

7.8 Thermal Control (Continued)

This thermal concept would probably ensure that the required thermal control can be accomplished.

7.9 Structure and Mass Properties

The structure of the Paxsat spacecraft must be capable of sustaining the launch vibration environments of the Shuttle and Ariane IV launch vehicles and provide a rigid platform upon which the subsystems may be attached. The structure is therefore cubelike employing cruciform bracing to contribute to the rigidity of the spacecraft. Strict structural dimensions enables the propulsion tanks to also contribute to the structural integrity of the spacecraft as that which appears to be considered in the design of near term future upper stages. Mounts are provided for attaching the Power, Command & Data Handling and the Attitude and Orbital Control Subsystem modules. The payload elements are also provided with modular interface units specifically designed for the payload element. A launch vehicle adapter interface on the bottom of the spacecraft permits mating to the selected launch vehicle airborne support system.

Since subsystems other than the payload elements have not been designed to specific details, subsystem powers and weights are necessarily estimates of the typical current resource allocations required of a spacecraft to perform the Paxsat mission. More detailed estimates are performed in the latter phases of a satellite development culminating with an almost 100% certainty when the elements have been measured.

Various typical spacecraft designs have been consulted to estimate Paxsat resource demands. The most notable programs were the MMS spacecraft, Radarsat of Spar/BAE and a study conducted by RCA for NASA on the National Oceanic Satellite System (NOSS). From these spacecraft, programs mass and power estimates were made.

Table 7-16 details the mass estimates on a subsystem basis for a Paxsat concept spacecraft. The total spacecraft weights 1,466 kg dry at end-of-life with a 20% margin. 3,000 kg of fuel enables the spacecraft to operate over the required regions of space. The spacecraft weight at beginning of life lies in the