



Dawn's plans to explore Vesta in 2011

Carol Raymond (1), Christopher Russell (2), and the Dawn Team

(1) Jet Propulsion Lab, California Institute of Technology, Pasadena, CA, USA (carol.raymond@jpl.nasa.gov), (2) ESS & IGPP, UCLA, Los Angeles, CA, USA IGPP (ctrussell@igpp.ucla.edu)

The Dawn mission, launched on September 7th 2007 aboard a Delta-II rocket, is the ninth project in NASA's Discovery program. Dawn's ion propulsion system enables a dual-rendezvous mission to protoplanets Vesta and Ceres in the main asteroid belt. Dawn's first target is Vesta, a dry differentiated body that is thought to be the source of the Howardite-Eucrite-Diogenite meteorites. Dawn will begin its approach to entering orbit around Vesta in May of 2011. During the Approach Phase several rotational characterizations will be performed to update Vesta's pole, finalize instrument calibrations, and tune exposure times for the redundant Framing Cameras (FC from Max Planck/Lindau) and the Visible and InfraRed Spectrometer (VIR from INAF/Rome). Dawn enters its Survey orbit in August of 2011, observing Vesta for six orbits over 18 days at a mean radius of 3000 km, while the sun is at its highest southern latitudes. After achieving global color and multispectral maps with FC and VIR, the spacecraft transfers to the High-Altitude Mapping Orbit (HAMO – mean radius 950 km) using the ion propulsion system. In HAMO Dawn performs detailed global mapping in multiple color filters with FC, while VIR collects high-resolution multispectral data in the southern hemisphere. Multi-angle off-nadir mappings in the FC clear filter are performed to derive the topographic model. After 30 days in HAMO, Dawn transfers to the Low-Altitude Mapping Orbit (LAMO - mean radius of 460 km), where the Gamma Ray and Neutron Detector (GRaND from LANL/PSI) will map Vesta for nominally 70 days, while daily tracking passes will map the gravity field to degree and order 10 using the radio science package (from JPL). Near-global high-resolution nadir imaging will be collected in LAMO, along with selected VIR targets. Following LAMO, Dawn will begin to spiral out for departure to Ceres, but will stop at HAMO altitude to observe the newly illuminated terrain in the northern polar region, and complete the topographic mapping of Vesta. Departure to Ceres is scheduled for July 25, 2012 to meet the arrival date of February 1, 2015. A similar observation plan will be preformed at Ceres.