



# FLIGHT OPPORTUNITIES



ISSUE 80 — MARCH 2025

**ISRU Community of Practice Webinar | Program Staff Updates | Moon Missions Updates | ACO Solicitation Released | SmallSat State-of-the-Art Report | New Flight Opportunities Resource | Upcoming Events**

## COMMUNITY OF PRACTICE WEBINAR

### April Webinar: Advancing In-Situ Resource Utilization Technologies Through Flight Tests

Wednesday, April 2, 2025 • 10–11 a.m. PST

Join us April 2 for a panel discussion on in-situ resource utilization (ISRU) technologies and the importance of flight testing to buy down risk.

Harnessing and using resources found on the Moon, Mars, and beyond — rather than transporting them from Earth — is important to the success of future space missions. ISRU can help enable sustainable exploration by reducing launch costs, increasing mission duration, and improving self-sufficiency. In a discussion moderated by Flight Opportunities personnel, researchers who recently tested ISRU technologies on parabolic flights as well as the lead of the ISRU capability leadership team in NASA's Space Technology Mission Directorate will identify best practices, lessons learned, and key insights for flight testing ISRU technologies.



*An artist's illustration of astronauts mining water on Mars. Credits: NASA Langley Advanced Concepts Lab/ Analytical Mechanics Associates*

**LEARN ABOUT OUR APRIL 2 WEBINAR**

## Program Staff Updates

As members of the Flight Opportunities team move on to their next life adventures, we wanted to apprise our community — many of you had the opportunity to engage with them during their years with the program.

**Paul De León** served as a campaign manager for more than a decade, providing technical direction and managing reduced-gravity parabolic, high-altitude balloon, and suborbital rocket flights. Having supported NASA since 1985, Paul received numerous awards, honors, and certificates from the agency for his work. He retired at the end of February.



*Paul De León*

**Stephan Ord** also retired in February, after serving NASA for more than 38 years. Steve began working for Flight Opportunities in 2014 as a technology manager. In 2020, he became chief technologist, managing the payload portfolio and leading the TechLeap Prize competition and TechFlights solicitation.



*Stephan Ord*

The chief technologist position is now filled by **Dr. Macarena Parra**, who joined Flight Opportunities in 2023. Since joining NASA in 2002, Macarena has served as a payload scientist for the Space Shuttle and International Space Station programs and was project scientist for GeneSat, the first small satellite to run an autonomous biological experiment on orbit. Prior to joining Flight Opportunities, she was a branch chief in the Engineering Division at Ames (Code RE) for the Instrument and Engineering Technology Group, developing technology to support life sciences and search-for-life missions.



*Dr. Macarena Parra*

Although **Aamod Samuel** was with Flight Opportunities for only one year, he made an outsized contribution to the TechRise Student Challenge and our operational efficiency. In his service to NASA since 2011, his projects included the X-59 low-boom flight demonstrator and the X-57 all-electric experimental aircraft. Aamod left NASA earlier this month to pursue a new venture focused on “the intersection of engineering and creativity.”



*Aamod Samuel*

We wish Paul, Steve, and Aamod well and thank them profusely for their significant contributions to the success of the Flight Opportunities program.

## Five Technologies Matured Through Flight Opportunities Go to the Moon

Flight testing supported by NASA's Flight Opportunities program helped move five technologies to their next level of maturity, paving the way towards flights aboard Moon-bound spacecraft.

The tests conducted aboard rocket-powered landers, high-altitude balloons, suborbital rockets, sounding rockets, and parabolic flights helped research teams reduce their technologies' risks, preparing them for two recent NASA CLPS (Commercial Lunar Payload Services) missions, both of which launched aboard SpaceX Falcon 9 rockets from NASA's Kennedy Space Center in Florida.

