember about ship trails is that their direction and their length (which indicates the corresponding ship's velocity) are both relative to your ship's direction and velocity. So, for instance, if you are stationary, the trails you see from another ship will indicate that ship's velocity. If you are moving, however, then your direction and velocity become factors in reading the other ship's trails. No matter how fast you are going, if another ship is moving at the same velocity, its trail will be very short. In order to be useful, then, ship trails almost always must be considered along with other information.

Look at the example in figure 2.2. The trails head down and left from the target ship. This could indicate that the ship is moving up and right, relative to the player's ship. But it is also possible that the target ship isn't moving at all, and the player's ship is moving down and left. Furthermore, looking at the trails alone, it is impossible to know whether both ships are moving "forward" (into the screen) or "backward" (out of the screen). If this seems confusing, keep in mind that this concept will be much easier to understand once you see ship trails in action.

Indicators and Alerts

Your HUD also includes several important gauges. On the left side of your scanner is the fuel gauge. To the right of the scanner is the energy gauge. These gauges measure the quantities of fuel and energy on your ship.

Below the fuel gauge are gauges for heat and stress (Figure 2.5). Certain ship components, such as your engine, will add heat and/or stress to your ship. As you fly, you may see these gauges climb to the

right. Under such circumstances, it is usually advisable to ease up on the accelerator, as well as on other systems, in order to cool down.

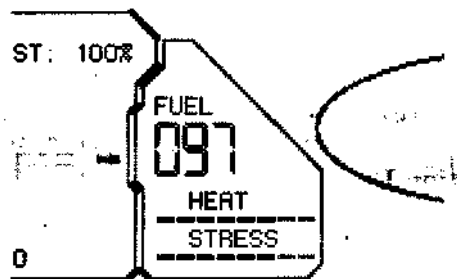


Figure 2.5: Gauges

Below the energy gauge are gauges for radiation and oxygen. Monitoring these gauges is important to the health of the ship's pilot. A ship which produces too much radiation creates a serious, frequently fatal situation. A ship with insufficient oxygen may be even more perilous.

If something does go wrong on your ship, you will be alerted by signals appearing in a horizontal line above the scanner and multi-function displays (described below). These warnings include the following :

- **HULL** Your hull is dangerously weak. Further stress could be disastrous.
- **COLLIDE** Your ship is heading toward another ship or object. Unless you take immediate action, a collision will be unavoidable.
- **HEAT** Your ship is overheating. This will disable your surge cells, preventing you from firing weapons. It will also decrease your ship's tolerance for stress.
- **RAD** Radiation level is excessively high. Harm to the pilot's health, including the possibility of death, will follow.
- **FUEL** Your ship is extremely low on fuel. Soon you will be unable to fly.
- **ENERGY** Your ship is seriously low on energy. Running out will cause your computer and other systems to shut down.
- **STRESS** Your ship's hull is undergoing serious stress. Hull damage will soon result.
- **SPEED** You are traveling too fast. Subatomic particle collisions will increasingly stress your hull.

- **OXYGEN** Breathing will soon become difficult, then impossible.

Message Centers

Under certain circumstances, your HUD produces messages which appear on the left and right side of the center reticle. These messages let you know particular ship systems have been activated or deactivated, or warn you of specific dangers, such as an incoming torpedo.

Multi-Function Displays

At the bottom left and the bottom right of your HUD are the multi-function displays, or MFDs. Each MFD can be configured to present one of several different packages of information. The MFD cycle keys, *comma* (,) and *period* (.) allow you to choose which information is displayed, and in which MFD. The package choices are:

- **Ship Diagnostic** This includes a diagram of your hull, with color indicating damage to armor. It also shows your current speed, hull strength, and thrust level. Thrust level is the percentage of full power at which your engines and thrusters are firing. This MFD also includes a display of how much space remains in your cargo bay.
- **Detail Scanner** This includes the name of your current target, its hull strength, closure rate, distance, and ETA (estimated time of arrival). If you have targeted a system on the ship, that is listed as well, along with the system's strength and armor. To use this MFD, you must have a functioning detail scanner aboard your ship .
- **Ordinance** This shows the name of the weapon currently selected and the amount of ammunition available for that weapon, along with a list of all the weapons on your ship. If the names of all weapons you have will not fit at once on the MFD, the display will cycle every few seconds. A weapon name will be colored blue unless there is no ammunition available for that weapon. Then its name will appear in red.
- **Sniffer** To use the sniffer MFD, you must have a sniffer device on your ship. You also must be within 20km of the targeted ship, depending on the target's stealth, and your own scanner power. The sniffer device scans the targeted ship and then displays a complete manifest of what is aboard. However, the sniffer does not provide information about whether a device onboard the target ship is active or inactive, or whether it has been damaged or not.

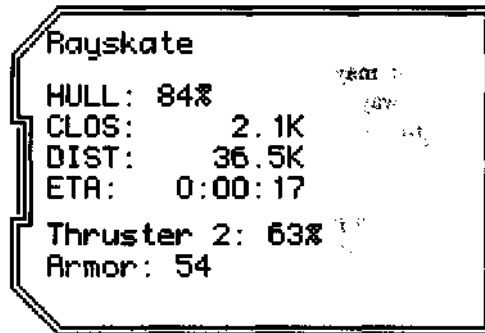


Figure 2.6: Detail scanner MFD

- **Scoreboard** In multiplayer melee modes, the Scoreboard shows each player's score.

2.2.2 Flying In Space

Flying in space is flying in a vacuum; there is no air friction to slow you down. All of the power from your ship's thrusters goes directly into acceleration. And, because there is no resistance in space, it takes exactly the same amount of time to slow from one speed to another as it does to accelerate between these same two velocities. That means if it requires 15 seconds to go from a stop to your desired speed, you must begin to slow down more than 15 seconds before reaching your target if you want to avoid a collision.

Inertia Compensators and Thrusters

Without gravity or air friction in space, a pilot often can use help in staying properly oriented. To this end, all space ships are equipped with inertia compensators. When active, inertia compensators will automatically fire the appropriate thrusters to help maintain speed and keep the ship moving in the direction it is pointing.

With the inertia compensator active, press **A** to increase speed and **Z** to slow down. By pressing **Z** you can also move backwards. You also have thrusters to move you laterally, and up and down. However, because a ship's main (forward/reverse) thrusters are almost always more powerful than its lateral thrusters, facing in the direction you wish to travel and then moving forward is usually most effective.

Thrusters and Unrestrained Flight

Sometimes, however, it may become useful to face one direction while traveling the opposite way. This occurs most often in combat situations when a pilot wants to retreat from an enemy without giving up visual contact. To do this, you must turn off your inertia compensators using *C*. Now your thrusters will no longer automatically correct your flight based on the direction you point.

With your ship's inertia compensators disabled, you can use *A* to thrust forward and *Z* to thrust backward. For moving left, use *Q* and use *W* for moving right. Use *5* to thrust up and *X* to thrust down.

Thrust Level

When you press the various thruster keys, the thrusters generally fire at full power. However, there may be times when you want a more precise level of control over your velocity. In these cases, you will want to change your thrust level. Thrust level is displayed on the ship diagnostic MFD, is decreased by pressing *D* and increased by pressing *E*. When your thrust level is 50% for example, your thrusters only fire at half power, reducing both your acceleration, and sensor signature.

Don't forget to increase your thrust level back to 100% if you need to make a quick getaway. It will take you much longer to get anywhere if you leave the thrust level down.

Stopping

During space flight you may be accelerating along more than one directional axis at once - up, left and forward, for instance. Stopping can be tricky. That's why the "stop" key (*TAB*) is very useful. Hitting this key will activate your inertia compensators and coordinate the appropriate thrusters to bring your ship to a stop as quickly as possible.

2.2.3 Looking Around

Sometimes you can gain a better perspective on your situation by using a different point of view. In *Terminus*, several points of view are available:

- **Front (Press *F1*)** This is the normal view, looking out the front of your ship.
- **Rear (Press *F2*)** Looks out the rear of your ship. Your HUD is still viewable, but the center marker is removed.
- **Left (Press *F3*)** This view looks out the left side of the ship.

- **Right (Press F4)** Looks out the right side of the ship.
- **Up (Press F5)** Looks up.
- **Down (Press F6)** Looks down.
- **Chase (Press F7)** Views your ship from directly behind.
- **External Padlock (Press CTRL-F7)** Views your ship from the outside, but changes orientation to keep your current target within view at all times.
- **Weapon (Press F8)** Chases the most recent torpedo you have fired.
- **Target (Press F9)** Chases your current target.

You may change your zoom in any of the views by pressing *right bracket (])* to zoom in, and *left bracket ([)* to zoom out.

2.2.4 Weapon Types

Before you can go into battle, you should become familiar with all the different types of weapons you might use or encounter. Keep in mind that every weapon requires at least one surge cell to operate. Increasing the amount of surge will enhance the performance of all these weapons, but to varying degrees.

Energy Weapons

Energy weapons require large amounts of surge to operate. While low surge will not prevent an energy weapon from being fired, it will reduce the damage imposed by each shot. Therefore, allow your surge cell to power up sufficiently in order to get the maximum from the weapon. Helium-3 is relatively lightweight, so stocking up has little negative impact on your ship's maneuverability.

Although the range of energy weapons is less than mass weapons, the energy weapons tend to inflict more damage. The helium plasma cannon, for instance, has the greatest damage factor of any weapon except the torpedoes.

- **Electron Particle Bolt (EPB)** The EPB is the weakest of the energy weapons, and has a moderate range. However, this weapon is also the lightest and can fit into any weapons bay. This makes multiple EPB configurations convenient. EPBs can be repelled by an EM field (see page 93).

Ammo consumption: 1 unit of helium-3 per shot

- **Proton Particle Bolt (PPB)** The PPB delivers medium damage and has a medium range, and is attracted to EM fields. The PPB is only slightly larger than the EPB, and can be fit into most weapons bays.
Ammo consumption: 2 units of helium-3 per shot
- **Neutron Particle Bolt (NPB)** This weapon has a longer range than a PPB, but offers less damage per shot. It also requires more ammunition to operate than the EPB or the PPB. However, the NPB has the benefit of being unaffected by any electromagnetic fields.
Ammo consumption: 3 units of helium-3 per shot
- **Helium Plasma Cannon (HPC)** The HPC is a powerful, rapid-fire energy weapon. Only the largest ship hulls can accommodate this sizable weapon. The HPC is also unaffected by an EM field.
Ammo consumption: 10 units of helium-3 per shot
- **Training Weapon** This is a weapon used for training purposes, which does not fire live rounds.

Mass Weapons

All mass weapons require some surge to fire. But, unlike energy weapons, mass weapons will inflict the same degree of damage regardless of surge. Generally, mass weapons have a greater range than energy weapons as well. It is important to note, however, that mass weapons impart a form of stress when fired. Therefore, it is not advisable to fire a mass weapon when a ship is already near its stress limits.

- **Rupture Cannon** This weapon fires an exploding projectile. But be aware that the rupture cannon also has one of the shortest ranges of any weapon. Like the EPB, the rupture cannon can be fit into any weapons bay. Because it is the lightest of the mass weapons, rupture cannons are often used in groups of four or more. These weapons are extremely inexpensive to buy and maintain, which makes them common additions to many civilian ships. Rupture rounds are repelled by an EM field.
Ammo consumption: 1 rupture round per shot
- **Mass Driver** The mass driver is the middle of the road for mass weapons. This weapon can be placed on almost any ship and offers a high rate of fire with a reasonable range and damage rate. The mass driver is a favorite among the Mars military.
Ammo consumption: 1 metallic round per shot

- **Rail Gun** The rail gun has the longest range by far of any projectile weapon currently available. It also offers an excellent speed and damage rate. The downside of the rail gun is that it is very large and heavy. Only the largest ship hulls can accommodate this weapon. Another negative factor is that the rail gun will degrade with use. Costly repairs will be necessary when this weapon is used extensively.

Ammo consumption: 1 metallic round per shot

Torpedoes

You will have to outfit your ship with the appropriate launcher to use any of the torpedo weapons. To operate effectively, the Icarus and the Omega torpedoes both require a target-lock. The Rocket is a "dumb-fire" projectile weapon and must be aimed at its target.

- **Icarus Torpedo** The Icarus has the longest range of all the weapons at your disposal. However, this weapon sacrifices maneuverability for speed. Once fired, it will accelerate quickly. But the downside is that the Icarus can be "side-stepped" without great difficulty.
- **Omega Torpedo** The Omega is slower than the Icarus. But the Omega has a larger payload, making even a single hit with this torpedo potentially devastating. The Omega also can turn tighter than the Icarus, so it is much tougher to "side-step."
- **Rocket** The rocket has no guidance system at all. It is slow and it has the shortest range of all the projectile weapons. It does, however, have the largest payload. The rocket is used mainly to damage large capital ships. Be forewarned: one hit with the rocket can destroy even the sturdiest single-seat fighter.

Flares

Flares are used to confuse and divert incoming torpedoes. But the word "flare" itself is an archaic term. The flares of the late 22nd century work by duplicating the sensor signature of the user's ship. Be aware, however, that the actual sensor signature of a ship is always stronger than the flare's decoy signal. Therefore, to be most effective, flares should be fired close to the incoming torpedo. Flares can be fired like a normal weapon, but since it is important to be able to fire a flare quickly, it can be fired immediately by pressing \.

Immobilizers

This weapon will disable a ship's engine permanently. The only way to repair the damage done by an immobilizer is by bringing in a repair tug. The number of shots needed to disable an engine will vary depending on target size. Ammunition for an immobilizer is extremely expensive and often is hard to come by.

There are two types of immobilizers: Light and Heavy. The Heavy immobilizer is used only by the military and, consequently, very little information about it is available.

Related technology

The following items are rarely used as weapons, but because they are fired in much the same manner as weapons they have been included in this section.

- **Force Beam** By attracting objects within its range, the force beam can be used to move material in space. The amount of attraction will depend on how close the target is. A weapons-lock is necessary for the force beam to operate. The force beam requires no ammunition, but it does generate a high amount of radiation.
- **Mining Beam** Used by mercenaries to mine ore in the asteroid belt, the mining beam can return a sizeable profit in a short time span. Be aware, though, you will need a large cargo bay to haul enough ore to make your effort pay-off. No ammo is required.
- **Repair Tug** To fix a ship disabled in deep space a repair tug is required. A ship equipped with a repair tug launches it toward the immobilized ship to complete the needed overhaul.
- **Spy Probe** As the name suggests, a spy probe is launched to gather information about a specific target. Spy probes are necessary for the completion of many posted contracts. When launched, the spy probe configures itself to transmit on your sensor receive frequencies, so you can view its telemetry on the navmap. One of these frequencies must also be set appropriately to complete a spy contract. See page 69 for information on how to set sensor frequencies in the Comm interface.

2.2.5 Basic Combat

Targeting

Your HUD's targeting function can be used for finding information about other ships as well as for aiding you in combat. When you target a ship, its location is indicated on the HUD systems designed for this purpose. The targeted ship also can be evaluated using the various scanner displays on the reticle. Here is a list of all of the targeting methods:

- **Target closest (Press J)** Targets whatever object is closest to your ship.
- **Target center (Press U)** Targets whatever object is closest to the center of your screen.
- **Target next (Press K)** Targets the next object in the sector.
- **Target previous (Press H)** Targets the object you targeted previously.
- **Target Earth Ship (Press L)** Cycles through all the Earth ships.
- **Target Mars Ship (Press semicolon)** Cycles through all the Mars ships.
- **Target Marauder Ship (Press quote)** Cycles through all the Marauder ships.
- **Target Other Ship (Press O)** Cycles through any ships not in one of the other three categories.
- **Target closest incoming missile (Press I)** Targets the nearest missile that is locked onto you.
- **Target next incoming missile (Press U)** Cycles through all incoming missiles.
- **Target Communicating Ship (Press 0 [zero])** Targets the most recent ship that sent you a communication.
- **Target Subsystem (Press G)** Cycles through the various subsystems of the currently targeted ship. This is useful in case you want to focus your attack on a propulsion bay, or weapons bay, for example.
- **Target Turret (Press Y)** If you are targeting a capital ship, this key will cycle your target through the various turrets on that ship. The target subsystem key will also target turrets, but because it is often necessary to target turrets very quickly, this key is provided.

- **Clear Target Subsystem (Press B)** This key restores your targeting system to target the entire ship.
- **Target by Name** If you know the name of an object in your sector, you can target it immediately by using the `/target` command. For example, to lock onto Ursa 04, simply type `/target ursa 04`.

With the exception of the "target closest" key, all targeting keys only target ships within your scanner range. You can change your scanner range using the *equals* (=) and *minus* (-) keys.

Key Combat Tactics

Space combat demands the mastery of many skills and techniques. Give yourself a head-start by reviewing these key tactics:

- **Closure** To reach a distant destination, your first impulse may be to travel as fast as possible until you get there. But, because it takes as long to slow down as it does to speed up, this method of flying may lead to ramming your target or passing right by it. It is best to use a more conservative method. As you get closer to your target, slow down and fix your approach vector to be sure you reach your destination at a reasonable speed.

If you are approaching a target and realize you don't have time to stop, try to fly around the object by turning in the appropriate direction and applying your main thrusters. Remember, your lateral thrusters are usually not as powerful.

Also, if you approach your target too quickly, landing a weapon becomes very difficult. When you over-fly your target, you make another high-risk pass necessary as well. Of course, approaching too slowly will make your ship a more likely target. You must find a speed between these two extremes that will work for the situation at hand.

- **Weapon Choice** The weapon you choose will depend on the particular circumstances. When you must fire a great distance at a target, a torpedo is usually best because it has the longest range and can track any movements made by your opponent during the extended interim of the weapon's travel. For medium to close range combat, when your ship and/or your target are moving quickly and thus shortening the lead vector (see below), high-speed mass weapons are usually best. For slow targets such as capital ships, bases, or heavy fighters, it is a good idea to use the slower

but more powerful energy weapons, which generally inflict greater damage per hit. Select your weapon by pressing *Enter*.

- **Leading the Target** Speed is all relative. When you fire a weapon, its velocity will be determined in part by the velocity of your ship at that instant. You must account for this fact when aiming the weapon. You can use the lead vector on your HUD to guide you in aiming weapons, but remember it has its limitations. The lead vector plots a course for your selected weapon to intercept the target. It predicts where your target will be, relative to your ship's position, in the time it will take your selected weapon to reach the target. To do this, the lead vector assumes the velocities of your ship, the target, and the weapon itself will all remain constant.

To maximize your aiming accuracy, try to shorten the distance between the target and the lead vector. One way to do this is to change your sideways velocity by using the lateral thrusters. Another way is to choose a weapon with a greater speed.

When your ship and/or your target is accelerating, then the HUD lead vector will be much less accurate. If you know this to be the case, aim your weapon around the lead vector, in the direction of acceleration.

Once you have lined up your shot, fire your weapon by pressing *Space*.

- **Evasive Weapons** An enemy firing at your ship must also use lead compensation in order to make a hit. By erratically changing your speed and direction you can make this much more difficult for your opponent. However, there is a downside to this method of evasion: it also makes it difficult for you to hit your enemy. This is another case where you will have to find a balance between two conflicting goals in order to be effective.

Multifire

Normally when you pull the trigger, a single weapon fires. Some pilots prefer to use multifire, in which all weapons of the same type fire simultaneously. Multifire results in more damage to the opponent if a shot is executed accurately, as well as more energy and ammo wasted if a shot is missed. The use of multifire is entirely up to pilot preference. Feel free to try turning multifire on and off in combat and see which you prefer. Multifire is toggled by pressing *M*.

2.2.6 Navigation

Up until this point, the focus has been on flying your ship within a local area. In this section, navigation between different planetary sectors will be discussed.

The Navmap

On the navmap, the location of every object for which your ship has sensor data is plotted. This includes bases, ships, and vortex gates. A brief description of the features and components of the navmap follows.

- **Viewing the Map** Press *CTRL-N* to activate the navmap. It will appear as in figure 2.7. Initially, the navmap will be centered on your ship. If you drag the left mouse button, you can rotate the map on two axes, right-left and up-down. Dragging the right mouse button (or holding down the Control key while dragging) allows you to zoom in and out. Move the mouse up to zoom in, move it down to zoom out. The color of the grid shows the strength of your sensor data at each point. You will generally be able to detect ships in the blue region of the grid. Red regions are outside your sensor range. The grid will also show the sensor influence of other ships on-screen which are sending you sensor data.
- **Selecting** Clicking on any object you see on the navmap will re-center the map around that object. It also will show information about the object in the detail display located in the bottom left corner.

The bottom right corner contains a list of all the objects available for viewing, divided into groups. Selecting one of these object names also re-centers the navmap. The group names are Inanimate Objects, Fighters, Capital Ships, Bases, Gates, Moons, and Planets.

- **Searching** You can seek out objects by using the search box at the bottom of the navmap. It will find any object name starting with the string you type in the box and then display the results in the box in the lower right.
- **Detail Display** The detail display shows information about the currently selected object. This includes its name and hull strength, and your closing velocity, ETA, and alignment. Also listed is the object on which your navigation system is currently locked (navlock).

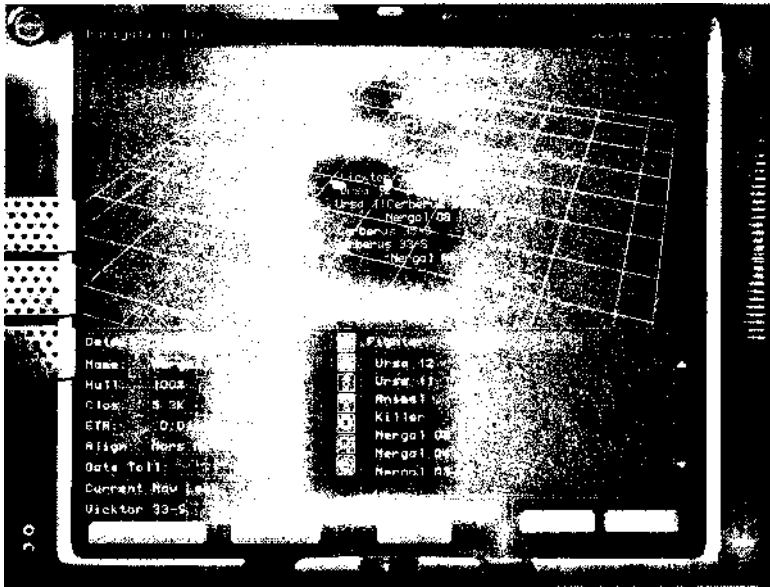


Figure 2.7: The Navmap

- **Navlock** This button allows you to lock your navigation system on a particular target. This will allow you to travel through the gates in the gate path to your destination. You can also navlock an object without using the navmap by using the `/navlock` command from the cockpit. For example, to navlock UEMS Unzen, you may type `"/navlock uems unzen"`.
- **Gate Path** This button toggles the display panel to show your gate path. The gate path will appear only if you are navlocked on an object. The gate path identifies the vortex gates through which you have to travel to reach your target. The toll amount for each gate is also listed.
- **Target** This button allows you to target an object once you leave the navmap. This will work only if the object is within the same sector as you.
- **The Registry** The registry is a database of all known ships and their owners. You can access the registry by clicking the **Registry** button, and view logs of ships, space stations, and pilots. As a civilian, you can only access information about space stations.

However, military pilots can view detailed logs of ship activities, such as docking and vortex gate travel. The registry is most useful for finding particular ships or pilots if their whereabouts are unknown.

Using Vortex Gates

You can use vortex gates if you are navlocked on an object, such as a space station or a planet, outside your sector. A yellow indicator will appear on your HUD and point you to the proper gate (Figure 2.8). If you are not facing the gate, the indicator will appear as an arrow pointing in the direction to turn. If you are facing the gate, then the indicator surrounds the gate on your HUD.

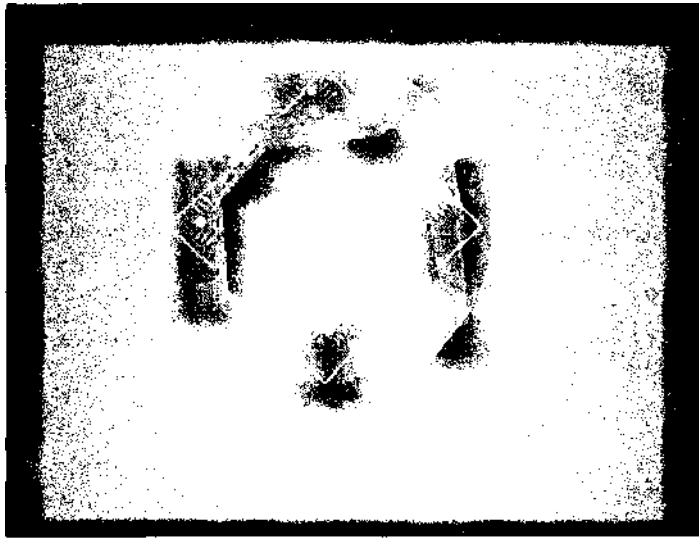


Figure 2.8: Navigation Lock Indicator

To activate the gate you must have a navlock. Once you have reached the gate, simply press *V* and it will open for ten seconds to allow your passage.

2.2.7 Docking

Docking at space stations is essential to being a pilot. Recently, the process has been greatly simplified by an automated system implemented

after several deadly crashes prompted revision of the older manual docking method.

Today, the procedure requires only that you approach the docking bays, marked with blinking lights, at a slow velocity. Then you activate the docking computer by hitting *CTRL-D*. If your approach is sufficiently slow, your ship's engine computers will coordinate the docking procedure with the station's main computer, firing thrusters as needed. If you attempt to dock while moving too quickly, or from too far away, your computer will not be able to compensate and will abort the docking maneuver.

Stations

- **Commercial** This is the most common type of station in the Solar System. Commercial stations have no official military or group designation, and they can be accessed by civilian pilots. But not all commercial stations are alike. For instance, some stations may allow certain goods which are not permitted by others, and you will find that not all parts and supplies are available on every station.
- **Military** There are several military stations throughout the Solar System, the majority of which are controlled by the United Earth League. Each military station is accessible only to personnel affiliated with that station's military. All operations are launched from these bases. For this reason, they often become the targets of attacks.
- **Research** There are two research stations. One is a commercial enterprise. The other is a highly guarded station, at a remote and secret location in the Jupiter Node. Little is known about activities on either research station. Their lack of openness leads many in the Solar System to question the nature of these operations.

2.3 Military and Commercial Stations

Military and commercial stations offer many similar activities, as well as activities which are unique to each. What is and what isn't available on the two types of stations is a result of the differences between the military and civilian careers themselves.

The military, by definition, is a highly controlled organization. Pilots in the armed forces have limits on their freedom. But, at the same time, everything these pilots need to fulfill their duties is provided to them with little effort on their part.

- By contrast, civilian pilots have much more flexibility. They can decide which mission contracts to accept and they will get paid for successfully completing them. However, civilian pilots must do everything on their own - from procuring the right ship for an assignment, to buying special weapons or cargo. And, because a civilian pilot must accomplish much more, the commercial stations must have a broader range of facilities to accommodate.

This section describes the features of both military and commercial stations, distinguishing where appropriate between what's available to a military pilot and what's available to a civilian pilot. The section which follows this one focuses on aspects which are exclusive to a commercial station. Keep in mind that pilots in civilian careers do not have access to military stations, and military pilots cannot visit a commercial station.

2.3.1 Lounge/Concourse

While docked at a military station, pilots in the armed forces can enter the lounge. There, they can confer with colleagues, catch up on the latest media reports, or go into the briefing room to learn about an upcoming mission.

The concourse on a commercial station serves a similar purpose as the military lounge. In the concourse, civilian pilots can communicate with workers and other visitors to the station. They can also review contracts and buy or sell items, including the materials necessary to build their own ships.

2.3.2 Conversations with Characters

In story mode, pilots have the chance to converse with non-player characters from many walks of life. These military officers, technicians, doctors, journalists, criminals, business-people and fellow pilots appear from time to time on certain bases and on capital ships.

To see if a conversation is available, click on one of the character hot-spots in the lounge on a military station or in the concourse on a commercial station. A window will appear with a list of characters to choose from. Select a name and hit the **OK** button, or hit the **Cancel** button to close the window.

Once you select a character, your conversation will begin. A picture of the character's face appears in the upper left. Your dialog options appear in the lower window. In the upper right area, you will see the character's part of the conversation.

You proceed through the conversation by selecting what to say at each interval. The character will respond, triggering additional dialog

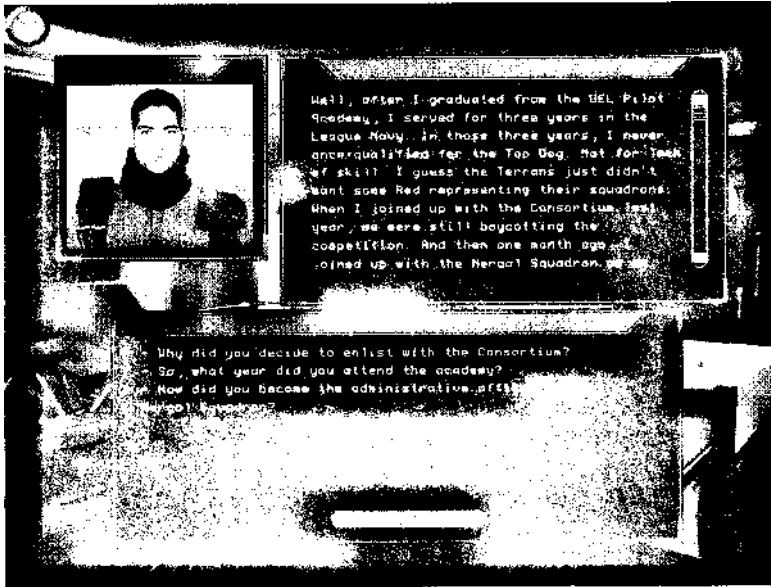


Figure 2.9: Talking to a Pilot

choices for you. This continues until the conversation ends naturally, or you press the End Conversation button. If you press this button, you may later resume the conversation from where you left off. You may also try to converse with the same character at a later time. He or she may have something new to say.

2.3.3 Info/Comm Booth

The Info/Comm menu provides access to news services, a database for buying and selling goods, a personal database, and other information and communications systems. This is available on the military stations and the commercial stations.

News Screen

The News Screen keeps you up-to-date on current events in the Solar System. New reports are posted periodically. You will be notified directly of a breaking story if your news pager is turned on (see page 71).

The top section of the News Screen lists all of the news items available. Along with the story headline, this section also displays the time the report was posted and a flag indicating whether or not you have read it. The stories are listed in chronological order, beginning with the most recent. Click on a headline to access the story.

The text of the story will appear below. The pages will change automatically as the text is read aloud by the anchor. You can also use the left and right arrows to change pages manually. The Audio button can be used to turn the voice on or off.

Economy Screen

The Economy Screen is a vital resource for success as an entrepreneur. It contains information on pricing and the availability of merchandise at commercial bases throughout the Solar System.

To view information about an item, choose the appropriate category from the list of icons at the left. This will display a list of all the items in that category. When an item is selected, the window at the bottom displays a description of the item, including its volume and mass.

The window at the right will display a list of commercial stations in the Solar System. Each base reports the price at which you can buy and sell the item, as well as that station's current stock.

Personal Info Screen

The Personal Info Screen has seven sections: Personal Info, Ships, Contracts, Standing, Face, Page Toggles, and Clock. It can be accessed on the base via the Info/Comm booth, or from your ship by pressing *CTRL-I*.

- **Personal Info** The Personal Info section displays some basic facts about your character. Here you can find your name, career, and reputation, along with the number of kills and the amount of credits you have. Implications of reputation are explained on page 74.
- **Ships** The Ships section shows a list of all the ships you own, as well as their current location. Clicking on a ship name will give you some basic information about the craft. This section is rarely relevant for military personnel.
- **Missions/Contracts** For military players, this window will show information on your current mission. For civilian players, this window will list all the contracts you are currently working on. By

clicking on a particular contract, you will access detailed information about it. Civilian players may cancel a contract by selecting its name from the list and hitting the Cancel button.

