

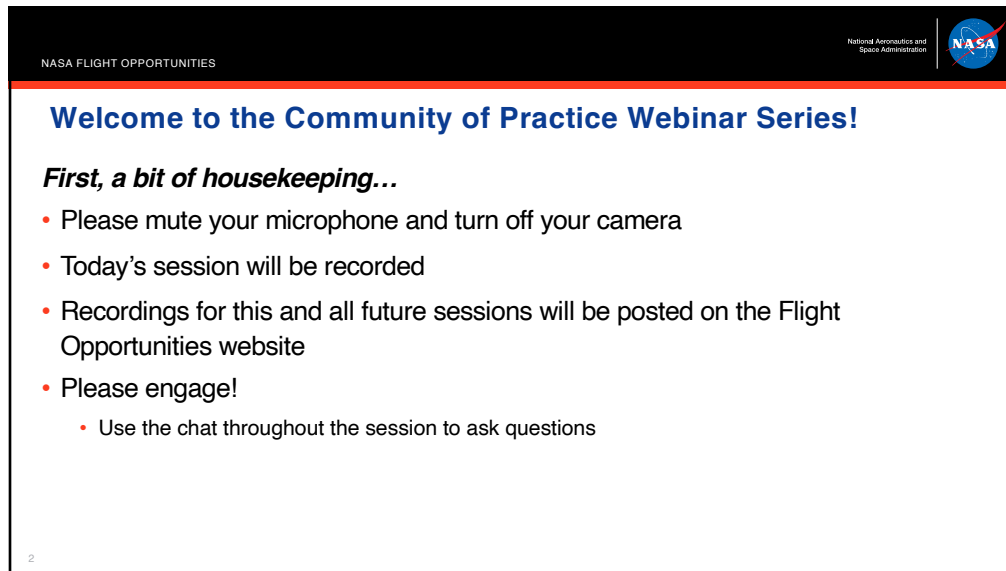


NASA Flight Opportunities
NASA TechLeap Universal Payload Interface Challenge
Anh Nguyen, Ph.D., NASA Headquarters
Danielle McCulloch, NASA's Armstrong Flight Research Center
Christibelle Villena, Carrot

Community of Practice Webinar Series – January 10, 2024
Session will start at 10 a.m. PT – Please mute your microphone and turn off your camera

www.nasa.gov

1



NASA FLIGHT OPPORTUNITIES

National Aeronautics and Space Administration

Welcome to the Community of Practice Webinar Series!

First, a bit of housekeeping...

- Please mute your microphone and turn off your camera
- Today's session will be recorded
- Recordings for this and all future sessions will be posted on the Flight Opportunities website
- Please engage!
 - Use the chat throughout the session to ask questions

2

NASA FLIGHT OPPORTUNITIES 


Welcome to the Community of Practice Webinar Series!

Flight Opportunities hopes these webinars will enable researchers, program staff, and flight providers to connect informally and share information

- Designed to distill and share the most important lessons learned to:
 - Increase the impact of suborbital flight tests
 - Transfer best practices
 - Optimize the experience of current and prospective program participants
- Part of a broad effort to capture, organize, and communicate lessons learned by suborbital researchers
- An opportunity to hear from subject matter experts on best practices for preparing for suborbital flight tests

3

3

NASA FLIGHT OPPORTUNITIES 

Join us for future Community of Practice webinars!

Subscribe to our newsletter for updates on future webinars!

https://www.nasa.gov/directorates/spacetech/fli_ghopportunities/newsletter


Future webinars

- Webinars are held 1st Wednesday of each month at 10 a.m. PT
- Topics will be announced in the Flight Opportunities newsletter and website
- Session recordings will be posted on the Flight Opportunities website
- Let us know session topics you would like to see covered


4

4


NASA FLIGHT OPPORTUNITIES

National Aeronautics and Space Administration 


Today's Speakers



Anh Nguyen
Program Portfolio Integrator
Flight Opportunities



Danielle McCulloch
Program Manager
Flight Opportunities



Christibelle Villena
Chief Program Officer
Carrot

5

5





EXPLORE SPACE TECH

**NASA TechLeap Prize
Universal Payload Interface Challenge**
Flight Opportunities Community of Practice Webinar
January 10, 2024

Anh Nguyen – Program Portfolio Integrator, NASA Flight Opportunities
Danielle McCulloch – Program Manager, NASA Flight Opportunities

6

FLIGHT OPPORTUNITIES & SMALL SPACECRAFT TECHNOLOGY PORTFOLIO


Flight Opportunities and Small Spacecraft Technology seek to **change the pace of space** exploration, discovery and space commerce.

Portfolio speed, flexibility, and access to a wide array of commercial suborbital / orbital capabilities provides opportunity to rapidly address technology gaps and emerging needs.

WHY?

To ensure **American leadership** in space...

...and **increase the rate of scientific discoveries** within our lifetimes.