### Blue Ghost Mission 1

Firefly's Blue Ghost lander launched on Jan. 15 and landed on the Moon on Mar. 2. Three of its ten payloads were advanced through flight testing with Flight Opportunities:

- **PlanetVac** successfully collected, transferred, and sorted lunar regolith from the Moon using pressurized nitrogen gas, demonstrating a low-cost, low-mass solution for robotic sample collection.
- **RadPC** (Radiation-Tolerant Computing) successfully operated in transit and on the lunar surface, verifying low-cost solutions to mitigate radiation effects on computers to make missions safer and more cost effective.
- **LuGRE** (Lunar GNSS Receiver Experiment) acquired and tracked satellite network signals, marking the first time a navigation solution has been achieved using Global Navigation Satellite System (GNSS) in lunar orbit and on the Moon.



Artist renderings of (top) Firefly's Blue Ghost lunar lander and (bottom) Intuitive Machines' Nova-C lunar lander



PlanetVac was flight tested in the "feet" of a vertical takeoff and vertical landing vehicle. Credits: Astrobotic

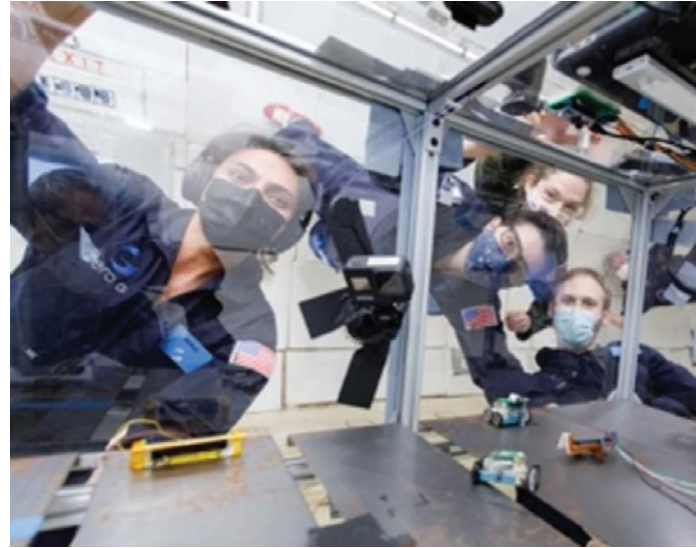
[Learn more about the three flight-tested payloads](#)

## IM-2 Mission

The second Intuitive Machines mission launched on Feb. 26 and carried two payloads with NASA Flight Opportunities heritage:

- The **ARMAS** sensor was tasked with measuring radiation both en route to the Moon and on the lunar surface.
- The **AstroAnt** technology was designed to move across the top surface of a rover, making contact-less temperature measurements to monitor the rover's thermal.

The Nova-C lander named Athena arrived at the Moon on Mar. 6, landing closer to the lunar South Pole than any previous spacecraft. Its side orientation prevented the instruments on board from fully operating; however, Athena completed some instrument checkouts and are assessing the data that was collected.



*MIT's AstroAnt team on a parabolic flight test in 2021. (left to right) Bahar Haghighat and Julia Ebert of the Self-Organizing Systems Research (SSR) group at Harvard with SEI Director Ariel Ekblaw and SEI Mission Integrator Sean Auffinger. Credits: Zero Gravity Corporation*

[Learn more about the two flight-tested payloads](#)

## Share your transition story



*Evaluating OSIRIS-REx sampling system in microgravity via Flight Opportunities. Credits: NASA/James Blair*

**Have you tested your payload with Flight Opportunities and transitioned your technology to a NASA mission or commercial use?**

**Let us know!**

[Share your story!](#)

[Visit our Technology Transitions webpage](#)

## NASA to Release Announcement of Collaboration Opportunity (ACO) for Space Technology Development

Through the ACO, the Space Technology Mission Directorate seeks partnerships that reduce the development cost of space technologies and accelerate the infusion of emerging commercially developed technologies into future missions that can benefit both the space industry and government missions. For the 2025 ACO solicitation (expected release Mar. 31), NASA intends to award approximately 10 ACO awards valuing \$1-2 million per award.