Civilian pilots also have the option of selecting "Auto-Set Frequencies." When this option is enabled and you accept a contract, your ship's frequencies will be automatically set to match those specified by the contract.

- **Standing** The Standing window gives you an idea of how your work as a pilot is currently rated by each of the other careers. Keep in mind that this information is only an approximation. Also, an individual ship may or may not share the same feelings as others in its career.
- **Face** The Face window on the upper-right displays a picture of the face which you selected at the start of the game (free mode **and** story mode only, see page 20). Other players see this picture when you communicate with them.
- **Clock** The Clock at the lower right shows the current date and time in the Terminus universe.

Comm Screen

The comm system accessed on a station is exactly the same as the comm system aboard your ship. Detailed information on its use can be found on page 68.

Navmap Screen

The navmap accessed on a station is exactly the same as the navmap on your ship (Page 40), except it uses sensor data collected from the space station.

2.3.4 Pager

The Pager holds messages sent to you and will relay your responses. **The** Pager button can be accessed from the Personal Info, Comm, Navmap, or Engineering screens on your ship, or from any station screen. It is the green indicator in the upper-left corner of each of those screens.

The button has three states. When there are no waiting pages, **the** button is off. If there are waiting messages, the button will be on. When a new page arrives, the button flashes. Click the button when a page is waiting to bring up the pager window.

The pager window displays all of your waiting pages. You may cycle through the pages by pressing the arrow buttons. There are several types of pages which you can receive.

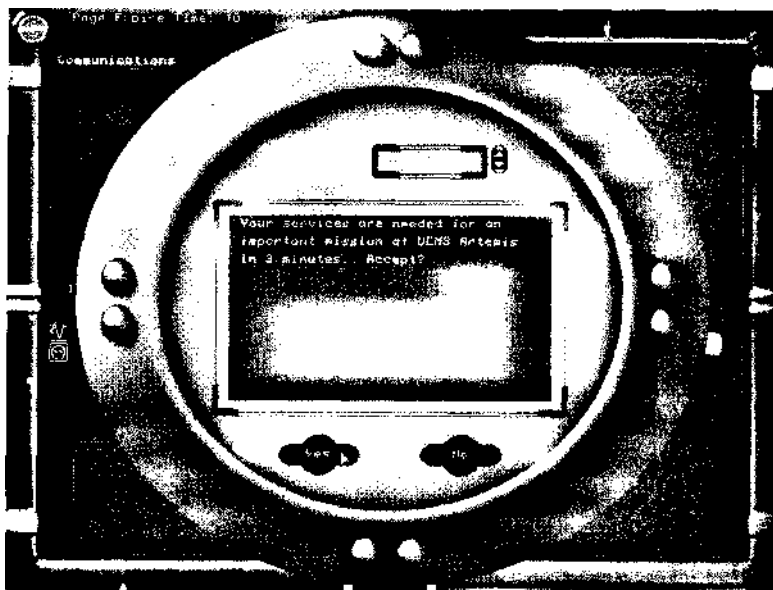


Figure 2.10: The Pager

If your News Pager option is on (see page 70), you will receive a page when a news story is posted. You can read the story at the News Screen (page 45) when you have free time.

When a high-priority mission becomes available for your career, you will be paged and asked to participate. Since this type of mission is extremely time-sensitive, you will be given only a short period in which to respond. If you decline the mission, or don't respond at all, you can return to your previous activities.

If you agree to participate in a mission, you must travel to the station indicated, go to the Mission or Contract Screen (see below), and accept the mission. If you happen to change your mind about taking a mission, you may return to your Pager and cancel.

2.3.5 Tactical Operations/Contracts

Each mission (military) or contract (civilian) is labeled as a certain type. The time that the mission was posted is also listed. You can click on a mission to select it for further review. Additional information will be presented in the lower left box. In the lower right box, if you are a military pilot, you get to see the ship you will use. Here are the mission types:

- **Strike** On a strike mission, you set out to destroy a certain ship or ships. The mission is complete when all assigned targets are destroyed. In your pre-mission briefing, you are told the last known location of the target (s). Spy probes may also be targets of strike missions.
- **Hijack** Hijack missions require taking the cargo away from a certain ship and bringing it back to a base. In your pre-mission briefing, you are told the last known location of the ship and where you are to bring the goods.
In order to hijack a ship you must target it and send the comm command "Tell target to jettison cargo." The target ship may or may not drop its cargo at this point. If you need to "convince" a ship to drop its cargo, you may have to attack it. Dropped cargo will appear in a canister outside the target ship. To collect it, you must use a cargo scoop. In the military, you will be provided with a ship with a cargo scoop.
- **Spy** On a spy mission, you fire spy probes at a certain assigned location. In the military, a ship equipped with spy probes is provided for such missions. Once you have fired the spy probe at the target you must then protect the probe. If the spy probe stays alive for a period of time, the mission is considered complete. Be aware that base commanders do not like being spied upon and probably will issue a strike contract on you and the spy probe.
- **Mine** On a mine mission, you collect ores from asteroids. Military pilots are given a ship with a mining beam for such missions. In your pre-mission briefing, you are told the quantity of material needed and where you must take it. To complete the contract, you fly to an asteroid, mine the ore, then bring it to the designated station.
- **Transport** Transport missions require moving goods to a certain station. Military pilots are given a ship with the goods aboard. You must arrive safely with the goods at the assigned destination to complete your mission. Civilian pilots must purchase the needed cargo and sell it at the destination station.

- **Patrol** On a patrol mission, you patrol a prescribed area. You simply fly to a number of pre-determined points, in the sequence assigned. Once each way-point has been visited the mission is considered complete.

To accept a particular mission, a military pilot just clicks on the **Launch** button. Then you simply wait for clearance, and go.

A civilian pilot will be given more information about the contract mission, including the pay offered for completing it. The civilian pilot also has more options regarding contracts. For more details, see the next section.

2.4 Specific to Commercial Stations

As stated earlier, commercial stations are the domain of civilian pilots - the entrepreneurial mercenaries and pirates. On the commercial station's concourse, pilots can speak with other characters, operate the Info/Comm system, and use the Local Station Exchange.

2.4.1 Local Station Exchange

The Local Station Exchange is the hub of economic activity on every commercial station. Using this networked database, you can engage in many types of commerce, from trading goods to posting and taking contracts. There are five interfaces available via buttons on the Local Station Exchange screen:

Parts/Cargo

Using the Parts/Cargo interface, you can buy and sell parts for your ship, and trade cargo on that station. These types of transactions are described in more detail in the section on ship construction on page 56.

Buy/Sell Ship

The Buy/Sell Ship interface lets you purchase, sell, or trade-in ships. The upper left corner of the screen has several icons, one for each available hull, as well as an icon for "all ships." Clicking on any of these icons will list all the ships of that kind which can be built with parts available at your present location.

When you click on one of the ships on the list, information about it appears on the right side of the screen. The price of the ship and a

list' of all its components will be included. You can find **out** more about each component by clicking on it.

If you have enough credits to purchase a ship outright, click on the **Buy** button to close the deal. The ship will be added to your collection at that location. If you would prefer to trade-in one of your ships, you can select the Trade In button. This will bring up a list of your ships, and you can choose which one to trade-in. When you select a ship, its trade-in value will be shown.

If you own more than one ship, you can sell one by selecting it from the list on the left side of the screen, then clicking on the **Sell** button.

You also can use the **Performance Profile** button to help you decide about buying or selling a ship. Clicking this button gives you information about how well a particular ship flies and fights. This function is described in more detail on page 63.

Select Ship

If you have more than one ship docked at your current location, you can use the Select Ship interface to switch ships. Your current ship will be put into storage at that station. You can then pilot the newly selected ship. For tips on using multiple ships, see page 95.

Contracts

Civilian contracts are more complex than military missions. Clicking the **Contracts** button on the Local Station Exchange brings up a dialog box with three options. The first, and most important, option is **Browse Contracts**.

Clicking on this button brings up the contract list screen. In addition to the mission type and other information detailed earlier under Mission/Contract Analysis (page 49), every civilian contract also has a fee listed to the right of it. This is what you will be paid for successfully completing the contract.

In addition, each civilian contract has an **Accept** button instead of the **Launch** button provided for military missions. When you accept a contract, you will not launch immediately, but the contract will be added to the others in your Personal Info database (see page 46).

The second option is the **Post Contract** button. This enables you to post your own contract and hire someone to carry out a task for you. The third option is the Bounties button. The bounty interface lets you see which ships have bounties on them. A bounty is a sum of money offered for destroying that ship. The bounty interface also allows you

to place bounties on other ships. Posting contracts and bounty hunting are both described in more detail on page 72.

Bazaar

The bazaar is an area for conversation and trading where you can swap credits and goods with other human players at the same station. Of course, the bazaar is only active in multiplayer games. It is described more fully on page 85.

2.5 Saving a Game

Saving a game creates a save game file on your computer's hard drive that records the state of the game universe. Everything from the time of day, to the gadgets in a ship's cargo bay are saved. At a later time, this information can be loaded and players can continue where they left off in the universe.

A couple criteria must be met before a game can be saved. First, the game must be in story mode, free mode, or training. If the game is single player, the player must be docked at a base (not a capital ship). If the game is multiplayer running on a non-dedicated server, only the player on the server computer can save and that player must be docked at a base. On a dedicated server, only the server can save.

In a single player game, or multiplayer game on a non-dedicated server, the game can be saved by exiting out to the In-game Menu and selecting Save Game. Enter the name of the game to be saved and click on Ok to save. The save game process itself usually takes a few seconds.

In a multiplayer game on a dedicated server, the game can be saved in one of two ways. If the dedicated server is running from the console, entering the "save" command and then the filename will save the game (see page 82). If the dedicated server is not running from the console, clicking on the Save Game button on the Server Diagnostic interface will save the game (see page 81).

If a multiplayer game is being saved, there may be more players on the server than there are player save slots (see page 80). If this is the case, Terminus will allow you to increase the maximum player saves so that all players can be stored. If you elect not to increase the player saves, only as many players as can fit in maximum player saves will be stored.

2.6 Loading a Game

Save game files can be loaded from the main menu by selecting Load Game. The Load Game dialog will appear. Here you can select different save files and view information about them. To load a game, select it and click on Ok.

If the save game was of the single player type, you will simply be returned to the point where the game was saved. If the game was a multiplayer one, Terminus starts up the game server automatically and clients will be able to join where they left off. An important note: saving a multiplayer game does not require that all the clients be at a base when the game is saved. However, the save game file stores each client at the closest friendly base to their position when the game was saved.

To load a game on a console dedicated server, see page 82.

Chapter 3

Intermediate Game Play

3.1 Ship Manager

The Ship Manager allows the player to manage his or her custom and pre-configured ships before entering a game. The Ship Manager can be reached from the Main Menu right before you select a game mode. Its dialog contains two major parts: the pre-configured ship section and the custom ship section.

The pre-configured ship section lists all the ships that come pre-built with Terminus. Selecting a pre-configured ship causes it to be the current ship. The current ship is the ship the player will start with when a game is launched in Gauntlet or Melee mode. The credit value of each ship is listed next to its name.

The custom ship section lists all the ships the player has constructed or edited. Selecting one of these ships causes it to become the current ship. Custom ships can be copied, renamed, deleted, added, edited, imported and exported all via buttons below the list.

- **Copy** Prompts for a name of a new ship and copies the selected ship into this new name.
- **Rename** Prompts for a new name to call the selected ship.
- **Delete** Removes the current ship from the list of custom ships.
- **Add** Prompts for a hull type and name. A new ship containing no gadgets is created with that hull and name.

- **Edit** Allows to the player to outfit the selected ship (see page 59).
- **Import** Prompts the player for the filename of a previously exported ship. This button is useful for moving ships from one computer to another.
- **Export** Prompts the player **for** a filename to save the currently selected ship. After a filename is entered, the ship is saved to that file.

3.2 Spacecraft Design

You can buy your own single-seat spacecraft, and customize it to your specifications, using the Local Station Exchange available on each commercial station. Use this menu to access the Buy/Sell Ship interface.

3.2.1 Choosing a Hull

Choosing a hull for your spacecraft is done using the Buy/Sell Ship interface. Click on one of the ship icons on the upper left of the interface to review the specifications of that spacecraft. Described in detail below are the eight types of single-seat spacecraft currently available. A more detailed look at these ships can be found on page 160.

Durango Class Light Transport



The Durango Class light transport is the only single-seat transport used in Sol. Because it has the most cargo space of all single-seat craft, it is often used by merchants and traders to move goods around the system.

The performance of the light transport varies wildly depending upon the mass of the current cargo. Fully loaded, it accelerates very slowly, but lightly loaded or empty, it can keep up with the most agile fighters, despite its rather slow turning rate. It also **has** a minimal weapons capacity, offering at least a small line of defense.

Razor Class Heavy Fighter

The Razor class fighter is the oldest and largest fighter in use today. For its size, it is quite speedy. Of the single seat fighters, only the Eclipse has a larger weapons loadout than the Razor. The Razor is also equipped with a large cargo bay, making it a favorite among mercenaries and outlaws. The Razor has one major drawback, however: repairs and fuel for such a large fighter are very expensive.



Eclipse Class Heavy Gunboat



The Eclipse gunboat is a gunboat in the truest sense of the term. Of all the single seat spacecraft, the payload of the Eclipse is by far the largest. Like the Razor, it has six weapons bays, but two of them have been specifically designed to carry torpedo launchers, along with an immense stock of torpedoes. Of course, such a payload has its detriments.

The Eclipse is also one of the slowest and least dextrous of the single seat spacecraft. To compensate for its awkwardness, the Eclipse hull has been constructed to take a huge amount of punishment.

Bee Class Light Fighter

The Bee class is the smallest light fighter in use in Sol. Although it has only one weapon bay, the Bee can be equipped with up to four engines, giving this fighter astonishing speed and maneuverability. If not properly managed, however, the Bee tends to overheat. And, even with its tiny size, the Bee's survivability is low. But a skilled fighter pilot at the helm of a Bee won't let anything touch her ship, let alone destroy it.



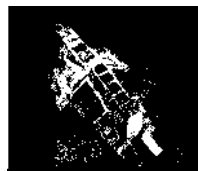
Talon Class Medium Fighter



The Talon is **attractive to civilian** pilots because of its blend of maneuverability and cargo capacity. It is a moderately capable fighter, though its weapons loadout is reduced in favor of price and performance.

Jackal Class Light Gunboat

The Jackal class gunboat is a much smaller gunboat than the Eclipse. But do not mistake this ship for a light fighter. The Jackal can carry an impressive payload, especially considering its size. The ship is outfitted with one weapons bay expressly designed to accommodate 50% of the torpedoes an Eclipse can carry. The Jackal can be surprisingly fast, too - except when at full capacity. Since the ship is manufactured for convoy duty, or for situations where it can fire its payload and run, the Jackal's sluggishness with a full load is not a major concern.



Hyperion Class Assault Fighter



The Hyperion was designed as the successor to the Razor. Small sacrifices in weapons loadout and cargo space make the Hyperion one of the fastest crafts in the Solar System. With this profile the Hyperion compares very favorably with the Razor in battle. The single drawback of the Hyperion is lower survivability because it is not as heavily armored as the Razor.

Rayskate Class Light Fighter

The Rayskate is extremely fast and agile. Unlike the Bee with its single weapons bay, the Rayskate has two, although each of the Rayskate's weapons bays are about one-third smaller than the Bee's. The optimized Rayskate design allows for increased performance using less propulsion. However, this optimization necessitated leaving the Rayskate with minimal armor, although it has a higher level than the Bee. The Rayskate also is the first spacecraft fighter designed without an external viewing cockpit. The pilot is entirely reliant on the imaging system in the internal cockpit.



3.2.2 Outfitting Your Ship

Once you choose the hull you want, you can add or remove the equipment of your choice. Or, by choosing an empty hull, which is available in each category, you can add your own selections and build a ship from scratch. Either way, you must outfit your ship with the gadgets necessary for the kind of trade or missions you will seek.

There are certain items every ship must have, however. These items include a reliable energy system with adequate backup. Remember, nearly every device in your ship requires energy. If the energy supply goes down, then nothing will work. One reason for the failure of energy systems is the drain caused by an insufficient power supply. Whenever possible carry extra energy storage devices like capacitors or batteries.

Another crucial item is fuel. Without fuel your engines and thrusters **will** not operate. If you are using a reactor, this will shut down as well. This, in turn, could cause an energy problem.

Another essential item is a life support system. If the life support system fails, then everything else on your ship will be of little use to you. Consider having backup life support systems as insurance for your future.

From the Buy/Sell Ship interface, select **Parts/Cargo**. On the left side of the Parts/Cargo interface, icons for each category of items with which you can outfit your ship appear. Select the specific equipment you want from each category. The categories are described briefly below in the order they appear in the interface.

- **Computers** Needed to access the HUD display, and guide missiles. Different computers can manage a different number of simultaneous missiles. May be placed in any bay.

- you may add fuel pump(s). Be aware that if your fuel demand exceeds supply, engines, thrusters and any active reactors will be shut off. To reinstate them requires going into engineering and turning them back on, however you must do so carefully to avoid overloading again. Fuel systems may be placed in any bay.
- **Energy systems** These include batteries, reactors and capacitors. Batteries and capacitors both store energy, while the reactor generates it through consumption of fuel. Batteries are used for long term storage, the capacitor for short term, burst applications. Capacitors help prevent energy starvation which could lead to a fuel pump shut down. When turned on, reactors provide continuous energy flow, whether or not that energy is used. It is sometimes smart to turn off your reactor when it is not needed, but this usually requires having a battery back up. Energy systems may be placed in any bay.
- **Weapons** All weapons require at least one surge cell onboard to operate. Most energy weapons require a great deal of surge, while torpedoes and rockets require very little. Weapons must be placed in a weapons bay. Be sure to load the same bay with the appropriate ammo pack.
- **Surge cells** A form of capacitor linked to your weapons system. With low surge, you can still fire an energy weapon but the damage inflicted will be diminished. May be placed in any bay.
- **Cargo** This category lists various cargo types ranging from exotic metals to cheap labor. May be placed in any bay, though the cargo bay is usually the best choice.
- **Ammo** Includes Helium-3 for your energy weapons, metal rounds for the mass weapons and the appropriate ammo for light immobilizers and flares. You will also find interesting additional items for unique missions. Must be placed in the same bay as the weapon it will be fired from.
- **Armor** Armor sustains damage before anything else on your ship. When the armor fails, your ship's hull and its gadgets will begin to take damage. Must be placed in the armor bays.
- **Refuel, Repair, Reload Ammo** Actually these **are** three separate categories. Access the appropriate item whenever you dock at a base and need to refuel or repair your ship, or re-load your ammo.

Transferring Items

To buy an item, simply drag it **from** the window on the left to one of the bays captioned on the ship schematic on the right. The appropriate amount of credits will be deducted from your account. If you want to see what is in a particular bay, click on its name and a window will appear listing its gadgets. Items can also be dragged in and out of this window. Items can be moved and rearranged on your ship to optimize available space and performance.

If you need extra space, **you** can place items **temporarily in your personal** storage, in the lower-right corner of the schematic window. Items in personal storage can also be sold to other players at the Bazaar (page 85). Be aware, however, that items left in personal storage will not remain after you leave a particular station.

In loading items on your ship, remember that each item has a particular mass, and this cumulative mass has an effect on your ship's acceleration rate. If you are designing a ship for combat, take care to use lighter components, and sufficient engines and thrusters to maintain agility. Use the performance profile to assess the effect of these factors on your acceleration.

As you look at the different bays, notice the unique properties they have: bay type, exposure, and space. Bay type determines in part what types of devices will operate in that bay. For example, engines can only operate in propulsion bays. Another property is exposure. Many devices require exposure to space to operate properly. Thus, they will only work in an exposed (or open) bay. Finally, space determines how much each bay can hold. Different bay types are:

- **Propulsion Bay** A propulsion bay is exposed to the front and rear of the ship, and has fuel ports designed to connect to high-thrust engines. Because of these unique properties, engines will only operate in a propulsion bay. However, other items that require exposure, such as scanners will operate in this bay as well.
- **Thruster Bay** Thruster bays are exposed so that thrusters can fire in any direction, to move and rotate your ship. For this reason, thrusters will only work in a thruster bay.
- **Weapons Bay** Weapons bays are forward-exposed, and have energy conduits designed for the high surge and mechanical stress of spaceborne weapons. Weapons will only operate in a weapons bay. Larger weapons bays are often called "torpedo bays," because they have a greater capacity for a torpedo payload, but in fact any weapon will work in any kind of weapons bay it can fit into.

- **Avionics Bay** The avionics bay is a small bay designed to provide exposure for scanner devices. Many pilots also place small devices such as computers in this bay to save space in the central equipment bay.
- **Equipment Bay** The central equipment bay is designed to hold fuel systems, energy systems, surge cells, and other items that do not require exposure. Although these items can be placed in any bay, this is often a good location because on most ships, this bay is centrally located and well-armored.
- **Cargo Bay** The cargo bay is for anything else you wish to carry onboard your ship. No item in cargo bay can be activated, since the bay does not have any fuel or energy ports. However, items that do not need fuel or energy, such as hull struts or heat sinks, will still be effective.
- **Armor** While armor is not stored in bays, it appears the same as a bay on the ship schematic. The caption shows the type of armor mounted at a particular point on the ship. If an armor box is blank, it means that region of the ship is covered by only a basic alloy that offers no protection against damage.

3.2.3 Performance Profile

Click on the Performance button in Buy/Sell Ship, or the folder icon in the Parts/Cargo interface, to get detailed information about the capabilities of the ship you've selected. You can also use it to compare the performance of your ship to that of another.

On the lower left of the Performance Profile interface, you will find the Analysis window. This window displays any serious flaws in your ship. If flaws are detected, a warning light flashes and a list of the problems appears.

The Ship Tolerances window, found on the lower right, will tell you how close your ship is to failure. This window displays your ship's Stress Level, Fuel/Energy Consumption, and Radiation Level. If any of these levels is at or above 100% your ship is not safe to fly. Even values under 100% can be dangerous, since any subsequent damage to your ship can push these levels into the critical zone. Note, however, that the levels presented are based on the devices that are activated on your ship by default. Items such as the overthruster can easily push you over the limits, even if the tolerances shown are under 100%.

Using the buttons on the upper right, you can select a list of ships to compare against yours. Each button represents a different hull type.



Figure 3.2: Performance Profile

By selecting a hull type (or 'All' to see all ships), you can see a list of ships. Selecting a ship will display a comparison in the window to the right.

Two ships are compared based on the **amount** of armor each **has**, the hull strength of each, their relative stealth, their defensive and their offensive capabilities, and their acceleration.

3.2.4 Ship Painting

You can customize the colors applied to your fleet of ships with the Ship Painting interface. First, select which of the three areas of the ships you want to work on by using the buttons labeled Region 1, 2, and 3. Then, use the color palette on the right to choose the color you want to apply to that part of your ships. If you change your mind, press **Clear** to reset the color. Repeat the process for all three areas of your ships.

It is important to note that the colors you choose belong to you as a player, not to a particular ship. The colors you pick here will be applied globally, effecting the colors on all of your ships.

3.3 Operations for Experienced Pilots

3.3.1 Flight Lock

Using the flight lock function of your ship's computer makes it easier to pursue another ship or object. Once activated, flight lock adjusts your ship's "zero" speed to that of your target. Flight Lock allows you to fly in a normal fashion while the computer compensates for the changes in speed and direction of the object you choose. To enable flight lock, press *F*.

Here is an overview of how flight lock works. First, remember that when your ship's inertia compensators are turned on, your computer identifies a desired velocity and direction in which to move the ship. Normally, that speed and direction is relative to fixed objects in the space around you. With flight lock turned on, however, the desired velocity and direction become relative to your chosen target.

For instance, if you fly toward your target while flight lock is engaged, and your target moves laterally, your ship will also move laterally. If you try to stop your ship with flight lock on, you will cease all forward momentum and appear to be still relative to your target, but you will not actually stop unless your target has. With flight lock on, however, you can choose to accelerate to overtake your target. In effect, flight lock works to maintain your ship's minimum speed and its direction to match your target's.

Unfortunately, your computer cannot update flight lock continuously. It must make several readings of your target's position and velocity to accurately calculate your new desired speed and direction. Because of this, flight lock revises your ship's movement at intervals of about 8 seconds.

Flight lock can be used in combat situations, making it easier to maintain proper approach speeds and to keep a steady view of an enemy. It is also very useful when trying to scoop cargo canisters in space (see page 89).

3.3.2 Torpedo Avoidance

There are three basic ways to try to avoid an incoming torpedo: by using flares, by side-stepping, and by attempting to shoot the projectile.

When the incoming torpedo alert sounds, press *I*. Doing this will show you where the torpedo is coming from. Aim the nose of your ship at the torpedo and fire a flare. If the flare is well-aimed, and well-timed, it will divert the torpedo's guidance system, decoying the projectile away from your ship. See page 175 for more detailed information.



Figure 3.3: A Close Call

To side-step a torpedo, you must accelerate at a 90 degree angle to the approach vector of the projectile. You can try to do this by using your lateral thrusters, but it is very difficult with a heavy ship. Instead, you can turn your ship and apply your main engines. Both maneuvers have drawbacks, however. If you side-step using your lateral thrusters, you risk taking a torpedo hit on the front of your ship. If you use your main engines, you may not be able to return fire on your enemy.

You can destroy a torpedo by shooting it with one of your torpedoes or another weapon. But this is hard for even the best marksman and may be suicidal for less seasoned combat pilots. In the end, trying to shoot down a torpedo should be a last resort.

3.3.3 Engineering

The Engineering screen allows you to view the status of, and make changes to, the hardware on your ship. Using the Engineering screen, you can turn gadgets on and off, jettison unwanted items, assign hotkeys to gadgets, and change the priority queue of your repair system. You can get to the Engineering screen by pressing *CTRL-E*.

The Engineering interface is divided into two sections. The first section is activated by selecting a gadget category using the buttons on the upper left. The second section, the Repair Queue, is activated by

pressing the wrench button on the lower left.

When you select a gadget category, you will get a list of all your ship's gadgets which fit into that category. You will see the name of the gadget, the quantity of that item, the amount of damage to the gadget, its power status, and the current hotkey, if any.

Status

There are five possibilities for the Status of a gadget. "Off" means that the gadget is currently inactive, and will remain so unless you turn it on yourself. It may also indicate the gadget is one which cannot be turned on and off, such as ammo. "On" indicates that the gadget is currently on and will remain so until turned off manually.

The Status of auto-power gadgets may read "Auto|Off" or "Auto|On." "Auto|Off" means that the auto-power gadget is currently off, but will be activated automatically by the ship's computer if needed. "Auto|On" means the opposite: the auto-power gadget is on, but will be shut-down automatically when no longer needed. Auto-power gadgets can be turned off, which means they will not be activated even if needed. Turning an auto-power gadget back on will return its control to your ship's computer. Examples of auto-power gadgets are engines and surge cells.

The fifth and final Status possibility is "Cargo," which means that the gadget is in a cargo bay and cannot be used or altered at that time.

The Status of a gadget can be changed by double-clicking on it, or by selecting it and pressing the **Toggle Power** button at the bottom of the screen. In an emergency situation, it may be useful to quickly reset the power of all your gadgets to their default settings. To accomplish this, press the **Default Power** button at the bottom. Be aware, however, that if your systems are damaged you could overload the fuel or energy system. See page 89 for more details.

Hotkeys

A hotkey can be assigned to a gadget by selecting the gadget and pressing the + or - buttons at the bottom of the screen. Any of the five Aux keys you configured in the Control Options interface (page 14) can be used as hotkeys. By default, these keys are *CTRL-1* through *CTRL-5*. However, no two gadgets can have the same hotkey. To remove a hotkey from a gadget, use the + or - buttons until the key field is blank.

Jettison

To get rid of a gadget, just select it, then press the **Jettison** button at the bottom of the screen. The gadget will be removed from your ship and end up floating in a canister in space. Canisters can be retrieved by using the Cargo Scoop (see page 89).

Repair

If your ship is equipped with a Repair System, then any damaged gadget can be scheduled for repair by dragging its name from the gadget list onto the wrench icon at the lower left. Make note, however, that an item which is 100% damaged cannot be repaired. Gadgets that have been dragged onto the wrench go into the Repair Queue. You can view the Repair Queue by clicking on the wrench.

The Repair Queue screen shows the order in which gadgets will be repaired. You can drag and drop items within the list to change this sequence. You can also alter the level to which an item is repaired before the Repair System moves on. For instance, you may want your Surge Cells to be repaired only to 50% damage, then have the Repair System restore your Engines completely, finally returning to your Surge Cells to finish the job. To accomplish this, set your Repair Queue as in figure 3.4. The Repair Level can be changed by selecting a gadget and moving the slider at the bottom of the screen.

All ships have a default repair queue. You may clear this list, or clear any queue you create, by pressing the **Clear** button at the lower right.

3.4 The Comm System

The Comm System is your tool for communicating with other ships in the Solar System. To access the Comm Interface while on your ship, use *CTRL-C*. On a station, access the Comm Interface via the Info/Comm menu.

3.4.1 The Comm Interface

The Comm interface allows you to communicate through both voice **and** written text. The interface is divided into several sections.

The large area at the top displays a log of incoming communications. As they arrive, these messages are also displayed on your HUD. But the comm screen provides a list of recent messages as well.

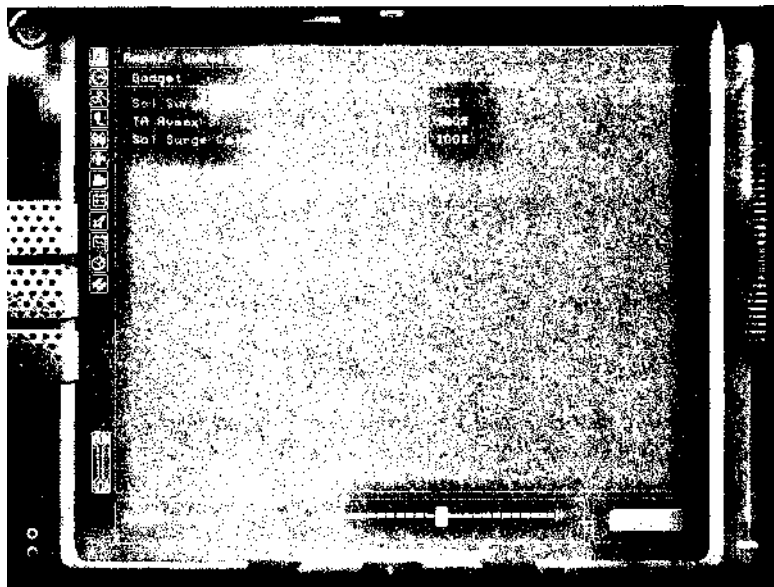


Figure 3.4: The Repair Queue

Below and left of the message log, you will find buttons for your ship's comm and sensor frequencies. By clicking the comm button, you can change your comm frequencies. Clicking the sensor button lets you change sensor frequencies.

You may set up to four frequencies for transmission, and four for reception. Each transmit/receive slot has a check box which allows you to turn the frequency on and off. It also has a field in which you can set the frequency to any four digit number. At times, frequencies may be reserved for official military use and cannot be changed.

Comm frequencies determine which ships your broadcasts reaches, as well as which broadcasts you receive. Any ship set up to receive a frequency on which you transmit can hear your communications. You see and hear only those broadcasts transmitted on a frequency you are set up to receive.

Sensor frequencies work like comm frequencies, except they transmit sensor data instead of communications. Any two ships with matching sensor frequencies can see each other's scanner data on the navmap (see page 40).

