

NASA Small Spacecraft Technology

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Overview



The Small Spacecraft Technology program expands U.S. capability to execute unique missions through rapid development and demonstration of capabilities for small spacecraft applicable to exploration, science and the commercial space sector. Through targeted development and frequent in space testing, the program:

- Enables execution of missions at much lower cost than previously possible,
- Substantially reduces the time required for development of spacecraft,
- Enables new mission architectures through the use of small spacecraft,
- Expands the reach of small spacecraft to new destinations and challenging new environments, and
- Enables the augmentation of existing assets and future missions with supporting small spacecraft.

Recently Completed and Upcoming Missions



Mission	Technology Demonstration / Objectives	Status
Integrated Solar Array and Reflectarray Antenna (ISARA)	<ul style="list-style-type: none">• Demonstrated a reflectarray antenna that increases downlink data rates for CubeSats to more than 100 megabits per second (Mbps)• Used to help develop the reflect array technology for MarCO	Completed in 2018
Optical Communications and Sensor Demonstration (OCSD)	<ul style="list-style-type: none">• First-ever high-speed laser comm from a CubeSat• First semi-autonomous coordinated propulsive maneuver between two CubeSats• Proof of concept demonstration for CubeSat-to-CubeSat optical communications	Completed in 2019
CubeSat Laser Infrared Crosslink (CLICK)	Demonstrate full-duplex (send and receive) optical communication crosslink and precision ranging between two CubeSats.	Launch planned for late 2020
Cubesat Proximity Operations Demonstration (CPOD)	Demonstrate rendezvous, proximity operations, and semi-autonomous docking between two cube-sat class spacecraft	Launch planned for late 2020
Pathfinder Technology Demonstrator (PTD) Series	Test the operation of a variety of novel CubeSat technologies in orbit, providing significant enhancements to the performance of these small and effective spacecraft.	PTD-1 launch planned for 2020
Cislunar Autonomous Positioning System Technology Operations and Navigation Experiment (CAPSTONE)	Demonstrate how to enter into and operate in the lunar near rectilinear halo orbit (NRHO) targeted for orbit as well as test new peer to peer navigation capability	Launch planned for 2022
Lunar Flashlight	Precede human explorers to the moon to prospect for water resources that can be extracted to support sustainable exploration and commercial lunar activity	Planned to launch with Artemis-1
Starling	Deploy a formation of four CubeSats to test multiple distributed mission technologies.	Launch planned for late 2021