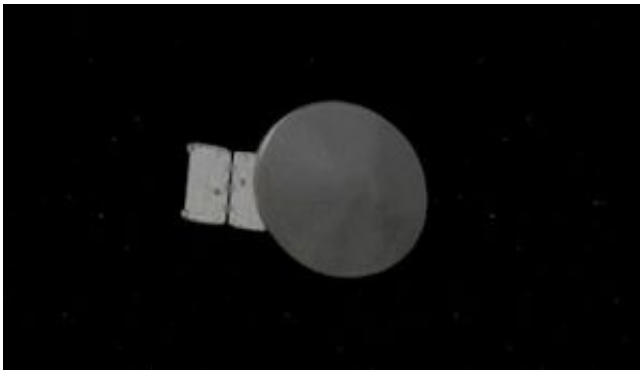


# Phoenix: Tasks En Route to Mars Include Course Tweak, Gear Checks

October 31 2007

---



Artist concept of Phoenix in space. Image credit: NASA/JPL

NASA's Phoenix Mars Lander, launched on Aug. 4 and headed to Mars, fired its four trajectory correction thrusters Wednesday for only the second time. The 45.9-second burn nudged the spacecraft just the right amount to put it on a course to arrive at the red planet seven months from today.

At Mars, Phoenix will face a challenging 7-minute descent through the atmosphere to land in the far north on May 25, 2008. After landing, it will use a robotic digging arm and other instruments during a three-month period to investigate whether icy soil of the Martian arctic could have ever been a favorable environment for microbial life. The solar-powered lander will also look for clues about the history of the water in the ice and will monitor weather as northern Mars' summer progresses

toward fall.

The second course adjustment had been postponed a week to allow time for carefully returning the spacecraft to full operations after a cosmic-ray strike disrupted a computer memory chip Oct. 6. Experiences with previous spacecraft have shown hits by cosmic rays are a known hazard in deep space. The Phoenix spacecraft properly followed its onboard safety programming by putting itself into a precautionary standby state when the event occurred. Mission controllers then followed step-by-step procedures to understand the cause and resume regular operations.

"Our engineers responded in a very careful and deliberate manner. Since this was a very well-understood anomaly, it was a good experience for the team," said Phoenix Project Manager Barry Goldstein of NASA's Jet Propulsion Laboratory, Pasadena, Calif.

This week's trajectory correction maneuver, plus the flight's first one on Aug. 10, were planned in advance to adjust for a launch-day course that was intentionally designed to be slightly offset from Mars. The offset had prevented the possibility of the third stage of the launch vehicle hitting Mars.

Before the Oct. 24 maneuver, the spacecraft's planned trajectory would have missed Mars by about 95,000 kilometers (59,000 miles). Now, Phoenix is on track to intercept Mars in its orbit next year.

"The first and second trajectory correct maneuvers were designed together," said JPL's Brian Portock, chief of the navigation team for Phoenix. "We gain a more efficient use of fuel by splitting the necessary adjustment into two maneuvers." The second maneuver changed the velocity of the spacecraft by about 3.6 meters per second (8.05 miles per hour), about one-fifth as much as the first maneuver.

Four additional opportunities for trajectory corrections are scheduled in April and May 2008. "The remaining ones are really for fine tuning," Portock said. The landing site is a broad valley at about 68 degrees north latitude, 233 degrees east longitude.

Initial in-flight checks of all the science instruments were completed with Oct. 26 testing of the Canadian-provided weather station, which includes a laser-reflection device called a lidar. "With the activation of Canada's weather station, the testing of the precision lidar instrument and the temperature and pressure sensors, we will be receiving our first space weather report from Phoenix as it continues its voyage to Mars," said Alain Berinstain, Director of Planetary Exploration and Space Astronomy at the Canadian Space Agency.

In recent weeks, flight controllers have conducted two sessions of heating the spacecraft's Thermal and Evolved-Gas Analyzer to drive off water vapor that was carried from Earth in the instrument. Results indicate that the process is successfully removing water vapor. Additional "bake-out" sessions for this instrument are planned prior to landing.

Source: NASA

Citation: Phoenix: Tasks En Route to Mars Include Course Tweak, Gear Checks (2007, October 31) retrieved 20 April 2024 from <https://phys.org/news/2007-10-phoenix-tasks-en-route-mars.html>

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.