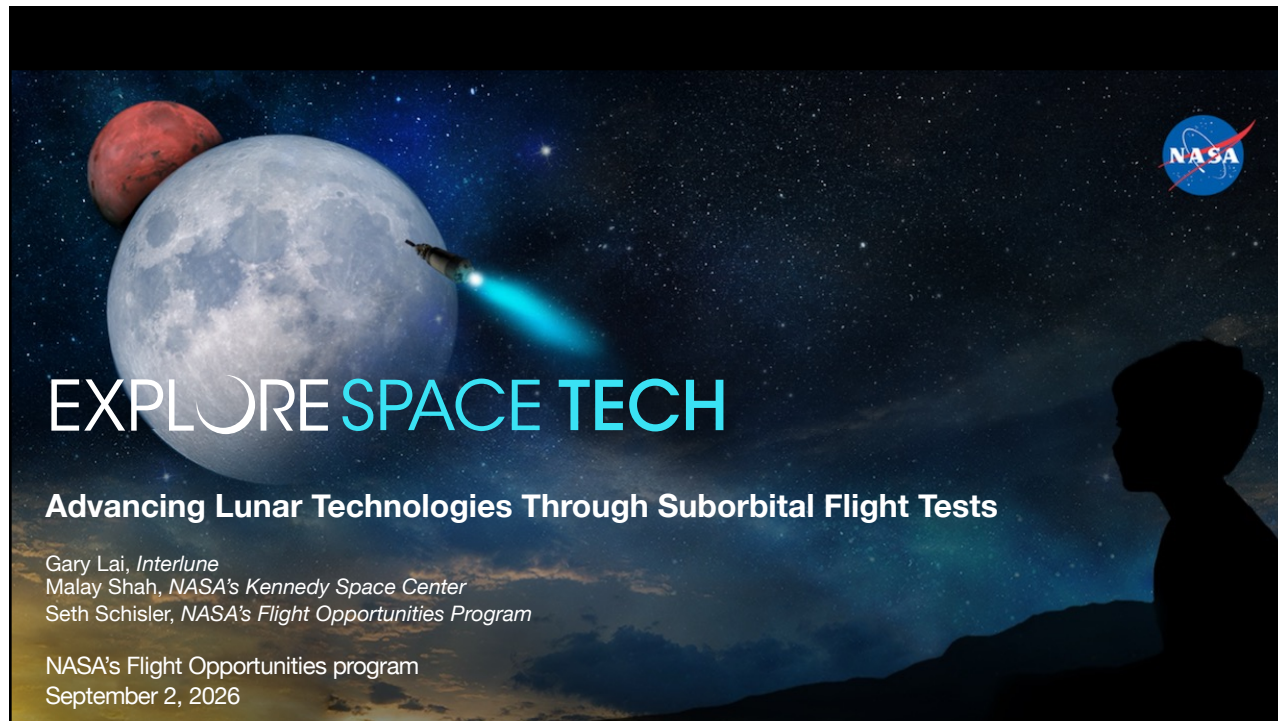




1

WELCOME TO THE COMMUNITY OF PRACTICE WEBINAR SERIES

▶ **Keep your mics muted and cameras off**

- Helps ensure a clean recording



▶ **The recording will be posted online**

- nasa.gov/flightopportunities
- Resources menu
- Community of Practice webinars



▶ **Please engage!**

- Post your questions in the chat



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ABOUT THE COMMUNITY OF PRACTICE WEBINAR SERIES



An opportunity to hear from subject matter experts on best practices for preparing for suborbital flight tests



Researchers, program staff, and flight providers



Connecting and sharing information and lessons learned to:

- Increase the impact of suborbital flight tests
- Transfer best practices
- Optimize the experience of current and prospective program participants

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JOIN US FOR COMMUNITY OF PRACTICE WEBINARS

Subscribe to our newsletter for updates on future webinars!