To the right of the frequency section, in the center of the screen, is

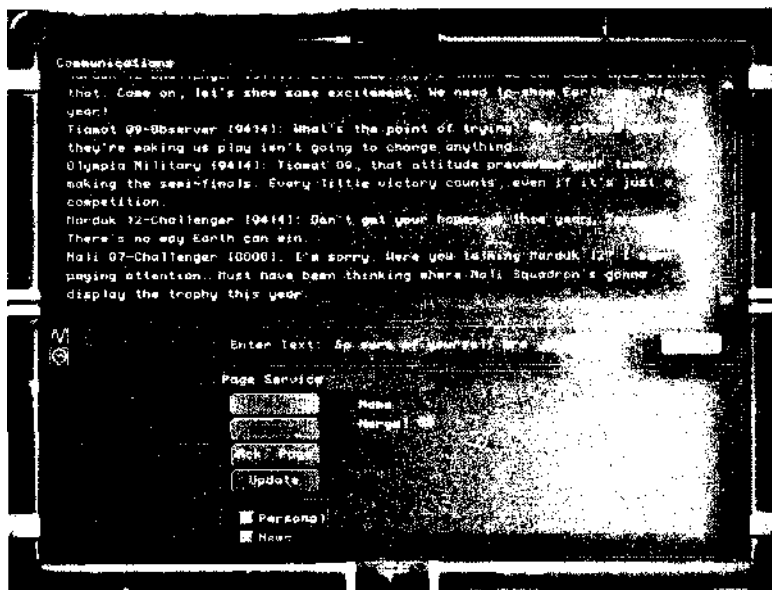


Figure 3.5: The Comm Interface

the "Enter Text" area. You type your message in this box and then press return. What you have typed will be broadcasted to anyone with matching comm frequencies. You can also send text by pressing *T* from the cockpit.

On the far right of the screen is the **Talk** button. When holding this button down, you can use a microphone to transmit voice messages to anyone with matching comm frequencies. Your computer must have full duplex audio capability to use this function (see page 17). You can also transmit voice in the cockpit by holding down *R*.

Page Service

At the bottom right of the screen is the Page Service window. A list to the right side of the Page Service window shows you all the players in the current game and their pager status.

You may page anyone with an active pager by selecting them from the list and pressing the Page button. When you receive a page, press the **Ack**. Page button to acknowledge the page. When a page is acknowledged, the ships' computers will set both players' comm frequencies

to match, allowing communication to take place. Pressing the **Update** button will update the list of players.

Personal and news pages can be turned on and off using the check boxes provided. Turning off personal pages blocks other players from attempting to page you through their Comm interface. Turning off news pages will eliminate notifications when news stories are posted.

3.4.2 Giving Orders

There are many other people flying ships in Sol with you. You may sometimes want to ask them for help - or demand that they do your bidding. The Communications Command Menu is an excellent way to do this. By pressing the *accent* (') key you bring up a list of special commands you can issue to all your transmit frequencies. Here is a rundown of what each command communicates:

- **Destroy target** Summons ships in your area sympathetic to your cause to attack the ship you currently have targeted.
- **Destroy target subsystem** Calls sympathetic ships to attack the subsystem you have targeted.
- **Disable target** Calls sympathetic ships equipped with immobilizers to attempt to disable the ship you have targeted.
- **Cover me** Summons ships in the area to help defend you.
- **Protect target** Instructs ships to defend the ship you have targeted.
- **Tell target to jettison cargo** Instructs your target ship to place their cargo in a canister and jettison it. This is most often used by pirates after immobilizing a transport. Issuing this order is considered hostile and may carry serious consequences. On the other hand, issued to the right ship, this order could help boost your wealth tremendously. Remember, though, ships won't automatically submit, especially if they do not recognize you as a sufficient threat, or if they want to challenge you.
- **Ignore previous order** Instructs all ships to ignore the last order you sent.

The keys 1-7 will also send these messages immediately, circumventing the menu.

3.4.3 Calling for Help

When things look bleak, and you are unable to fly your ship to a station where you can dock, press *CTRL-H*. Whether your engines or thrusters

are destroyed, or you are out of fuel, a rescue ship will be dispatched to your location to provide basic repairs. Your ship will not be restored to fully-operational, but you will at least be able to fly your ship back to a space station to complete the repairs. Be aware, however, that this service comes at a considerable fee. If you are unable to afford the rescue, one more option remains; press *CTRL-Delete* for self-destruct.

3.5 Posting Contracts and Bounties

To post a contract or a bounty, first access the contracts database using the Local Station Exchange available at every commercial station. In the contracts database, you will find interfaces for posting contracts and for reviewing and posting bounties.

3.5.1 General Options

The Post Contract interface is divided in **half**. **The left half presents** options specific to each of the different contract types you may post: Patrol, Strike, or Spy. These are explained further on. The right half of the Post Contract interface deals with options that are the same for each contract type.

Start with the right side of the interface. The Duration section has two fields: Mission Limit and Contract Life. Mission Limit refers to the amount of time within which the mission must be completed to be considered a success. If you enter a zero in this field, or press the **Forever** button, there is no time limit. Contract Life is how long the contract will remain available. If no one takes the contract within this time, the contract is removed and your money is refunded. No contract can be posted for more than 60 minutes.

The Employees section lets you set criteria for the person you wish to hire, as well as how much you will pay. Set your price by typing the desired number into the Credits field. This amount will be deducted from your account when the contract is posted. If the employee completes the contract, this money will be paid to him or her. If the contract is not completed, the money will be returned to you.

The Min Reputation field allows you to specify the minimum reputation an employee must have to take the contract, from 0 to 150. Setting this field to 'None' permits anyone to take the contract.

Using the Hire Mercs and Hire Pirates check boxes allows you to restrict your contract to just one of these careers. But at least one of these boxes must be checked.

The Frequencies section allows you to assign Comm and Sensor frequencies to the contract (see page 69). By doing so, you require the employee to use these particular frequencies for the duration of the contract. This allows you to monitor the employee's progress on the navmap (see page 40), or communicate with them during the mission. The Select button will allow you to choose from your current frequencies to set these fields.

Also in this section is the Secure check box. If you check this box, potential employees will not be able to see the details of the contract until they have been hired. By using the Authorize checkbox, you can review each prospective employee and reject those you do not wish to hire.

Below are facts about each type of contract you may post.

3.5.2 Patrol Contracts

You may select up to six waypoints for a patrol. The employee must proceed to each waypoint in the order stipulated. When all the selected waypoints have been reached, the contract is complete.

3.5.3 Strike Contracts

For a strike mission, you may select up to six targets. All the selected targets must be destroyed for the mission to be complete. The Location field allows you to specify an area where the target (s) may be found. Be aware that if a target is not at the named location, some employees may not be enterprising enough to complete the mission.

3.5.4 Spy Contracts

Select the target you wish to spy on. The employee must drop a spy probe near the target, then defend it for a period of time. The contract is complete if the target is still under surveillance after that time. To view the data from the spy probe, use your navmap (see page 40).

3.5.5 Bounties

The Bounty interface lets you both browse and post bounties. A bounty list will be displayed on the left side. Each entry consists of the name of the target and the price on his or her head. Clicking on an entry provides a list of employers for that bounty. Bounties are removed when an employer dies.

To post a bounty, use the window in the lower right. The **Select** button allows you to choose a target for the bounty. The Credits field is where you to enter the amount of the bounty. When you press the **Post** button, the bounty is made available to the general public and the credits are deducted from your account. The bounty remains in effect until the target is killed and the assassin is paid, or until you die.

To claim a bounty, find and destroy a target on the bounty list. When the kill is confirmed, the bounty will be automatically credited to your account.

3.6 Reputation

Your reputation is key to maintaining good relations with your superiors or employers in Sol. Reputation is primarily based on continued involvement in the activities of the Solar System. No activity is just as detrimental to your standing as poor performance. In order to keep your reputation high, you will need to accept missions or contracts and successfully complete them.

If you choose a career with the UEL, Mars, or the Marauders, you will need to maintain a positive reputation at all times. Should you find yourself with a low reputation in any of these careers, you will be given a warning to improve your performance. When your reputation reaches zero, you will be expelled from your career, and forced to fend for yourself as a mercenary. If you're in the middle of a priority mission when your reputation reaches zero, you will be given the chance to successfully complete your mission, but, should you lose, you will be expelled. Once expelled, you can never rejoin and must continue as a mercenary. As a mercenary, your reputation does not directly determine your continued survival. However, it becomes increasingly difficult to find work as your reputation among employers decreases, so it is just as important to maintain good standing.

You can inspect your reputation on the Personal Info screen (page 46).

3.7 Economy

The economy of the Terminus universe is complex and dynamic. It responds to the ever changing dictates of supply and demand. Although each commercial station has its own independent economy affecting the prices of goods and services, each is also influenced by economic and political events throughout the solar system.

3.7.1 How the Economy Works

The price of an item at a particular station consists of two components. What is called the sell price is the amount at which you can sell an item to the station. A markup is added to the sell price to determine the price at which the item may be bought.

The current supply and demand of a particular item impacts both the item's sell price and its markup. If supply of an item exceeds demand for it, the price and markup of the item may be reduced in an effort to raise demand. On the other hand, if a station has a shortage of an item which is in demand, the price on that item will go up to increase profits as well as to encourage more deliveries of the item.

Information about prices for goods are available at **the Economy** screen at each station (see page 46).

3.7.2 Trading

You can make money in many ways by trading in the solar system. The most obvious method is to buy low and sell high, but this isn't always easy. Fortunately, there are other options available.

The Economy screen (page 46) is an essential tool for the successful trader. Use it to locate stations where you can buy an item at a low cost. Then you can transport it elsewhere to sell at a profit. Keep in mind, however, that prices are always changing. Remember to factor in fuel, energy, and gate toll costs to your overall expenditure as well. Also, transporting items through some areas of space is dangerous. Any damage to your ship also will cut into your bottom line.

Mining asteroids can be lucrative. The startup cost is little more than the expense of a mining beam. Note, however, that most ores are in low demand at stations near the Asteroid Belt, so you will probably turn a tidier profit transporting it elsewhere to sell.

For the less scrupulous entrepreneurs who may crave extra excitement, you can get cargo for free by hijacking other ships. Don't overlook the downside of this method of building wealth, however. Angering a pilot with powerful friends can get you into serious trouble.

Another way to make money is trade with other players using the Bazaar. With this interface, you can engage in almost any type of commerce, from bartering for better prices to loaning cash to others at high interest rates. The Bazaar is explained in more detail on page 85.

Chapter 4

Multiplayer

In a multiplayer game, you can play with and against several other players on a computer network. Terminus can be played over a LAN or the Internet in several different game modes. These modes include Melee, Story Mode and Free Mode. A Melee game can be either Deathmatch or Hockey, and is scored on a point system (see page 86). Melee games can also be timed, played in different areas of space and played in team mode. In team mode, players on the same team are unable to damage each other's ships.

There are two components to a multiplayer game, the game server and the game client. The game server is a computer that controls a Terminus game. It handles the game simulation and allows clients to join or leave the game at anytime. The game client is a computer that receives game information from the server and handles drawing graphics and playing sound effects. In short, the server tells the client what to do. In a multiplayer game there is one server but many clients.

4.1 Joining a Game

To join a multiplayer game, go to New Game/Multiplayer/Join Game from the main menu. The Join Game dialog box has two sections. The first section lets you specify information about yourself. This includes your character's name and ship name. By going to the Ship Manager you can select which ship you wish to fly. See page 55 for more information on the Ship Manager. Finally, in a story or free mode game, you can use a password. If you use a password, you will only be able to re-join a game by using the same password. If you choose to not use a password,

then when you leave, anyone can join the game and impersonate your identity (and use your money and ships!) just by choosing the same name as you.

The second section of the Join Game dialog contains information about servers hosting games you can join. If you are on a LAN the Local Games list will show a list of all the Terminus servers on your LAN. Clicking the Update button refreshes this list. If you see a game you wish to join in the Local Games list, simply click on it and hit the **Join** button under the list. If you want more information about a server in the list, select it and hit the Stats button. Server Stats is described in the next section.

If you want to play games not on a LAN you must enter its Internet address in the address area below the Local Games list. Hitting the **Join** button will join the server at this address. Hitting the Stats button will display Server Stats.

If you join a team game you may be prompted to pick a team color, but only if there is an equal number of players on each team. If the teams are uneven, you will be assigned to the team with the fewest players.

4.1.1 Server Stats

The Server Stats dialog contains information about a Terminus game server. The first line is the server's name. The second line is the type of game being played. The third item tells whether or not the server hosting the game is a dedicated one. See Hosting a Game on page 79 for more information about dedicated servers.

The next group of information starts with your ping. Ping is described in detail in the following section. The next item is the number of human players in the game. The last item in this group is the maximum number of players. You will not be able to join the game when the maximum number of players is reached.

The last section of this dialog is a list of players in the game. Each player's name, ping, points and team are listed. The points and team information is only valid for Melee games. To join the game, simply click on the Join button at the dialog. To go back to the main join game dialog box, click on the Back button.

4.2 Ping and Bandwidth

Ping and Bandwidth are terms used when describing the performance of a multiplayer game (or, in general, a network connection).

Your ping is the time it takes for information to travel from your computer to the server's computer and back. Terminus measures ping time in milliseconds. A server that is far away from your computer or a server that is very busy processing other game data will have a higher ping. The higher the ping means more lag. A game with a lot of lag takes a while for an action performed on the client to actually occur in the game. An example of lag would be if you pressed the fire weapon key, then one second later you actually see the weapon fire on screen. In this case there would be one second of lag. As you can imagine, playing a game with one second of lag is very difficult and frustrating. A ping of 250ms or less is preferable.

Another factor in multiplayer game performance is bandwidth. Bandwidth is a measure of how much data can be sent or received in a certain period of time. If a game has many players or is a more complex game (like Free Mode) it may require more bandwidth than a simpler game. In other words, more complex games require more data to be sent. If you are playing a Terminus game with an ordinary modem you may not be able to effectively play some of the more complicated Terminus multiplayer games. This is because an ordinary modem may not be capable of sending the required amount of data fast enough. Terminus does not include a measure of the bandwidth from the server to client. In general, however, telephone modems have lower bandwidth than cable modems or other dedicated connections.

4.3 Hosting a Game

Hosting a multiplayer game generally requires a more powerful computer than either joining a game or playing single player games. Hosting a game also requires more network bandwidth than joining a network game. An under-powered server makes the game difficult to play for all clients. If you are trying to start a multiplayer Terminus game with friends, the person with the faster computer and best network connection should generally be the server.

To host a multiplayer game, go to New Game/Multiplayer from the main menu. From this menu there are options to host three different types of games: Melee, Story and Free Mode.

4.3.1 Starting a Server

Before any type of game server can be launched, the server must be set up through the Host Game dialog box. The Host Game dialog varies slightly based on the type of game being launched so only the common elements

will be discussed here. The dialog is split into three sections. The topmost section contains the server name, maximum players, dedicated server option and maximum player saves information.

- **Server Name** A string that identifies the server. This name will be shown to clients using the Join Game dialog.
- **Maximum Players** The maximum number of players allowed to join the game.
- **Dedicated Server** The server can be placed in dedicated mode with this option checked. A dedicated server is one that only runs a server and no client. Someone hosting a game as a dedicated server will not be able to play the game. Dedicated servers have the advantage of being faster than non-dedicated servers because the computer only has to run the server side of the game and not the client side.
- **Maximum Player Saves** Every player in a multiplayer game that leaves while docked at a base is "saved" on the server. When rejoining the game, the player's data (including ship, outstanding contracts, and credits) is restored. The maximum player saves is the maximum number of players that can be preserved. Since each player save slot takes a significant amount of memory, this option is provided.

The middle section contains information about the local player. That is, if the server is non-dedicated, this player will join the game on the host computer. This information is the same as the player information in the join game dialog (see page 77).

The final section of host game dialog allows you to set the difficulty and physics as well as ship value and immobilizer option for the server.

- **Difficulty and Physics** These settings affect the difficulty level for every player in the game. See page 19 for details.
- **Ship Value** The ship value is the maximum cost of ship allowed on the server. This can prevent players with "super" ships from joining a network game. To find out the cost of a ship see the Ship Manager section on page 55.
- **Players Can Be Immobilized** This checkbox defines whether or not players can immobilize other players with the immobilizer weapon.

4.3.2 Server Diagnostic Screen

The server diagnostic screen displays a large amount **information about** the performance and status of the server. This screen is displayed if the server is started as a dedicated server from the Host Game dialog. Additionally, if the server is non-dedicated, pressing the server diagnostic key (*CTRL-S*) from the main cockpit view can activate the server diagnostic screen. The elements of the server diagnostic screen are as follows.

- **Server Name** The name of the server.
- **Game Type** The type of game the server is running.
- **Bandwidth** The number of bytes the server sends per frame. See page 78 for a discussion of bandwidth.
- **Complexity** A measure of the number of objects in the game universe compared to the maximum number of objects the server can handle.
- **Frame Rate** The number of frames the server is processing per second.
- **Players** The number of players **currently on the server**.
- **Max Players** The maximum number of players the server allows.
- **Player List** The player list displays the name, ping, points and team of each player on the server.
- **Kick** Selecting a player from the player list and clicking on the **Kick** button will kick the player off the server.
- **Ban IP** Selecting a player from the player list and clicking on the Ban IP button will do two things. First, the player will be kicked off the server. Second, any player attempting to join the server from the same Internet IP address will not be allowed to do so. The offending player's IP is stored in the file `terminus.ban`. To remove an IP address from the ban list, `terminus.ban` must be edited using a standard text editor (or deleted entirely).
- **Messages List** The list of the last several server messages. Server messages are generated for many different events. These events include players entering and leaving the game, comm messages, and more.
- **Enter Text Box** Entering text in this box and pressing enter causes the server to send a global message. A global message is one that is transmitted to all clients. Global messaging is helpful when informing clients of actions the server is taking (such as shutting down). You can also send a globalmessage by typing `"/globalmessage <message>"` in the cockpit.

- **Save Game** Pressing the **Save Game** button opens the save game dialog in Free Mode and Story games. Melee games cannot be saved. See page 52 for more information on saving games.

4.3.3 Console Dedicated Servers

In addition to starting dedicated servers from inside Terminus, dedicated servers can be launched in a text-only console.

Starting on Windows and MacOS

Use the Launcher to create a console dedicated server.

Starting on Linux

Since there is no Launcher on the Linux platform, consult the file `config.txt` for command-line arguments to launch a console dedicated server.

Dedicated Server Commands

Once the server is running there are several commands that can be used to get the status of, and maintain the server. They are listed below.

- **help** Displays a summary of console server commands.
- **status** Displays the current number of players, frame rate, complexity and network bandwidth on the server.
- **listusers** List all the players in the game along with their user number, ping, kills and team.
- **ban** Ban a specific user number. (See page 81.)
- **kick** Kick a specific user number. (See page 81.)
- **exit** Shutdown the console server, "quit" is a synonym.
- **save** Save the current game to a given file name. (See page 52.)
- **globalmessage** Broadcast a global message. (See page 81.)

4.4 Multiplayer Modes

There are three major multiplayer modes: Melee, Story Mode and Free Mode. A Melee game can be either Deathmatch and Hockey.

4.4.1 Melee: Deathmatch

A Deathmatch game is one where all the players interact in a **small** area of space and the object of game is to destroy as many enemy ships as possible. By going to New Game/Multiplayer/Host Melee from the main menu you can start a Deathmatch game server. Simply click on the **Game Options** button at the bottom of the Host Game dialog to setup the Deathmatch game. This will open the Melee Options dialog. The Melee Options dialog has several configuration options.

- **Game Type** For a Deathmatch game, select Deathmatch from the list.
- **Time Limit** This is the maximum length of the game in minutes. After the time limit expires, the game will end and start over. A time limit of 0 specifies that a single game should continue indefinitely.
- **Point Limit** This is the maximum number of points any player can receive before the game ends. A point limit of 0 specifies that there is no point limit. See page 86 for details on the scoring system.
- **Area selector** Deathmatch games can be played in three different areas. They are: "Arena without Boundaries," "Arena with Boundaries" and "Solar System." Arena without Boundaries is simply an empty area of space. Arena with Boundaries is a small area of space enclosed in a cubic grid. This cube contains all the players in the game. Finally, the Solar System area is the entire solar system.
- **AI ships** Up to 8 computer controlled ships can be placed in a Deathmatch game. These ships will not be on any team and can make a Deathmatch game with only a few players more exciting.
- **Teams** If teamplay is used, 2 to 8 teams can be created for a Deathmatch game. Each team will be assigned a team color. Players are not able to damage their teammates during the game.

Once configuration of the Deathmatch game is complete you can launch it by going to Start Server in the Host Game dialog.

4.4.2 Melee: Zero-G Hockey

Zero-G Hockey is a game for two teams played in a bounded arena. At two ends of the arena are vortex gates. A small puck is also in the arena. The object of the game is to move the puck into the opposing team's

vortex gate. The puck can be moved in several ways. Colliding with the puck or shooting it with a weapon moves the puck forward. Using a force beam, a ship can pull the puck. Using the mining beam, a ship can push the puck forward. To use either the force beam or the mining beam the player must be within 20km of the puck and the player must have a weapon lock. Press and hold the fire button to use either beam. The closer the puck is to the player, the stronger the effect of the beams.

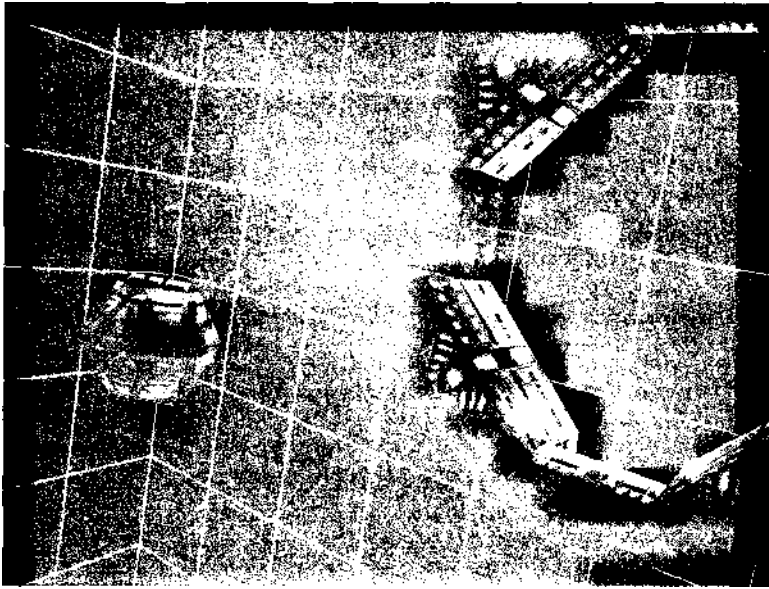


Figure 4.1: Hockey Puck and Goal

By going to New Game/Multiplayer/Host Melee from the main menu you can start a hockey game server. Click on the Game Options to open the Melee Options dialog.

In the Melee Options dialog, select Hockey from the game types list. You can also set a point limit and time limit. These limits are described on page 83.



Figure 4.2: Zero-G Hockey Action!

4.4.3 Story Mode and Free Mode ""

Story Mode and Free Mode are multiplayer versions of their single player counterparts. No special setup options exists for these two types of multiplayer games.

4.5 The Bazaar

The Bazaar allows you to trade gadgets, armor, ships and credits with other players. This interface is only useful in a multiplayer game when there are other players to trade with. To trade with another player, you both must go to the Bazaar in the same base. Any number of players can use the Bazaar at the same time.

In the lower right hand corner there are two windows which allow you to chat with other traders. To send a message, just enter it at the Enter Text prompt and press return. Messages from those you are trading with will appear in the Communications window above.

The For Sale window in the upper right displays a list of items being

offered for trade. **To get more information about an item, click on it** and a detailed description will appear in the window at the lower left. If you wish to buy an item, select it and press the **Buy** button at the bottom of the list. Your offer will be sent to the person selling the item. A window will pop up to inform you of this, along with a **Cancel** button if you wish to change your mind. If the seller approves of the deal, you will be informed, the item(s) for sale will be transferred to you, and your payment will be transferred to the seller.

To see which items you may offer for sale, use the Storage window **at** the upper left. There are three buttons which allow you to select a category: Personal Storage (see page 62), Ships, or Credits. You may only offer stored ships at the current base, not your active ship. See Select Ship on page 51 for more info. Once you've selected a category, click on an item in the resulting list and more detail will be displayed in the window at the lower left.

Once you have found an item to offer, drag it into the **Offer** window below. You will be asked how much you would like to charge for it, as well as how many you want to offer if more than one is available. Once you've completed this procedure, the item will appear in the Offer window and will be available in the For Sale window of the other traders. To remove an item you are offering, drag it out of the Offer window and back to the Storage window above.

When another player wishes to buy an item you are offering, a window will pop up to inform you. You have three options. First, you can accept the offer, which will automatically transfer the item and payment. Second, you can refuse the offer. Third, you can ignore the player, which will block any future offers from that player. The list of ignored players is erased when you leave the interface.

4.6 Multiplayer Scoring

Melee games are subject to the scoring system. **Players** receive **1 point** for a destroying another ship. They lose a point for destroying their own ship. Hockey games award 10 points for putting the puck through **a** vortex gate to every member of the team that scored.

To see the current Scoreboard in a Melee game you can switch to the Scoreboard MFD on the HUD.

4.7 GameSpy Support

Terminus supports GameSpy to allow players connected to the Internet to find Terminus servers. If you wish to make your server available to users of GameSpy, see page 16. GameSpy provides an application to browse Terminus servers (and many other games) on the Internet. On the World Wide Web, visit www.gamespy.com to download this application.

Chapter 5

Advanced Topics

5.1 System Overloads

Both the fuel and energy systems are capable of overloading. In the case of an energy system, if the gadgets on a ship draw energy faster than the system can handle, the energy system overloads. When an energy system overloads, all the gadgets that use energy are shut down. The energy system itself will also shut down for at least 5 seconds. An overload may occur when a ship's energy systems are damaged and thus not able to provide as much energy as they can undamaged.

To recover from a system overload go to the engineering screen (see page 66). Turn on the ship's energy systems, including batteries and capacitors. All the gadgets that use energy will be off. Some gadgets that use energy can be powered back on. However, if too many gadgets are turned on, the energy system will overload again. Therefore, make sure to enable critical devices, such as life support and computers, first.

The fuel system is also capable of overloading. A fuel system overload can be handled in a similar manner as an overloaded energy system.

5.2 Retrieving Cargo

A cargo scoop gadget is used to retrieve canisters and shrapnel floating in space. Canisters can contain any type of gadget while shrapnel contains only minerals.

In order to collect a canister or piece of shrapnel, approach the object to be collected at a speed of less than 2 km/s. When your ship is close

enough, items (gadgets or minerals) are extracted and placed in the ship's cargo bay. If there is not enough space in the cargo bay, only as much as will fit is extracted. Additionally, if a canister or piece of shrapnel is depleted, it will disappear.

A cargo scoop will work in any bay on your ship.



Figure 5.1: A Cargo Canister

5.3 Flying for Stealth

There may be circumstances when you don't want to be seen, either because you are in a dangerous section of space, or there is a contract or bounty on you. In these situations, you may want to think about ways that you can avoid being detected.

The most obvious thing you can do to avoid detection is to stay away from ships and bases. If a ship or base detects you, that information is broadcasted to anyone using the same sensor frequency. But there are other things you can do to make your ship inherently less scannable.

The first is to simply buy a stealth device. Stealth devices dampen emitted radiation to decrease the magnitude of your sensor signature. A more detailed analysis of this effect is presented on page 183. A smaller sensor signature means that an enemy will have to get closer to you in order to detect you. To remain hidden, you will want to stay outside of this range. Below a certain minimum distance, generally, you will always be detected.

You can **tell if your** stealth is effective by examining the scanner. As described previously on page 27, a ship that cannot detect you has a number displayed next to it on the scanner. The closer that number comes to 100, the closer they are to detecting you. However, when the number is present, they cannot see you at all.

There are other more mundane ways than stealth devices to be more stealthy. Since detection often is a result of emitted radiation, restricting the use of radiation-emitting devices is beneficial. The worst offender in this category is energy weapons, however any weapon, including force and mining beams, will make you stand out. Next are the engines. If you want to move about stealthily, it is advisable to turn off your engines, maneuvering with only thrusters. You may also achieve additional effect by reducing your thrust level (page 32).

Your scanner and detail scanner also emit telltale radiation. Turning off your detail scanner is not too much of a hardship, but turning off your scanner, although it increases your stealth, also makes you blind, making it useful only in the most dire of circumstances.

If you do not have a stealth device and need to reduce your sensor signature *very* quickly, you can toggle off main power by pressing *CTRL-P*. This will power down your entire energy system, and every device except for engines and thrusters. Of course you will have no scanner or computer, and your surge cells will stop charging, but assuming you do not fire engines or thrusters, you can be assured that your sensor signature is as low as it can be. Press *CTRL-P* again to restore power. If your ship requires an auxiliary fuel pump, it is inadvisable to turn off main power and attempt to use the engines. A fuel system overload can result. This will leave you blind *and* drifting.

5.4 Managing Heat, Stress, and Radiation

At times, heat, stress, and radiation can be your biggest enemies in space. Nearly everything in your ship produces all three in some quantity. Here is how these factors affect your ship:

Stress is caused by your engines and thrusters pushing on your ship. Your hull can handle a certain amount of stress, and if your ship is well-designed, simultaneously using your maximum engines and thrusters should not cause your ship to over-stress. When your ship exceeds the stress limit, the hull will begin to be damaged. This is unfortunate, because as your hull becomes damaged, your stress limit is reduced further, exacerbating the problem. Therefore, it is in your best interest to make sure that your stress is well within limits.

Stress is also imparted to your ship by external forces, most often a weapon or force beam. To better survive these encounters, it is good to have a stress limit that is *much* greater than that exerted by your own engines, so that you can tolerate the external stress as well. (That is, if you are flying near your stress limit already, an opportunistic force beam may mean curtains for you!)

You can increase your stress limit by adding hull struts to your ship, or choosing a larger hull. You can also build a ship that produces less stress on itself, such as choosing smaller engines, or simply lowering your thrust level.

Heat is another dangerous factor. Engines, thrusters, scanners, computers, and weapons all produce heat. When your hull builds up excess heat, your ship becomes more susceptible to stress damage (i.e. it lowers your stress limit). Also, high-energy type capacitors used in surge cells are very sensitive to heat, and will drain quickly during an overheat condition. Energy weapons, both fired by you and those that hit you, will increase heat as well.

To increase your heat limit, add heat sinks to your ship, or choose a larger hull. You can also produce less heat by using smaller engines, using your engines less often, or decreasing your thrust level. Also, certain scanners and computer components produce more heat than others.

Heat and stress are detrimental to your ship, however radiation is your personal foe, as exceeding the radiation limit over a period of time will kill you, the pilot, directly. Radiation is produced by most of the same things that produce heat. Heat sinks have a small effect on radiation, but more often than not, the best way to protect yourself from radiation is to avoid it.

5.5 Overthruster

The overthruster, despite its name, is not a thruster at all. It is a compact, very powerful, and very fuel-thirsty engine modification. Under certain circumstances you may want to use it for a quick escape, or to accelerate to top speed very quickly. Although it produces a massive

amount of thrust, the amount of fuel that is used is much greater, even at lower thrust levels, so it should never be used routinely. Also, the overthruster produces a dangerous amount of heat and stress, so great care must be used to ensure that you don't put yourself in even more danger than that which prompted you to use the overthruster in the first place.

5.6 EM field

The EM (electromagnetic) field emitter is a device intended as a defense against certain types of weapons. It emits a negative static charge to repel them. Because of the negatively charged nature of the EPB and rupture cannon, these weapons can be repelled by an EM field. Unfortunately, since the neutron bolt (NPB) is electrically neutral, the EM field has no effect. It also has no effect on mass weapons or torpedoes. However, be aware that because the proton bolt (PPB) is positively charged, it is attracted to the EM field. Always turn off your EM field when your opponent is using a PPB.