7

COMMERCIAL VEHICLES MAKE FLIGHT OPPORTUNITIES POSSIBLE

- Rocket-Powered Vehicles**

Credits: NASA
- High-Altitude Balloons**

Credits: World View Enterprises
- Parabolic Flights**

Credits: University of California, Berkeley
- Vertical Takeoff Vertical Landing (VTVL) Vehicles**

Credits: Lauren Hughes/NASA
- Orbital Platforms Hosting Payloads**

Credits: Firefly (formerly Spaceflight, Inc.)

8

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

National Aeronautics and Space Administration

9

NASA TechLeap Overview

- Rapidly identify and develop technologies of significant interest to the agency through a series of challenges
- Challenges
 - **No. 1: Autonomous Observation Challenge (Up to \$500k Prize)**
 - *Autonomously detect, locate, track, and collect data on transient terrestrial events such as aerosol dispersion in the atmosphere or maintain line of sight communication with an object on the lunar surface*
 - **No. 2: Nighttime Precision Landing Challenge (Up to \$650k Prize)**
 - *Develop sensing systems that can detect hazards from an altitude of 250 meters or higher and process the data in real time to generate a terrain map suitable for facilitating safe landing of a spacecraft in the dark*
 - **No. 3: Universal Payload Interface Challenge (Up to \$650k Prize)**
 - *Reduce the cost and complexity of payload integration through an optimized interface system that enables rapid and seamless integration of diverse payloads onto various flight vehicles, including suborbital, orbital, and planetary lander vehicles.*
- Eligibility
 - US Citizens and Permanent Residents
 - Organizations Must Be Incorporated & Operating in US
 - Individuals & Teams Permitted; Lead must be US Person, 18+

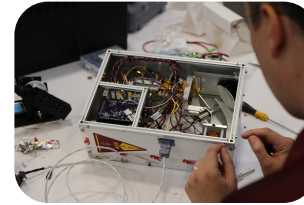
See website for full eligibility details

National Aeronautics and Space Administration

10

NASA TechLeap Prize – No. 3 Universal Payload Interface Challenge

- **Challenge Statement:** This challenge aims to reduce the cost and complexity of payload integration through an optimized interface system that enables easy integration of diverse payloads onto various flight vehicles, including suborbital, orbital, and planetary lander vehicles.
- **Technologies Sought:** Robust universal payload interface solutions that are low-cost and modular to enable straightforward, rapid payload integration and reduction of overall time-to-flight. An ideal interface system would also satisfy scenarios where payloads require multiple flight tests.
- **Schedule:**
 - Competition launch – October 16, 2023
 - Registration deadline – February 1, 2024
 - Application deadline – February 22, 2024
 - Winners selected – June 2024
 - Distribution of first prize (\$200k) – June 2024
 - System Build Round 1 (\$200k) – October 2024
 - Site Visit and Evaluation
 - System Build Round 2 (\$100k) – March 2025
 - Site Visit and Evaluation
 - Performance Incentive Phase (Up to \$150k) – August 2025
 - Universal payload interface system integration with a payload and vehicle assigned by NASA for flight testing



National Aeronautics and Space Administration

11

11

TECHNICAL GUIDELINES

OBJECTIVES

- Enable **rapid and accessible transition of payloads** from the bench to flight vehicle integration for testing on **multiple different commercial flight vehicle types** (e.g., suborbital, orbital, lander)
- Enable payloads to be **as vehicle-independent as possible to facilitate rapid integration**
- Enable **early payload development without vehicle interface knowledge**
- An ideal universal payload interface system would not dictate, suggest, or attempt to predict all possible use cases to ensure the most extensible application
- ***Rationale should be provided on how the proposed universal payload interface system satisfies the challenge objectives***


INTERFACE ELEMENTS

- Minimum required capabilities and potential additional interface capabilities are listed in the [Technical Guidelines](#)
- Systems providing additional capabilities beyond the minimum requirements (including those not listed as examples) may be scored higher. Refer to the [Scoring Rubric](#) for more details.
- ***Rationale should be provided for all proposed universal payload interface system elements.***

National Aeronautics and Space Administration

12

TECHLEAP CHALLENGE

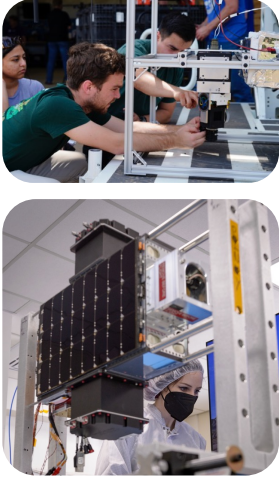


Visit <https://www.upic.nasatechleap.org/> for challenge registration and additional information

KEY DATES

- **Registration Deadline:** Thursday, February 1, 2024, no later than 5:00 PM Eastern
- **Applications Deadline:** Thursday, February 22, 2024, no later than 5:00 PM Eastern
- **Winners Selected:** June 2024

Email inquiries to: questions@nasatechleap.org




National Aeronautics and Space Administration

13

13


NASA FLIGHT OPPORTUNITIES

National Aeronautics and Space Administration 

Thank you!

Flight Opportunities website:
<http://nasa.gov/flightopportunities>

Contact us:
NASA-FlightOpportunities@mail.nasa.gov



14 www.nasa.gov

14