Future webinars

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

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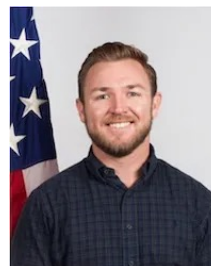
TODAY'S SPEAKERS



Gary Lai
Co-Founder and
Chief Technology Officer,
Interlune



Malay Shah
Thermofluids Engineer,
NASA's *Kennedy Space*
Center



L. Seth Schisler
Technology and Flight Test
Manager, NASA's *Flight*
Opportunities Program

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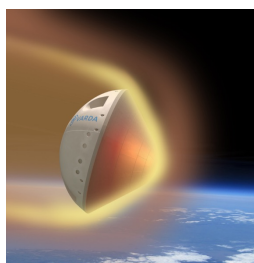
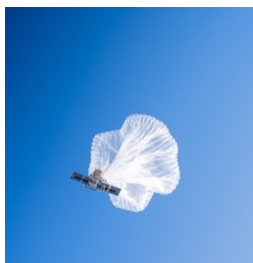
NASA'S FLIGHT OPPORTUNITIES PROGRAM



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

Program offers:

- Subject matter expertise on flight test with commercial providers
- Flight tests of technologies, instruments, and experiments through:
 - IDIQ contracts (available to all of NASA and OGAs)
 - Astute use of funding mechanisms
- Strategic investments in the growth of the U.S. commercial spaceflight industry



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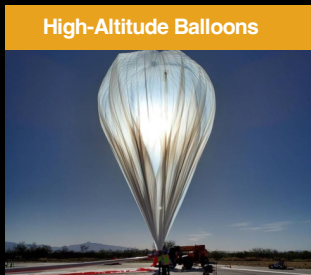
Credits (clockwise): Virgin Galactic, NASA/Matthew Kuhns, Blue Origin, Zero Gravity Corp., SpaceWorks Enterprises, Varda Space Industries, and Austin Butler

6

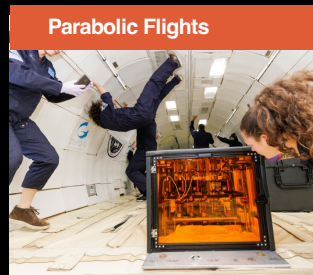
NASA FLIGHT OPPORTUNITIES PROGRAM COMMERCIAL TEST PLATFORMS



Credits: Blue Origin



Credits: World View Enterprises



Credits: University of California, Berkeley



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Credits: Lauren Hughes/NASA



Credits: Varda

7

7

EXPANDING ACCESS TO COMMERCIAL CAPABILITIES VIA FLIGHT OPPORTUNITIES CONTRACTS



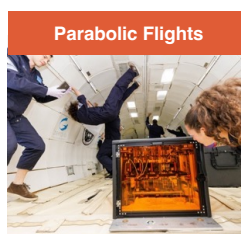
Credits: Virgin Galactic

- Astrobotic
- Blue Origin
- Rocket Lab USA Inc.
- Virgin Galactic



Credits: World View Enterprises

- Aerostar International LLC (acquired Near Space Corporation)
- Angstrom Designs
- World View Enterprises



Credits: University of California, Berkeley

- Zero Gravity Corp.



Credits: Varda

- Astro Digital
- Loft Federal
- Momentus Space
- Rocket Lab USA Inc.
- Space Exploration Technologies (SpaceX)
- Spire Global
- Tyvak Nano-Satellite Systems (Terran Orbital)
- Varda Space Industries

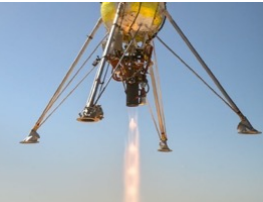
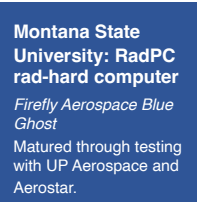
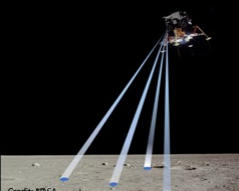
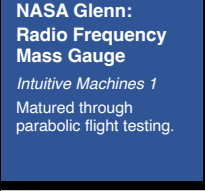
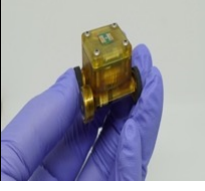
Links to payload users guides (PUGs) available on Flight Opportunities website:
<https://www.nasa.gov/stmd-flight-opportunities/flight-provider-overview/>

