

SPACE EXPLORATION SYMPOSIUM (A3)  
Small Bodies Missions and Technologies (5)

Author: Dr. Marc D. Rayman

Jet Propulsion Laboratory - California Institute of Technology, United States, marc.d.rayman@jpl.nasa.gov

THE SECOND YEAR OF DAWN MISSION OPERATIONS: MARS GRAVITY ASSIST AND  
ONWARD TO VESTA

**Abstract**

Dawn launched in September 2007 on a mission to orbit main belt asteroids (4) Vesta in 2011 - 2012 and (1) Ceres in 2015. The mission is enabled by an ion propulsion system, which will be operated for the majority of the interplanetary cruise. Following 10.5 months of thrusting that concluded in October 2008, the spacecraft began a period of optimal coast scheduled to end in June 2009. On 18 February 2009, a Mars gravity assist will provide an effective  $\Delta v$  of 2.5 km/s. The mission flexibility afforded by the use of ion propulsion provided a relatively large target at Mars. Opportunities for two nominal trajectory correction maneuvers had been planned prior to Mars, but only one was needed. While the gravity assist is the only required outcome of the Mars encounter, the project plans to take advantage of the flyby for other engineering applications. Further special activities are scheduled during the subsequent coast period as well. This paper will describe the progress of the mission including the approach to Mars, the encounter itself, engineering activities conducted prior to the resumption of ion thrusting, and the continuation toward Vesta.