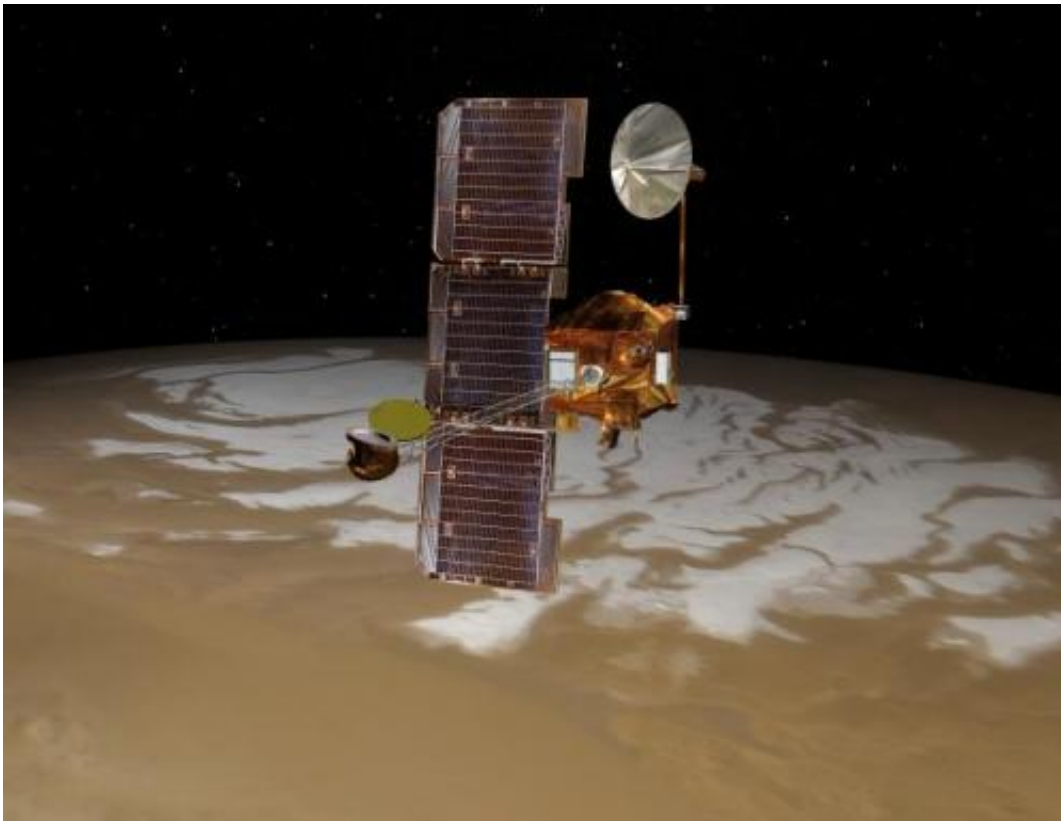


Test of spare wheel puts Orbiter on path to recovery

June 15 2012, By Guy Webster



NASA's Mars Odyssey spacecraft passes above Mars' south pole in this artist's concept illustration. The spacecraft has been orbiting Mars since October 24, 2001. Credit: NASA/JPL

(Phys.org) -- In a step toward returning NASA's Mars Odyssey orbiter to full service, mission controllers have tested a spare reaction wheel on the spacecraft for potential use with two other reaction wheels in adjusting

and maintaining the spacecraft's orientation.

After more than 11 years of non-operational storage, the spare reaction wheel passed preliminary tests on Wednesday, June 12, spinning at up to 5,000 rotations per minute forward and backward. Odyssey engineers plan to substitute it for a reaction wheel they have assessed as no longer reliable. That wheel stuck for a few minutes last week, causing Odyssey to [put itself into safe mode](#) on June 8, Universal Time (June 7, Pacific Time). [Safe mode](#) is a precautionary status with reduced activity.

"We are taking steps to assess the replacement of the troublesome wheel with the spare that Odyssey has been carrying for exactly this purpose," said Mars Odyssey Project Manager Gaylon McSmith of NASA's Jet Propulsion Laboratory, Pasadena, Calif. "If the assessment results are positive, this will put us on a path toward resuming full use of Odyssey."

Like many other spacecraft, Odyssey uses a set of three reaction wheels to control its attitude, or which way it is facing relative to the sun, Earth or Mars. Increasing the [rotation rate](#) of a reaction wheel inside the spacecraft causes the spacecraft itself to rotate in the opposite direction. The configuration in use since launch combines the effects of three wheels at right angles to each other to provide control in all directions. The orbiter carries a fourth reaction wheel skewed at angles to all three others so that it can be used as a substitute for any one of them. This spare wheel had not rotated since before Odyssey's April 7, 2001, [launch](#).

Odyssey can also use thrusters to control its attitude. Reaction wheels offer the advantage of running on [renewable electricity](#) from the orbiter's [solar array](#), rather than drawing on the finite supply of thruster fuel. They also provide more precise control of pointing, which can enable higher data-rate communications through the orbiter's directional antenna.

Odyssey has worked at Mars for more than 10 years, which is longer than any other Mars mission in history. Besides conducting its own scientific observations, it serves as a communication relay for robots on the Martian surface. [NASA](#) plans to use Odyssey and the newer Mars Reconnaissance Orbiter as communication relays for the Mars Science Laboratory mission during the landing and Mars-surface operations of that mission's Curiosity rover.

Provided by JPL/NASA

Citation: Test of spare wheel puts Orbiter on path to recovery (2012, June 15) retrieved 20 March 2024 from <https://phys.org/news/2012-06-wheel-orbiter-path-recovery.html>

<p>This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.</p>
--