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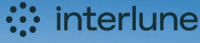
8

COMMERCIAL LUNAR PAYLOAD SERVICES (CLPS) TRANSITIONS

Supporting Commercial Lunar Landers and Demonstrating Technologies on the Lunar Surface  Credit: Dean Bolt	Honeybee Robotics: PlanetVac regolith sample collection <i>Firefly Aerospace Blue Ghost</i> Tested on Xodiac lander (Astrobotic).  Credit: Honeybee Robotics	Montana State University: RadPC rad-hard computer <i>Firefly Aerospace Blue Ghost</i> Matured through testing with UP Aerospace and Aerostar.  Credit: Montana State University
NASA Glenn: Radio Frequency Mass Gauge <i>Intuitive Machines 1</i> Matured through parabolic flight testing.  Credit: NASA	NASA and the Italian Space Agency: LuGRE (Lunar GNSS Receiver Experiment) <i>Firefly Aerospace Blue Ghost</i> Tested with UP Aerospace.  Credit: NASA	NASA Langley: Navigation Doppler Lidar <i>Astrobotic 1 and Intuitive Machines 1</i> Tested on Xodiac lander (Astrobotic).  Credit: NASA
MIT: AstroAnt mini robot <i>Intuitive Machines 2</i> Matured through parabolic flight testing with Zero Gravity Corp.  Credit: MIT Media Lab Space Exploration Initiative	SET: ARMAS radiation monitor <i>Intuitive Machines 2</i> Matured via flight tests with World View (balloon) and Blue Origin (suborbital rocket).  Credit: Space Environment Technologies	SET: ARMAS radiation monitor <i>Intuitive Machines 2</i> Matured via flight tests with World View (balloon) and Blue Origin (suborbital rocket).  Credit: Space Environment Technologies

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Advancing Lunar Technologies Through Suborbital Flight Tests

Flight Opportunities Community of Practice Webinar

Gary Lai, Co-Founder and Chief Technology Officer

2 September 2026

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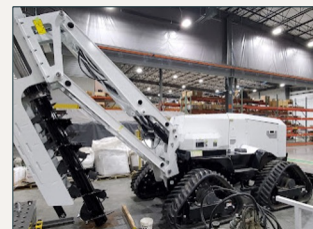
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Interlune Overview

- Space infrastructure and resources company building the industrial backbone of the space economy
- 40+ full-time staff
- Offices in Seattle, WA and Houston, TX
- Awards from NASA, DOE, NSF, AFRL, and Texas Space Commission
- Helium-3 multi-year offtake agreements with DOE, Maybell Quantum, and Bluefors



Helium-3 separation system using cryogenic distillation



Full-scale lunar excavator prototype

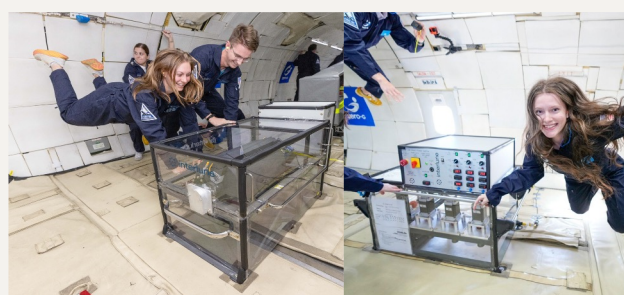


Lunar regolith processing system for extraction of volatiles

11

Sort and Extract

- **Sort:** Centrifugal motion isolates particles most likely to contain solar wind volatiles, while separating materials for construction feedstock
- **Extract:** Low-power method of releasing solar wind volatiles that requires 10 times less power than traditional heat-based methods
- Prototype of regolith size sorting device flown in simulated lunar-g in August 2024
- Three iterations of comminution devices flown in simulated lunar-g in February 2024, November 2024, and May 2025 (two flights)
- Co-funding from National Science Foundation (Phase 1 SBIR) and NASA Flight Opportunities (two separate Techflights awards)



