

Small Bodies Mission Status and Recent Findings

Dawn Status

<http://dawn.jpl.nasa.gov/mission/status.asp>

Dawn Completes Another Month of Interplanetary Thrusting November 30, 2009

Dawn thrust with its ion propulsion system for most of November, pausing for less than half a day each week to point its main antenna to Earth.

The mission control team completed preparations for some special activities the spacecraft will execute in December (so check back next month to learn more!).

Nearly in the Main Asteroid Belt, Dawn Continues Thrusting to Vesta October 31, 2009

Dawn devoted most of the month continuing to thrust with its ion propulsion system. The spacecraft is healthy and making steady progress reshaping its orbit to rendezvous with Vesta. As it continues to climb away from the Sun, Dawn will reenter the main asteroid belt on November 13.

Dawn Completes Second Year of Flight September 30, 2009

Dawn passed its second anniversary of being in space on September 27. It spent most of the month continuing to thrust with its ion propulsion system. It has expended about 104 kilograms (230 pounds) of xenon in its 392 days of thrusting since launch. The effective change in speed so far is more than 2.6 kilometers per second (5800 miles per hour), far more than most spacecraft ever achieve with their propulsion systems.

Stardust NExT Status

http://stardustnext.jpl.nasa.gov/mission/mission_status09_q4c.html

December 2, 2009

All subsystems are nominal. At the start of the first pass in more than three weeks, we found the spacecraft in Safe Mode. The spacecraft team returned Stardust NExT to nominal operations yesterday afternoon, December 2.

Safe Mode entry was requested by the Attitude Control Fault Monitor. The attitude controller was correctly maintaining pointing control within the deadband of the Z-axis. The fault monitor, however, using an independent check, incorrectly determined the attitude was beyond the deadband limit. The fault monitor's check is based on a small-angle approximation. While the controller was commanding the thrusters as designed, the approximation from the fault monitor requested a Safe Mode entry when none was required. In the future, this problem will not occur since contact periods will be more frequent, and smaller deadbands will be used. During Safe Mode, the IMU was powered on for less than 7 minutes. Sequence SN031 is now the active sequence, and the next contact is Monday, December 7.

December 9, 2009

All subsystems are nominal. The most recent contact was Tuesday, December 8.

Propulsion and Navigation engineers are meeting Thursday, December 10, to discuss the results of the Mass Assessment Experiment (MAX). The objective of the experiment was to determine the remaining fuel mass. Using heaters on the spacecraft's fuel tanks, the tank was heated and cooled while monitoring the tank's response to changes in temperature. Nominally, tank temperatures are near 8 degC; during the experiment the temperature cycled around 21.5 degC. The estimate of remaining fuel mass is desired to allocate reserves for the remainder of the mission and determine a fuel budget for upcoming trajectory correction maneuvers. The next contact is Sunday, December 13.

Stardust Findings

<http://stardustnext.jpl.nasa.gov/science/brownlee1.html>

When we first looked at the tracks of comet dust captured in silica aerogel, it was clear that they were not solely "dirt clods" of sub-micrometer components. Most of the capture tracks, formed as particles slowed to a stop, were deep and were shaped like carrots. The production of deep tracks requires relatively large strong particles and even when we first opened the capsule we could see with our unaided eyes rather large particles at the ends of some of the tracks. We immediately suspected that the comet contained a sizeable amount of solid material that is much larger than interstellar grains. If the comet dust had been made of the expected dirt-clods composed of tiny stardust grains, they would have produced holes in the aerogel that looked more like shallow bowls than carrots because tiny components stop quickly and cannot travel far in aerogel. Some of the bigger particles found at the ends of the carrot-shaped tracks are a million times more massive than typical stardust grains.

EPOXI Status

<http://epoxi.umd.edu/1mission/status.shtml>

07.31.2009 A'Hearn	<p style="text-align: center;">IR spectrometer calibration</p> <p>The calibration team has been analyzing the best set of IR spectrometer calibration measurements from the Moon that have been acquired to date. Key to good calibration data is to have the IR spectrometer operating at cold temperatures to reduce noise in the data. The team is quite pleased with the results and are confident that the calibrations of the past year will result in improvements in the discrimination of signal from the noise and they hope to have improved spectroscopic data for scientific interpretation soon. A team of calibrators has also been at work characterizing components of the system in the laboratory at the Jet Propulsion Lab. Stay tuned for results of these analyses and resulting</p>
-----------------------	---

scientific interpretations.

Recent Mission Findings

EPOXI

<http://epoxi.umd.edu/2science/hydratedmoon.shtml>

COLLEGE PARK, Md. - Just published data from the Deep Impact spacecraft and the [Moon Mineralogy Mapper](#) (M3), an instrument aboard India's recently ended [Chandrayaan-1](#) spacecraft, provide, for the first time, clear evidence that water exists on the surface of the Moon.

"The Deep Impact observations of the Moon not only unequivocally confirm the presence of OH/H₂O on the lunar surface, but also reveal that the entire lunar surface is hydrated during at least some portions of the lunar day," write University of Maryland astronomer Jessica Sunshine and co-authors in a paper on the Deep Impact data published online in the September 24 issue of the journal [Science](#).

Deep Impact

http://deepimpact.umd.edu/flash/di_science.html