



EXPLORE SPACE TECH

Advancing Small Spacecraft Technologies Through Suborbital and Orbital Flight Testing

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EXPLORE SPACE TECH

THROUGH SUBORBITAL FLIGHT

The Flight Opportunities program rapidly demonstrates promising technologies for space exploration, discovery, and the expansion of space commerce through suborbital testing with industry flight providers.



EXPLORE SPACE TECH

WITH SMALL SPACECRAFT

The Small Spacecraft Technology program expands the ability to execute unique missions through rapid development and demonstration of capabilities for small spacecraft applicable to exploration, science and the commercial space sector.



WHAT DOES FLIGHT OPPORTUNITIES SUPPORT?

Innovators from:

- **Universities**
- **Industry**
- **Non-profit research institutes**
- **NASA**
- **Other government agencies**



Cryogenic Fluid Management



Advanced Materials, Structures, and Construction



Entry, Descent, and Landing (EDL) and Precision Landing



Advanced Habitation Systems



Thermal Protection Systems and Thermal Management



Advanced Manufacturing



In-Situ Resource Utilization (ISRU)



Small Spacecraft Systems

COMMERCIAL VEHICLES MAKE FLIGHT OPPORTUNITIES POSSIBLE



Rocket-Powered Vehicles



High-Altitude Balloons



Parabolic Flights



Vertical Takeoff Vertical Landing (VTVL) Vehicles



Orbital Platforms Hosting Payloads



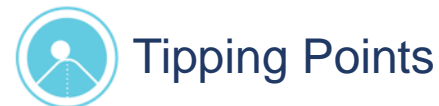
MECHANISMS FOR FUNDING FLIGHT TESTS TO AID TECHNOLOGY DEVELOPMENT

Both Flight Opportunities and Small Spacecraft Technology aim to test and advance technologies as quickly as possible. The two programs creatively use a variety of funding mechanisms to mature innovative solutions for the Nation's technology needs.

Challenges



Solicitations



Unsolicited Proposals and Other Mechanisms



Missions of Opportunity

- Space Act Agreements
- Grant Extensions
- Broad Agency Announcements (BAA)
- Unsolicited Proposals
- Interagency Agreements
- Other mechanisms (Center-led, FFRDC / UARC task, etc.)



Flights of Opportunity

- In-Space Manufacturing/ ISS Program Office
- Intergovernmental support (Department of Defense, USDA)
- TechFlights Reflights

FLIGHT OPPORTUNITIES



Includes topic areas that address agency and mission goals; up to \$1M to purchase flights on suborbital or hosted orbital platforms directly from any eligible U.S. commercial flight provider



Challenges addressing specific NASA technology needs; previous awards have been up to \$650K to build payloads, plus access to a suborbital flight test



Competition to inspire the next generation of space researchers; offers hands-on insight into the design and test process used by NASA-supported researchers



Through collaborative internal and external relationships, the program takes advantage of opportunities to flight test valuable space technologies



To increase access to test opportunities in relevant environments, Flight Opportunities collaborates with other NASA initiatives like **SMD's ROSES** and **SOMD's SubC** to help them leverage the commercial flight ecosystem

Pre-solicitation synopsis out now!

Includes topics that align with **STMD's strategic technology framework** as well as a collaboration with the Science Mission Directorate's **Commercially Enabled Rapid Space Science (CERISS)** initiative

SMALL SPACECRAFT SYSTEMS VIRTUAL INSTITUTE (S3VI) STATE OF THE ART REPORT

For more information on hosted orbital platforms, check out the 2022 State of the Art Small Spacecraft Technology Report:



FLIGHT TEST HIGHLIGHTS OF SMALL SPACECRAFT TECHS



Montana State University

Radiation-tolerant computing technology for spacecraft

Advanced through University SmallSat Technology Partnership and Flight Opportunities

CSLI, ISS, and CLPS infusions

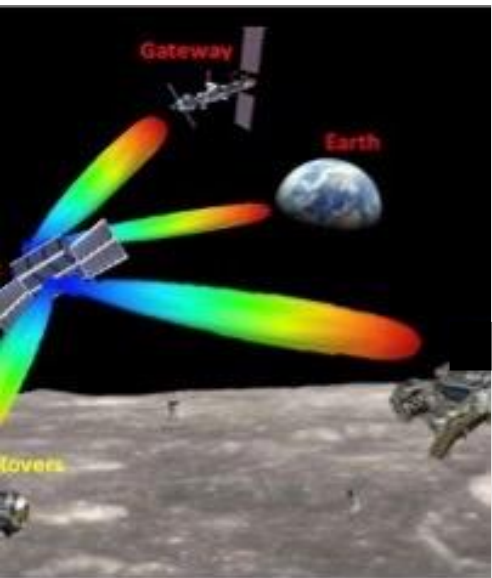


V-R3x, Stanford, and NASA Ames

Advanced swarm communications tech

Orbital flight test in Jan 2021

High-altitude balloon test in March 2021

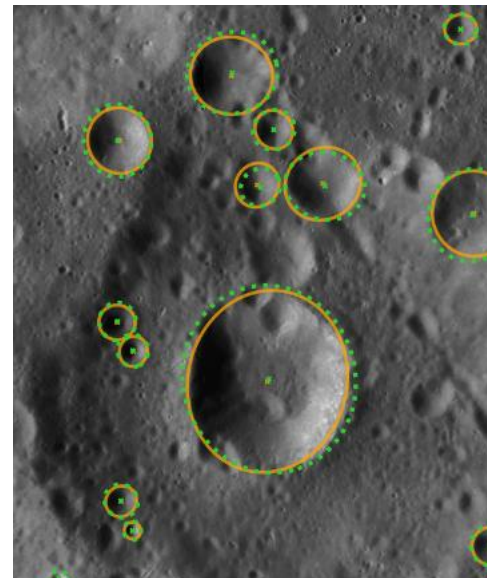


San Diego State

Ongoing University SmallSat Technology Partnership

Commercial 5G technologies to provide LunaNet relay nodes with high gain, high data rate, multi-point communications without physical pointing mechanisms

Upcoming high-altitude balloon flight test via Flight Opportunities



University of Texas at Austin

Ongoing University SmallSat Technology Partnership

Surface feature-based navigation and timing for cislunar spacecraft using machine learning algorithms

NASA SPLICE and CSLI awards for tech demos

SUPPORTING THE FLIGHT TEST COMMUNITY

Community of Practice Webinars

Designed to distill and share most important lessons learned by suborbital researchers.

First Wednesday of each month 10 am PT



October 6, 2021 Community of Practice -
An Open Conversation About Suborbital Flight Testing

Flight Opportunities Newsletter

www.nasa.gov/flightopportunities



STAY ENGAGED:

[NASA.GOV/FLIGHTOPPORTUNITIES](https://www.nasa.gov/flightopportunities)

[NASA.GOV/SMALLSPACECRAFT](https://www.nasa.gov/smallspacecraft)

Visit our websites for more information and resources, including our newsletter and monthly Community of Practice webinars.

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