Flight Opportunities

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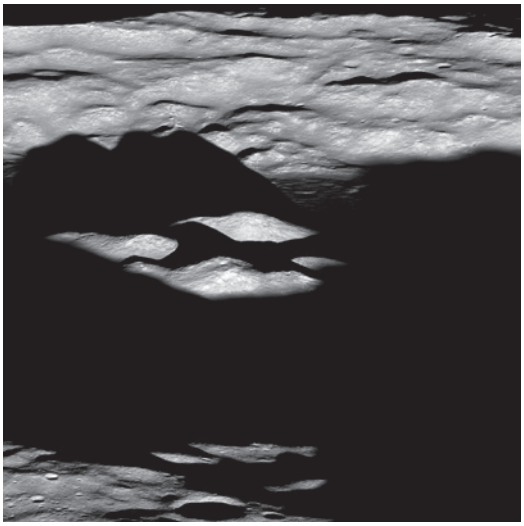
Enjoy!
The Flight Opportunities team

News

NASA Announces Winners of TechLeap Prize: Nighttime Precision Landing Challenge



NASA has named three winners in the agency's second **TechLeap Prize** competition, **Nighttime Precision Landing Challenge No. 1**, with the aim of enabling the agency to identify low-cost sensing systems that can map terrain in the dark from an altitude of 250 meters or higher. Such technology will be critical for future space exploration, which will require spacecraft of various sizes to land routinely and precisely in challenging terrain, such as the rocky and often dark or shadowed areas of the Moon's cratered surface. The winning teams have been awarded an initial $200,000 prize to help mature their technology, with the opportunity for each to win up to a total of $650,000 in prizes as well as a suborbital flight test on a commercial rocket-powered landing vehicle.

Read the **full NASA announcement** to learn more and read about the winners.

17 NASA-Supported Payloads Set to Launch on Blue Origin's New Shepard

Seventeen NASA-supported payloads representing a range of technology capabilities for space exploration and commerce are set to launch no earlier than August 31, 2022 aboard Blue Origin's New Shepard rocket-based system from the company's launch site in West Texas.

Recent Flights

Winners of TechLeap Prize: Autonomous Observation Challenge Take Flight

Winners of the first **NASA TechLeap Prize** launched their technologies this summer on high-altitude balloon flights to test them at stratospheric heights – just one year after applying to the competition. The **Autonomous Observation Challenge No. 1** asked winners to develop SmallSat observation technologies that can autonomously detect, locate, track, and collect data on transient events on Earth and beyond – such as dust plumes on the Moon or other planets or terrestrial phenomena on our home planet. After developing their payloads over the last year, the **winning teams** leveraged balloon flights from Aerostar (formerly Raven Aerostar) of Sioux Falls, South Dakota to gather valuable test data and experience with the full process of building a technology payload and bringing it from lab to flight test.

Read about the **launch of wildfire-detection system Bronco Ember** from Cal Poly Pomona's Bronco Space Lab – and stay tuned for features about launches of winning payloads from Orion Labs and Texas A&M.

Image: Aerostar's Zero-Pressure Balloon System launches from the company's facility in Sioux Falls, South Dakota on July 28, 2022 carrying a TechLeap Prize-winning payload from Orion Labs in its gondola. Credit: Orion Labs/ Margarita Reyes

June 2022 Parabolic Flights Test Multiple Payloads in Microgravity

Two parabolic flights, June 27-28, 2022 in Santa Maria, California provided testing for innovations designed for cryogenic fluid management, CubeSat attitude control, reduction of spaceflight-related motion sickness, **space-based printing of electronics**, and more. Funded by Flight Opportunities through a wide variety of NASA mechanisms (e.g., **TechFlights awards**, **SBIR**, **Tipping Point** awards) the flights were provided by Zero Gravity Corporation and featured brief periods of microgravity aboard their G-FORCE ONE aircraft, enabling teams to test the performance of their payloads in one of the challenging conditions they would encounter in space.

Related NASA feature: **Microgravity Testing Advances Space-Based Printing of Electronics**

"Technology maturation is done in steps, and a very important step is parabolic flights and the microgravity testing they provide. These flights help us take technologies to higher technology readiness levels and allow us to evaluate them for potential infusion in lunar and Gateway missions, among others."

Curtis Hill, senior materials engineer, NASA's Marshall Space Flight Center, principal investigator for NASA's On-Demand Manufacturing of Electronics project

Community of Practice

Join Us For the September Webinar

NASA's TechLeap Prize: Advancing Space Technologies and Innovative Teams
Speakers:

- Sara Jennings, Chief Executive Officer, Orion Labs
- Zachary Gaines, Project Lead, Bronco Space Club at Cal Poly Pomona

Wednesday, September 7, 2022
10:00 a.m. - 11:00 a.m. PDT

Learn more and join the webinar online.

