

## ULYSSES RTG PERFORMANCE

The Ulysses spacecraft was launched in October 1990 with a single RTG, F-3. Its trajectory led it to the planet Jupiter, where in February 1992, it received a gravitational assist that sent it out of the plane of the Earth's orbit and eventually over the poles of the sun. It passed over the south pole in October 1994 and the north pole in 1995. Ulysses completed its original 4.7 year mission in August 1995 and is now in an extended mission of a second polar orbit. The power estimates for F-3 are shown in Figure 9. Unlike Galileo there is no direct measurement of RTG power output. RTG power output is estimated from an algorithm which considers (1) the main bus current, (2) an internal power dump current, and (3) nominal power consumption values for ten spacecraft components if they are operating at the time. Initial telemetry power was reported to be 289 W(e) at the RTG connector which exceeded the specification requirement of 277 W(e). (The prelaunch prediction of BOM power was in the range 282 to 287 W(e). The RTG continued to meet all spacecraft power requirements throughout the 42,000 hour (4.8 year) mission. The EOM power requirement was 245 W(e). JPL has reported that during the periods leading up to an following perihelion in March 1995, there were several spacecraft power reconfigurations in response to the large changes in solar heating as the spacecraft-Sun distance decreased and then increased. Since the algorithm used to estimate power is configuration dependent, these reconfigurations have clearly introduced artifacts into the data set.

## CONCLUSIONS

Test results indicate that the BOM and EOM power requirements for the Cassini spacecraft will be met by three RTGs with a power margin of five percent. Telemetry data from the Galileo and Ulysses spacecraft show that all mission power requirements have been met.

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## REFERENCES

Hemler, R. J. et al, 1992, "Flight Performance of Galileo and Ulysses RTGs," Proceeding of the Ninth Symposium on Space Nuclear Power Systems, Albuquerque, New Mexico, 12-16 January 1992, American Institute of Physics Conference Proceedings 246, 1:171-176.

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