5.7 Conserving Fuel and Energy

Fuel and energy can be expensive at times. Here are some ways you can conserve:

- **Fly slower** If you accelerate to 20kps to go 1000km, you will get there in 50 seconds. If you only accelerate to 10kps, it will take you twice as long, but use half the amount of fuel. Remember, there is no friction in space, so this is always the case.
- **Use the overthruster sparingly** The overthruster uses several times the normal amount of fuel as your engines. This fuel consumption is far greater than the additional amount of thrust it gives you. Use the overthruster only when you need to make a fast escape.
- **Turn off the reactor** If you're not using a lot of energy, and the energy meter reads 100%, that means the extra energy being produced by your reactor is being wasted. If you turn off the reactor, it will save fuel. You can turn it back on later, when your energy supply gets low enough. (Definitely remember to turn it back on before going into battle!)
- **Turn off the EM field emitter** If you're not in battle, or your opponent is not using charged energy weapons, then there is no

sense in wasting energy by producing an EM field around your ship.

- **Go easy on energy weapons** It's often tempting in battle to lay on the trigger and fire as often as possible. This will use energy at the maximum rate of your surge cells, and in many cases drain the surge cells completely. When the surge cells are drained, it also means your weapons are firing with low power, and will not be very effective.
- **Turn off the inertia compensators** The inertia compensators make many corrections per second to ensure that your velocity is kept in line with your orientation. If this precision is unnecessary, turn them off, and use manual thrusters when you need them. If you coordinate the thrusters well, and don't waste any momentum, you can save a considerable amount of fuel.

5.8 Specialized Tactics

5.8.1 HPP Assault on Station

In a typical HPP attack on a station, the attackers have one or more cruisers to launch HPPs, along with a number of fighters to protect them. Those defending the target usually have a squad of fighters to repel the HPPs, and some heavier fighters, or another capital ship, to drive away the attacking cruiser (s).

According to the Hague convention of 2175, destroying HPPs is illegal. The only approved method of stopping an HPP assault is to immobilize the pods. However, particularly ruthless (or desperate) individuals have been known to fire on the pods.

Normally, one group of attacking fighters is charged with defending the pods en route to the station, while another guards the launching cruiser(s). In a similar way, defending fighters divide up the task of immobilizing the pods and destroying the cruiser(s). If a sufficient number of marines are able to board the station from the HPPs, they can overpower the local defenses, and secure control of the station.

5.8.2 HPP Assault on Capital Ship

To capture an opponent's capital ship also requires a cruiser (or cruisers) to launch HPPs. The fighter crafts on the attacking side must fill many roles, and their job is much more difficult than when trying to invade a station. Since HPPs are unable to attach to a non-immobilized ship, a

gunboat equipped with a heavy immobilizer must first disable the target. If the target is a cruiser, its exterior turrets can be lethal to incoming HPPs, so they must be destroyed as well. They can be shot clear off the side of the target ship.

Defending a capital ship is the same as defending a station. The HPPs, heavy immobilizer ship(s), and attacking cruiser(s) are all targets.

5.8.3 Capturing Smaller Ships

To capture a single seat craft, it must first be immobilized and not spinning. Once it is in this state, a shuttle can dock with the ship. A boarding party can then take control.

5.8.4 Blockading

To trap an enemy, or to keep certain ships from using a gate or a station, sentry pods and mines can be deployed to create a blockade around the object. Corvettes are the only craft with the launchers needed for sentry pods and mines. Since it is best to mount a blockade uninterrupted, a corvette will call for fighter backup if enemy forces are in the area. Once a blockade has been erected, enemy fighters may attempt to destroy it. That is why the owners of the blockade typically position fighters to protect it.

5.8.5 Hijacking

Hijacking, and other pirate activities, are still common in the Solar System, and especially in the heavily traveled Asteroid Belt. Mining ships and cargo-laden transports make attractive targets for daring individuals. Generally, a hijacker will intimidate the victim ship between gates, where quick escape is difficult. With the victim disabled, or simply scared, the hijacker orders the jettison of cargo. Some people are brave enough to refuse these orders, but the safest course is compliance. The hijacker then scoops the cargo, then usually sells it as his own.

5.9 Handling multiple ships

As a civilian in Terminus, you can own more than one ship. This can be useful in many circumstances. For example, you may at times work as a trader, moving goods across the system, but at other times, you may

want to take on strike contracts. Owning a transport as well as a more capable fighter might be helpful.

When you buy a second ship, both ships will be located at your current station. This is important to remember, as when you take off in your new ship, your old ship will still be at *that* base. Therefore, if you want your old ship back, you will need to return to that base. For that reason, it might be important to buy your ship at a central and/or safe location, that you know you can return to often. If you buy a ship at a remote location, then your old ship will also be left at that remote location, which might be inconvenient.

To move items between ships, if necessary, use "Personal Storage" at the Parts/Cargo screen. (Items will remain in the storage locker until you leave the base, so remember to take your items before you launch. Otherwise they will be lost.) At the Select Ship interface, choose the ship you would like to take parts from. Then, go to the Parts/Cargo screen, and drop the items into the storage locker. Return to the Select Ship screen, and choose the other ship. Return to Parts/Cargo and move the items from the storage locker onto your ship.

You can sell any of your ships at any time, but you can never sell your last ship.

5.10 The Flight Recorder

The Flight Recorder is very powerful system to edit and view recorded in-flight sequences, divided into two parts: The Scene Manager edits individual scenes of a flight recording. The Movie Sequencer organizes individual scenes into a complete movie.

5.10.1 Recording A Scene

The flight recorder can be activated at any time during the game from the main cockpit view by pressing the flight recorder toggle key, *F12*. If the flight recorder is engaged, a small bar graph in the upper left of HUD will be displayed. The gray portion of bar graph represents the total remaining space in the flight recording. The red portion of the bar graph represents the used space in the current recording. The line on the bar graph represents the current record position.

While flight recording is activated everything that happens around your ship will be written to a flight recorder scene. Toggling flight recording off causes that scene to be closed and written to the disk with a sequential filename such as "flt004.scn."

- A couple of important notes. First, if the entire flight recorder bar graph is red the flight recorder will write over previously recorded data. You can adjust how much data the flight recorder can store before overwrite occurs by going to the Game Options menu and moving the Flight Recorder Buffer slider (see page 16).

A second note, the flight recorder will not record what happens while at a base or in ship interface screens (such as Engineering or Personal Info).

5.10.2 The Scene Manager

After you record a scene using the flight recorder, you can edit it using the scene manager.

Start the Scene Manager by going to Flight Recorder/Scene Manager from the main menu. The Scene Manager contains three major windows: the Navmap window, the Preview window and the Camera window. Between the Navmap window and Camera window there are some playback controls. Finally, in the lower right, there are several buttons.

The first step in editing a scene is to go to the Load Scene button in the lower right. Pressing it will display a dialog box with a list of the previously saved scene files. Select the scene to edit and click on Ok to load.

With a scene loaded, the Navmap window will display all the objects near your ship when the scene was first started. The Navmap window can be manipulated in the same way that the Navmap interface is used (see page 40). Clicking on an object's name in the Navmap window selects it by turning its name white. Notice that the true object names are not displayed, instead, every object is given a type and numerical designation.

The Preview window shows the view from the current camera at the current point in the scene. A camera is simply a location and orientation in space from which you can view a scene. When a scene is first loaded the Preview window shows the view out of the ship that recorded the scene. Pressing the **Full** Screen button in the Preview window will playback the entire scene in full screen mode. Pressing a key during full screen playback will halt the playback.

The playback controls below the Navmap window can be used once a scene is loaded. The bottom row of buttons here control playback in the Preview window. There are, from left to right: rewind, play, stop, pause and fast forward. Notice that when playback is running the Navmap window and Preview window change to reflect the current position in

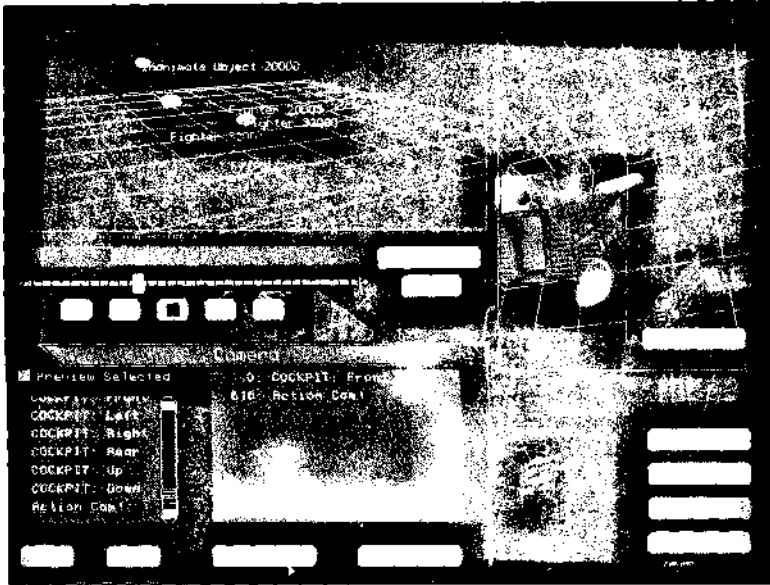


Figure 5.2: The Scene Manager

the scene.

To jump to a particular point in a scene use the slider directly above the playback buttons. The button to the right of the slider, the jump button, will also let you jump to a particular point in the scene. When a scene is first loaded this button is labeled by a "0". Pressing the button will bring up the Set Frame dialog box. Here you can enter a frame number to jump to. The range button directly above the jump button gives the range of valid frame numbers.

The range button allows you to set the range of frames to be played back. For example, if to play only frames 0 through 100 (assuming there are at least 100 frames in the current scene) press the range button and enter 0 for the first frame and 100 for the last frame. Any changes to the playback range will be reflected in the range bar graph above the slider. The mouse can also be used to set the range of playback. Simply click on range bar graph where the playback range should start and drag until playback should end. The frame numbers will be reflected on the range button.

The real power of the Scene Manager lies with cameras. Cameras

axe controlled in the Camera window. The Camera window is divided into two parts, a list of all cameras on the left and a camera script on the right. When a scene is first loaded there are six default cameras shown in the camera list. They are the standard cockpit views for the ship that recorded the scene. On the **right** the camera script contains only one camera, "0: COCKPIT: Front". The "0" signifies that the "COCKPIT: Front" camera is active starting at frame 0. Other cameras can be selected from the camera list. If the Preview Selected checkbox is enabled, any camera selected from the list will be shown in the preview window.

To make a selected camera part of the camera script, simply hit the **Switch Cams** button. This will make the current camera active at the current frame. To remove a camera from the script, press the **Delete** button.

New cameras can be added to the camera list by pressing the **New**-button. This brings up the properties dialog. Before creating a new camera it's a good idea to make sure Preview Selected is checked so you can see your changes to the new camera as you make them.

The first camera property is the name. It defaults to "New camera" but can be changed. The second property is the camera orientation. Clicking and dragging the **Set Y/P** button, the yaw and pitch of the camera can be changed. Precise yaw and pitch values can also be directly entered (in degrees). The **Clear** button clears the yaw and pitch to 0. By clicking on the **Track Obj** button the currently selected object in the Navmap is "tracked" by the camera. This means that the camera always attempts to point at that object. Any yaw or pitch values previously entered become offsets to the tracking orientation.

The camera location property is similar to the orientation. The **Set X/Y** and **Set Z** buttons can be dragged to set the x, y and z camera position. The **Track Obj** button forces the camera to always follow the tracking object. Pressing the **Ok** button at the bottom of the dialog commits changes to the new camera.

Cameras can be edited by simply double clicking on them in the camera list. Cameras can be deleted by pressing the **Del** button under the list.

Once editing of a scene is complete it can be saved. The **Save Segment** button in the lower right group saves only the part of the scene that is currently selected by the range button. The **Save Scene** button saves the entire scene regardless of range. The **Back** button returns the Flight Recorder menu. Next, scenes can be compiled together to form movies using the Movie Sequencer.

5.10.3 The Movie Sequencer

The Movie Sequencer is started through Flight Recorder/Movie Sequencer from the main menu. It contains three major windows: the Scenes window, the Film window and the Preview window. Additionally, there is a group of playback control buttons under the Preview window.

The Scenes window contains a list of all the scene files and the dates they were last modified. Individual scenes can be dragged from the Scenes window and dropped in the Film window.

The Film window is a list of scenes that make up a movie. The movie will be played starting at the topmost scene, moving down. Scenes can be removed from a movie by pressing the **Delete** button. The **Clear All** button removes all the scenes from the list. The **Load Film** button will load a previously saved list of scenes. The **Save Film** button saves movies.

Any scene saved into a movie can be extracted out with the **Save Scene** button. Simply select the scene from the film window and hit the Save Scene button. Finally, on Microsoft Windows based computers, movies can be saved as AVI files. Standard movie players outside Terminus can play these files. (Linux and MacOS versions of Terminus have not implemented the AVI export feature.)

To save an AVI file click on **Export AVI**. This will show the Save AVI dialog. The name of the AVI can be entered on the bottom line or an existing file can be selected from the file list. On the right side of the dialog there are a few options. First, the size options specify the size of movie to output. Smaller sizes equal smaller AVI file sizes. The second option is the Anti-Alias checkbox. Anti-Aliasing makes AVIs of smaller size look smoother. However, this option, when enabled, increases the time necessary to save the AVI. A warning about AVI files: they can be very large depending on the options selected and the length of the movie. In fact, they can easily be hundreds of megabytes. The movie sequencer will inform you if you do not have enough disk space to save an AVI file.

The Preview window functions in the same manner as it does in the Scene Manager. The playback controls under the Preview window are also identical to those in the Scene Manager. The **Back** button in the lower right exits the Movie Sequencer.

Chapter 6

Story

6.1 The Principal Organizations of Sol

6.1.1 The United Earth League (UEL)

In the waning years of the 22nd century, the United Earth League still holds its dominant position in the Solar System. The UEL has immense military resources, a strong presence in space, and the allegiance of many of the wealthiest nations and corporations on and off the planet.

Convened in 2076, the UEL was chartered as an overseer government with a policy of non-interference in the internal matters of its member blocs, but sole authority in off-world affairs. The UEL Premier functions as the chief executive of the government and a senate acts as the lawmaking body. Jakarta serves as the capital city.

Since its founding, the UEL has had to face many challenges, including Earth-wide epidemics, space piracy, and ruthless terrorist attacks. Most vexing, however, has been the UEL's relationship with the colonies and companies of Mars. As the people developing the resources of Mars have become richer and more self-sufficient, they have sought greater and greater independence from the UEL. Because of the resistance of the Martians, the UEL's efforts to make the environment of Mars more hospitable for mass colonization have been continually delayed. The discovery of Callisto technology in 2167, and the construction of the Sol Gate Network in the years following, has only intensified the rivalry between the UEL and Mars.

(See page 125 in the "History of Terminus" Timeline for more details.)

6.1.2 The Mars Consortium (MC)

The Mars Consortium was established in 2158 by the Martian Mining Corps and other companies operating on Mars. The new organization was planned as a way to protect the economic interests of Martian businesses and to eliminate the infighting between competitors that had gone on since the first days of the planet's colonization.

Twenty-five years later, Kareem Muhammad, Director of the Martian Mining Corps, was elected as Governor of the Martian Protectorate, the colonial governing body set up by the UEL. Muhammad, and many other members of the Colonial Congress with ties to the Consortium, pressured the UEL to restructure the Protectorate. They wanted to incorporate many of the proven elements of the UEL framework into the Martian government. With the support of UEL Premier Monique Gerard, the Martian Colonial Congress was replaced with a junta-like body controlled by the Consortium. It was named the Board of Directors. In 2194, the Board appointed Julianne Hobbes to the newly formed position of Director of the Consortium.

The economic boom which followed completion of the Sol Gate Network has benefitted the Consortium enormously. They have plowed large portions of their new wealth into developing their armed forces and their presence in space. In 2196, the Consortium converted Olympia and Ulysses, two of the commercial stations in Martian orbit, into military stations. Tensions between the UEL and the Consortium have never been higher - and the Consortium has never been more of a threat to the UEL.

(See page 133 the "History of Terminus" Timeline for more details.)

6.1.3 The Marauders Pirate Clan

The expansion of mining activities in the Asteroid Belt at the end of the 21st century attracted the inevitable rogues and thieves. Shipments of refined metals and volatile materials, much of it transported on drone ships and unpowered containers, fell prey to hijackers hungry for an easy profit. Over time, many of these outlaws formed alliances with one another. A number of clans evolved. Today, the Marauders are believed to be the largest, most well-equipped, and best organized of these pirate groups.

The Marauders are extremely secretive, even among their own clan brothers and sisters. What little is known by the public about them comes from government or corporate spies who have infiltrated their ranks, the rare pirate prisoner who talks, or rarer still, the one-time Marauder who has gone straight.

Many of the people who join up with the Marauders do **so** because they have become disillusioned with their lives elsewhere. They seek greater riches, greater respect, and perhaps, a greater sense of belonging. Ex-military pilots, former miners and laborers, even doctors and lawyers have teamed with career criminals, drug dealers and assassins inside the Marauder clan.

The Marauder leaders demand loyalty. Some observers believe the dedication and discipline they get from at least the core members of the clan is the key to their strength. Pressure from the UEL and the Mars Consortium, as well as from security forces of the corporations around Sol, together with heavy competition from other pirate clans, makes life as a Marauder tough. For those in the clan who fully embrace the vision of their leaders, the challenges may be even more difficult. Rumors persist that head Marauder, Muldante Kerr, and his Inner Circle, have a quest unique among the Belt pirates: to take the Marauders beyond hijacking and hiding out in the Asteroid Belt and somehow create a new, more powerful role for all pirates in Sol.

6.1.4 Independent Council of Governors

In 2181, the governors of all the commercial stations in Sol gathered to discuss ways to improve conditions for business enterprises in space. During this historical meeting, the governors drafted their own regulations on free trade to be applied to transactions at commercial stations. These new rules had far fewer restrictions on the sale and marketing of goods than those imposed by either Mars or Earth.

Perhaps more significantly, the governors also agreed to form the Independent Council of Governors. The ICG is an oversight group which manages relations between the commercial stations in Sol and represents the group to the UEL. They have become an important and powerful lobby, many times influencing the direction of UEL policy on commerce, off-world migration, technology development, military affairs and other matters. The Council has its headquarters at Mimas Station.

6.2 Space Stations in Sol

There are three types of space stations which you will encounter: commercial stations, military stations, and research stations. Brief descriptions of individual stations appear below. For more detailed descriptions of the technical aspects of each type of station, see page 150.

Commercial stations are the most common type of station. Commercial stations have no official military affiliation and are usually con-

trolled by a governor elected from the companies based on that station. All civilian pilots can dock at these stations. Keep in mind that not all commercial stations are alike. Some allow goods that others may not, and not all parts and supplies are available on every station.

There are five military stations throughout the Solar System. The United Earth League controls three of them, while Mars has constructed two military stations of their own. These stations are accessible only to pilots in the military with which the station is affiliated. All military operations are launched from these bases - which makes them the target of frequent attacks.

There are two research stations in the Solar System. One is a commercial enterprise and the other is a highly guarded operation. The careers allowed to dock on either of these stations will vary with the political situation.

The following stations are listed generally in order of their distance to the sun, starting with Venus Terraform Research Station, at the heart of the system, to Umbriel Commercial, orbiting a moon of the distant Uranus:

6.2.1 Venus Terraform Research Station

Venus Terraform Research Station is one of two research stations in the Solar System and it is the only station orbiting Venus. As the station name implies, the research on this station focuses on finding new and improved terraforming methods for Venus. The station also occasionally contributes research to the Martian terraforming effort.

The station governor allows any civilian ship to use their facility. But be forewarned: station security strictly forbids illegal goods to come aboard. Violations will result in confiscation and heavy fines.

6.2.2 United Earth Military Station (UEMS) Artemis

UEMS Artemis orbits Earth, serving the UEL as their primary patrol station. Artemis is the first line of defense for guarding Earth from all enemies. Only UEL military pilots in good standing may dock at Artemis.

6.2.3 Lunar Commercial

As the gateway for deep space trade and travel to Earth, Lunar Commercial is one of the most heavily used commercial stations in the Solar System. Flights leave from Lunar Commercial to other stations in Earth orbit as well as to the planet's surface. Goods produced on Earth are

shipped through this station to points beyond. A fair number of UEL member companies are based on this station as well.

Lunar Commercial abides by strict trade rules imposed by the League. These rules forbid certain goods from entering or leaving the station. Persons caught with banned items will have all their possessions confiscated and fines levied against them.

6.2.4 United Earth Military Station (UEMS) Unzen

This UEL military station resides in Earth Node II, on the opposite side of the planet's orbit from Artemis station. UEMS Unzen serves as the supply station for all UEL off-planet military interests. From here, both Artemis and UEMS Saldrea are resupplied on a daily basis. UEMS Unzen also provides protection for the Tycho Shipyard and will assist Artemis when necessary. Only UEL military pilots may dock at Unzen.

6.2.5 Olympia

This station orbits Mars and serves the Consortium as their primary patrol station. Olympia is the principle line of defense for protecting Mars from its enemies. Only Consortium military pilots in good standing may dock at Olympia.

6.2.6 Mars Commercial

With nearly as much traffic as Lunar Commercial, Mars Commercial is also a very popular spot for travelers and traders. Mars Commercial serves as a gateway station for Mars much like Lunar Commercial serves Earth. Most goods produced on Mars are shipped through this station. As might be expected, a number of Consortium companies have their headquarters on Mars Commercial.

Mars Commercial abides the free trade manifest stipulated by the Independent Council of Governors. But officials there will confiscate any illegal goods entering or leaving the station. Anyone caught with such items will be fined.

6.2.7 Mars Mining Station

Mars Mining Station is a trading post in Mars Node II. This station serves primarily as a supplier of minerals and ores mined in and around Martian orbit. But being located away from the principle gate paths

deters some traffic to and from Mars Mining Station. Still, many merchants tolerate its inconvenient location because the alternative of traveling through the Belt means risking a pirate hijacking instead.

Mars Mining Station follows the free trade manifest established by the Independent Council of Governors. But Mars Mining will seize any illegal goods found at the station. The penalty for possessing such items includes a heavy fine.

6.2.8 Ulysses

Ulysses resides in Mars Node II, on the other side of the planet's orbit. This military station serves as the supply station for all Consortium military interests. Ulysses also provides protection for the Nugent Shipyard and is available to back up Olympia when needed. Only Consortium military pilots may dock at Unzen.

6.2.9 Belt Station

Situated in the Prime Node of the Asteroid Belt, the Belt Station is the only stop between the outer nodes of Sol and the main centers of activity around Earth and Mars. The station handles high levels of traffic, with ships carrying manufactured goods and raw materials to and from the far reaches of the Solar System.

Even though the station is a key portal for many travelers and traders, it is not free from problems. Pirates operating in the Belt have become bold enough to hit transports as they try to pass through the node. Many people believe the governor of Belt Station has been corrupted with kick-backs from pirate clans and that is why such activity can thrive around the station.

6.2.10 Pirate Base(s)

The Asteroid Belt is home to many outlaws, including pirates. Rumors have spread that a massive pirate base orbits somewhere deep within the Belt. These rumors remain unconfirmed to this day. However, informers have confirmed that a pirate outpost does exist much closer to the gates, although its existence is not widely publicized.

Those pilots who don't let ethics interfere with their livelihood often seek out the pirate strongholds when they need to boost their income. Such employment is rarely easy and never safe, however. Pirates have never been known for loyalty to anything but their own clans. They will attack anybody they see as a threat, especially if it can result in a profit.

6.2.11 United Earth Military Station (UEMS) Saldrea

UEMS Saldrea is the UEL patrol station in the outer nodes **and** as such is the only military presence beyond the orbit of Mars. Because Saldrea is situated at the crossroads between Jupiter, Saturn, and the Asteroid Belt, all ships traveling into deep space must pass by Saldrea.

Because of Saldrea's strategic location, the UEL holds a distinct advantage over anyone bold enough to challenge them in the outer nodes. Only UEL military pilots in good standing may dock at Saldrea.

6.2.12 Europa Commercial

Europa Commercial is situated in its own node, one jump away from Saldrea station. Europa is one of several commercial stations in orbit around the gargantuan planet of Jupiter. Like many of the stations in the outer nodes, Europa doesn't specialize in any one type of commercial endeavor. Instead, there is a variety of companies based on the station, most of them offering a unique opportunity.

6.2.13 Callisto Research Station

Orbiting the Jovian moon Callisto, this research station is quite far from even the closest gate. Governed under its own charter, Callisto operates as an independent entity. As a result, little is known about the activity aboard this station, except that it has resulted in the development of the vortex gate technology.

The station is vigorously guarded by the Callisto Squadron, an elite corps of fighters, most of them hand-picked from the UEL and Consortium military. The Callisto Squadron will stop at nothing to ensure Callisto technology does not fall into the wrong hands.

No unauthorized vessels are allowed in Callisto space, no matter if they are UEL ships, Consortium ships, or even just someone who is lost. Anyone not invited to Callisto will be asked to leave. Anyone who refuses will face forced ejection.

6.2.14 Traeger Aerospace

As its name indicates, this station is home to Traeger Aerospace, the largest producer in Sol of spacecraft, ship components, capital ships and even stations. In orbit around Ganymede, Traeger Aerospace manages a high level of traffic, bringing in raw materials and sending out finished products to destinations all over the Solar System.

Like most upstanding **members** of the Independent Council of Governors, Traeger follows the organization's free trade manifest. Be aware, however, that officials on Traeger will commandeer any illegal goods coming or going from the station. Anyone detained with such items will be hit with substantial fines.

6.2.15 Io Mining

This is a small mining station orbiting the moon Io. Very little traffic moves through here, although Io is a major exporter of raw materials. Because of the remote location and low profile of Io Mining station, many questionable goods are also exchanged here.

6.2.16 Titan Commercial

This station orbits Titan, a moon of Saturn. Many companies are based on this station, most of them in the gas mining business. Titan is situated on the gate path between Jupiter and Uranus, so it receives greater traffic than Mimas, the other station in Saturn's shadow.

6.2.17 Mimas Station

This station orbits Mimas, one of Saturn's moons. A few small companies are based here. More importantly, however, is the fact that Mimas is the home of the Independent Council of Governors (ICG). From Mimas, the Council represents the independent stations and oversees all fair trade agreements.

6.2.18 Oberon Station

Orbiting Oberon, one of Uranus' largest moons, this station is little more than a remote production facility for Haldeman Industries. Oberon abides by the free trade manifest stipulated by the Independent Council of Governors. But Oberon officials will seize any illegal goods found coming in or going out of the station. Anyone held for handling such items will face stiff financial penalties.

6.2.19 Umbriel Commercial

Umbriel Commercial is the farthest and most remote station in the Solar System. The station orbits Umbriel, a moon of Uranus. Just a small number of industries operate at Umbriel.

- Most of the companies on Umbriel have chosen this location to escape the bustle of the inner nodes. But all the businesses based around Uranus know they are positioned to profit tremendously if travel to other star systems ever becomes possible.

6.3 Dominant Commercial Enterprises in Sol

6.3.1 United Earth League Companies

Tanaka Heavy Industries

Tanaka Heavy Industries, a conglomerate of several large Asian industrial companies, stands among Earth's corporate titans. A leader in developing fusion reactors since the first days of the Asian Economic Bloc, Tanaka also constructs an enormous variety of products for planet-side consumption. But the primary focus of the company today is building propulsion and fuel systems for the space market. Their market share in the transportation industries, especially in advanced fusion space-planes, is one of the reasons the AEB has gained dominance in the League.

In recent years, however, Tanaka abandoned plans to extend their market beyond Earth orbit, partly because of the relative low demand for deep space ships, but mainly because of the tight hold Traeger Aerospace has on that segment. Tanaka executives believe Traeger uses unfair practices to maintain their dominance, and Tanaka has leaked stories to the media about Traeger pay-offs, sabotage and industrial spying.

Although Tanaka has their main headquarters on Kyuushu, one of Japan's southern islands, their construction facilities are located at the Tycho Shipyard in Earth's orbit. Most of their merchandise is shipped to Lunar Commercial station to be sold.

The Asian Digital Aggregate

The Asian Digital Aggregate is based on mainland China. The ADA pioneered a process for micro-gravity crystal growth which propelled the organization to world dominance of the electronics industry. Today, the ADA continues to sell more electronic data processing, communication and entertainment systems than any other company in the United Earth League.

The ADA has a production facility on Lunar Commercial, where most of their merchandise can be purchased. The ADA also collab-

orates frequently with the UEL military and has a research facility on UEMS Unzen that specializes in electronic and digital countermeasures.

Mukhtar Biotech

Founded in 2135, Mukhtar Biotech came to prominence by developing, with financial assistance from the UEL, a cure for the Pandemic Virus. Mukhtar is now the largest supplier of biotechnology for all UEL interests in space, with the largest micro-gravity research labs in the Solar System. The Mukhtar labs, located at the center of Lunar Commercial, specialize in pharmaceutical production, advanced tissue generation research, and in seeking new ways to counter the physiological effects of low gravity and micro-gravity.

In micro-gravity, a number of changes occur in the human body. A person's bones become less dense and lose calcium, making them more brittle. A loss of muscle mass, strength, and reflex-response occurs, as well as fluid imbalances, including head congestion. The heart becomes smaller and blood flow diminishes. In low-gravity environments such as Mars (with about one-third the gravity of Earth) similar problems exist, but to a lesser extent. People living under such conditions face considerable health risks when exposed to Earth gravity.

Mukhtar has invested considerable intellectual and financial resources into overcoming the long-known hazards of low gravity living, but without any great success to date. With the ever rising number of people leaving Earth, however, the potential profits in solving these problems continues to propel Mukhtar's quest.

6.3.2 Mars Consortium Members

Santos Materials Research Inc.

Santos Materials Research Inc. is a company headquartered in Martian orbit. They have spent years developing aerogels for space-planes and certain components in spaceships. Currently, most of Santos' research is focused on developing new and better memory-alloys for repairing stations and spacecraft. To manufacture memory-alloys successfully requires a micro-gravity environment. Otherwise, the wide variances in the density of the component materials prevent attaining a uniform mixture.

Santos was one of the founding companies of the Mars Consortium. They enjoy a strong, positive reputation among professionals throughout the Solar System. An extremely high number of scientists and engineers from both Earth and Mars apply each year to work for Santos, even with the political pressure on the Consortium intensifying.

In the past, Santos has formed joint-ventures with other companies, including Traeger Aerospace and Kologorov-Meisch. Recently, however, Santos has backed away from cooperative deals with any companies outside of the Consortium. Though Santos gave no reason for this new position, many have speculated that the cause for the change is the recently initiated partnership between Santos and Parkhurst Manufacturing.

Parkhurst Manufacturing

Parkhurst Manufacturing is the largest of the heavy industrial manufacturers in the Mars Consortium. They produce a variety of spaceship components at the Nugent Shipyard. Their merchandise can be purchased on Mars Commercial Station.

Top management at Parkhurst has had a high-turnover rate in recent decades as the company's Board of Directors has unsuccessfully sought a way to gain market share from Traeger Aerospace, by far the dominant player in the market. This policy of revolving door leadership has only added to the perception of Parkhurst's mediocrity.

Santos & Parkhurst

Santos & Parkhurst is a cooperative formed two years ago from a limited partnership between Parkhurst Manufacturing and Santos Materials. The spin-off company produces such equipment as engines and spaceship systems. Their research and production is conducted at the Nugent Shipyard. S & P products can be found at Mars Commercial.

Because of past acclaim for the research and development efforts of Santos Materials, many people wonder about the lackluster performance of much of the S & P product line. Some critics have speculated that, because the management of Santos Materials did not want to work with Parkhurst but felt pressured to do so by the Consortium Board of Directors, they may be channeling the best design ideas away from S & P.