Image: The TechLeap Prize-winning Orion Labs team makes final hardware checks on their Quantum Earth Observation payload prior to launch on an Aerostar high-altitude balloon. Credits: Orion Labs/Margarita Reyes

Opportunities

Now Open: NASA TechRise Student Challenge 2022-23

NASA is calling on middle and high school students to join the second **NASA TechRise Student Challenge**, which invites student teams in grades six to 12 to develop, build, and launch science and technology experiments on high-altitude balloons. A total of 60 winning teams will each receive $1,500 to build their experiment and an assigned spot on a NASA-sponsored high-altitude balloon flight operated by one of two commercial providers: Aerostar of Sioux Falls, South Dakota, or World View based in Tucson, Arizona.

Upcoming Key Dates

- Virtual Field Trip: September 22, 2022
- Applications due: October 24, 2022

To learn more, read the full **NASA press release** and visit:
https://www.futureengineers.org/nasatechrise

Notifications Sent: NASA TechFlights 2022

The Flight Opportunities program thanks all who submitted a Mandatory Preliminary Proposal (MPP) for **TechFlights 2022**. The program has reviewed all MPPs and has notified all proposers of their status. Invitations have been extended via **NSPIRES** email to those selected to submit full proposals.

Full proposals due: September 29, 2022

Now Open: Request for Information - NASA's Strategic Technology Framework "EXPLORE & LAND Thrusts"

NASA's Space Technology Mission Directorate (STMD) has released a Request for Information (RFI) intended to obtain information and feedback from commercial industry, other government agencies, and academia on NASA's Strategic Technology Plan. STMD utilizes the Strategic Framework to organize its technology investments to address desired outcomes. The Framework currently includes four "thrusts" – GO, LAND, LIVE, and EXPLORE – along with corresponding outcomes and capabilities. This RFI specifically addresses the EXPLORE and LAND thrusts.

Read the full RFI on NSPIRES
Responses due: October 6, 2022

Closing Soon: NASA SBIR Ignite

SBIR Ignite is a new way for small businesses with a commercially viable technology idea to use NASA as a stepping stone in their path toward commercial success. The solicitation funds early-stage, high-risk U.S. technology development to help make companies and their technologies more attractive to private sector investors, customers, and partners.

Learn more about NASA SBIR Ignite
Proposals due: September 1, 2022

Technology Transition Spotlight

Carthage College's Modal Propellant Gauging Commercialization Underway

Modal Propellant Gauging (MPG): What It Is
MPG is a non-invasive, inexpensive, robust method designed to gauge settled and unsettled liquid propellant at gauging resolutions of 1% for settled propellants and 2-4% for unsettled, sloshing propellants.

Why It Matters
MPG is designed to address the needs of NASA's Space Launch System (SLS)/Orion architecture. SLS/Orion requires in-space gauging accuracy of 1% for remaining propellant mass and leak detection.

Image: Carthage students Taylor Peterson (left) and Celestine Ananda are shown observing the gauging of unsettled liquids during a period of microgravity on a flight with Zero Gravity Corporation in November 2018. Credits: Carthage College

Suborbital Flight Milestones
Flights on Zero Gravity Corporation's G-FORCE ONE and Blue Origin's New Shepard have enabled researchers to:

- Demonstrate MPG's ability to gauge at resolutions of 1% for settled propellant and 2-3% for unsettled, sloshing propellant
- Validate a computational fluid dynamics model of how modal gauging is affected by propellant slosh and other vehicle dynamics
- Develop models of the slosh dynamics of the Orion service module propellant tanks

What's Next
As a result of **suborbital flight testing**, Carthage College has achieved several commercialization successes with MPG:

- Airbus has adopted MPG for a one-year study as part of its zero-emission commercial passenger jet program. The project is the culmination of a project for which five Carthage College undergraduates won the Lemelson-MIT Prize in 2020.
- Seattle startup GeoJump is commercializing MPG for use on its Sherpa-class spacecraft via a Small Business Technology Transfer grant with the U.S. Air Force.
- NASA Commercial Payload Services (CLPS) contractor Intuitive Machines has installed the MPG technology on its NOVA-C lunar lander test articles.

"I'm grateful for the support from both Flight Opportunities and Zero Gravity Corporation over the years. Our recent successes show that all of this work is starting to translate into tangible **results."**
Kevin Crosby, Ph.D., principal investigator for MPG, Carthage College

Events

ASCEND 2022
October 24-26, 2022
Las Vegas, Nevada and Online
Join Flight Opportunities Program Manager John Kelly for the session "Leveraging Prize Authority to Address Critical NASA Technology Needs" and Deputy Program Manager Danielle McCulloch for "NASA Design Lab: Exploring Solutions to Expand Entrepreneurship and Space-Based Innovation." (Dates and times subject to change. Refer to the ASCEND program for the most up-to-date information.)

American Society for Gravitational and Space Research (ASGSR) Annual Conference
November 9-12, 2022
Houston, Texas
Join Flight Opportunities leaders and NASA-supported researchers for a panel at this year's event. Panel information will be available on the event website in the coming weeks.

American Geophysical Union (AGU) Fall Meeting
December 12-16, 2022
Chicago, Illinois and Online
Join Flight Opportunities Deputy Program Manager Danielle McCulloch in conversation with NASA-supported researchers on a panel at this year's event. Panel information will be available on the event website in the coming weeks.

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STAY CONNECTED:

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