

Mars Odyssey Works Overtime After Successful Mission

August 26 2004

NASA's Mars Odyssey orbiter begins working overtime today after completing a prime mission that discovered vast supplies of frozen water, ran a safety check for future astronauts, and mapped surface textures and minerals all over Mars, among other feats. "Odyssey has accomplished all of its mission-success criteria," said Dr. Philip Varghese, project manager for Odyssey at NASA's Jet Propulsion Laboratory, Pasadena, Calif. The spacecraft has been examining Mars in detail since February 2002, more than a full Mars year of about 23 Earth months. NASA has approved an extended mission through September 2006.

"This extension gives us another martian year to build on what we have already learned," said JPL's Dr. Jeff Plaut, project scientist for Odyssey. "One goal is to look for climate change. During the prime mission we tracked dramatic seasonal changes, such as the comings and goings of polar ice, clouds and dust storms. Now, we have begun watching for year-to-year differences at the same time of year."

The extension will also continue Odyssey's support for other Mars missions. About 85 percent of images and other data from NASA's twin Mars rovers, Spirit and Opportunity, have reached Earth via communications relay by Odyssey, which receives transmissions from both rovers every day.

The orbiter helped analyze potential landing sites for the rovers and is doing the same for NASA's Phoenix mission, scheduled to land on Mars

in 2008. Plans call for Odyssey to aid NASA's Mars Reconnaissance Orbiter, due to reach Mars in March 2006, by monitoring atmospheric conditions during months when the newly arrived orbiter uses calculated dips into the atmosphere to alter its orbit into the desired shape.

Odyssey was launched April 7, 2001, and used the same "aerobraking" technique to shape its orbit during the initial months after it reached Mars on October 23, 2001. The spacecraft carries three research systems: a camera system made up of infrared and visible-light sensors; a spectrometer suite with a gamma ray spectrometer, a neutron spectrometer and a high-energy neutron detector; and a radiation environment detector.

Less than a month after the science mapping campaign began, the team announced a major discovery. The gamma ray and neutron instruments detected copious hydrogen just under Mars' surface in the planet's south polar region. Researchers interpret the hydrogen as frozen water -- enough within about a meter (3 feet) of the surface, if the ice were melted, to fill Lake Michigan a couple times.

Here are a few of Odyssey's other important accomplishments so far:

- As summer came to northern Mars and the north polar covering of frozen carbon dioxide shrank, Odyssey found abundant frozen water in the north, too.
- Infrared mapping shows that a mineral called olivine is widespread. This indicates the environment has been quite dry, because water exposure alters olivine into other minerals.
- Findings indicate the amount of frozen water in some relatively warm regions on Mars is too great to be in equilibrium with the atmosphere, suggesting that Mars may be going through a period of

climate change. Features visible near small, young gullies in some Odyssey images may be slowly melting snowpacks left over from a martian ice age.

– – The first experiment sent to Mars specifically in preparation for human missions found that radiation levels around Mars, from solar flares and cosmic rays, are two to three times higher than around Earth.

– – Odyssey's camera system has obtained the most detailed complete global maps of Mars ever, with daytime and nighttime infrared images at a resolution of 100 meters (328 feet).

"We've accomplished everything we set out to do, and more," said JPL's Robert Mase, Odyssey mission manager. Although an unusually powerful solar flare in October 2003 knocked out the radiation environment instrument, Odyssey is otherwise in excellent health. The spacecraft has enough fuel onboard to keep operating through this decade and the next at current consumption rates. The mission extension, with a budget of \$35 million, essentially doubles the science payoff from Odyssey for less than one-eighth of the mission's original \$297 million cost.

For more information about Mars Odyssey on the Internet, visit:

mars.jpl.nasa.gov/odyssey

Citation: Mars Odyssey Works Overtime After Successful Mission (2004, August 26) retrieved 3 May 2024 from <https://phys.org/news/2004-08-mars-odyssey-overtime-successful-mission.html>

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