Mangala Technologies

Mangala Technologies produces digital equipment for the Consortium. They have facilities on Mars Commercial, where most of their consumer and business products are made. Despite the high standards of Mangala's manufacturing process, however, products manufactured by the Asian Digital Aggregate continue to sell better.

Mangala also has research facilities at an undisclosed location on the surface of Mars, probably inside one of the higher mountains, where the

lower gravity can help accelerate their tests. There, at what is called the Adleman Center, Mangala has been focusing on advanced computing technology. The tight-lipped corporate culture at Mangala keeps outsiders guessing about the exact nature of the company's research. It is easier to know what Mangala is not doing; in recent years, they have publicly steered away from quantum research.

These facts have raised suspicions among certain detractors of the Mars Consortium. They point to Mangala's secretive ways, and their unwillingness to share any research findings, as evidence the Consortium may be aiding Mangala in the unlawful use of Callisto artifacts in their studies. Others have speculated that what is behind Mangala's closed door policy is the Consortium's desire for a Martian company to create a product revolutionary enough to make the efforts of the Asian Digital Aggregate and other Earth companies obsolete.

O'Connor Research Laboratories

O'Connor Research Laboratories was established in 2162 when Colleen O'Connor left Muktar Biotech with a number of her colleagues to form a pharmaceutical research firm on Mars. After promising research into xenovirology, O'Connor Labs was granted membership in the Mars Consortium in 2170. With this, O'Connor Labs became the youngest company in the Consortium. Soon after, Colleen was appointed to the Consortium Board of Directors. With Colleen's death in 2187, her seat on the Consortium Board went to her son, Patrick.

O'Connor Labs is the largest manufacturer of Pharmaceuticals in the Consortium. They have substantial production facilities on Mars Commercial, but some people allege O'Connor also has labs on Ulysses. The company vehemently denies these rumors.

O'Connor continues to publish results from their xenovirology research. With the discovery of the Callisto Artifacts thirty years ago, the company began working in conjunction with the Joint Research Team (JRT) at Callisto to isolate any and all alien viruses uncovered at the site. Though no alien strains have been discovered, O'Connor has developed a thorough protocol to cope with a potential outbreak. Both the JRT and the UEL military have incorporated much of O'Connor's containment methods into their daily practices.

Martian Mining Corps

Since its beginning, the Martian Mining Corps has strip-mined Mars and asteroids for every mineral and ore of value. Their operations now extend to Deimos, the Asteroid Belt, and beyond.

The MMC is one of the founding members of the Mars Consortium; in fact, the MMC is the oldest company in the Consortium. The company was started by the former OPEC nations who sponsored the so-called rogue colonies on Mars, most of them populated by people not affiliated with any of the three major economic blocs on Earth. Dozens of small mining operations, run by some of the poorest nations on Earth, combined forces in the MMC.

The MMC continued to recruit people largely from Third World countries without ties to the major economic blocs. Because of the poor conditions of these regions of Earth, the people there welcomed the chance to work as cheap labor for the MMC. The result has been a massive influx of people to Mars over the past century.

Over the last few decades, automation of mining operations has evolved to where robotic devices have now replaced a majority of the human mining crews. Some of the miners have been trained to operate and maintain the automatons, but most of the laborers have had to seek other employment. Fortunately, the Consortium has been able to absorb many of these displaced workers, primarily into service industry jobs.

The MMC has undergone other changes as well. Due to the population expansion on Mars, many of their mining operations on the planet have been shut down. But now the MMC supervises construction of underground communities on Mars. The MMC also has taken an active role in the terraforming of the planet, although in recent years the Consortium has held back these efforts for fear of Terrans overrunning the Martian communities. That fear may be unfounded, however; most Terrans don't want to live on a planet as miserable as Mars, despite what they have to tolerate on Earth.

Since the discoveries at Callisto, the MMC has been specializing in the mining of valerium, the compound needed to power all vortex gates. To this end, the MMC has established offices at both Io Mining and Europa Commercial stations.

6.3.3 Independent Space-borne Companies

Traeger Aerospace

Traeger Aerospace is the largest aerospace company in Sol. They produce an extensive line of products, including fighter hulls, capital ships, and even space stations. They have their own station and shipyard orbiting Ganymede.

Traeger's first major successes came with the company's design, manufacture and marketing of space-planes. For a long time, however, founder Donald Warren Traeger resisted venturing into any new areas

of business. Even when his daughter Dr. Kelly Traeger developed a new and highly efficient fusion reactor system she had to look elsewhere for funding.

Ultimately, however, Kelly Traeger's design for the **KT- Alpha** MFCPS became the impetus for what business commentators of 2134 called "the merger of the century" between Traeger Aerospace and Haldeman Industries. Haldeman-Traeger Industries built stations, cruisers, and transports. In the late 2170's, the merged company won a UEL military contract to design and manufacture the first single fighter spacecraft.

Although the fighter - called the Razor - delighted pilots, the cost overruns on the project soured the marriage of Haldeman and Traeger. After losing nearly 6 billion credits, the two companies went their separate ways, reverting to their original corporate identities. Haldeman Industries now focuses on weapons and ship components, along with creating space stations.

But Traeger has stuck it out building space ships. Their first solo attempt at producing a single seat fighter, the Eclipse Class Gunboat, slowly became a favorite of such organizations as the Mars Consortium. With the post-Callisto boom in space travel, Traeger Aerospace has grown rapidly. They moved to their present location in 2181.

Haldeman Industries

Haldeman Industries produces weapons and other ship components. The company is based on Oberon Commercial Station.

Haldeman Industries was founded in 2049 by Joseph Haldeman. As an engineer for NASA, Haldeman designed and developed the first orbital Earth colony in 2042. With his newly found fame, and valuable connections in the UNAE military, Haldeman became a major player in the aerospace business.

For decades, Haldeman Industries focused primarily on building space stations. The company became known for its quality and its constant innovation. In many ways, Haldeman drove the evolution of space station design and construction.

In the mid 2130's, Haldeman began shopping for a business partner to share the growing financial risk in the aerospace industry. Competition had heated up, especially with Tanaka Heavy Industries taking an interest in the construction of space stations. Finally, Haldeman Industries entered a merger with Traeger Aerospace.

Haldeman-Traeger Industries designed the first single seat space fighter. But fulfilling their contract with the UEL cost the corporation 5.8 billion credits over their production expenses. After that experience, James

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Haldeman, director of development, vowed the family company would never produce another space fighter.

The board of the company disagreed. Ultimately, James Haldeman resigned from Haldeman-Traeger Industries and resurrected Haldeman Industries.

Cosmospatiaele

The success of Traeger Aerospace's Eclipse Class Gunboat lured many other fledgling aerospace manufacturers into developing single seat spacecraft. One of the first companies to do so was the small European firm Cosmospatiaele. Though their expertise was limited at the time to the development of submersibles, their first space ship, the Bee Class Fighter, enjoyed considerable popularity.

But Cosmospatiaele has not been able to shrug off the sophomore jinx. They have not gotten a new design into production for over a decade. Currently, the company has just a few propulsion system items in production. Constant changes in the management of the space division have resulted in often contradictory goals for their future. It is rumored that, despite their promising start, Cosmospatiaele may pull out of the space industry for good.

Kolgorov-Meischt

Spurred by the success of Traeger's virgin jump into the space ship building business, Kolgorov-Meischt also went into spacecraft manufacturing with little prior experience. They made up for their lack with perseverance, however. In 2184, they produced the Vulture Class Shuttle, which was a runaway hit. From there they have had their stumbles (the Talon Class) as well as other triumphs (the Hyperion Class).

Attracted by the opportunity of operating independently of Earth and Mars, Kolgorov-Meischt moved all of their production facilities to Umbriel Commercial shortly after that station was complete in 2186. Although far from being the largest aerospace firm in Sol, Kolgorov-Meischt does produce the highest quality in the industry. Pilots who want superior performance propulsion systems generally chose K-M products. Kolgorov-Meischt is constantly courted by Earth and Mars and maintains sizable military contracts with both governments.

Wheltraum Systeme

Wheltraum is a small company spun off of parent company Kolgorov-Meischt in 2196. Whetraum has specialized in the design and production

of high **performance** fuel systems. Like Kolgorov-Meisch, they are also based on Umbriel Commercial.

Belt Colonies Manufacturing

Belt Colonies Manufacturing (BCM) is a small company based on Belt Station. Although BCM has a roster of competent engineers, the company has grown very little since their establishment in 2192.

The trouble BCM has had expanding their business can be directly traced to the company's difficulty in attracting new talent. Few ambitious professionals want to live on Belt Station, much less raise a family there. Crime on Belt Station is higher than at any other station in Sol. Pirates and other outlaws come and go as they please.

Efforts by BCM employees aimed at improving this situation have been met with resistance from the governing forces on Belt Station. The prevailing assumption is the governor of Belt Station has been corrupted with kick-backs from pirate clans, which is why such activity can thrive around the station in the first place.

Cronus Interplanetary Mining

Cronus specializes in the mining of gaseous materials. The company is one of the few in Sol with all of their operations, including administration, located in space. Their headquarters is located on Titan Commercial Station, where they have ready access to Titan, the atmosphere of which provides them with abundant mining opportunities.

Working in an environment such as that of Titan - low gravity, low temperatures, no oxygen - is difficult enough. When that work involves extracting gases, many of them quite volatile, the task becomes more arduous, and more dangerous. Minuscule miscalculations or minor equipment malfunctions can trigger vast shifts in pressure capable of destroying expensive equipment and imploding the bodies of the workers. Development of safe, yet practical, mining methods continues to be a goal of Cronus.

The Io Corporation

The Io Corporation, as the name implies, is based on Io Mining Station. Like many companies in the Solar System, Io Corp is a mining company. But, unlike many others, they have succeeded at pulling a profit from the forbidding environment of Io.

The success of Io Corp can be contributed largely to what seem like archaic mining techniques. Io Corp relies minimally on automated

technology, using humans almost exclusively to control machinery, and depending on a vast number of human laborers. Although this may seem less efficient, the fact that automatons fail almost hourly in the horrendous conditions on Io makes flesh and blood miners more reliable - and less expensive - in the long run.

Mining on Io is extremely unpleasant. Aside from volcanic eruptions, the surface of Io is dotted with lakes of molten sulfur. The atmosphere is composed mainly of sulfur dioxide. It is commonly believed that Io Corp ships in cheap labor from the most impoverished member blocs of the UEL.

Peter Newton Agricultural Center

The Peter Newton Agricultural Center (PNAC) was founded in 2191 with a grant from the United Earth League by botanist, engineer and inventor Peter Newton. The PNAC is currently based on Mimas Station where they have been developing new hydroponic techniques and researching other agricultural methods to make stations more self sufficient. The scientists at the PNAC have published papers exposing the deficiencies of the current station recycling technology. The ultimate goal for PNAC is to incorporate their research into new station designs.

Last year, the grant from the UEL expired, leaving the PNAC in search of new funding. Peter Newton and his associates have been pursuing a partnership with Traeger Aerospace after rumors of that company's plans for new station construction. At this time, however, Traeger has decided not to sponsor the PNAC's research. The hunt for funds will continue.

6.4 Terminus Universe Timeline

6.4.1 Era of Economic Consolidation (2015-2043)

2019 - First Manned Mission to Mars

Under the guidance of NASA, the first manned expedition to Mars lands safely on the planet's surface. Sponsors of the mission include the United States, Russia, Japan, and the European Union. Transit between Earth and Mars takes 138 days. The six man crew touches down on Mars on June 19, 2019.

2021 - First Mars Mission Crew Returns

After spending 600 days on the planet's surface, the first Mars mission crew returns to Martian orbit. Then, using the ERV (Earth Return Vehicle), the crew travels back to Earth, finally landing on July 3, 2021. A second crew launches for Mars later that year.

2022 - The Second Manned Mission to Mars

The second Martian manned expedition lands on Mars at the beginning of the year.

2023 - EU and Japan Pull Out of Third Mars Mission

In September, the second Martian crew boards the ERV for their long trip home. As the second crew heads toward Earth, the European Union and Japan both unexpectedly announce they will pull out of the third Mars Mission. They give no reason for their decision at the time. Later, it becomes known that each of them did so to focus on building Lunar Bases.

The remaining Mars mission sponsors forge ahead with their plans. They are able to find other governments to help finance the third mission.

2024 (Jan. 12) - Second Mars Mission Crew Returns

After 612 days on Mars, the second crew returns to Earth. The remaining sponsors proceed with the third manned mission to Mars.

2024 (June 7) - Third Mars Mission Crew Launches

The third Martian crew launches. Extra equipment has been launched ahead of them to help extend their stay to at least 800 days. Their goal will be to explore major portions of the planet surface and research the feasibility of Martian terraforming (creating an Earth-like environment on the planet).

2024 (August 3) - Third Mars Crew Dies

Nearly two months into transit between Earth and Mars, the third crew's command module, the Demeter, is struck by meteoroids. The life support system suffers irreparable damage. The entire six person crew perishes three days later. This loss, combined with other events in the years to come, will postpone further missions to Mars for over a quarter of a century.

2026 (Feb. 14) - Japan First With He3 Fusion Reactor

Japan becomes the first nation to have a fully operational He-3 Fusion Reactor. Unlike other attempts at fusion reactors, which use only hydrogen isotopes, the Osaka University-designed reactor uses helium-3. And, when fused with deuterium (heavy hydrogen), the helium-3 yields more useful energy than the other methods. The DHe3 reactor also produces much less radiation and waste, making it safe for widespread use. Though helium-3 is rare on Earth, it is abundant on the Moon.

2026 (Feb. 20) - EU Begins Race For Lunar Real Estate

The European Union has a Lunar Mission crew on standby. With the announcement of the Osaka Reactor, the EU mission launches. Five months later, the Joint European Torus station is online. Japan soon launches a Lunar Mission as well. In the coming years, many other countries also will launch Lunar Missions, all trying to claim a piece of the now valuable real estate on the Moon. Each of these missions will have the same purpose: to build a facility to extract the helium-3 from the lunar regolith (the surface soil of the Moon).

2027 - New Moon Agreement Proposed (and Rejected)

Key members of the Organization of the Petroleum Exporting Countries (OPEC) propose a new Moon Agreement based on the previous Moon Agreement of 1979, and the Antarctic Treaty of 1959. Neither the EU, Japan, China, Russia, or the United States will ratify this agreement, however.

As retribution, the same OPEC members decide to collaborate on an accelerated space program of their own.

2029 - EU Establishes First He-3 Extraction Facility on Moon

The European Union helium-3 extraction facility is situated on the near-side of the Moon where scientists have predicted high concentrations of the substance. Once the EU begins shipping helium-3 from this facility back to Earth, they will initiate construction of a second extraction site. The Japanese facility will be completed soon after the first EU facility. Chinese and American facilities are under construction as well.

2031 - Unified European Economy (UEE) Founded

Many corporations, as well as other governments, begin pressing for property rights on the Moon. Members of the EU decide the best response is to form an economic bloc to coordinate their ventures in Earth orbit and on the lunar surface. With this effort, the Unified European Economy is born. By allowing open membership to all European countries and European international companies, the UEE becomes a major force off-planet.

UEE founders base their organization on the European Union (1998), itself based on the European Economic Community (1957). UEE member nations try to maintain peaceful relations within the group by using the threat of expulsion from the organization as a deterrent to would-be aggressors. Economic exclusion manages to keep most countries in line, but a few Balkan nations are expelled in less than five years.

2033 - United North American Economy (UNAE) Founded

Comprised of Mexico, the United States, and Canada, the UNAE is founded in response to the creation of the UEE. The UNAE is initially based on the NAFTA protocols of the 1990s. The organization soon expands to include other select American nations, but no country contributes as much to the UNAE as its three founding members. Most of the production facilities owned by the UNAE are constructed by the United States, indicating that this economic consolidation is primarily a means to protect interests planetside.

2035 - OPEC Lunar Mission Crew Lands on Moon

By the time the OPEC crew reaches the moon in 2035 and begins construction of a He-3 extraction facility, most of the lunar surface has been unofficially claimed by one of the moon's current residents. OPEC demands possession of territory occupied by EU facilities. The land dispute is brought before the United Nations.

2036-2038 The Lunar War

The Lunar War, as it becomes known, is a misnomer. Very little fighting actually occurs on the Moon. But the conflict does have its origins on the lunar surface. In early 2036, after the UN has failed to settle the lunar land disputes between OPEC and the UEE, the UEE launches a security crew to the Moon to protect their interests. Rumors have surfaced that the OPEC crews are armed.

After a terse verbal exchange between a UEE extraction crew and an Arab construction crew, fighting breaks out. Although each side blames the other for the event, the result is the same: three members of the UEE and the entire OPEC crew die.

In retaliation, Saudi Arabia, the United Arab Emirate, and Iran launch air strikes on cities in the UEE, initially using conventional explosive weapons. The UEE respond in kind. The UNAE, unwilling to face-off with the UEE, pulls all military support from Saudi Arabia and its neighboring countries. Desperate now, the Middle Eastern nations target biological weapons on major European cities. Although most missiles are destroyed before reentry, one does slip through the UEE's orbital defenses, hitting Paris. Over 100,000 people perish in the initial viral outbreak.

Fearing further escalation of the conflict, the UNAE and Japan reluctantly join with the UEE. This alliance, bolstered by intelligence provided by the UNAE, cripples the missile capabilities of OPEC. But Saudi Arabia, Iran and many of the other smaller nations still persevere. From mid-2037, through most of 2038, battles rage in and around the Red Sea, the Persian Gulf and the Caspian Sea. Casualties rise beyond 2 million. It is not until UEE forces invade Tehran, then target Riyadh and Mecca, that the OPEC alliance finally surrenders.

2039 - Lunar Treaty of 2039 Signed

In order to prevent new land disputes on the Moon, **all lunar property** holders agree to sign the Treaty of 2039. The agreement prohibits expansion of operations beyond the boundaries laid down before the Lunar War. None of the OPEC countries that participated in the Lunar War can establish a permanent presence on the Moon.

2040 - Asian Economic Bloc Formed

The Asian Economic Bloc, or AEB, is formed in March of 2040, confounding most mainstream analysts who had discounted the possibility of cooperation between the nations involved. The consolidation of efforts on Earth and on the Moon by China, India, Japan, the Little Dragons of southeast Asia and Indonesia, and several of the former Soviet Republics, comes as a mighty blow to the UEE and UNAE. With vastly greater natural and human resources, the AEB wields superior power over the other two major economic blocs.

The AEB grants their member countries a good deal of internal self-governance, but all international relations are handled through the AEB. Member nations are expected to contribute to the AEB as best they

can. If a country **does** not meet expectations, they are penalized or even expelled. This fosters a sense of competition between the members, but rarely any serious hostility. The strength of the coalition helps ensure the AEB will maintain political, economic and social dominance for decades to come.

6.4.2 Era of Colonization (2042-2100)

2042 - First Colony in Earth Orbit at L3

The first orbital Earth colony becomes operational in June, 2042. It is constructed at the 3rd LaGrange Point in Earth orbit. The UNAE, the sponsors of the project, see this as a significant step toward coping with crisis level overpopulation on the planet's surface.

This first colony is designed by Joseph Haldeman, then an employee of NASA. Haldeman goes on to found Haldeman Industries, a company later renowned for creating space stations.

2050 - The Return to Mars

The UNAE launches the first manned mission to Mars in over a quarter of a century. By dubbing it the Renaissance Mission, the UNAE hopes to signal the rebirth of human travel to Mars, as well as the economic and spiritual renewal of the nations in their bloc.

Using fusion-powered rockets, the transit between Earth and Mars takes only 60 days, rather than the 130- to 180-day Hohmann transfer orbit necessary only twenty-six years before. The twelve person crew consists of scientists from key UNAE companies. Their two-year mission focuses on cataloging the planet's resources and preparing Mars for a UNAE colony.

2052 - Renaissance Mission Crew Returns

Once the Renaissance Crew returns to Earth, the UNAE begins the rigorous planning of the new Martian Colony. They establish a terraforming protocol to be initiated once key segments of the colonization strategy are in place.

2068 - Tanaka Completes First Fusion Powered Space-plane

Tanaka Heavy Industries, a conglomerate of Asian industrial giants, has been a leader in developing fusion reactors since the first days of the

AEB. With the cooperation of Osaka University, Tanaka finally designs a reactor efficient enough both in power and in mass to propel one of their space-planes. With the superiority of this advance as a method for escaping a planet's gravity, the fusion powered space-plane virtually negates the need for space elevators. Large scale mining of planets and asteroids is now seen as only a few years away.

2069 - The Ares Colony

A harsh economic downturn forces the UNAE to delay the launch of their Martian colonists until 2069. That year, one hundred colonists arrive on Mars to establish a habitat site at Ares Vallis. Priorities include building additional habitats to allow more specialists to join the effort on Mars.

The UNAE has a great many hopes pinned on the success of their Martian colonies. They want to replenish their dwindling natural resources, find a permanent solution to their population explosion, and regain the prestige lost by North America in the previous century.

Analysts of the time label the Ares Colony an unwise investment. They feel the initial cost is too high, and that the UNAE's resources would be better applied toward gaining influence on Earth.

2071 - Asteroid Mining Begins

Orbital and asteroid mining is established as a parallel venture to the Ares Colony, but soon the two grow in synergy. Mars provides a convenient local market for the metals, carbon and volatiles mined from the Belt and also serves as a nearby shipyard. As the mining activity increases, small outpost colonies are formed by independent miners throughout the Belt. .

2072 - United Nations Disbanded

The United Nations, founded in 1945, is disbanded in 2072. The **poor** performance of the organization, as evidenced by its handling of the Lunax War, and its inability to effectively sanction the major economic blocs, renders the UN obsolete in the eyes of most world leaders.

2073-2074 - New Martian Colonies Appear

In five years, the number of UNAE colonists living in the network of habitats in the Ares Colony grows to nearly five thousand. The completion of two domed colonies over the next year will allow the population to swell to 25,000. With the announcement of the new dome construction,

many smaller nations sign on to the fledgling colony. People volunteer from all areas of life - from once doubting scientists to poverty stricken laborers from Central and South America. Because the construction of these new colonies will be automated with advanced robotics, however, very few people are accepted for the journey right away. The majority of those who want to live in the UNAE's Martian colonies will have to wait for the full-scale terraforming effort.

There are alternatives, however. Other colonies begin springing up all over Mars. With the decreasing cost of travel between Earth and Mars, some nations not affiliated with the three large economic blocs, including the former OPEC countries, establish colonies of their own. Lacking the advanced robotics of the Ares Colony, these unregulated colonies will evolve on pure determination. Unfortunately, human error and miscalculation will cost the lives of many of these rugged pioneers.

Efforts to tame the Martian frontier revitalize a practice in near dormancy for 400 years. Indentured servitude, in which a company pays for a colonist's transport in return for several years' service, proves to be an effective means to exploit something most poor nations have in abundance: unemployed workers. Some Martian colonies even make back door deals with the most desperate countries to ship segments of their populations to Mars for work in construction, mining, and service positions. By taking advantage of the antiquated labor laws of these poor nations, the unregulated colonies subject the indentured servants to dangerous situations with few of the amenities enjoyed by laborers from the three major economic blocs.

Soon, the unregulated colonies begin to undercut the Ares Colony, which the UNAE has expected not to turn a profit for another ten years. The financial hit causes the North American bloc to fall even further behind its rivals. Ironically, however, the stress on the UNAE nations has the effect of encouraging emigration of their people to Mars in the decades which follow.

2075 (Aug 12) - Completion of Apsu and Tiamat, First Two Domed Colonies

With the completion the two dome colonies, Apsu and Tiamat, the population of UNAE colonists swells. Most of the new arrivals on Mars will be involved with terraforming operations.

Engineers and their crews start construction of a giant mirror to orbit over the South Polar region of Mars. Once in place, the mirror will raise the polar temperature by about 5 degrees. This will melt the polar ice caps, releasing carbon dioxide trapped in the caps, as well as in the Martian permafrost. The carbon dioxide is predicted to create

a greenhouse effect which will continually raise both the **temperature** and the pressure in the Martian atmosphere - the first goals of Martian terraforming.

2075 (Dec 6) - Market Crash Spawns New Tech Standards

After years of unprecedented growth in the technology industry, the entire sector heads for a crash. Worried that incompatible standards in the global market place will hinder continued growth, major investors quickly liquidate their high tech holdings. The resulting run on technology stocks wipes out large corporations worldwide. The AEB is hit especially hard.

Realizing the severity of the situation, the AEB rushes to solve the standards issue, and pushes for the creation of a body to oversee technology standards worldwide. The resulting organization, the Computing Standardization Forum, is first met by heavy criticism. By the end of the following year, however, nearly every country in the world is a member of the CSF. The boost to economic growth which results helps a fledgling new government take hold.

2076 - United Earth League Founded

Led by the AEB, the United Earth League (UEL) is officially convened in 2076, four years after the disbanding of the UN. All economic blocs and unaffiliated countries are invited to join. The UEE reluctantly ratifies the League Charter, recognizing that with the even larger power base of the UEL, the AEB would be stoppable. Many other smaller powers sign on with the UEL as well. But a few nations, mainly those with off-world interests, do not. These countries are labeled as rogues, and they are continually pressured to ratify the League Charter. The UNAE also declines to attend the First League Congress, and refuses to recognize the UEL.

The UEL government structure is very similar to that used by the AEB. The UEL acts as a overseerer; there is a policy of non-interference in the internal affairs of an economic bloc. However, off-world affairs are handled solely by the League. A premier is appointed by the key members of the major economic blocs. Lei Chen serves as the first premier of the UEL. A senate is created as the lawmaking body. Jakarta is designated as the temporary capital of the UEL until a final location is agreed upon. The UEE will lobby for Geneva to be the permanent capital for many years to come

Since the previous decade, plans for the UEL have been circulating in the higher echelons of government and inside the board rooms of

international corporations. Rumors of a government body to replace the UN have been surfacing for even longer than that.

2079 - UNAE Finally Joins League

After three years under intense economic and political pressure, and still no profits from their Martian colonies, the UNAE can no longer resist the United Earth League mandate for them to join the organization. UNAE member countries also officially become members of the CSF. UNAE representatives travel to Jakarta to ratify the League Charter. In doing so, they concede control of their Martian colonies to the League.

UNAE critics claim the North American bloc stalled in joining the UEL to buy time for their Martian colonies to pay off. The way the detractors see it, the UNAE hoped increased economic power would translate into political leverage once they finally entered the UEL. In fact, the UNAE's huge investment of time and finances into the colonies has the opposite effect. This reinforces the opinion that the UNAE's Martian colonies, ten years old at this point, have always been a mistake.

2082 - Two New UEL Domes Begin Construction

Profits slowly trickle in from the UNAE's original colonies, two years before expectations, but three years too late to benefit the North American bloc. With continued growth all but assured, the UEL tentatively approves the construction of two more domes on Mars.

2085 - Conflicts Between Competing Colonies

Reports come from Mars about the unregulated Martian colonies and the UEL colonies in conflict over territory. A rogue Venezuelan colony is said to have sabotaged one of the Tiamat Colony's automatons.irate members of the Tiamat mining crew lash out at a passing prospector from the Nigerian colony. Equipment owned by a UEL corporation is destroyed. There is alleged tampering with oxygen stores at the Iranian colony. Such skirmishes soon lead to increased destruction and broader fighting.

2086 - Martian Orbital Mirror Destroyed

Apparently in retaliation for the destruction of an Algerian-habitat, the unregulated colonies coordinate their efforts. They launch a salvo of missiles and manage to destroy the orbital mirror.

The Martian terraforming effort is halted. Many people believe the rogue colonies destroyed the mirror in anger. But others think it was an act of resistance. If the Martian environment is made more hospitable, the UEL can easily unload their surplus population on the planet, as well as establish their own government there. The rogue colonists, and their sponsor nations, see this as a threat. Because they view Mars as a way to reclaim lost glory, they want to establish and maintain dominance there.

Back on Earth, following the destruction of the polar mirror, the UEL calls for the creation of a Martian colonial government. The UEL also increases pressure on the nations sponsoring the rogues to acquiesce to their demands.

2089 (April 17) - Colonial Congress To Establish Martian Government

The leaders of the UEL sponsored colonies and of the rogue colonies meet at the Apsu Dome. They all agree that the conflict has gone too far. No one wants to repeat the mistakes of the Lunar War.

After lengthy debates end four days later, the territorial disputes are still not settled and a form of government cannot be decided upon. The Congress calls a recess for two months. In the meantime, the UEL applies renewed pressure on the rogue colonies' sponsor countries back on Earth.

2089 (May 8) - Formation of Martian Mining Corps

Mining companies from the unregulated colonies agree to pool their resources, forming a conglomerate company they call the Martian Mining Corps. Outsiders believe part of the reason for this decision is to create a stronger power base for the so-called rogues as they continue to negotiate with the UEL.

2089 (June 21) - Martian Protectorate Founded

When the Colonial Congress is reconvened, a startling announcement is made. The unregulated colonies propose a compromise solution which allows Mars-based companies to maintain some authority in how they run their businesses and related services, as well as a degree of independence in other areas. In return for the UEL pushing through this agreement, the rogue nations on Earth will become members of the League.

Although suspicious of the proposal, the UEL finally approves a modified version. What is agreed upon limits the freedoms of the Martian

companies without forcing them to relinquish total control. With this agreement, all territorial disputes are resolved and the Martian Protectorate is founded. As anticipated by many in the former rogue colonies, however, most of the officials initially elected to the Protectorate are from the UEL colonies.

In the coming years, the UEL grants the Martian Protectorate increasing latitude in managing the colonies. Thirteen years after the UEL's formation, the organization is still united in name only. With commitments to solving problems on their home planet, and the lengthy interplanetary travel time, it remains difficult for the League to shape the new colonial government. Instead, the UEL must rely on the implicit threat of punishment to keep the colonies in line.

2090 - The Protectorate's Ecopoesis Manifest

The Martian Protectorate, at the behest of the UEL, puts forth the Ecopoesis Manifest. It calls for Mars to reach a state of ecopoesis within eighty years using a new method: the release of perfluorocarbons by factories on the surface of the planet. Like the orbital mirror, the factories will increase the greenhouse effect, thereby warming the ice caps and permafrost, and releasing carbon dioxide. During the first twenty years of the plan, the Protectorate will also determine the best course for introducing more water into the Martian biosphere.

Ecopoesis is the stage in terraforming at which the temperature and air pressure of the Martian atmosphere is hospitable enough for a person to move freely on the surface without an exoskeletal suit. However, the air still contains poisonous amounts of carbon dioxide. People must continue to wear breathing units. With water vapor introduced into the biosphere, genetically engineered plants could produce more oxygen in the atmosphere.

Feeling the strain of overpopulation, the UEL lauds the Ecopoesis Manifest. But they will spend the coming years lobbying the Protectorate for measures to keep accelerating the terraforming process.

6.4.3 Era of Destabilization (2100-2160)

c. 2100 - Rise in Piracy

As mining activities in the Asteroid Belt expand through the end of the 21st century, the inevitable parasites evolve as well. Shipments of refined metals and volatile materials, much of it transported on drone ships and unpowered containers, fall prey to hijackers hungry for an easy profit. Overall, however, piracy proves only a minor nuisance.

c. 2105 - Martian Economic Boom

In the years around 2105, the Martian economy makes rapid strides. Existing companies continue to grow, while new businesses, such as Parkhurst Heavy Industries and Mangala Technologies, are founded. In response to the boom, the UEL increases tariffs on the Protectorate.

The strong economic growth on Mars, coupled with the promise of a more hospitable environment in the future, lures more and more people from Earth to live on the red planet. The Martian terraforming effort, however, proceeds slowly. And Earth's population keeps expanding.

2108 - Construction of the Civitas in Jakarta

After decades of wrangling, the UEE finally agrees to let the capital remain in Jakarta. To commemorate this event, construction of the UEL's new military headquarters, the Civitas, begins. The Civitas is designed to withstand any attack, including nuclear assault and planetary bombardment.

