

Flight Opportunities

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In This Issue

News

- NASA TechFlights 2023 selections

Community of Practice

- March 6 webinar: 19 Million Miles Away: Infusion of a Flight Tested Technology Enabling Deep-Space Communications

Tech Transitions

- Techs advanced via Flight Opportunities now on the Moon

Opportunities

- Lunar Surface Innovation Consortium “show and tell”

Resources

- State-of-the-Art Report on Small Spacecraft Technology

Events

- Mar. 11-15: Lunar and Planetary Science Conference • The Woodlands, Texas
- Apr. 8-11: Space Symposium • Colorado Springs
- Apr. 23-24: Lunar Surface Innovation Consortium Spring Meeting • Laurel, Maryland
- Apr. 23-25: CubeSat Developers Workshop • San Luis Obispo, California

Enjoy!
The Flight Opportunities team

NASA TechFlights 2023 Selections

NASA has **selected** 11 technologies for flight testing on commercial suborbital vehicles, including reusable suborbital rockets, rocket-powered landers, and aircraft following parabolic profiles that achieve micro-, lunar, or Martian gravity. These selections were made as part of the 2023 **NASA TechFlights** solicitation, which is managed by the agency's **Flight Opportunities** program.



This year's selected technologies set out to address critical technology gaps facing NASA and the nation. The solicitation also included a call for technologies to support the agency's Commercially Enabled Rapid Space Science (**CERISS**) initiative, part of the Science Mission Directorate's **Biological and Physical Science** division.

[Learn more and view the technology selections.](#)

Community of Practice

19 Million Miles Away: Infusion of a Flight Tested Technology Enabling Deep-Space Communications

Wednesday, March 6, 2024
10:00-11:00 a.m. PST

Join this month's **webinar** for insights into the development of a **vibration isolation platform** that was part of NASA's **first demonstration** of optical communications beyond the Earth-Moon system. Speakers will explore the technology's maturation pathway that leveraged flight tests supported by NASA's **Flight Opportunities** program. This progression ultimately led to the platform's infusion into the agency's historic Deep Space Optical Communications (DSOC) experiment aboard the Psyche mission. DSOC is a Technology Demonstration Mission aimed at streaming very high-bandwidth video and other data from deep space – enabling future human missions beyond Earth orbit.



The DSOC flight laser transceiver shown here is stabilized by the vibration isolation platform (underneath the instrument), which was matured through the Flight Opportunities program. Credit: NASA/JPL-Caltech

Microsoft Teams meeting

Join on your computer, mobile app or room device

[Click here to join the meeting](#)

Or call-in (audio only):

+1 256-715-9946 • Phone Conference ID: 573 645 751#

[See all Community of Practice webinars.](#)

Techs Advanced via Flight Opportunities Now on the Moon

Before the Intuitive Machines Nova-C lander called Odysseus touched down on the Moon on Feb. 22 – the nation’s first landing to the lunar surface in 50+ years – two technologies had received important flight testing to prepare for the journey, thanks to NASA’s **Flight Opportunities** program.

The mission known as IM-1 that launched on Feb. 15 is part of NASA’s Commercial Lunar Payload Services (**CLPS**) program. CLPS supports the delivery of science and technology payloads – including these two previously supported by Flight Opportunities – to the Moon’s surface for testing. Both of these technologies ultimately contributed to the successful soft landing.

Navigation Doppler Lidar (NDL)

Developed at NASA’s Langley Research Center, **NDL** uses a laser to measure a spacecraft’s altitude to within a few feet and relies on the Doppler effect to determine its direction and speed to within a few centimeters per second. The NDL system is lighter and more accurate than radar-based systems.

NDL played a key role in the IM-1 mission, providing Intuitive Machines with **an assist in landing** when the lander’s navigation system encountered a sensor issue.

In 2017, Flight Opportunities supported **testing of NDL**, which was instrumental in bridging the gap in technology maturation toward spaceflight in **the CLPS mission demonstration**. The rocket-powered Xodiac vehicle provided a unique environment for examining the effect of landing vehicle dynamics on NDL’s operation.

