

Hermes Global Orbiter Mission Design

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Abstract

The Hermes Global Orbiter is a proposed Discovery-class mission to Mercury with participants from NASA centers, universities and industry. The main objectives of the mission are to attain global imaging coverage of the surface of Mercury and to probe its magnetosphere. The observation will be made from a 12-hr elliptic orbit with a spacecraft carrying a Visible Imager, an Ultra - violet Spectrometer, a Laser Altimeter/LIDAR, a Magnetometer and Plasma Wave Instruments. The spacecraft is a TRW Eagle Class Lightsat modified for the mission.

This mission is designed to conform to the Discovery-class mission constraints of a fixed cost cap and the use of a launch vehicle not larger than a Delta 11. This challenge of mass/cost constraint can be met by; 1) adhering to a few focused science goals, 2) timely applications of advanced technologies, 3) use of a low cost mission operations concept, 4) creation of an effective management structure and 5) a mission design which expeditiously manipulates the available mission design space to accommodate science requirements as well as practical flight system limitations to benefit the mission .

This paper contains a brief description of the spacecraft design concept, science goals, observational approach and requirements. It is followed by discussions of important mission design drivers and a proposed mission scenario. The paper will address the following mission design issues: launch strategy, orbital design, mass performance, orbit stability, effects of particle and thermal radiation environment, solar occultations (power out), communications and observational geometry,