2120 - Terraforming Effort Fails to Reach 30-Year Milestone

The Martian terraforming effort does not meet its thirty-year milestone. The Protectorate calls for releasing greater volumes of perfluorocarbon into the atmosphere to intensify the greenhouse effect. The Colonial Congress considers construction of a new orbital mirror, but the idea is defeated. A majority feels the mirror is too vulnerable to sabotage.

The UEL, now less distracted by troubles at home, warns the Protectorate to come up with a way to speed the terraforming process or lose authority in the matter to the Earth government. Protectorate scientists try to ease UEL fears by claiming the Manifest's targets soon will be reached.

2121 - Pendleton Harvests Meta-Atom

After years of research, Dr. Stewart Pendleton publishes his paper, "Super-Molecular Reconstruction of Atomic Structures Through Magnetic Particle Acceleration and Separation." His work delves into the theories of meta-atoms, establishing breakthrough understandings which will form the basis of fusion and weapon development for many years to come.

2130 - Traeger Designs KT-Alpha MFCFS

Dr. Kelly Traeger designs a multiple fuel cycle fusion system, composed of several reactor modules, to be used in space stations. Called the KT-Alpha, the reactor builds on ancillary techniques in Pendleton's research.

The KT-Alpha is fueled by hydrogen. The first stage reactor uses a modified deuterium-deuterium reaction to produce helium-3 to fuel the second stage reactors, as well as to produce helium-3 for new He3-He3 reactors used in spaceships.

Unfortunately for Dr. Traeger, the company her father founded, Traeger Aerospace only has experience building space-planes. The company is not equipped to construct the KT-Alpha. Dr. Traeger must seek outside investors, and the process is made difficult by so many competitors flooding the market with reactor designs.

2134 - Haldeman-Traeger Industries Is Formed

For four years following her discovery, Kelly Traeger has been unable to sell her design for the KT-Alpha reactor. She fears design knock-offs will appear at any time. Finally, however, there is good news. Haldeman Industries proposes a merger with Traeger Aerospace.

Haldeman wants to incorporate the KT-Alpha into the company's next station design. Haldeman also wants a business partner to share the growing financial risk in the aerospace industry. Competition is heating up with Tanaka Heavy Industries, already an experienced aerospace developer, taking an interest in the construction of space stations.

2140 - Terraforming Effort Fails to Reach 50-Year Milestone

After the Protectorate missed two previous milestones, the UEL gave the Martian body one last chance to meet the timetable of the amended Ecopoiesis Manifest. Now, after efforts have once again fallen short at the fifty-year mark, the UEL calls for a special session of the Colonial Congress to be led by their delegation.

Earth populations are at an all-time high, despite the UEL's efforts to lower the birth rate. Migration to orbital colonies and the current Martian domes has had no significant impact on Terran overcrowding. The prevailing attitude of the UEL is that ecopoiesis must be reached within twenty years. The UEL delegation to the Colonial Congress demands new measures to make this happen.

Research has shown that vast amounts of carbon dioxide reside within carbonate minerals on the Martian surface. However, current techniques won't release this stored CO₂; a more drastic approach is required. Three

options are proposed: a heat beam concentrated on certain areas of Mars, buried nuclear explosives, and an asteroid impact with the surface of Mars.

The Colonial Congress finds all of these options unacceptable - **and** the last two particularly disturbing. Led by the Martian Mining Corps representatives in the Congress, they protest by shutting down **all** terraforming plants on the surface of Mars.

After three months of deadlock, the UEL and the Protectorate come to an agreement. The Protectorate will construct an orbiting platform equipped with a heat beam in return for certain concessions, including lower tariffs. The UEL ultimately agrees.

2141 (May 1) - Saar Appointed Premier of UEL

Marcus Saar holds many distinctions within the UEL. To date, he is the only politician from the UNAE to be appointed Premier. He is the first Premier to die in office as well. And Saar is the first UEL Premier to gain his office primarily by maligning Mars.

After taking office, Saar vows to push forward with the terraforming of Mars and Venus no matter what. "The people of Earth deserve these options," Saar declares. "We will not stand for undue delay because of the selfishness of those already enjoying the financial benefits of living and working off-planet."

2141 (Sept. 5) - Terraforming Resumes Under New Manifest

With the revised Ecopoiesis Manifest secured, Premier Saar gets Martian terraforming moving once more. Construction of the orbital heat beam begins. Other efforts resume. But the rate of change never reaches its former tempo.

2144 - Construction of Heat Beam Complete

Two weeks after the completion of the heat beam, terraform engineers use it to carve a canal between two sections of the Martian landscape several scientists predict will evolve into a pair of seas. In carving the first canal, carbon dioxide is released as theorized. But, in the middle of carving of a second canal, trouble arises. The heat beam malfunctions and fries the control system. The beam is shut down for investigation.

2145 - Saar Pushes For Increased Vigilance Against Piracy

In a series of public speeches and addresses to the UEL Senate, Premier Marcus Saar promotes his plan to build up Terran military forces

around Earth, Mars and the Asteroid Belt in response to increased pirate activity. "We've seen the rate of space hijackings double in the last years," Saar tells one group. "And we've seen these pirates evolve from lone wolves to sophisticated clans equipped with much of the latest technology. It's time the UEL put a stop to this trend."

One pirate clan, the Marauders, grows in dominance, apparently after capturing and upgrading retired UEL spacecraft and weapons. After a string of highly publicized raids by the Marauders, which result in dozens of deaths and financial losses near half a billion credits, Premier Saar gets his way. Funds are appropriated for increased patrols by the UEL of all trading lanes between the Belt, Mars and Earth.

2157 - Martian Colonial Militia Established

The Martian Protectorate decides it also must respond to the increased pirate activity. They create a space militia, doing so without the consent of the UEL. The militia is small and disorganized; its only function is to protect Martian space traffic.

2158 (Jan. 18) - The Earth Pandemic

Displeased by the formation of the Colonial Militia, the UEL prepares to send another delegation to Mars. These plans fall apart, however, when members of the delegation become suddenly and severely ill. Premier Saar experiences the same dire symptoms the next day. The deaths of these government officials within three days confirm that they are among the first victims of a viral plague sweeping Earth at an unparalleled rate.

Tens of thousands of people die the first week of the outbreak, with millions diagnosed with the virus the second week. Within hours of exposure to the virus, a victim experiences debilitating pain in the limbs, followed shortly by muscle paralysis. Within days, the paralysis advances to vital muscle areas. Typically, the victim dies from heart failure or suffocation due to the lungs being incapacitated.

Early medical study shows the virus is spread through the air as well as through direct contact with bodily fluids and wastes from the human victims. One cough from a contaminated individual is enough to cause infection. Other studies indicate the virus has a dormant phase in which it is transmitted from unaffected carriers, probably mosquitoes and/or flies, to human victims.

By the third week, the **devastation** caused by the plague brings about widespread civil unrest. Earth citizens riot when demands for medical treatment cannot be met. With the weakening of local and regional law enforcement agencies, looters run rampant.

Just three months after the outbreak, the Earth's population already has been reduced by an estimated 10%. Before the end of the year, however, the plague is contained to designated Quarantine Zones. But the lawlessness that began in the early weeks will continue for many years even after a cure for the plague is found.

2158 (Jan. 31) - Mars Consortium Founded

The Mars Consortium is founded by the companies operating on Mars to protect their collective economic interests and to eliminate the in-fighting between competitors, and certain nationalities, that has gone on since the first days of Martian colonization. Acting as a consortium, the various companies on Mars can better represent themselves in the Protectorate and to the UEL.

Because the UEL is preoccupied by the pandemic on Earth, their reaction to the formation of the Mars Consortium is muted. With the UEL temporarily out of the picture, the Consortium unofficially halts terraforming on Mars once again.

2158 (March 1) - New UEL Premier Promises Cure

Anjali Johar is appointed as the UEL's new premier. She promises to find a cure to the Pandemic Virus within the year. She takes a hard stance against rioters, but is even tougher on those trying to flee the Quarantine Zones. "We must be vigilant," Johar says. "Even if the cure seems at times more cruel than the ailment, we cannot shirk from taking our medicine." Many infected people trying to escape the QZs are shot dead.

Johar maintains that if people with the virus can be kept in isolation, the plague will be curtailed. Even with the best efforts of the military, however, small outbreaks of the virus continue to crop up outside of the QZs. The premier's no nonsense policies, although justified, make her very unpopular.

Despite the chaos the plague causes for the economy of Earth, the UEL still polices the commercial transit lanes between the Belt, Mars and the home planet. Johar justifies this expense by pointing to the ongoing pirate activity in space. She vows that "these outlaws shall not benefit from our grave misfortunes here on Earth."

2161 (June 4) Jupiter Observer 3 Launches

The Observer 3, along with her sister ships, launch to reinvestigate the Jovian moons as prospective sites for both mining and human coloniza-

tion. Past probes of Jupiter were too limited in their scope. New data is required to satisfy the growing interest in the commercialization of the outlying planets stirred by the Earth Pandemic and the slow Martian terraforming process.

Premier Johar leads the call for expanding Earth's frontiers. She vows to take humanity to the farthest reaches of the Solar System. "We must reach far beyond the confines of our native planet if we want to survive as a species. I believe it is that simple."

2161 (July 25) - Cure for Pandemic Virus Found

After three years of grueling research, Mukhtar Biotech discovers a cure for the Pandemic Virus. This breakthrough will not be put to use saving lives immediately, however. Over the last two years, the disease has been largely contained through diligent policing of the Quarantine Zones. So, for the now long dead victims of the virus, Mukhtar's discovery has come too late. But, with a cure in hand, people need no longer fear the dormant virus will resurface. This means the arduous process of decontaminating the QZs can begin.

Nearly one-third of Earth's population (including over one-half of the planetside military forces) has succumbed to the virus. Premier Johar still pushes for the terraforming of Mars, but with the need for massive population relocation much less urgent, the issue is not given priority. Soon, another new discovery will keep the topic on the back burner indefinitely.

6.4.4 Era of Connection (2162-Present)

2162 - Unknown Element Discovered on Callisto

The Jupiter Observer 3 lands on Callisto and begins drilling beyond the depths of previous mining probes. During this process, an unknown element, believed not native to Callisto, is found. This new element is named valerium. A fragment of a non-indigenous artifact is also found in the valerium vein.

Immediately, more mining probes are dispatched to the other Jovian moons. Plans for a fully manned expedition to Callisto are drawn up and put on the fast track. A short list of team members are drawn up, including three respected scientists from the Mars Consortium. Knowledge of the discovery is kept from the public.

2163 - Callisto Expeditionary Team Lands

The engineering team of the Callisto Expeditionary Team (CET) arrives at Callisto first. They build habitats at the Asgard Basin, the planned location of colony housing for many of Earth's greatest scientific minds. The archeological team arrives shortly after the construction of the operations base is complete. They immediately set up excavation sites all over the surface of Callisto.

Upon realizing this operation could continue for decades, the UEL puts out a bid request to the civilian sector for the construction of a research station in Callisto's orbit. Haldeman-Traeger Industries beats out Tanaka Heavy Industries for the contract. Haldeman-Traeger plans to use a new station design (informally known as Station VII) which will incorporate many novel features, including the KT-Beta, a second generation MFCFS. Construction crews are launched to Callisto near the end of the year.

2165 - Callisto Observatory Completed

Haldeman-Traeger crews finish the new station which has been dubbed the Callisto Observatory. The station functions as a variable gravity workplace for the CET to study what they uncover on Callisto. To this point, however, the team has found nothing except a few fragments of unknown origin and small pockets of valerium.

Meanwhile, back on Earth, rumors about the reasons for the station occupy much of the media. One day there are news stories about vast mineral deposits on Callisto; the next day tales circulate about Callisto station as a site for new weapons tests; another day discovery of an alien culture is the chosen topic. Finally, media companies begin sending probes to the Observatory in a race with each other for a glimpse at what is going on.

2167 (March 3) - Gate Artifacts Discovered

On March 3, **2167**, just as the moon Callisto slips into **the** vast shadow of Jupiter, the CET makes an astounding discovery. Deep below the Gipul Catena, the archeological team breaks through a layer of magnesium-laced stone, opening up what would be described in subsequent communications to Earth as an ancient burial chamber. Embedded in the chamber, the team finds artifacts later verified to be millions of years old. The signs and symbols of what appears to be an unknown language are engraved over the chamber walls and the artifacts.

The CET excavates all the intact artifacts and transports them to the Observatory for study. Two artifacts are also sent to Earth for further study. The findings are kept confidential.

2167 (December 22) - CET Has Breakthrough

A team of cryptographers and linguists finally decipher the writings on the Callisto artifacts and the burial chamber. The writing tells how the artifacts were once components of giant structures known as Gates. The Gates would allow whatever passed through them to jump from one gate to another, across the vast areas of space. The CET also learns that valerium is used to power these monstrous devices. Again, the public is not officially informed of these findings.

2168 (July 3) - UEL Loses Communication with Callisto Observatory

With no warning, communication transmissions stop between the UEL coordinating team on Earth and Callisto Observatory. The UEL launches a secret investigative team to discover why they have lost contact not only with the CET, but with their military units around Jupiter as well.

2168 (November 29) - Public Learns of "Vortex" Gate Technology

The UEL investigative team arrives at the Callisto Observatory to find every member of the CET dead. The team searches the station for three days, unable to find enough clues to discern exactly what happened or who is responsible.

On the fourth day, November 29, a frantic message broadcasted by the investigative team is received on Earth. The message begins with a mayday, then focuses on the findings of the investigative team thus far, detailing as much information on the "Vortex" Gates as the team can muster. Their transmission, like that of the CET, ends abruptly.

Major media outlets go public with the content of the investigative team's broadcast. All of Earth learns about what appears to be remnants of an alien technology found on Callisto.

At first, the UEL tries to discredit the broadcast. Then the leadership makes a realization. They will need to try building these Vortex Gates before anyone else does, and they will need to contract much of the work to the civilian sector. Therefore, attempting to squelch the truth would be pointless. The UEL reluctantly confirms the accuracy of

the Callisto broadcast just before the end of the year. They also confirm that the Observatory was destroyed by unknown assailants.

Public speculation about the mysterious destruction of the Callisto Observatory runs the gamut of possibilities. The entertainment industry concocts several wildly successful theatrical submergies, as well as home-use interactive games, based on the events. Of course, in the versions to come out of the Bombay studios, diabolical aliens are responsible for demolishing the observatory and a few UEL team members survive to tell their tale.

2169 (Feb 3) - Locations Chosen for 1st Two Vortex Gates

The UEL moves forward with their plans to construct the first two vortex gates, guided by the information deciphered from the two artifacts sent to Earth after their discovery. The location for the Earth Gate is chosen. Tycho Shipyard is locked down and moved there. Asteroids are then moved into Callisto orbit for construction of the second gate.

2169 (August 9)- UEL Expeditionary Force Heads to Callisto

A UEL military expedition heads to Callisto. They will oversee the safety of the Second Gate Construction Crews, during the long voyage and throughout construction of the gate. The military will also build, then guard, a new base on Callisto for a second archeological team to continue the work of their murdered predecessors.

2169 (Nov 26)- Burial Chamber Rediscovered

The second archeological team manages to find their way to the ancient burial chamber. They collect the remaining artifacts, despite the damaged condition of many, and return them to Earth for study.

2170 - O'Connor Warns of Potential Xenoviral Infection

After the existence of Callisto artifacts became public, Dr. Colleen O'Connor, of O'Connor Laboratories, began study of the potential for transmission of xenovirus from exposure to the alien articles. She insists that current protective measures are not good enough and she continues to publish papers urging the adoption of more stringent standards. Soon, she will begin work with the archeological team on Callisto to establish protocols to take the risk of a xenoviral infection as close to zero as possible.

2171 - First Two Vortex Gates Built

Surprising many observers, the Callisto Gate, scheduled to be ready one month after the Earth Gate, is completed first. A week later, crews finish the Earth Gate. The UEL military performs the first test. A cruiser with a skeleton crew successfully jumps from Earth to Callisto. The scientists presiding over the construction project rejoice. Dr. Peter Thistle, head of the prototype development group, declares, "It is an extreme understatement to say that the success of this technology heralds a new dawn for mankind."

One thing bothers Thistle and his colleagues, however. Though they have officially named the new transport "Hyperspatial Field Generators," the moniker "Vortex Gate," coined in the infamous Callisto broadcast, continues to be used by the media, military and politicians. "HFGs don't create a vortex at all," Thistle protests, "it's more... well, like a bubble." But his objections fall on mostly deaf ears.

Plans for a network of gates throughout the Solar System are finalized within days of the Earth-Callisto test. Government contracts are signed with every capable company to begin the massive undertaking. The plan calls for minimized valerium consumption after all the gates are in place. Once the plans become public, the Consortium moves the Nugent Shipyard to the location they have chosen for their first vortex gate.

With the public announcement of the successful test, several anti-Callisto organizations take shape. Most notable among them is a group who call themselves the Lidless Eye (as a symbol of what they claim is their "eternal vigilance for the good of humanity"). Over the next year, protests against the adoption of Callisto technology by the Lidless Eye become more frequent - and more confrontational. The Lidless Eye's Luddite tendencies, and their willingness to intimidate, makes it easy for the media to vilify the group. Soon people begin to wonder aloud if the Lidless Eye is responsible for the destruction of the Callisto Observatory.

2173 - Lidless Eye Incites Skirmish in Earth Orbit

As part of their protests, the Lidless Eye keep harassing travelers passing through gates, following them for some distance, and announcing that "each time you pass through one of these hellish contraptions, you're bringing humanity one step closer to its demise."

A pair of transports threatened by the Lidless Eye's actions opens fire on the protestor's ships. Fortunately, a UEL cruiser on patrol interrupts the skirmish before any ships are destroyed. This incident does not sit

well with many people, including some members of the Lidless Eye who resign from the group a short time later.

2175 (April 4) - "The Vault" Is Discovered

The second Callisto archeological team fulfills a prediction made by the CET years before when they uncover another ancient chamber. Dubbed "The Vault," this new chamber is much larger than the others. New artifacts are found inside it as well, but no information is released about their nature. With this news, the UEL commissions the construction of a new research center in Callisto orbit.

2175 (June 12) - The Three Days of Terror

The discovery of the Vault compels the Lidless Eye to take more drastic action. In a surprise maneuver, they capture two UEL corvettes and their crews at Tycho Shipyard and begin a three day orgy of destruction around the Solar System. Because the cruisers used by the UEL at this time had not been updated since 2162, they prove nearly useless against the newer corvettes hijacked by the Lidless Eye.

Finally, in the seventy-first hour of their violent spree, the Lidless Eye is stopped when the UEL rams specially outfitted TROVs (telemetric rovers) into their engine bells. Unfortunately, the boarding parties do not arrive in time to stop the Lidless Eye from killing the crews and committing suicide. In the minds of many, this incident costs the UEL a great deal of their prestige, a handicap which haunts them to this day.

In the coming months, Domestic Affairs Minister Monique Gerard becomes instrumental in tracking down most of the living members of the Lidless Eye. Her fierce efforts to bring the terrorists to justice boost her popularity in the upper echelons of the UEL. Even former political foes now seem willing to overlook her pacifist leanings.

2175 (Aug 19)- The Hague Convention of 2175

The Three Days of Terror serves as a wake-up call for the UEL. Military leaders arrange a top level meeting between the UEL, the Martian Protectorate, and the other recognized colonies and stations. Convened in the Hague, on August 19, 2175, the convention focuses on standardizing the rules of engagement for combat in space. Included among the new regulations are stipulations against the destruction of Vortex Gates and breaching pods.

Shortly after the Hague Convention, Bernard LaRiviere, the Minister of Defense, cites the need for an improved UEL space force. He envi-

sions squadrons of short range space fighters operating from stations strategically located near Vortex Gates. These fighters will safeguard traffic moving from node to node. Minister LaRiviere argues that, with the reduction of the range, size, and crews of these ships, they will be more cost efficient than having capital ships patrolling these same areas. After being taken up by several influential UEL Senators, LaRiviere's ideas soon become reality. These developments later earn LaRiviere the nickname, "Father of Modern Gate Warfare."

Haldeman-Traeger wins the bid to design the first of the new fighters for the UEL military. Their ship, known as the Razor, is projected to be ready for service in 2178.

2176 - Construction of Callisto Research Station Complete

Callisto Research Station, completed in June of 2176, is designed to support a moderate security team. Initially, the UEL military serves that function, with personnel on the station and UEL corvettes patrolling the node. The two remaining asteroids in Callisto orbit are soon converted, one to a storage facility, and one to a testing facility.

2177 - UEMS Unzen Goes Online

In anticipation of the first order of space fighters to be **delivered** by Haldeman-Traeger Industries, United Earth Military Station Unzen is constructed in Earth orbit. The station officially goes on-line in March, 2177 - a full nine months before Haldeman-Traeger will finally have their ships ready.

2178 (May 1) Monique Gerard Appointed UEL Premier

Premier Johar steps down from office after twenty years as **leader** of the UEL. In her resignation announcement, she requests that the Senate replace her "with someone who can help carry Earth forward into the new century with pride and dignity." Premier Johar goes on to recommend Monique Gerard for the job.

With a majority in favor, the Senate appoints Monique Gerard as the new premier. In her inaugural speech, Gerard recalls how the many disparate factions of the UEL managed to coalesce in response to the Three Days of Terror. Then she asks for the same spirit of unity and peace among all citizens of the Solar System. "As representatives of humanity, we stand poised to expand our influence beyond Sol. We must strive to spread peace and good will as well as prosperity."

2178 (Sept 15) - Callisto Neutrality Pact Ratified

Premier Gerard's first act is to draw up a charter for governing Callisto and all the stations in its orbit. Gerard firmly believes the Callisto technology should be used solely to benefit humanity. She believes the technology should be under the constant watch of an organization which maintains this focus. The Callisto Neutrality Pact, as Gerard's charter comes to be known, calls for the establishment of two independent organizations, each answerable only to Terran Law. The Pact is ratified on Sept 15, 2178.

The two Callisto organizations are the Joint Research Team (JRT) and the Joint Security Team (JST). The JRT is granted the right to unhindered research on the new station. All of their noteworthy findings are to be made available to the public. Development of new technology must follow strict guidelines; the JRT is absolutely forbidden to develop any weapons based on Callisto technology.

The JST comes to be known as the Callisto Squadron, after fighter pilots are added to the security team a year later. The Callisto Squadron is given broad authority to operate as they see fit in order to promote the best interests of humanity. They will protect Callisto technology from falling into the wrong hands. They are even allowed to deny any unwarranted military operations in the Callisto Node. If either the JRT or the Callisto Squadron fails to adhere to the regulations governing their existence, or if they fail to uphold Terran Law, their charter will be dissolved and all members will face prosecution.

Members of both Callisto teams come from the UEL military, the Protectorate's militia, and even some civilian sectors. The most rigorous standards are used in their selection. The Callisto Squadron, in particular, gains a reputation of being the best of the best. The myth of their elite-level skills and discipline grows in military circles, and in the media, over the coming years.

2179 - First Razor Finally Available

Haldeman-Traeger Industries finally rolls out the first production models of the Razor, almost a year and a half behind schedule.

2180 (March 24) - Break-Up of Haldeman-Traeger Industries

Haldeman-Traeger Industries has no choice but to sell each Razor fighter at a huge loss: fulfilling their contract with the UEL costs the corporation 5.8 billion credits over their production expenses. James Haldeman, director of development and grandson of the founder of Haldeman Indus-

tries, vows the family company will never produce another space fighter. After his experience with the Razor, he is convinced there is no way to make a profit.

The board of the company disagrees. Not only do they believe there is money to be made in the new industry, they think they can recoup their losses on the Razor with their very next model.

Ultimately, James Haldeman resigns from Haldeman-Traeger Industries and resurrects Haldeman Industries. Haldeman-Traeger Industries re-incorporates as Traeger Aerospace.

2180 (Aug 25) - UEL Academies Open to All of Sol

As a gesture of good faith to all citizens in the Solar System, Premier Gerard opens the UEL Academies to applicants from all parts of the Solar System, including the Mars Protectorate and other small colonies. Enrollment in the academies had been limited previously to Earth-born applicants only. In return for an education at one of the UEL academies, a cadet must serve at least three years in the League military forces.

2180 (Sept 16) - First Top Dog Fighting Competition Held

Using the newly purchased Razors, the UEL holds the first ever Top Dog Fighting Competition. Nali Squadron, based on UEMS Unzen, easily defeats the newly formed Argus Squadron.

2181 (Feb 25) - Traeger Aerospace Announces Move to New HQ

The Board of the newly reconstituted Traeger Aerospace decides to take the company off-planet. They begin construction of a new station and shipyard in Ganymede orbit in anticipation of the economic boom to follow the completion of the Sol Gate Network. Production facilities for their fighter ships will re-locate to Traeger Aerospace station once the station is completed.

2181 (June 7) - Independent Council of Governors Founded

At the urging of Traeger Aerospace, a meeting occurs between the governors of all the commercial stations which have sprouted in recent years. The governors draft their own regulations on free trade, with far fewer restrictions than those imposed by either Mars or Earth. They also form the Independent Council of Governors, an oversight group which

will manage relations between the commercial stations in Sol **and** represent the group to the UEL in important matters. The Council moves its headquarters into Mimas Station once it is completed.

2181 (Aug 25) - Flight Academy Adds New Classes

Gerard authorizes a new set of classes for the Flight Academy curriculum to train fighter pilots for the squadrons to be deployed at the UEL's new military stations.

2183 - Mars Consortium Comes to Power

Kareem Muhammad, Director of the Martian Mining Corps, is elected as Governor of the Martian Protectorate. This means the Mars Consortium now controls the majority vote within the Colonial Congress.

Muhammad and many members of Congress contact Premier Gerard with the request to restructure the Protectorate. They want to incorporate many of the proven elements of the UEL framework into the Martian governing body. They do not dare push for independence from Earth, however. They feel that would be something not even Gerard could muscle through. As it happens, Gerard urges the League to pass legislation to allow the restructuring of the Protectorate. The law is passed by a slim margin in the League Senate. The pressure Gerard brings to bear on this matter ultimately polarizes the Senate. The fact that two distinct camps are created - one pro-Gerard, one anti-Gerard - will dog the premier for some time to come.

With the support of Premier Gerard, the Colonial Congress is replaced with a junta-like body controlled by the Consortium, and named, appropriately, the Board of Directors. Muhammad dissolves the title of Governor of the Protectorate. Now, only the Board will rule Mars. Soon, instead of referring to themselves as members of the Protectorate, all Martians will say they are citizens of the Mars Consortium. The UEL, however, continues to refer to Mars as their colony.

2184 - Michael Moser Captured on Io Mining Station

Michael Moser, the last of the Lidless Eye leaders still at large, is captured on Io Mining Station after nine years of evading authorities. He had been working as a foreman for Io Corp under an assumed identity for three years. After a failed rescue attempt by a band of mercenaries, Moser is transported to Earth.

In Jakarta, Moser stands trial for his crimes. After eight days in court, Moser is convicted. Two months later, he is executed. His wife,

Isabella Moser, is sentenced to thirty years in prison for treason and aiding and abetting a known felon. Their son, Joseph, is placed in a government custody program.

2186 - Last Three Uranus Gates Completed

Before March of 2186, the three vortex gates orbiting Uranus are completed. Construction of Oberon Station and of Umbriel Commercial station is finished less than three months later. The governor of Oberon entices Haldeman Industries to move to Uranus orbit.

The completion of all the planned vortex gates brings new prosperity to Sol. The boom benefits the Mars Consortium most. But the UEL and the outlying colonies have significant growth as well. The Sol Gate Network also proves to be a hindrance to piracy. But the clans remain resilient. They manage to develop - as well as pilfer - new technology, including tracking viewers and blockers, to mask their movements from gate to gate.

2192 - Premier Gerard Calls for Martian Independence

In response to the deterioration of relations between the Mars Colony and the Mars Consortium, Premier Gerard takes action. In an address to the League Senate, she calls for the United Earth League to grant the Consortium independence. Because rumors had indicated Gerard would announce trade sanctions or military action against the Consortium, her actual announcement shocks even her closest supporters.

A motion for independence is brought before the Senate, but it is easily defeated. Gerard's detractors call for her resignation. Pressure mounts on the premier, and, at the end of the year, Gerard announces she will step down.

2193 (May 1) - Chen Appointed Premiere of UEL

After Gerard's resignation, the Senate votes to appoint a new premier: Junho Chen, a politician with what many Senators feel is a much needed hard-line attitude toward Mars and the other Earth colonies.

2193 (Aug 25) You Graduate from UEL Flight Academy

August 25th is your graduation day from the United Earth League Flight Academy.

2194 (Jan 31) - Hobbes Appointed 1st Director of Mars Consortium

The Maxs Consortium Board of Directors appoints Julianne Hobbes to the newly formed position of Director of the Consortium. Respected both on Earth and on Mars as a well-informed and fair minded politician, Hobbes is deemed by many to be the ideal choice to help improve relations between the UEL and the Consortium.

2194 (Apr 13) - UEL Academies Return to Policy of Earth Exclusivity

Junho Chen pushes a measure through the Senate to restrict acceptance to the UEL military academies. Once again, only Earth-born applicants will be considered for enrollment.

2195 (May 4) - Sabotage At Valerium Mines

With the number of ships using the Sol Gate Network escalating on a daily basis, and many scientists speculating about future uses for the Callisto technology, efforts intensify to mine more valerium, the compound which powers the vortex gates. As production of valerium begins to reach new heights, however, incidents of apparent sabotage occur at several mining sites. The first hit comes on May 4th to operations run by a confederation of Earth companies on Io. The next week the Consortium's Mars Mining Corporation suffers significant damage at two sites on Europa.

The destruction of mining equipment, transports and the valerium stores themselves is blamed on an environmental terrorist organization called the Siblings of Vissar. "This group of misguided vandals is at least an equal opportunity outfit," UEL Premier Chen jokes at one press conference. "But that won't stop the UEL from clamping down hard on these overgrown juvenile delinquents."

2195 (July 16) - Consortium Pushes to Phase-Out UEL Tariffs

In a planned news conference, Consortium Board of Directors member Kareem Muhammad tells media representatives that Martian companies want to phase out paying tariffs to the UEL. "The Consortium already maintains much of the infrastructure of Mars on its own," Muhammad says. "Without the undue burden of these tariffs, we could take full

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responsibility for public services to Martian businesses and Martian citizens. We know what's best for Mars and we want to see that our money goes to the right places."

"It is the considered opinion of the Board of Directors," Muhammad continues, "that the tariffs imposed by the UEL unfairly benefit Earth-affiliated businesses by inhibiting the growth of Martian companies. These are the reasons we want to eliminate tariffs to the UEL." Muhammad ends his announcement with a call for "a future of free and open trade throughout the Solar System."

The UEL government makes no official reply to the Consortium announcement, which most media outlets interpret as a purposeful snub. Rumors from Jakarta insiders indicate that Premier Chen became visibly angered after learning of the Martian statement.

2195 (Sept 9) - Mars Boycotts Top Dog Fighting Classic

As many have expected in light of the recent rise in tensions between the UEL and the Consortium, Mars boycotts the Top Dog Fighting Classic this year. The competition continues without them. Nali Squadron narrowly manages to take home the trophy this time.

2195 (Oct 10) - Haldeman Elected Governor of Oberon Station

Engineer, businessman and staunch UEL supporter, James Haldeman easily wins election as governor of Oberon Station.

2196 (Feb 16) - Mars Begins Conversion of Olympia and Ulysses

The Mars Consortium decides to reinforce their defenses in Martian orbit. As part of their plan, they begin conversion of two of their commercial stations, Olympia and Ulysses, to military stations.

2196 (Sept 9) - Mars Again Boycotts Top Dog Classic

Once again this year, pilots from the Mars Consortium boycott the Top Dog Fighting Classic. The competition continues without them, however. Ursa Squadron wins the trophy this year.

