

### 7.7.1 Requirements (Continued)

provides the power required by the payload instruments and sufficient power for housekeeping services required by the spacecraft bus subsystems to run the spacecraft, and to charge the batteries during sunlight operations for subsequent employment during eclipse operations.

The power subsystem required by a Paxsat spacecraft unlike modern earth resources, communications or scientific satellites needs to be able to operate in a variety of orbits ranging from LEO to GEO. Not only must the power subsystem maintain a daily energy balance between eclipse and sunlight periods in low earth orbits, it must also supply a sufficient power margin for the spacecraft to operate at EOL after experiencing its mission years in the harsh radiation environments of the higher GEO and Molniya type orbits.

Additionally, the power subsystem aboard Paxsat must be able to generate sufficient power to operate in orbits whose hour angles do not permit maximum power output for its configured solar arrays. A combination of unfavorable hour angles, high orbit inclinations and seasons of the year can rapidly reduce the power output from a configured solar array. This factor is of great concern in any power subsystem design and its effects are aided by defining the angle between the normal of the solar array's area to the sun itself, as the solar aspect angle. Since a solar array produces its maximum power when the sunlight is perpendicular to the surface of the array, the design philosophy attached to the design of solar array configurations is to minimize the solar aspect angle.

A power subsystem concept for Paxsat is presented in the following sections.

### 7.7.2 Generation

Power for spaceborne applications can be generated in a variety of fashions ranging from Radio-isotope Thermal Generators (RTG's) through solar cells to exotic nuclear reactors. Most satellites in the past have employed the solar cell technology to generate electricity from incident light energy. The result of this activity is a mature and reliable technology upon which to base future missions. Each power generating