

SMALL SPACECRAFT TECHNOLOGY – CAPSTONE

The Cislunar Autonomous Positioning System Technology Operations and Navigation Experiment (CAPSTONE) is first U.S. commercial mission to the Moon and the first spacecraft to demonstrate the unique lunar orbit intended for NASA's Gateway. The 12U CubeSat was the first spacecraft to enter into this near rectilinear halo orbit (NRHO) and verify its dynamics.

Objectives

- Validate and demonstrate NRHO / three-body orbit Earth-Moon operations. ✓
- Inform future lunar exploration operations for the Artemis program and Gateway. ✓
- Demonstrate and accelerate infusion of the Cislunar Autonomous Positioning System (CAPS) and help lay a foundation for commercial support of missions beyond Earth.

Current Status

- Launched June 28, 2022 and arrived in NRHO on November 13, 2022
- Over 180 days of operation at the Moon and over 27 orbits in NRHO
- Information is helping validate simulation results for Gateway mission design

Schedule

- Ongoing Crosslink Demonstrations with LRO. Analyzing ranging and doppler data from May 9, 2023 pass to evaluate CAPS performance.
- End of Primary Mission L+10 months. Beginning Extended Mission for additional technology demonstration.



CAPSTONE Spacecraft

CAPSTONE 12U lunar CubeSat prior to shipping
Credit: Terran Orbital Corporation