2196 (Oct 11) - More Damage at Valerium Mines

Despite increased security provided by Consortium armed forces, valerium mining operations on Europa lose three production days after an

explosion at one of the excavation sites. The next week two UEL mining sites on Io suffer even greater damage following a series of unexplained explosions. Two miners are killed in this incident. With the Siblings of Vissar still at large, it is assumed they are behind the sabotage.

2197 (Jan 5) - Announcement of Trade Summit

In separate, but simultaneous, news conferences the UEL and the Mars Consortium each make a short but startling announcement to the citizens of Sol. "In an effort to ease tensions between Earth and Mars," the UEL spokeswoman declares, "we will hold a summit before the end of this month to iron out our disagreements on trade and related issues." After a nearly identical statement, the Consortium spokesman adds: "We want to settle our differences peacefully and equitably." Neither spokesperson fields questions from the media.

2197 (Jan 16) - Surprise Top Dog Announcement

The UEL announces they will hold the Top Dog Fighting Classic early this year and will invite Mars to attend as a way to help strengthen relations between all the people of the Solar System. The UEL spokesman says, "We need peace now more than ever, and the Top Dog has always promoted a healthy competition and respect between all pilots." Mars agrees to participate in the annual contest.

2197 (Jan 22) - Callisto Squadron Convoy Hijacked

A Callisto Squadron convoy carrying newly designed Callisto broadcast transmitters from Earth to the Callisto Station is hijacked by unknown assailants, widely assumed to be the Marauders pirate clan. The transmitters, created to make real-time broadcast communication possible between all parts of the Solar System, are said to be gifts from the UEL to the citizens of Sol.

These are excerpts from a statement released by Senator Klaus Enger of the UEL: "To compensate for past infractions of the Callisto Neutrality Pact, and other acts which some have interpreted as counter to the common good, the UEL voluntarily notified the Callisto authorities about these devices and our intention to share them with all of humanity.

"We admit our past mistakes and we humbly ask for forgiveness. For the sake of peace and stability, we urge Mars to do the same,

"We chose to forego commercial profit from these broadcast transmitters and instead present them to the public with no strings attached.

Because the transmitters were produced in private, using Callisto technology, however, the Callisto Squadron was obliged to confiscate them. Unfortunately, that act has resulted in the theft of this new technology. We ask everyone and anyone who can to help us recover these items. Not only because of their intrinsic value, but because of their symbolic role as a tool for re-integrating the community of man."

2197 (Jan 23) - The Start of Terminus

The UEL-Mars Consortium Trade Summit is being held today at an undisclosed location. Hopes run high that Earth and Mars will be able to negotiate a settlement of their differences.

6.5 Space Flight and Combat Technology

6.5.1 Vortex Gates

Vortex Gates **are giant** constructs in space which allow near instantaneous travel from one point to another. To use a gate, a space ship pilot must select a destination, then transmit that information to the initiator gate. The initiator gate will lock to whichever gate, within its limitations, is nearest the ship's destination. Once locked, each gate will activate and form a bubble-like energy field in the center of its structure. These bubbles serve as the portal between the two gates. A ship passes through to the destination gate, arriving in a new node of space.

Vortex Gates are based on Callisto technology and they are powered by valerium, an element discovered in abundance on Jupiter's moons. The first Callisto Expedition found artifacts which contained the information to construct the gates. Only the top minds in Sol know exactly how a Vortex Gate is constructed, but how they work continues to be open to speculation. The predominant opinion is that each gate contains a Callisto artifact which somehow uses valerium to create the bubble through which a ship can pass. The rest of the gate is constructed to support the artifact and its energy needs, as well as the hardware necessary to lock the gates.

Like the first gates in 2171, most of the Vortex Gates were built by moving an asteroid to the location of the gate and using it as a base of construction. The asteroid then served both as a foundation on which to begin construction and as a source of raw material.

After the construction of the first two gates, the Sol Gate Network expanded from the inner nodes to the Belt, then to Jupiter, Saturn, and finally to Uranus. To construct the gates in the outer nodes, the asteroid

and crew had to travel out there. Construction crews were able to use the gates they had previously constructed to shorten the trip to the next gate location. Only after a gate in a node was operational would construction begin on any stations in the area.

An important characteristic of valerium consumption was discovered during the initial expansion of the Sol Gate Network. The amount of valerium required to make a jump increases exponentially as the distance increases between the initiator gate and the destination gate. Therefore, it is more economic to make several shorter jumps than one long jump. Upon discovering this fact, a plan was drawn up for the Sol Gate Network to conserve consumption of valerium, which is always in short supply.

Certain locked (dedicated) gates are used to jump long distances. These gates are locked to each other and require a toll for passage to subsidize the cost of the valerium. Examples of these gates are the Earth-Mars Gate or the Saturn-Uranus Gate. Other unlocked gates, known as node gates, are used for short distance travel, typically around planets. Node gates are able to lock onto other node gates in the local vicinity. Node gates don't require a toll because valerium consumption for these jumps is relatively minimal. Examples of node gates are the Saldrea Node Gate (Jupiter Node 1) and the Ganymede Node Gate (Jupiter Node 4).

When the Sol Gate Network began to grow, many citizens feared that the military would take control of the Vortex Gates. However, commercial lobbyists with stakes in the Sol Gate Network pressed for legislation to keep the Sol Gate Network available to everyone. The Hague Convention of 2175 ensures that the Vortex Gate is considered an independent entity. The Hague Convention also expressly forbids the destruction of any Vortex Gate for fear of what it might do to the environment. Stations in the same node as the gate cannot shut that gate down remotely, nor deny passage through any gate. The stations are only able to govern the space surrounding the gate. Generally, stations are not able to determine the destination of a ship leaving through an unlocked gate. But the UEL military has developed technology that will allow it to view a ship's gate path after it has jumped.

Before the discovery of vortex gate technology, real time communication across the solar system was simply impossible. Because electronic signals could travel no faster than the speed of light, the delay between adjacent sectors was several minutes. When gate technology came into use, a faster method of communication was designed almost overnight, and has been in place ever since. The new communication network requires the Vortex Gate to have a discrete auxiliary gate opened to an adjoining gate at all times. Comm-signals broadcasted from a ship are

picked up by transceivers, and encoded into a particle stream. This stream is sent through the Vortex Gate, a receiver on the destination gate decodes the particle stream, and broadcasts the signal via standard electronic transmission methods. Real time, two-way communication has since become standard, and bandwidth has been increased to accommodate the growing number of ships in Sol.

6.5.2 Profiles of Active Space Stations

Ennis Class Commercial Station

- Manufacturer: Haldeman-Traeger Industries
- Production Year: 2172

The first Ennis Class Commercial Station went online in 2172. The design was based in part on the architecture of the colony stations in use over the preceding decades. But the Ennis Class focused on providing a dedicated platform for spaceborne commercial activities.

The Ennis Class incorporated accommodations for crew and visitors, trading areas, ship servicing areas, and rooms for commercial processing machinery. Laboratories and production facilities are located throughout the rotating section to take advantage of variant gravities caused by rotation. The Ennis Class is also capable of supporting a small security force under the jurisdiction of the station governor. The Ennis Class station has been adopted by almost every corporation in the system.

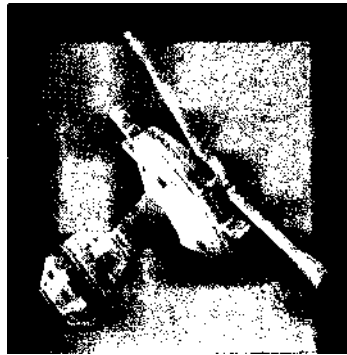


Mayes Class Research Station (Mk VIII)

- Manufacturer: Haldeman-Traeger Industries
- Production Year: 2176

Based on the design of the Station VII model built in 2165, the first Mayes Class Research Station was built in Callisto orbit to replace the destroyed Callisto Observatory. Like the Station VII design and the Ennis Class stations, the Mayes Class station has been built with research laboratories at various levels of gravity throughout the rotating section. The Mayes Class is equipped to conduct virtually any type of research.

Unlike the Station VII, the Mayes Class station design can accommodate security personnel, as well as a modest hangar for shuttles and transports. However, with the signing of the Callisto Neutrality Pact, more security personnel than originally anticipated had to be housed on Callisto Research Station. To provide more room for security personnel, and eventually for the Callisto Squadron, some research facilities had to be refitted. The two asteroids in orbit with the station have been converted into smaller satellite

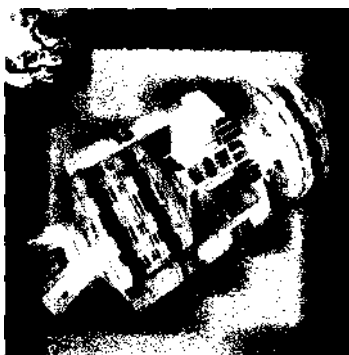


bases for research teams supplanted by security forces. It has been rumored among Traeger Aerospace employees that a new, larger station is under design to replace the Callisto Research Station and eliminate the need for the asteroid satellites.

The only other Mayes Class station currently in use in Sol is Venus Terraform Research Station. Unlike the Callisto Research Station, Venus Terraform has not had major modifications made to the original design.

LaRiviere Class Military Station

- Manufacturer: Haldeman-Traeger Industries
- Production Year: 2177



UEL Defense Minister LaRiviere called for the upgrade of the UEL space forces following the Hague Convention of 2175. LaRiviere sought to take advantage of the expanding Sol Gate Network. The integral component in his plan was the creation of military stations to guard strategic nodes near the Vortex Gates. Squadrons of small fighters would be based at these stations. Several military stations could work in conjunction to extend the range of fighters and allow coverage of nearly all the

gate traffic lanes. All LaRiviere Class military stations were to house a battalion of Marines to defend the station from any attempted invasion.

United Earth Military Station (UEMS) Unzen was the first LaRiviere Class station to go online in 2177. Unfortunately, the station could not fulfill its mission immediately because fighter ships on order from Haldeman-Traeger Industries were drastically behind schedule. UEMS Unzen remained idle for nearly two years until the Razor Class Heavy Fighters became available. In 2180, the UEL commissioned the newly formed Traeger Aerospace to construct a second LaRiviere Class station, UEMS Artemis, which now serves as a patrol station in Earth orbit.

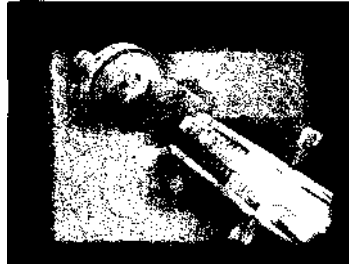
After the Sol Gate Network had been completed, the UEL realized the need for a stronger military presence beyond the Asteroid Belt. They issued a request for bids on a third station: UEMS Saldrea. UEMS Saldrea was constructed in Jupiter's orbit, on the main gate path between the Asteroid Belt and Saturn. Once online in 2185, UEMS Saldrea allowed easy patrol of the outer nodes.

The Mars Consortium, feeling the need for a better defense position in orbit, constructed their own military stations in Mars orbit. The two stations, Olympia and Ulysses, were in fact originally commercial stations. Although not technically LaRiviere Class stations, Olympia and Ulysses have virtually the same functionality as the LaRiviere Class, with only a few minor modifications.

Kozura Class Shipyard

- Manufacturer: Various
- Production Year: NA

The Kozura Class Shipyard is a vital component of production in a modern space economy. It serves as the center of production for items that stations cannot produce due to size limitations, including capital ships and station components. It also serves as a location to repair and rearm capital ships, which further increases its value to the organization that controls it.

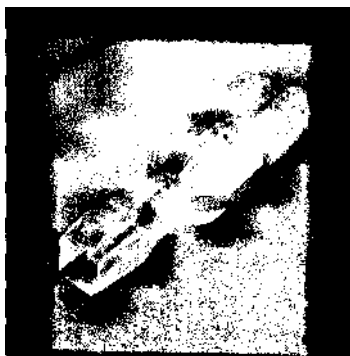


There are currently three operational shipyards in range of the Sol Gate Network. Tycho Shipyard orbits Earth and is under the jurisdiction of UEMS Unzen. Nugent Shipyard can be found in Mars orbit and is protected by Ulysses. Galileo Shipyard orbits Ganymede and is owned and operated by Traeger Aerospace. Each was constructed initially from an asteroid that had been moved to the shipyard's eventual location, using that asteroid as a source of raw materials and an anchor.

6.5.3 Profiles of Capital Ships

Designation: Yamato Class Cruiser

- Manufacturer: Haldeman-Traeger Industries
- Production Year: 2162 (original), 2179 (refitted variant)
- Armament (refit): 2 Medium Torpedo Bays, 8 Heavy Weapons Turrets, 2 Breaching Pod Launchers



Haldeman-Traeger Industries won the bid to produce the Yamato Class in 2162. This was shortly after the discovery of valerium on Calisto and the UEL was not satisfied with the range or payload of the Alexander Class for long range missions such as the Callisto Expedition. They needed a capital ship that could both escort larger cargo ships and sustain smaller shuttles and transports. The Yamato Class performed both roles extremely well. The fact that many Yamato Class cruisers are still commissioned is a testament to

Haldeman-Traeger's innovative design.

The Yamato's role in the military changed very little over its first decade. Even when the construction of the Sol Gate Network began, the Yamato Class cruiser was still used to escort construction crews into the deep regions of the Solar System. However, the need for a cruiser to sustain smaller ships became less important as the number of Vortex Gates and stations positioned near those gates grew. A new role had to be found for the aging Yamato.

The proliferation of stations in the Solar System, as well as the trouble the UEL had boarding the Lidless Eye controlled corvettes during the Three Days of Terror, spurred Minister LaRiviere to conceive a new duty for the Yamato Class cruiser: that of conqueror. Beginning in 2179, the Yamato Class cruisers were slowly phased out from their duties as long range escorts to be refitted with new components. Many of the areas on the ship dedicated to support crews and services was restructured to accommodate a company of Marines. Launchers were added to the hull to fire highly maneuverable breaching pods, known as Hull Penetration Pods, or HPPs. A captain of a Yamato Class cruiser could conceivably capture a ship or a station with the Marines he had onboard. Several unmodified cruisers, each of them indistinguishable at first glance from the revised Yamato, are kept in reserve for deep space missions.

Designation: Dauntless Class Corvette

- Manufacturer: Haldeman-Traeger Industries
- Production Year: 2175
- Armament: 2 Heavy Torpedo Bays, 3 Heavy Weapons Turrets, 1 Mine/Sentry Launcher

Bernard LaRiviere's first act as Defense Minister was **commissioning** a long-term mission capital ship with more firepower than the cruiser. The design of the Dauntless Class Corvette focused on firepower and heightened maneuverability, but, because of the expansion of the Sol Gate Network, the capability to sustain other ships was not necessary. Stalwart developer Haldeman-Traeger Industries won the bid to produce the Dauntless Class, basing their design in part on their successful Yamato Class cruiser. Minister LaRiviere also required equipping the Dauntless Class with a mine launcher to blockade Vortex Gates and other spaceborne objects.



The first combat test of the Dauntless Class Corvette came unexpectedly. As the first two production models awaited commissioning at Tycho Shipyard, the Lidless Eye seized control of them with their skeleton construction crews onboard. This, of course, was the beginning of the Three Days of Terror. The corvettes proved their prowess during this ordeal - no UEL cruisers could capture the corvettes until their engines had been damaged. The UEL increased their order of corvettes soon after this.

The enormous price tag of the Dauntless Class, however, has prevented all but the wealthiest governments and corporations from purchasing them. In fact, soon after the split of Haldeman Industries and Traeger Aerospace, Traeger cut back production of the Dauntless Class. The decreased demand for the corvette could not justify the current rate of production. Instead Traeger concentrated their efforts on the production of gunboats. Dauntless Class corvettes are still constructed periodically, but nowhere near the rate achieved between 2176 and 2179.

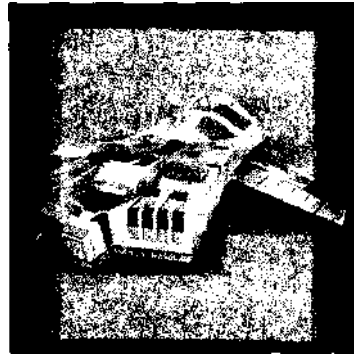
Designation: Vulture Class Atmospheric Shuttle

- Manufacturer: Kolgorov-Meischt
- Production Year: 2184
- Armament: None

This Vulture Class shuttle was 'newcomer' Kolgorov-Meischt's first entry into the growing field of spacecraft construction. The size of the shuttle was decreased from previous shuttles to allow for a smaller crew and less expensive construction costs. Even so, the Vulture can accommodate up to forty passengers.

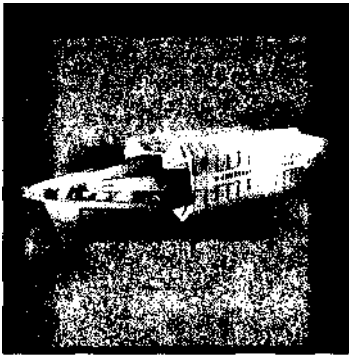
Typically, a ship this size would be restricted to transferring personnel from ship to ship, or ship to station. But Kolgorov-Meischt ingeniously extended the functionality of the Vulture by designing it for atmospheric as well as space flight. The Vulture's oversized propulsion bays allow it to be outfitted with engines that can reach escape velocity from all but the largest planets. The Vulture is also able to spread or retract its wings depending on the environment in which it is flying. With its wings retracted, the Vulture can easily dock in the station docking bays designed for single pilot ships.

The military instantly took to the Vulture because of its dual functionality. Since the military's adoption of the Vulture, many civilian corporations and cruise lines have also adopted it as well - the Vulture is still a money maker for Kolgorov-Meischt.



Designation: Princess Class Space Liner

- Manufacturer: Traeger Aerospace
- Production Year: 2192
- Armament: None



As spaceborne recreation became more affordable, companies wanted a way to shuttle people from planet to planet that was more luxurious than what was offered by the Dakota Class heavy transports. To meet this need, Traeger Aerospace was contracted to produce the Princess Class Liner, the first of which they completed in 2192. Providing far greater comforts and more elaborate entertainments than any ship built to this day, the Princess instantly made traveling on a space liner a symbol of status.

Today, the Princess Class serves a variety of functions. Vacation companies have purchased Princess Class Liners to use as cruise liners traveling all over Sol. A popular cruise is through the rings of Saturn. Other liners have been purchased to serve as places for quiet meetings between government officials or corporate executives. One liner, the Lucky Dog, has been converted into a traveling casino complete with slot machines, gaming rooms, restaurants, floor shows, and boxing rings - all to bring "a hot hot time to deep deep space."

6.5.4 Capital Ship Technology

HPPS

The Hull Penetration Pod, or HPP, is a maneuverable, short-range breaching pod. Like all breaching pods, HPPs are devices for delivering boarding parties, usually armed space marines. Essentially an enlarged canister with a life support system and thrusters, each HPP can carry up to sixteen marines and their equipment. Unlike other breaching pods, the HPP is designed to be specially fired from a Yamato Class cruiser. The Yamato Class is the only ship class large enough to be outfitted with the HPP launcher and to carry the full company of marines necessary to mount an attack on a station.

After being launched from the cruiser, the HPP thrusts toward the intended target, usually a station or capital ship. Using an electromagnet

or a claw, it attaches to the surface of the target. Once attached, the HPP uses plasma torches to slice through the enemy hull. A complete seal is then formed, and the airlock within the pod is opened. The marines can then storm the ship.

Earlier breaching pods were much larger and more readily targeted than the HPP. But because of the momentum from its launch, and the shorter distance to its target, an HPP can use smaller thrusters and less fuel, reducing the size of the pod and its scanner profile. This reduced size makes the HPP more easily steered than its predecessors as well.

Earlier breaching pods relied on the marines aboard to slice through the enemy hull. This proved unsatisfactory, however, because of the danger when the seal between the pod and hull was broken.

There are still problems with the HPP. For one thing, its survivability is low. But since the destruction of any breaching pod is outlawed, this flaw has not been corrected in current designs.

When they were first designed, breaching pods most often aimed for the central, spinning section of a cruiser or station. This placed the marines close to the Command Information Center (CIC) of the target, minimizing the resistance they faced en route. To counter this, it became common practice to add sweep bars around the rotating section of capital ships and stations. Any pod which attached to one of these would be obliterated by the collision before the marines could enter the target. Now, pods must attach to more distant points on the ship, making it more difficult for the boarding party to reach critical locations.

Mines, Sentry Pods and Blockading

Mines are simply devices that contain a limited thruster, a small scanner, and a deadly explosive charge. A mine does not maneuver - it remains in a single location. If any ship collides with the mine, the charge will explode, causing significant damage to anything within a certain radius.

Sentry pods, on the other hand, are slightly more complex devices. Their shell contains a scanner, rotational thrusters, optimized energy and fuel systems, and, most importantly, a weapon and ammunition. A sentry pod will track targets within its weapon range and fire upon them with the equipped weapon. Mass weapons and low powered energy weapons are used most often in sentry pods because they have low surge requirements.

Before the expansion of the Sol Gate Network, mines and sentry pods were used on a limited basis. Most frequently, they were positioned around stations or other locations of importance to help defend the potential target. Because of the vast number of space lanes available to a ship traveling in pre-gate times, mines and sentry pods served few

other purposes. Though these devices continue to be used for defensive reinforcement today, they have found a new use as well.

With the rise in importance of the Vortex Gates, mines and sentries have taken on a new role in the military. Minister LaRiviere conceived the notion of gate blockading - a tactic to deter most ships from jumping through a particular gate. Minister LaRiviere ensured that the military's next generation capital ship, the Dauntless Class corvette, has the capability to position blockades around a desired location using a specialized launcher.

In a blockade, mines are positioned close to the center axis of the gate to damage any capital ships that attempts to jump through it. If the mines are positioned correctly, no capital ships can maneuver around them. Smaller ships, however, often can avoid the mines. Sentry pods are placed closer to the structure of the Vortex Gate to engage any ships which pass through the mines. One pod poses only a moderate threat to most ships. But the large number of pods deployed in a typical blockade is lethal to all small craft.

6.5.5 Profiles of Single Pilot Ships

Designation: Durango Class Light Transport

Manufacturer: Haldeman-Traeger Industries
Production Year: 2172
Armament: 2 Heavy Weapons Bays
Hull Length: 43m
Hull Mass: 26000
Hull Strength: 3S5
Mech Stress Limit: 17000
Thermal Limit: 360000

The Durango Class light transport is the smallest transport used in Sol. Of all the single seat ships, however, it has the most cargo space. This alone has endeared it to self-made merchants who can't afford to pay the crew needed for a larger transport. The Durango's performance varies dramatically depending on the size of its cargo load. But when its cargo bay is empty, the Durango can keep up with the best of them.

The Durango was first constructed in 2172 by Haldeman-Traeger Industries to ferry parts and labor through Vortex Gates. The model established the need for short-range, single pilot ships, and most likely influenced the UEL military's decision to adopt fighter spacecraft in their fleets. Although old, the Durango has retained its popularity because it costs much less than its heavier interplanetary counterparts, the Dakota Class transports. However, the lower price tag has come at the expense of functionality - the Durango Class transport cannot be used for extended flights and its cargo space is dwarfed by that of the Dakotas. Despite the Durango's drawbacks, however, the model remains a favorite with many of the Solar System's small entrepreneurs.

Designation: Razor Class Heavy Fighter

Manufacturer: Haldeman-Traeger Industries
Production Year: 2179
Armament: 2 Heavy Weapon Bays, 2 Medium Weapon Bays,
2 Light Weapon Bays
Hull Length: 20m
Hull Mass: 16384
Hull Strength: 100
Mech Stress Limit: 16384
Thermal Limit: 180000

The Razor Class fighter is the oldest and largest fighter in use today. For its size, it is quite speedy. Of the single seat fighters, only the Eclipse has a larger weapons loadout than the Razor. The Razor is also equipped with a large cargo bay, making it a favorite among mercenaries and outlaws. The Razor has one major drawback, however: repairs and fuel for such a large fighter are very expensive.

Shortly after the Three Days of Terror in 2175, UEL Minister of Defense Gerard LaRiviere called for development and deployment of an improved space force to prevent such calamities in the future. His plan called for strategic placement of military stations around the Vortex Gates, with each station housing a short-range fighter squadron. Haldeman-Traeger Industries won the bid to develop a space fighter and immediately began design of the Razor.

Began in November of 2175, development of the Razor was to be completed in 2178 to coincide with the construction of the new military stations. However, the development cycle extended a year and a half past its deadline. As a result of budget overruns, Haldeman-Traeger Industries had to sell the 300 ships in their UEL contract at a loss of 2 million credits each.

Although the Razor eventually became a popular model in the early eighties, the loss affected the company more than financially. Traeger and Haldeman parted ways soon after the Razor project was complete. The Board of Directors at Traeger felt there was still a solid market for fighters and they have continued production. But Haldeman Industries have focused their efforts on production outside of the aerospace industry.

Designation: Eclipse Class Heavy Gunboat

Manufacturer: Traeger Aerospace
Production Year: 2183
Armament: 2 Medium Torpedo Bays, 4 Medium Weapon Bays
Hull Length: 26m
Hull Mass: 18000
Hull Strength: 210
Mech Stress Limit: 24000
Thermal Limit: 240000

The Eclipse Class is a gunboat in the truest sense of the term. Of all the single seat spacecraft, the payload of the Eclipse is by far the largest. Like the Razor, it has six weapons bays, but two of them have been specifically designed to carry torpedo launchers, along with an immense stock of torpedoes. Of course, such a payload has its detriments. The Eclipse is also one of the slowest and least dextrous of the single seat spacecraft. To compensate for its awkwardness, the Eclipse hull has been constructed to take a huge amount of punishment.

The Eclipse was the first single seat spacecraft designed by Traeger Aerospace. The goal was to fit as many weapons as possible into the smallest frame. Because the Eclipse was to operate as a member of a convoy, not as a lone wolf, its potential clumsiness was not an issue.

Upon release in 2183, the Eclipse initially met with little success. But soon the ship became a favorite with younger organizations, such as the Mars Consortium, who needed a heavy gunboat to fill the role of the much more expensive Dauntless Class corvette. Later, even established militaries, such as the UEL, found uses for the Eclipse. The enormous torpedo bays could be equipped with a variety of large weapons, such as the heavy immobilizer, which could not be accommodated by any other single seat craft of the time. This made the Eclipse an invaluable addition to anyone's fleet.

Designation: Bee Class Light Fighter

Manufacturer: Cosmospat:aele
Production Year: 2186
Armament: 1 Medium Weapon Bay
Hull Length: 8m
Hull Mass: 5096
Hull Strength: 30
Mech Stress Limit: 16700
Thermal Limit: 60000

The Bee Class is the smallest light fighter in use in Sol. Although it has only one weapon bay, the Bee can be equipped with up to four engines, giving this fighter astonishing speed and maneuverability. If not properly managed, however, the Bee tends to overheat. And, even with its tiny size, the Bee's survivability is low. But a skilled fighter pilot at the helm of a Bee won't let anything touch her ship, let alone destroy it.

Newcomer Cosmopat:aele introduced the Bee Class light fighter in 2187. With the rise of pirate activity, and tensions between Earth and Mars still high, there has been an increasing need for a small craft that could perform both escort and reconnaissance duties. The Bee fits the bill. Its small scanner profile has quickly endeared the ship to the UEL squadrons, who made a large purchase of Bees to use as scouting craft.

Designation: Talon Class Medium Fighter

Manufacturer: Kolgorov-Meischt
Production Year: 2187
Armament: 2 Medium Weapon Bays, 1 Light Weapon Bay,
1 Light Torpedo Bay
Hull Length: 16m
Hull Mass: 11000
Hull Strength: 70
Mech Stress Limit: 15384
Thermal Limit: 180000

Conceived as a multiple role fighter/gunboat, the Talon failed to live up to its promise. The ship was first designed to carry an impressive payload of medium weapons and torpedoes, but Kolgorov-Meischt engineers soon realized the payload would have to be reduced to gain the fleetness the manufacturer was already promoting. Ultimately, the revised design retained the maneuverability and cargo capacity advertised by Kolgorov-Meischt, which has made the Talon attractive to some civilian pilots.

Soon after its release in 2187, the Talon was phased into military squadrons throughout the Solar System. But the ship met immediate ridicule from most experienced pilots. Manufacturer Kolgorov-Meischt had been riding high with the success of their Vulture Class shuttle, and with the Talon tried to pack too much functionality into one design. After its poor reception in military circles, surplus Talons soon found their niche as inexpensive medium fighters for the growing number of mercenaries employed by outer node companies.

Designation: Jackal Class Light Gunboat

Manufacturer: Traeger Aerospace
Production Year: 2190
Armament: 2 Light ~~Weapon~~ Bays, 1 Medium Torpedo Bay
Hull Length: 16m
Hull Mass: 7000
Hull Strength: 70
Mech Stress Limit: 14000
Thermal Limit: 240000

The Jackal Class gunboat is a much smaller gunboat than the Eclipse. But do not mistake this ship for a light fighter. The Jackal can carry an impressive payload, especially considering its size. The ship is outfitted with one weapons bay expressly designed to accommodate 50% of the torpedoes an Eclipse can carry. The Jackal can be surprisingly fast, too - except when at full capacity. Since the ship is manufactured for convoy duty, or for situations where it can fire its payload and run, the Jackal's sluggishness with a full load is not a major concern, however.

Soon after sales of Traeger's Eclipse heated up, engineers at the company began plans for a lighter and speedier gunboat. But it took seven years until the Jackal was unveiled to the public in 2190. The main selling point for this new ship was that, although it was less survivable than the Eclipse, the Jackal could easily outmaneuver its predecessor. The Mars Consortium immediately took to the Jackal and placed a large order. However, other potential customers -most notably the UEL military - decided against a large purchase of Jackals. They felt a gunboat should have a higher level of survivability.

Designation: Hyperion Class Assault Fighter

Manufacturer: Kolgorov-Meischt
Production Year: 2192
Armament: 2 Heavy Weapon Bays, 2 Medium Weapon Bays,
1 Light Torpedo Bay
Hull Length: 16.5m
Hull Mass: 12000
Hull Strength: 85
Mech Stress Limit: 17000
Thermal Limit: 120000

Designed as the successor to the Razor, the Hyperion Class fighter triumphed on nearly every front. Small sacrifices in weapons loadout and cargo space make the Hyperion one of the fastest crafts in the Solar System. With this profile the Hyperion compares very favorably with the Razor in battle. The single drawback of the Hyperion is lower survivability because it is not as heavily armored as the Razor.

The Hyperion was unveiled by Kolgorov-Meischt in 2192. Initially the design was met by residual skepticism, from the less than sterling performance of K-M's Talon. However, K-M seems to have learned from the mistakes of that earlier fiasco. The Hyperion has had broad critical and financial success since that first year, becoming the superiority fighter of choice for most military forces.

Designation: Rayskate Class Light Fighter

Manufacturer: Kolgorov-Meischt
Production Year: 2195
Armament: 2 Light Weapon Bays
Hull Length: 13m
Hull Mass: 8192
Hull Strength: 65
Mech Stress Limit: 14384
Thermal Limit: 80000

The Rayskate Class is the newest fighter produced by Kolgorov-Meischt. It is extremely fast and agile. Unlike the Bee with its single weapons bay, the Rayskate has two, although each of the Rayskate's weapons bays are significantly smaller than the Bee's. The optimized Rayskate design allows for increased performance using less propulsion. However, this optimization necessitated leaving the Rayskate with minimal armor, although it has a higher level than the Bee. The Rayskate also is the first spacecraft fighter designed without an external viewing cockpit. The pilot is entirely reliant on the imaging system in the internal cockpit.

Kolgorov-Meischt released the Rayskate in 2195. Despite the fact the ship's externally mounted weapons and engines make an inviting target, Mars ordered a sizable number of Rayskates for their squadrons. Unfortunately for Kolgorov-Meischt, the Rayskate hasn't caught on that quickly anywhere else. But the company feels that as the reputation of the Rayskate grows, sales volume will follow.