This five-year standing opportunity allows participants to enter into Unfunded Space Act Agreements (USAAs). USAAs provide industry partners access to NASA's aeronautics and space resources — including facilities, technical expertise, hardware, NASA technology and software — on a no-exchange-of-funds basis. Flight tests with commercial providers may also be considered as part of the proposed work, with flights to be provided via a separate Space Act Agreement.



*As part of the 2022 ACO, Venturi Astrolabs partnered with NASA's Glenn Research Center and Johnson Space Center to demonstrate its lunar tire technology readiness. Credits: Venturi Astrolab*

### Expected Schedule:

- **First appendix release:** Apr. 14; informational webinar shortly after
- **Proposals due:** June 30, 2025

[Learn more about the ACO funding opportunity](#)

## RESOURCES

### New NASA State-of-the-Art on Small Spacecraft Technology Report Is Available

NASA's newest report on the state of the art for small spacecraft technology is now available. Produced by the Small Spacecraft Systems Virtual Institute (S3VI), this report provides a general overview of state-of-the-art SmallSat technologies and their development status, capturing new information on publicly available small spacecraft systems from NASA and other sources. Each chapter includes technologies' development status along with design considerations for researchers in identifying components for their SmallSat missions.



The current edition features updates for:

- **Hosted payload services** (see *Platforms* chapter)
- **Orbital maneuvering/transport vehicle (OMV/OTV) services** (see *Integration, Launch, Deployment, and Orbital Transport* chapter)
- **Formation flying and rendezvous and proximity operations** (see *Guidance, Navigation, and Control* chapter)
- **Passive and active deorbit systems** (see *Deorbit Systems* chapter) — note that these are rapidly growing fields that are now extensively represented at small spacecraft conferences, such as the CubeSat Developers Workshop (see Events below)

[Download the Report](#)

## ON-DEMAND WEBINAR: How to Engage with NASA's Flight Opportunities Program

**“Flight Testing Technologies, Instruments, and Experiments with NASA’s Flight Opportunities Program”**

This webinar recording offers an overview of the Flight Opportunities program and explains how researchers within and outside of NASA can engage with the program’s flight testing capabilities. Learn how Flight Opportunities serves NASA by offering **access to suborbital and hosted orbital flight tests** — via IDIQ (Indefinite Delivery/Indefinite Quantity) contracts and the strategic use of funding mechanisms — as well as subject matter expertise on flight tests with a range of commercial providers and a variety of flight platforms.



**NASA'S FLIGHT OPPORTUNITIES PROGRAM**



[Watch the recorded webinar](#)

## UPCOMING EVENTS

### Space Symposium

**APRIL 7–10, 2025 • COLORADO SPRINGS, COLORADO**

With a focus on international, commercial, emergent space, and national security, the 40th Space Symposium will deliver networking and engagement opportunities with the global space community. Over 10,000 space professionals attend every year.

### CubeSat Developers Workshop (CDW) 2025

APRIL 22–24, 2025 • CAL POLY, SAN LUIS OBISPO

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. Danielle McCulloch, the program executive for NASA's Flight Opportunities program, is scheduled to be the keynote speaker on Tuesday, April 22, when she will discuss "Changing the Pace of Space." Join members of NASA's Space Technology Mission Directorate at this workshop.

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### Lunar Surface Innovation Consortium (LSIC) Spring Meeting

MAY 20–22, 2025 • LAUREL, MARYLAND

Flight Opportunities team members are planning to attend LSIC's 2025 spring meeting, which this year focuses on technology payloads headed to the Moon. The agenda includes invited speakers, panels, focus area discussions, lightning talks, and posters. A technology "Show and Tell" from the community will provide an opportunity to learn more about available technologies, helping drive partnerships and establish networks to support a sustainable existence on the Moon.

- Apply for the [Show and Tell tech demo](#)
- Submit your abstracts for poster sessions in the [Abstract Portal](#)

### NASA Flight Opportunities Program

Flight Opportunities is part of NASA's Space Technology Mission Directorate.

Visit [nasa.gov/stmd-flight-opportunities](https://nasa.gov/stmd-flight-opportunities)

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