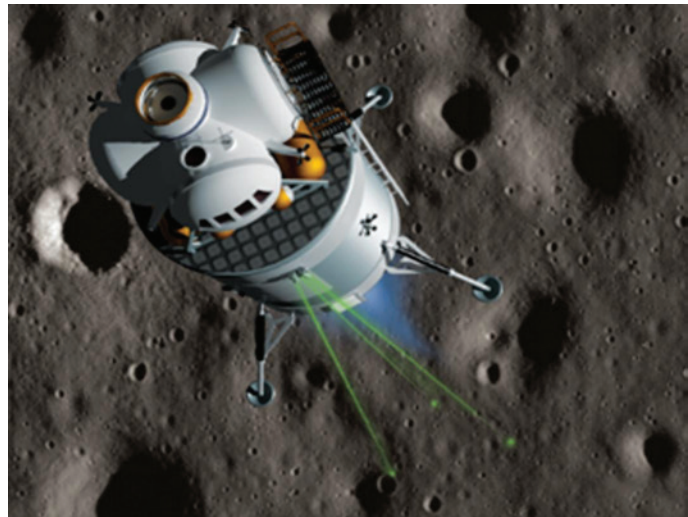
Radio Frequency Mass Gauge (RFMG)

Developed at NASA’s Glenn Research Center, **RFMG** uses radio waves and antennae in a tank to measure how much propellant is available—a particularly challenging task in microgravity. RFMG senses several resonant electromagnetic modes of the tank and compares them to results from several thousand numerical simulations. The best match indicates the fluid mass inside the tank.

During the IM-1 mission, RFMG helped Intuitive Machines verify the propellant levels in the Odysseus lander.



*Launch of the IM-1 CLPS mission on Feb. 15, 2024.
Credits: NASA*



Artist's concept of a lander descending to the lunar surface with assistance from NDL. Credits: NASA

Parabolic flights in 2011 supported by Flight Opportunities helped advance RFMG and led to novel ideas for improving the gauging algorithm. That progress helped RFMG secure a spot on the International Space Station for further testing, helping ready it for its **demonstration on the CLPS mission**.

Read more about future CLPS missions, several of which will have other technologies tested via Flight Opportunities.



In 2011, Dr. Gregory Zimmerli tested the RFMG in microgravity on parabolic flights supported by Flight Opportunities. Credits: Devin Boldt

Opportunities

Technology Demonstration “Show and Tell” at LSIC Spring Meeting

The Lunar Surface Innovation Consortium is taking submissions from individuals and/or companies interested in bringing a prototype to their **April 23-25 spring meeting** for a “show and tell.” To be considered for this showcase, fill out the online **Technology Demonstration Application**. (See the Events section below for more information about the LSIC spring meeting.)

Resources

Small Spacecraft Technology State-of-the-Art Report: 2023 Edition

NASA has released its latest update of the annually revised **Small Spacecraft Technology State-of-the-Art Report**. As in past years, the report contains a general overview of current state-of-the-art small spacecraft technologies and their development status as discussed in open literature. In preparing this year’s document, the editors made a concerted effort to update areas with recent technology developments that may ultimately bridge existing technology gaps.

Learn more and download the report.





Lunar and Planetary Science Conference 2024

Mar. 11-15, 2024 • The Woodlands Texas (near Houston)

LPSC brings together a diverse group of international experts in planetary research to showcase the latest science, research, and discoveries in the field. More than 2,000 planetary scientists and students will present their findings that provide new insights and a better understanding of the solar system.

Space Symposium

Apr. 8-11, 2024 • Colorado Springs, Colorado

This symposium provides a forum to discuss, address, and plan for future achievements in space. With a focus on international, commercial, emergent space, and national security, it provides networking and engagement opportunities with the global space community.

2024 Lunar Surface Innovation Consortium Spring Meeting

Apr. 23-24, 2024 • Laurel, Maryland

Join Flight Opportunities team members at LSIC's 2024 Spring Meeting. With a focus on engaging the community on how to return to the Moon together, the meeting will cover NASA's plans and updates, infusion paths, partnerships, and current technology investments. The agenda includes invited speakers, panels, focus area discussions, lightning talks, and posters. [Let us know if you're attending!](#)

March 1 Deadline: LSIC invites abstract submissions pertaining to LSIC focus areas, including technical capabilities and lunar surface technology needs and assessments. Submit abstracts via the [abstract portal](#) and following the [required template](#).

CubeSat Developers Workshop

Apr. 23-25, 2024 • San Luis Obispo, California

This annual three-day global conference brings together CubeSat developers to share ideas and experiences in developing small spacecraft. Other topics covered at the workshop include the status and availability of launch vehicles, new technology, and community communication. Join members of NASA's Space Technology Mission Directorate – including the Small Spacecraft Technology and Flight Opportunities programs – at this workshop.

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NASA Flight Opportunities Program

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