6.5.6 Ship Propulsion

Engines

Modern magnetic fusion engines using Helium-3 as an energy source can produce thousands of times more power than their fossil or synthetic fuel predecessors. By harnessing the unique characteristics of Phase Correlated Gaussium Aramide (PCGA), the reactors feeding these engines generate an extremely powerful and precise magnetic field to control the He3-He3 fusion reaction and direct the plasma propulsion, all without the use of an external power source.

PCGA was discovered by scientists looking for a way to produce a highly electromagnetic material. Instead, what they found is a material with an inherent magnetic field, the properties of which can be set during manufacture or installation by applying a current to its skin. PCGA is also lightweight and cheap to manufacture. All of these characteristics have proved invaluable for creating a fusion reactor capable of the power and durability required for a space ship engine.

Today, PCGA is used in the housing which contains the He3-He3 fusion reaction used to propel spacecraft. This reaction leaves no radioactive components within the system.

Thrusters

Thruster systems use a much smaller, simpler, and lighter version of the engine's design, but the thruster operation follows the same principles. Thrusters are positioned in various locations around the ship's hull to enable movement along all three axes - up/down, back/forward, left/right. Unfortunately, like engines, thrusters are also susceptible to the effects of immobilizers.

Overthrusters

Due to safety concerns and fuel conservation, the engine and fuel system are tuned so as not to use large amounts of fuel, or over-stress a ship. However, there are companies that produce overthrusters to cater to the crowd who lives on the edge, despite their danger. These devices interface between the engine and fuel system, utilizing a super high flow rate pump combined with a massive cyclotron to add enormous amounts of energy to the fuel. This high energy fuel is then pumped into the engines, where the reaction releases a substantial increase in energy over a standard reaction.

Because of their design, it is possible to use multiple units; however, it is not recommended. Many pilots have met their fate when they

added overthrusters and subsequently obliterated their ship. **After safety** concerns put a damper on their manufacture, only two overthrusters remain on the market, and their price puts them in range of the select performance enthusiasts.

Fuel System

The best fuel systems provide the highest possible storage of He-3, while keeping their internal temperature within operational limits. This is done with a Magnetic Cancellation Holding Chamber. The MCHC uses a network of powerful magnets to create a space of Magnetic Purity - the absolute zero of magnetism - to store an enormous number of He-3 atoms. Years of research have led to the production of fuel storage systems which have an MP rating over 90%. This indicates that less than 10% of the space is unused in the storage of He-3 atoms inside the magnetic bubble.

With slight alterations of the magnetic field, atoms of He-3 can be filtered from storage, piped through a special pump that adds energy, and sent to the engines, thrusters, and reactor. The constant adjustments made by a fuel system require highly advanced electromagnets. Due to the cost of electromagnets, and the wide price differences in the many different materials available, there is a great deal of disparity among storage systems. Some manufacturers lower their prices by using low quality parts which reduce the pump rate and require supplemental pumping systems.

6.5.7 Ship Energy Systems

Batteries

Batteries are the most common source of energy on ships. While battery technology has vastly improved since its discovery, the limitations in the ratio of a battery's stored energy to its weight still creates problems. Current battery technology is advanced enough to power electronics and other systems for several weeks without adding considerable weight to the devices in which they are used. But for ships the power requirements are so high that battery weight remains an issue. Also, batteries drain quickly when used with such devices as weapons or mining beams.

Nonetheless, batteries are widely used in the military where long-term energy drain is rarely a consideration. Both the UEL and Mars use cruisers for most long range operations. This leaves the fighter with a scope of operations contained enough to warrant using batteries as the sole means of energy storage. By eliminating the need for a reactor, and

allowing a smaller fuel system, the use of batteries can actually help cut the weight of a fighter.

Reactors

Reactors are meant to be used with batteries as part of a hybrid system. They consume fuel to recharge batteries and will continue consumption whether or not the energy generated is used. Therefore, reactors should be shut down when battery storage capacity has been reached to avoid unnecessary fuel loss. The rate of charge depends on the size of the system, but they do not recharge quickly.

The reactor is similar in principle to the engine, but it does not use the more expensive and exotic PCGA in the reactor chamber. Instead, cheaper magnetic structures are used to create the reactor housing, reducing size and cost at the expense of output. The advantage of this system is that an immobilized ship with nearly drained batteries can still charge them while awaiting repairs, and safely dock without worrying about a loss in energy.

Capacitors

Capacitors were designed to augment the transfer of energy between batteries and high demand systems such as surge cells. In battle, surge cells drain quickly and frequently, exceeding many times the delivery capabilities of the batteries. Capacitors serve as small storage, quick charge/drain devices that can bring surge cells back up to effective strength, while smoothing the load on the battery.

Capacitors do add weight to your ship and they have a significant footprint. But using several of these devices on your ship will help disperse the load on your energy system, and assure faster and more reliable charging of your surge cells.

Surge Cells

Surge cells are the most advanced of the energy systems on a ship. These highly optimized devices are specifically designed to store a large amount of energy, release it in the shortest possible amount of time, and to recharge quickly to continue powering weapon systems.

Earlier models of surge cells, built almost 100 years ago, were basically advanced versions of hybrid battery-capacitor devices. But they easily powered the mass-based weapon systems. With the introduction of He-3 weapon systems, however, the need for larger capacities, and higher charge and discharge rates, prompted a flurry of research into

the use of exotic materials. The results of this research hit the market several years ago. Currently, the prices for the most advanced surge cells remain far out of reach for the average consumer.

6.5.8 Weapons

There are several types of weapons used on spacecraft in Sol. They include energy weapons, mass weapons and torpedoes. Below are descriptions of these weapons.

Energy Weapons

In 2121, Dr. Stewart Pendleton pioneered a process to create "meta-atoms." His paper, "Super-Molecular Reconstruction of Atomic Structures Through Magnetic Particle Acceleration and Separation" proved to be the defining work in the field. But it was many years before these techniques became broadly used in practical applications. The process separates the core particles of atoms (protons, electrons, and neutrons) then reconstitutes structures with several orders of magnitude of protons in the core, and an equal number of electrons in orbit.

Even more amazing, Pendleton managed to produce "inverse meta-atoms" where the core of the conglomerate was composed of electrons, and the protons constituted the orbiting shell. To create this phenomenon, helium atoms are fed into one end of a solenoid shaped tube. An intense positive charge on the surface of the tube literally tears the electrons from the helium, and stores them for later use. The remaining neutrons and protons are then subjected to an intense negative charge. The protons are accelerated so quickly by the attractive force that they too are torn from the neutrons, leaving all three particles separated. At this point, hyper-magnetic fields are used to harvest and guide the three types of particles into larger structures.

- **Electron Particle Bolt** The Electron Particle Bolt (EPB) is the smallest, lightest, and cheapest energy weapon available. Thus, it is fairly common on both UEL and civilian ships. It makes use of first generation meta-atom technology to create a huge shell of electrons around a core of protons and neutrons.
- **Proton Particle Bolt** The Proton Particle Bolt (PPB) is a larger, distant cousin of the EPB. Using advanced Pendleton technology to create inverse meta-atoms, it fires deadly bolts of protons orbiting around enormous cores of electrons and neutrons. When the PPB impacts, the positive charge of the shell wreaks havoc on ship systems.

- **Neutron Particle Bolt** The last of the weapons based on meta-atom technology is the Neutron Particle Bolt (NPB). It uses a solid core of electrons and protons with a damaging shell of neutrons in their orbit. In its current stage of development, however, this weapon uses more helium than either the EPB or the PPB to generate a single bolt. But there is an upside to the NPB. Its lack of a net charge on the outer shell of the bolt prevents these shots from being deflected by electromagnetic fields. (See page 93).
- **Helium Plasma Cannon** The Helium Plasma Cannon (HPC) is a large and powerful energy weapon used most often for assault on larger ships. The HPC is unique in that when it fires, the weapon uses all the current surge available to fire a barrage of bolts at the intended target.

The helium ammunition is injected into a small chamber at the end of the barrel. Here, it is compressed and super-heated to form a volatile plasma. Once sufficient pressure has been created, the chamber opens, exposing the bolts to the remainder of the barrel. At this point, the incredible pressure of the plasma causes it to expand, propelling it through the barrel. Once the plasma ball reaches space, it expands beyond the size of the barrel, until it reaches a stable state. It continues traveling at a high velocity until the plasma cools, ultimately reverting to helium, which then dissipates.

Mass Weapons

- **Rupture Cannon** The Rupture Cannon is the lightest and smallest weapon available for single seat spacecraft. It uses an enhanced version of 20th century firearms technology. Each projectile is a block of solid propellant, with a metal core that explodes on impact. The caseless ammunition minimizes the accumulation of debris. The cannon itself loads the rounds into a traditional barrel, then applies a small current to ignition material embedded in the propellant. The propellant ignites, eventually burning away, but not before generating enough pressure to launch the explosive core at the target.
- **Mass Driver** The Mass Driver is a simple concept that produces a devastating weapon. A large disc rotates at tremendous speed (1500 revolutions per second). Hollow tracks run from the center of the disc to the outer edge. As the disc spins, metal projectiles are fed to the center of the disc, then pushed along the tracks by

centrifugal force to the outer edge. A magnetic field holds each projectile at the edge of the disc until that particular track rotates in line with the barrel of the gun. At this point, the magnetic field is switched off, and the shot is released along a tangential path, down the barrel. The multiple tracks in the disc allow for a very high rate of fire.

- **Rail Gun** The Rail Gun has been under development since the end of the 20th century. It still has not been perfected, but when used under the right circumstances it can be highly lethal. The barrel of the rail gun contains a large, powerful solenoid coil which generates an electromagnetic field. This field then pushes a simple metal projectile through the coil, reaching very high velocity in a short distance. Unfortunately, the recoil from the device is transferred to the solenoid coil directly, which ultimately breaks down under the strain. Therefore, after extended use, the rail gun essentially destroys itself.

Self-Propelled Weapons

- **Torpedoes** There are two types of torpedoes in use throughout Sol, the Icarus torpedo and the Omega torpedo. Both are based on the same technology. The basic design is a throwback to 20th century air-to-air missiles. A single stage rocket carries an explosive warhead to the target. Once a target has been selected, its scanner signature is uploaded to the torpedo's guidance computer by the ship's computer. However, the torpedo's own scanner is much weaker than a ship's. Therefore the torpedo requires periodic uploads from the ship's computer to track the target throughout the burn cycle. This drawback effectively links the number of torpedoes actively tracking a target to the power of the ship's computer.

The Icarus torpedo has a long burn cycle, but possesses limited maneuverability and only carries a moderate payload. The Omega torpedo has a much shorter burn cycle than the Icarus, but is much more maneuverable, and delivers a larger payload to the target.

- **Rocket Launcher** Rockets do not have guidance systems like torpedoes, so they are not much use in fighter combat. But rockets do have a very long burn cycle, and they deliver a staggering payload to the target. This makes them the perfect weapon for eliminating large, slow moving capital ships.

Immobilizers

After the Three Days of Terror in 2175, UEL authorities realized they needed a new way to disable ships without destroying them. Ramming a rover into the corvette seized by the Lidless Eye was a desperate last resort that depended more on dumb luck than military acuity for its success. UEL researchers went to work looking for a reliable method to immobilize ships. In 2180, they came up with a solution.

The researchers knew Phase Correlated Gaussium Aramide, or PCGA, had become integral in the construction of all spacecraft propulsion systems. They discovered that PCGA reacts with a high energy particle which they dubbed "gamion." These gamions fuse with the PCGA and render its magnetic field useless.

An apparatus called an immobilizer was produced that could deliver gamion particles to the engine of a target ship. The immobilizer operates by accelerating the gamions in a straight line particle accelerator to about two-thirds the speed of light. At the same time, a small powered device, known as a stasis round, is also activated.

The stasis round produces an intense but small range magnetic field. Gamions are fired into the magnetic field where they can remain in their high energy state. The stasis round is then accelerated through a barrel via a powerful electromagnet and delivered to the target ship. Because of the need to maintain the excited state of the gamions, and keep the immobilizer small enough to fit all ships in service (including single seat craft), each stasis round has a limited range and very little internal power.

The first generation immobilizer went into production in 2182 to equip small patrol craft. Propulsion manufacturers scrambled to redesign engines and thrusters with enough PCGA to withstand the gamion reaction. But there was no way they could create propulsion systems for smaller ships which could withstand the immobilizer without increasing the size of the engines beyond practicality.

With capital ships, however, it was a different story. Testing of first generation immobilizers on them revealed that the immobilizers were not able to deliver enough stasis rounds to neutralize the PCGA used in the massive reactors. But, by 2184, researchers had a new design.

The heavy immobilizer, as it came to be known, operated somewhat differently than the first generation immobilizer. A large and heavy cyclotron was used to accelerate the gamions until they approached the speed of light. To contain these higher energy particles, multiple stasis rounds were clustered together. Fewer gamions were in each cluster, but each gamion was now at a higher energy state. The heavy immobilizer was then capable of disabling even the largest ship's fusion reactor.

The result of this new system is increased cost, and a considerably higher mass and volume for the entire weapon system, when compared to the original. Only gunboats have the weapon space required to deploy the heavy immobilizer. Because of the powerful capabilities of the heavy immobilizer, and the desire to keep it out of the 'wrong' hands, the military restricts its use. Any operation of the immobilizer without authorization is illegal.

Flare Launcher

The Flare Launcher is used as a countermeasure against torpedoes. Each flare contains a small transmitter which reproduces the radar signature of the ship which fires it, thereby acting as a decoy to the incoming torpedo.

To avoid expending a **power** source with each flare, its metal casing is made slightly larger than the barrel; as the flare is expended from the launcher, friction heats up this outer shell. This heat is then used to power the transmitter for a short period of time. During this time, the flare is intended to lure the incoming torpedo away from the targeted ship.

Training Weapon

The Training Weapon is actually a scaled down version of the EPB. It fires traditional meta-atoms one order of magnitude smaller than those of its more powerful sibling. The bolts from the training weapon cannot damage a target, but they are useful in training exercises because the bolt's negative charge can be detected by ship systems.

6.5.9 Non-Combat Devices

Spy Probes

Spy probes are used to expand observation of an area without dedicating costly manpower or ships to the endeavor. Spy probes are small devices which require a launcher to be activated. The launcher provides propulsion and also locks the probe's transmit frequencies to the launching ship's sensor frequencies. The probe itself contains a small scanner, thrusters, transmitting equipment, and a self-destruct device.

Upon launch, the probe coasts for five seconds, then activates its scanner and transmitting equipment. The thrusters fire, slowing the probe and setting it into position, where it stays to transmit sensor data on the set frequencies. The probe is built with a powerful explosive

intended to discourage attacks. Use caution if your mission is to destroy one of these probes.

Force Beams

A discovery by the Joint Research Team at Callisto in 2192 made the development of the force beam possible. The force beam generates a focused ray of gravity capable of moving objects of great mass. Just like natural gravity, the strength of the beam decreases as the distance from its source increases. Many people in Sol feel the development of this device is the first step towards creating artificial gravity. The more cynical believe the existence of the force beam confirms that artificial gravity has already been developed away from the public eye.

As force beams were readied for production in 2195, orders came in from nearly every commercial sector with salvage or construction operations. But the UEL responded to this demand by blocking the sale of force beams. From the military's perspective, this seemingly benign device could be used to literally rip a ship apart. UEL officials managed to classify the force beam as a weapon only two weeks after production of the devices began. Because the force beam was based on Callisto research, its classification as a weapon made it a controlled technology and the UEL could impose sanctions on any manufacturer who made the device available to the public.

The UEL Senate is currently discussing legislation to make the force beam completely illegal. The legislation has not yet been passed because of a sharp division between Senators on the matter. Some see no need for the action. In their minds, the force beam would benefit the commercial sector and should not be withheld because of a remote chance it would be used as a weapon. Others feel that the measure does not go far enough. They would expand the legislation to include the mining beam, which is based on similar technology. The fact that the issue is being debated with such fervor has fueled beliefs the government is withholding artificial gravity from the public.

Mining Beams

The mining beam is a highly modified version of the force beam. Instead of a concentrated gravity beam, the mining beam widens the scope, decreases the power, and pulsates the beam in opposing directions. The field created resonates the asteroid material at which it is aimed and eventually breaks it apart. A more concentrated force beam directed at the center of the pulsating field directs the asteroid fragments into the

ship. An internal mechanism sorts the fragments, **then** crushes and purifies them, discarding unusable material, and storing harvested elements in the cargo bay.

The mining beam was **put** into production shortly after the force beam in 2195. But a safety mechanism was incorporated into the mining beam, in response to the lesson learned from the UEL legislation over the force beam. With this safety mechanism in place, the mining beam's pulsating field will not activate if directed at a ship's composite **hull**. The safety feature has enabled the mining beam to avoid being labeled a weapon and kept the government from interfering in its marketing. Sales of the mining beam have been dramatic. It has revolutionized the mining industry; now any pilot can become an asteroid miner for the cost of a mining beam.

6.5.10 Computers

After rapid growth in its first century, computing technology has gradually become more stable and reliable, principally because of the Computing Standardization Forum. Formed through the efforts of the AEB, the CSF is a citizen elected board which oversees standardization in important aspects of computing, including all upgrades to existing computer infrastructures and all major transitions in technology.

The creation of the CSF has been hailed as the true beginning of the information age. Before it's inception, sharing knowledge was easy only between similar technologies. During the reign of American-based companies, the multi-standard system was stable enough to provide years of high growth in the industry. As other countries began to catch up, however, and especially with the rise of the AEB, the lack of a single standard became a serious problem for businesses trying to market products globally.

Investors soon realized that expansion into new markets would be hindered by the mishmash of technologies in competition. With no standards for the most essential aspects of computing, such as data storage, data formats, data processing, and network communication, a majority of investors saw liquidating their computer tech holdings as the best strategy. The resulting crash wiped out many businesses, and there was widespread fear that the world would revert to a pre-computer era. Realizing what this would do to societies the world over, as well as to colonization efforts throughout the Solar System, the AEB helped formulate a plan, which involved the creation of the CSF.

In the over one hundred years of its existence, the CSF has continued to play an important role in the advancement of computing in

society. The ability of computers and components from any CSF compliant manufacturer to communicate without a glitch has been heralded as one of the most important advances facilitating space exploration and commercialization. The CSF has also kept growth in check, allowing manufacturers and consumers to purchase equipment with much less concern over short-term obsolescence. At the same time CSF ensures that computing technology continues to advance. The following are the key technologies currently in use.

Quantum Calculation

Theorized in the mid- to late-1900's as a possible way to increase processing speed, it wasn't until 2109 when a major discovery made the quantum computer a reality. There were several problems that had plagued researchers. In order for the quantum characteristics of particles to be used, a medium to hold the particles was needed. The medium used had to be able to hold the molecules in place, while at the same time allowing for manipulation of the states of its member particles.

Finally, in the early 2100's, new micro-gravity crystal growth techniques were discovered, and researchers finally had the tools to create a structure for quantum computing. After several years of research, they were able to create the Superposed Crystalline Architecture. The structure of SCA crystals permitted designers to manipulate gates made of the material using Condensed Amplitude High Frequency Lasers (see below). These lasers, combined with crystal-structured pathways just larger than the photon which passes through it, provided the path between gates, and the SCA crystals were used for the gates themselves. The resulting product was the first quantum processor.

Within ten years, the CSF had ratified a standard architecture which allowed manufacturers to begin producing the chips and using them in new computers. These new chips were several orders of magnitude faster than their serial computing electron based predecessors. They are credited for assisting scientists and engineers in creating the many new materials and processes used in the commercialization and industrialization of space.

Condensed Amplitude High Frequency Lasers

Used in everything from quantum chips to network communications, these lasers have the ability to emit photons with an amplitude not much larger than the theoretical size of a single photon, while at the same time increasing flow rates far beyond previously known limits. First developed to transmit massive amounts of data, the CAHF lasers gained a stronger

hold when they became critical in running quantum processors. **Able** to transmit gigabytes of data through a pathway only several microns across, the lasers revolutionized the flow of data, and now provide a surplus of bandwidth throughout the Solar System.

Crystalline Memory Architecture

The crystal growth experiments yielding this technology were the precursors to those responsible for the creation of the quantum computer. Scientists were able to perfect the science of high density, low-error crystal growths, and used that material to develop a non-volatile memory system with almost unlimited speed capabilities. The speed itself is governed only by the speed at which data can be input and output.

The memory operates using a laser which scans a material made up of millions of layers of crystal lattices, each just one molecule in thickness. These layers of crystal do not naturally form bonds between themselves, but when hit with a correct amount of laser energy, a single lattice will form between the layers, at the point which the laser was focused on the two molecules. By focusing the laser on different depths of the material, scientists are able to build three dimensional architectures millions of bits thick and trillions of bits wide.

With current solid state laser technology, it is possible to contain all of the components necessary for this system inside of a single chip. Its size, speed, and capacity are the best of any design currently on the market.

Universal Data Transfer Protocol

Perhaps the most important creation of the CSF, this protocol was designed with the future in mind. It uses IMbit packet transfers to connect any device with any computer supporting the protocol. Due to the CSF's power in enforcing standards, almost every device uses this system.

The design is quite simple and allows even the slowest of computers to connect to UDTF devices. The beginning 256 bits specify the device type, name, type of data encryption being used (if any), and Packet Data Type. The PDT signatures tell the computer the other data being sent in the packet and how and where it should be applied. All of this information is broadcasted unencrypted. The encryption type and key are broadcasted only in the first connection between devices.

Once the devices have settled on an encryption type and key, that information is never broadcasted again unless the encryption type changes or the device disconnects and reconnects. The PDT information can continuously change, updating the status of the device, and cycling the

information so several cycles will be used to transmit all data. Although the header information is unencrypted and can be easily read with any packet sniffer, the actual information being sent is highly secure. An advantage of having an unencrypted header is that no calculations need to be made to read it. Therefore, slower computers can connect with almost any device and receive data from it.

8.5.11 Scanners

The scanner system has two components, the main scanner and the detail scanner.

Main Scanner

The main scanner surveys space within a given radius from the ship to detect and identify objects by reading their radiation emissions. Interfacing with the main ship computer, the main scanner then maps all detectable objects onto the scanner display at the base of the HUD. The main scanner also works with the main computer to calculate closure rate to a target, and generate ETA based on velocities of both ship and target. With object tracking information supplied by the main scanner, the ship computer also calculates data for other display units of the HUD. These include the target vector trail, target lead vector, and distance to target.

The main scanner is an essential component of ship operation. However, because of the power required by scanners, they consistently generate internal and external radiation. With recent developments in materials research, manufacturers have built some scanner models which are quite small, generate little radiation, and have drastically improved scanning power. The downside is cost: the smallest and most powerful new scanners are much more expensive than their larger and older counterparts.

Detail Scanner

The detail scanner is used to learn specific information about an object. After the main scanner locks on a target, data on the target's position is sent to the detail scanner, then continuously updated as that object is tracked. The detail scanner can determine the signature and orientation of most targets. It sends this information to the main computer to be displayed on the MFD.

The detail scanner also can calculate the percentage of damage to individual points on a ship. Known ship structures and the radiation

signatures emitted by certain **components are the basis of** this analysis. The detail scanner can detect PCGA magnetic fields as well, alerting the pilot when the field is not present, which indicates the target is immobilized.

Because of the **detail scanner's scope of analysis, it is limited** to one target at a time. On average, the detail scanner generates less radiation and is smaller than the main scanner. However, the detail scanner does require a large amount of power to complete its tasks, which makes it another substantial contributor to radiation output. The same research that has yielded better performance for the main ship scanners has been applied to detail scanners. However, cost is still an issue with the newer models.

6.5.12 Defenses

Armor

Several advanced composite materials are currently in use for protecting a ship's hull from damage. They all rely on the effective transfer of energy, both mechanical and meta-atomic, to diffuse impact to the hull.

Each specific material has its own particular characteristics, and each has its own rates at which it will protect from the two types of energy transfer. But all of these different materials provide a certain degree of protection from both.

Armor works by absorbing and dispersing energy through itself and away from the hull. In the process, of course, the armor itself is damaged. Therefore, it must be regularly repaired to function effectively.

Electromagnetic (EM) Field Generator

This device operates on a continual basis, generating a negatively charged electromagnetic field which surrounds the ship. When a negatively charged particle comes close, the field repulses the particle, deflecting it away from the ship. However, when a positively charged particle comes close to the field, it is attracted to the field.

The only weapons which carry a charge are the EPBs, PPBs, and, to a lesser extent, rupture rounds. The electromagnetic field generator is effective in deflecting EPBs and rupture rounds, but attracts PPBs. Unfortunately, it is also useless against the many other weapons available on the market. This drawback has limited the EM Field Generator's widespread use.

6.5.13 Repair Systems

Repair Tugs

The repair tug, or repair drone, as it is sometimes called, is a device launched at a ship in need of repair. The device has a small set of thrusters it uses to maneuver itself into position over its target. Using an electromagnet, the repair tug then attaches itself to the docking point on the helpless ship and begins rehabilitation.

Repair tugs are equipped with raw materials and Standardized Repair System (SRS) droids which can move between ship compartments and access all devices. A computer directing the repair effort from the tug releases both Repair Bots and Material Bots through the SRS access port (right next to the docking point).

The Repair Bots travel to each section of the ship and determine the extent of damage, and what materials and tools are required for the job. Once this assessment has been computed, the Material Bots move in. The Material Bots use the raw material available on the tug to create much of what is necessary for repair. The Material Bots also have access to prefabricated parts, which they can obtain through the distribution system on the repair tug or manually carry from the tug to the damaged equipment.

Perhaps the most important item stored on a repair tug is PCGA, which can replace a ship's PCGA damaged or rendered inert by immobilizer rounds. But because of the amount of PCGA used in engines, plus the amount needed to calibrate an engine before the reactor can go back on-line, repair tugs can only bring engines to a fraction of their original capacity. This is enough, however, for the ship to reach a station where it can dock and be fully repaired.

The same holds true for most equipment on a crippled vessel. The SRS droids only repair critical systems to a fraction of their optimal operating efficiency. These systems include the aforementioned engines and thrusters, as well as computers, scanners, and life support. Because a ship cannot operate while leaking fuel or energy, all systems involved in the production, storage, and distribution of energy and fuel are fully repaired by the SRS droids.

Internal Repair System

In contrast to the repair tug, the internal repair system resides **within the** spacecraft itself and it continually make repairs as long as it is powered. Most internal repair systems used by most single seat spacecraft are much slower than a repair tug, however. Unlike the repair tug, which

was designed to get a severely damaged ship up and running quickly, the internal repair system is designed to be used over an extended period of time. Fewer SRS droids are used in the internal repair system to make room for more repair materials. This allows the internal repair system to take a ship to optimum status over time, as opposed to the repair tug, which can only repair systems to a fraction of their original efficiency.

6.5.14 Ship Enhancements

Heat Sinks

Heat sinks are special coolant systems which dissipate heat from the high temperature equipment used on a ship. These small, lightweight devices can be found on all but the smallest of ships. By keeping temperatures cooler, heat sinks help optimize all ship functions, but especially surge cell performance. And because of the properties of the material used in heat sinks, and the fact that they can be placed in any bay in the ship, heat sinks also serve to shield the pilot from radiation from energy systems, computers, and propulsion systems. All of this makes heat sinks highly recommended.

Hull Struts

Hull struts are used to strengthen a ship's structure. Like heat sinks, hull struts can be placed in any bay. Although they take up considerable volume and add substantial mass to a ship, hull struts are extremely useful for ships that endure large amounts of stress, such as heavy fighters. For these ships, hull struts are worth the sacrifice to cargo capacity.

Stealth Systems

The stealth system works by suppressing its host ship's radiation, which other ships' scanners try to lock on for tracking and identification. Based on noise cancellation techniques, the stealth system monitors its host ship's radiation signature, then generates an inverse radiation field. This dampens the strength of the radiation signature perceived by other ship scanners.

The more powerful the tracking ship's scanner is, the more powerful a stealth system must be to hide its host ship. Likewise, as the host ship's external radiation increases, so must the stealth system increase in strength to obscure its signature. Of course, the more powerful the stealth system, the more energy it will use, and the greater the risk to the pilot of over-exposure to radiation.

6.5.15 Miscellaneous Devices

Life Support System

An absolute requirement **for** every space vehicle and habitat, the life support system must be operational and powered for humans to survive. Using only a small store of water and air supplied to the unit during routine maintenance, the life support system continuously recycles and filters these products to minimize waste. If the system goes down, oxygen storage provides the pilot with a limited amount of breathing time before suffocation. If this reserve level drops, and then the system is repaired, an additional carbon dioxide recycler starts up to bring the oxygen reserve back to full.

Comm System

The communication systems on ships have grown smaller and smaller. Most comm systems on single seat ships are short range and rely on the Sol Gate Network to transmit information. They do not carry the broadcasting power of the comm systems in larger capital ships. However, the communication system on single seaters does have the ability to broadcast and receive at virtually any frequency set by the pilot.

Distress System

This small device emits a distress call indicating your ship's designation (name) and position when activated. The signal must be activated through the engineering system interface. It continues to send out a distress call every few seconds until deactivated.

Floodlights

These devices are non-essential but can be added to a ship for maneuvers in low-light situations. Floodlights have a limited range, and cannot be seen unless an object intersects their path. But they do provide significant illumination given the vastness and darkness of deep space. Floodlights do require a large amount of power, however, and they should be used sparingly when a self-renewing power supply is unavailable.

Cargo Scoop

A cargo scoop is an automated arm located in the cargo bay. By interfacing with the ship's computer, it is able to track and grab objects in

space moving at less than 2 km/s relative to it. The objects snagged by the scoop are placed in the cargo bay.

6.5.16 Controlled Military Equipment

Sniffer

Operating at extremely close range, the sniffer listens in on data transfers from a ship's components. It does this by exploiting the Computer Service Port on the ship's main computer to create a phantom receiving port. This process is fairly simple because the Computer Service Port was designed to allow ship diagnosis from an external system at a docking bay, or by a repair tug. And, although this diagnostic information is encrypted with the DSA 128 megabit standard, due to use of UDTP, the header information is not encrypted. The sniffer takes advantage of this security hole.

By reading all data packets sent to the main computer, the sniffer is able to determine the gadgets with which the ship is equipped. Because it cannot decipher the actual data being transferred, or the internal computer encryption, the sniffer's use is limited. But the equipment readout provided by the sniffer is valuable enough to warrant its use.

While this technology is used freely by the military to enforce regulations, many citizens believe the intrusion on privacy far outweighs the gains made by law enforcement. It is also widely speculated that these devices are used by pirates to discover the contents of a ship before hijacking, although conclusive evidence has been hard to obtain. Despite the lack of the evidence, sniffers were deemed illegal to own or operate except by the UEL military. Later, a special amendment was made to allow the use of sniffers in the Martian Colonial Militia (as the Consortium military is known in the UEL Senate) and the Callisto Squadron.

Tracking Viewer

Another important tool of law enforcement, the tracking viewer allows a user special access the Registry. The Registry is a giant database of all known ships and their owners in Sol. With special access, a user can download the secure logs of any Vortex Gate or station and see who has traveled through or docked there. By interfacing with the navigation module of the main computer, it allows the user to easily track the movements of any detectable ship. Tracking viewers are standard equipment on all military vessels; indeed, they are integrated directly into these ships' hardware. Like sniffers, they are illegal to own or operate

except by the military. Many privacy advocates claim that use of the tracking viewer violates citizens' personal freedom.

Tracking Blocker

Touted as the citizen's rebuff to violations of privacy in space travel, the tracking blocker is also used by many outlaws to hide their movements. The device operates by generating a powerful pulse of energy on the wavelength used to transmit data between the user ship's main computer and travel log or docking computers. The high energy pulse obscures the Registry transmission on that frequency, and the ship passes without being recorded. The tracking blocker is illegal to own and operate. Any ship caught using one by the military will be assumed to be a criminal vessel.

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