

Two NASA probes tackle new mission: Studying the moon

July 20 2011, By Dwayne Brown and Susan Hendrix

(PhysOrg.com) -- Two small NASA probes that had been used to study space weather now are orbiting the moon to study its interior and surface composition.

The spacecraft, called Acceleration, Reconnection, Turbulence and [Electrodynamics](#) of the Moon's Interaction with the Sun (ARTEMIS), began their journey away from Earth's orbit in July 2009. The first spacecraft entered [lunar orbit](#) on June 27, and the second on July 17.

Engineers used complex orbit maneuvers to relocate the spacecraft to their new locations. The journey required many gravity assists from the moon and Earth and used minimal amounts of fuel.

The probes will now approach the moon's surface to within sixty miles once per [orbit](#). The data will provide scientists with new information about the moon's [internal structure](#) for the next seven to 10 years.

"This is a good example of how additional science can be achieved with the innovative use of existing spacecraft," said Dick Fisher, director of Heliophysics for NASA's Science Mission Directorate in Washington. "The quality of the original design and construction of the spacecraft creates a double win: a new research opportunity for the space science community with no additional cost to the nation's taxpayers."

Both spacecraft were previously in areas called the Lagrangian points, areas on either side of the moon, where the moon and Earth's gravity

balance perfectly. These locations were ideal spots to study Earth's distant magnetic field and how the [solar wind](#), made up of ionized gas known as plasma, flows past the moon and tries to fill in the vacuum on the other side.

The ARTEMIS mission was made possible by repurposing two spacecraft that would otherwise have ceased operations in 2010. The spacecraft were part of NASA's Time History of Events and Macroscale Interactions during Substorms (THEMIS) mission launched in 2007.

"From their new orbits about the moon, ARTEMIS will collect important data about the moon's core, its [surface composition](#), and whether it contains pockets of magnetism," said Dave Sibeck, ARTEMIS and THEMIS project scientist at NASA's Goddard Space Flight Center in Greenbelt, Md. "[ARTEMIS](#) also will provide information needed to understand the moon's magnetic environment in space and its relationship to events near Earth."

The THEMIS mission consisted of five identical spacecraft that studied the magnetic environment around Earth, the aurora, and how these are affected by the sun. The other three THEMIS probes continue their original science mission. Substorms are atmospheric events visible near the poles as sudden increases in the brightness of the aurora. The findings from the mission may help protect commercial satellites and humans in space from the adverse effects of particle radiation.

More information: For more information about the ARTEMIS mission, visit: www.nasa.gov/mission_pages/artemis

Provided by JPL/NASA

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