Journey to the Moon: Reprise

On the 40th anniversary of the Apollo landing, two unmanned spacecraft make a historic journey to the Moon.

What does NASA do with spacecraft that are literally left out in the cold – that is, they have traveled into Earth's long shadow away from the Sun and are in danger of freezing? Why, recycle them, of course.

The two spacecraft in question are part of the fleet of five satellites that currently comprise NASA's THEMIS mission. The THEMIS satellites have orbited Earth for over two years to investigate the solar wind-generated energy release in space that causes dancing aurora (Northern and Southern Lights). The two farthest and slowest-moving of the five hard working satellites are spending the longest time in shadow, and thus are most likely to use up their limited energy sources. Spacecraft get their electricity from solar panels—without sunshine they can't stay warm enough to do their jobs because there's no more electricity to power anything.

This spring, both satellites are traveling through some very long shadows—on the order of six to eight hours. We don't want these two beautiful spacecraft to freeze and die. Could they be "recycled" and used somewhere else, while they still have two sets of perfectly functioning science instruments? They have been measuring charged particles, magnetic and electric fields. What other noteworthy science could they undertake? What about the moon? The moon's space environment, bathed almost constantly in the solar wind and spending part-time in Earth's long magnetotail, is deeply fascinating—and poorly understood. Sending two identical spacecraft to the moon to study the interaction between the solar wind and moon's environment, and between our magnetosphere and the moon's environment, has the potential to do something unique – observing from two separate vantage points will actually give us a 3-D perspective on these phenomena!

NASA saw the advantage of this novel idea. They approved the new mission and named it ARTEMIS. ARTEMIS—in addition to being the ancient goddess of the moon—also stands for Acceleration, Reconnection Turbulence and Electrodynamics of the Moon's Interaction with the Sun. This acronym describes in a nutshell the science we're going to do. Stay tuned – when we get closer, we'll elaborate. But for now, just know that human exploration of space depends on our understanding of how particle acceleration happens in the heliosphere (the region of space through which the solar wind extends), and on being able to predict when the big solar events like flares and solar mass ejections are coming. Then we can avoid travel during those periods to protect our astronauts, the brave men and women who in the future will be going beyond the moon to other planets.

Getting the spacecraft to the moon will be a challenge. A complex, convoluted, slow orbit change—one that also ingeniously gets assistance from the gravity of the moon—is the only option, since we don't have a great big rocket engine to power us directly to the moon like the Apollo astronauts did. But we have one thing in common with Apollo: the first maneuver to start this process will occur on July 21st of this year -- 40 years, nearly to the day, after man first landed on the moon!