

NASA is having a hard time communicating with its new tiny lunar spacecraft



NASA is having trouble establishing contact with its new CAPSTONE spacecraft, a tiny probe that just launched from Earth to test out a new orbit around the Moon. Because of these communication issues, NASA had to delay a planned maneuver of the vehicle that would help refine its path to deep space. The agency is still trying to reestablish contact.

CAPSTONE is the first mission of NASA's Artemis program, the agency's efforts to eventually send humans back to the Moon. As part of this lunar return, NASA plans to build a new space station in the Moon's orbit. But the orbit NASA wants to use is a unique one; it's a particularly elongated path that's never really been used by a spacecraft before. CAPSTONE is meant to serve as a pathfinder mission, with the spacecraft inserting itself into that orbit and giving NASA some operational experience before the agency starts to build out its new station.

About the size of a microwave oven, CAPSTONE launched from New Zealand on June 28th on top of a small Electron rocket operated by the aerospace company Rocket Lab. To give CAPSTONE an extra push to the Moon, Rocket Lab used a special booster called Photon, which stayed attached to the satellite after the initial launch and periodically raised the satellite's orbit. CAPSTONE finally detached from Photon on July 4th, and in the first 11 hours after separation, it seemed to work fine, according to Advanced Space, which manufactured and operates the spacecraft. CAPSTONE deployed its solar panels and began charging its onboard batteries.

Advanced Space says that CAPSTONE can handle the delay

The mission team was able to point CAPSTONE at Earth and establish communication with one of the dishes in NASA's Deep Space Network, a series of ground-based telescopes across the globe the agency uses to communicate with spacecraft heading to deep space. CAPSTONE was able to get in contact with one of the telescopes in Madrid, Spain, which allowed the team to start checking out the satellite and ready the vehicle for its upcoming maneuver to modify its path, planned for July 5th.

But, according to NASA, the spacecraft started having communication issues when it was in contact with another telescope in the Deep Space Network – this one in Goldstone, California. Advanced Space blamed the issue on an "anomaly" in the communications subsystem. As a result, the July 5th maneuver has been postponed while the team attempts to reestablish contact with the spacecraft. The maneuver is meant to be the first in a planned series of similar adjustments that CAPSTONE will perform on its way to the Moon.

Ultimately, Advanced Space says that CAPSTONE can handle the delay. The spacecraft is taking a particularly long route to get to the Moon, one that will take around four months to complete. It's a route that's particularly fuel-efficient but also time-consuming. Advanced Space says the route also gives the team time to fully understand the problem and figure out a

solution before proceeding with the maneuver.

In the time that CAPSTONE *did* establish contact, the mission team was able to determine the spacecraft's position and velocity in space. Right now, CAPSTONE is roughly 177,000 miles (285,000 kilometers) from Earth. Engineers were also able to stabilize the spacecraft, and they've been doing all they can to fix the communications issue. "The CAPSTONE mission team has been working around the clock and through the holiday weekend to support this important mission," Advanced Space wrote in its update.

Now, CAPSTONE is waiting alone in space as the teams furiously try to reestablish contact. NASA says it will provide updates when they become available.

<https://www.theverge.com/2022/7/6/23190459/nasa-capstone-artemis-moon-lunar-orbit-communications>