

Editorial

Galileo Spacecraft Thermal Designs

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THE Galileo spacecraft was launched by the Space Shuttle Atlantis on October 18, 1989, and several hours later it was injected onto an escape hyperbola by an inertial upper stage. Initially, Galileo is headed for a flyby of Venus and two flybys of Earth as it follows a circuitous, six-year path on its way to a rendezvous with Jupiter and its Galilean satellites on December 7, 1995. On route to Jupiter the spacecraft experiences a variety of thermal environments including the inside of the shuttle bay, the two-sun solar intensity at Venus, and finally the cold void of space at Jupiter.

The following three articles describe key elements of the thermal design of the Galileo spacecraft. All of the three articles are versions of papers presented at the AIAA 24th Thermophysics Conference held in Buffalo, New York, in June 1989.

The first article discusses the process of the thermal redesign of the spacecraft dictated by the selection of a new, complex,

lower launch energy flight path. This use of this new transfer trajectory came about as the result of the Challenger accident and the subsequent cancellation of the high-energy Centaur upper stage, which delayed the mission more than three years from its initial May 1986 launch.

The Galileo spacecraft is spin stabilized with a dual-spin capability to allow some science instruments to be despun for remote sensing experiments. The second article focuses on the thermal integration design for both the spun and despun science experiments.

Finally, the third article describes some unique aspects of the thermal design of the electronics housing or bus and the retropropulsion module. The retropropulsion module, built by Germany, provides all delta- V maneuvers including the large Jupiter orbit capture propulsive burn.

The Galileo spacecraft is currently functioning extremely well with no major anomalies in any of its subsystems, including the thermal design. Galileo received the desired gravity assist by Venus on February 10, 1990, and is en route to the first of two gravity assists by Earth.

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