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MESSENGER Inflight Performance

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The MErcury Surface, Space ENvironment, GEochemistry, and Ranging (MESSENGER) spacecraft, launched on 3 August 2004, will be the first orbiter of the planet Mercury. After insertion into a near-polar Mercury orbit in March 2011 MESSENGER will make detailed measurements of the planet for one Earth year. During the 6.6-year cruise phase, MESSENGER will fly by Mercury three times and map 90% of the planet. The payload consists of seven instruments, including a Mercury Dual Imaging System (MDIS) with wide-angle and narrow-angle cameras; a Mercury Atmospheric and Surface Composition Spectrometer (MASCS) with an Ultraviolet-Visible Spectrometer (UVVS) to detect atmospheric emissions and a Visible Infrared Spectrograph (VIRS) to map spectral absorption features on the Sun-lit surface; a Gamma-Ray and Neutron Spectrometer (GRNS) and an X-Ray Spectrometer (XRS) for remote geochemical mapping; a vector Magnetometer (MAG) to examine the internal and external field sources; a Mercury Laser Altimeter (MLA) to examine the topography of surface features and determine whether Mercury has a fluid core; and an Energetic Particle and Plasma Spectrometer (EPPS) to characterize ionized species in the magnetosphere. The payload was fully calibrated before launch, and all instruments have now been successfully operated in space. Operations have included initial instrument checkout through the redundant Data Processing Units and calibration observations of OB stars (MASCS/UVVS), Cassiopeia A (XRS), and bright stars and an onboard target (MDIS). The magnetometer is deployed and measuring the in situ interplanetary magnetic field, and observations of the solar wind and energetic particles have been made with the EPPS detectors. The Earth flyby in early August 2005 will be used for extensive in-flight calibration, especially of the camera (MDIS) and infrared spectrometer (MASCS/VIRS), by observing both the Earth and the Moon. The two Venus flybys will provide further opportunities for instrument observations prior to the first Mercury flyby in January 2008. Instrument behavior has remained as expected during the early phase of the MESSENGER mission.

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