COMPLETE SPACECRAFT: The Jupiter 2 stands over two stories tall and weighs over 1,100,000 pounds. The upper level contains all flight monitoring systems: propulsion, navigation, spectrometer, radar, communications, and computers. In addition, artificial gravity, cabin pressure, and climate-control systems are also monitored and controlled. Six cryogenic suspended animation "freezing" tubes were provided for the Robinsons and Major West to survive the five-and-a-half year voyage with virtually no aging. An airlock provides egress from the vehicle's main hatch to a noncompatible environment. Two additional hatches on either side of the elevator glide tube provide access to a tool/spacesuit storage area and to the Space Pod, respectively. A metallic rung ladder and an electronic elevator connect both levels of the spacecraft. Centrally located on the upper deck is the inertial navigation gyroscope (astrogator).

The lower level contains all propulsion machinery and electronic controls. Direct access to the atomic propulsion systems can be gained through the hatch next to the elevator glide tube. A fully equipped galley for food storage and preparation, a scientific laboratory, auxiliary control center, lavatory/laundry room, and three staterooms complete this level. A centrally located magnetic lock serves as the base station for the spacecraft's environmental control robot. Packaged within the interior of the spacecraft is a smaller excursion vehicle (Space Pod) and an all-terrain vehicle (Chariot, unassembled). All mechanical and electronic systems were designed to function for a minimum of ten years, even under extreme environmental conditions.

DRIVE SYSTEMS

ANTI-GRAVITY DRIVE: The anti-gravity drive system was designed for use in vehicle liftoff and touch down. The anti-gravity drive consumes 250 megawatts at full power and is capable of delivering up to ten g's of acceleration. In terms of the Earth's gravitational field at sea level, this translates to 55,000 pounds of thrust. The engine is relatively compact with the major space requirement being for the circular track in the lower region of the spacecraft which houses the Thompson unitectic gravity field projector. Visible light is given off as a by-product of each revolution of the generated field. The anti-gravity drive is throttled back when the pull of gravity on the spacecraft is less than 1/20th of Earth's gravity at sea level. At that field strength, the anti-gravity drive becomes ineffective, producing less than 200 pounds of thrust.

Important note: Because of the magnetic fields generated by this propulsion device, it can, and will, produce permanent brain damage in any life forms not protected by the freezing tube chambers during full-power liftoff. It is essential that all personnel be located within their assigned tube whenever 100% thrust is utilized in the anti-gravity drive to avoid the side effects inherent with the design. However, up to 80% of full power can safely be used without danger to the ship's occupants. Under normal circumstances this would be more than enough power for any required maneuver, and a call for "full power" by either pilot or copilot when the crew is outside of the freezing tubes would automatically be understood to be a request for power at the 80% level. A built-in safety device must be overridden to obtain power level of over 80% of actual available power, which in some cases may be essential for a proper trajectory.

Full-power launches are characterized by a loud hum of the anti-gravity engines, and a glow around the ship caused by the magnetic fields being generated at the time. Such a launch was used to leave Earth.

DEUTRONIUM ANNIHILATION DRIVE: Deep space propulsion is accomplished with two deutronium-annihilation atomic motors. Theoretically, these engines are capable of producing unlimited thrust and speed. Photons of energy are created through deutronium annihilation in the hafnium carbide reactor chamber located in the center of the lower region of the spacecraft. The energy photons radiate through the fins projecting from the Thompson field projector. These engines cannot be activated except in deep space. Operation within the atmosphere of a planet would result in life threatening contamination due to dangerous radioactive exhaust.

Testing on early prototype engines revealed that the deutronium annihilation process becomes unstable at more than 80% of maximum. Tests conducted in the stable operating region proved that the resulting thrust and terminal velocity were sufficient to propel the spacecraft to Alpha Centauri in 5.5. years. At the last design phase, electronic safeguards were placed on the Jupiter 2's central navigation and engine command sequencer to prohibit engine operation in an unstable mode.

YAW/PITCH/RETRO AND BRAKING CONTROL ROCKETS: For quick maneuvering, nine conventional liquid-hydrogen/liquid-oxygen rockets are employed. These assist in controlling yaw and pitch, and may also be fired to assist during liftoff or re-entry.

DEFENSIVE WEAPONS

A variety of offensive and defensive weapons were included on board the Jupiter 2 in case the new planet was inhabited by hostile life forms. Two subcontractors each produced a hand-held laser pistol capable of a sustained 100 kilowatt discharge for twenty minutes. Ten pistols were included in the spacecraft's complement. Four more powerful 500 kilowatt laser rifles were also included. All laser weapons are fully rechargeable. In addition to their obvious use as weapons, the laser devices were also intended to facilitate the clearing of land for colonization.

A supply of 50 grenades, each having a charge equivalent to one-half of a stick of dynamite, were provided for protection and to ease in the removal of larger geological features. In addition, the environmental control robot has an electro-force beam capability, and the Chariot has two neutron guns.

FORCE FIELD PROJECTOR: The Jupiter 2 itself has a close perimeter force field capability. This system is controlled from the main console on the upper deck. A more-powerful extended perimeter force field projector was packaged aboard the spacecraft for use once Alpha Centauri was reached. This device can protect the campsite up to a range of 100 feet. The force field projector was unassembled at launch and placed next to the Chariot in the spacecraft's hold.

CRYOGENIC SUSPENDED ANIMATION

Six cryogenic suspended animation chambers ("freezing" tubes) were included to slow the aging process of the astronauts. The aging ratio is one day for 5.5 years of travel. This technology reduces body metabolism and heart rate by lowering body temperature. All body functions are carefully monitored and controlled. Three static discharge tubes (one located between every two chambers) maintain the electromagnetic balance biologically necessary to keep the frozen human bodies in stasis.

The chambers were signaled by Alpha Control to operate at zero minus 45 seconds to launch. Medical telemetry provided data to Alpha Control throughout the launch. In the event of a malfunction, the onboard computer could reanimate the occupants. The flight computer was programmed to automatically terminate suspended animation upon entering the atmosphere of the new world. Manual controls were provided on the overhead consoles located behind the suspended animation chambers. In addition, the equipment could be tripped from the pilot's console.

NAVIGATIONAL GUIDANCE SYSTEM

The navigational guidance system consists principally of three components: the NGS scanner, inertial navigation gyroscope, and computer vector software. The NGS scanner protracts from an access hatch in the spacecraft's titanium hull. The scanner locates three reference stars (Alpha Centauri A, Sirius, and Sol) relative to the mean galactic plane and supplies their locations to the computers. The scanner also monitors the procession or recession of the reference stars by measuring the Doppler shift of the stars' light.

The navigation computers process all NGS scanner data along with a precise measurement of time supplied by the atomic clock to calculate spacecraft velocity and position. The spacecraft's velocity is determined from the Doppler shift measurements of the reference stars whose radial velocities are known. Distance is calculated by triangulation. This information, along with the computed spacecraft trajectory in vector form, is continuously stored on magnetic tape to ensure that a complete mission history is profiled.

Each time the computer system computes a new trajectory, it automatically updates the inertial navigation gyroscope. Centrally located on the upper deck, the inertial navigation gyroscope was calibrated to the spacecraft's mass at liftoff and is sensitive to changes in motion as small as 10 seconds of arc. A smaller but less accurate device was included in the environmental control robot as a safety backup.

COMPUTERS AND COMMUNICATIONS

COMPUTERS: Three main computer systems provide service with a 99.9999% reliability rating, necessary because of their importance in controlling every vital subsystem. Each computer is