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Prospect Moon

- Parabolic lunar gravity flight testing of prototypes led directly to award of a Phase III SBIR grant from NASA to develop the Prospect Moon lunar mission
 - **Objectives**
 - Demonstrate novel solar wind volatile extraction technology in-situ on the lunar surface
 - Characterize and quantify volatiles released, including helium-3, hydrogen, and others
 - Validate the relationship between lunar helium-3 and its remotely detectable proxies in a region of high helium-3 concentration
 - Includes a robotic arm and scoop, sorting device*, comminution device*, crucible, multispectral imager, mass spectrometer, and associated avionics and imaging
 - Ready for lander integration in September 2027
- * Prototypes tested on lunar parabolic flights



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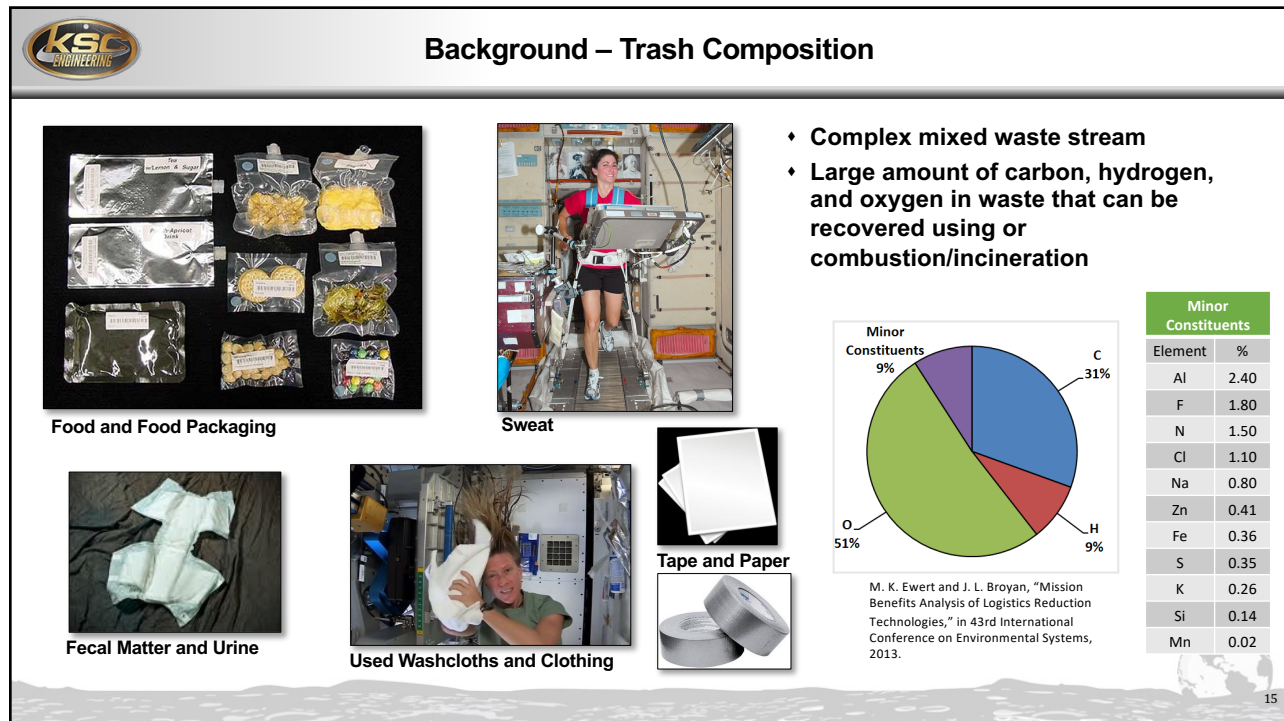
Orbital Syngas / Commodity Augmentation Reactor (OSCAR)

Presenter:
Malay Shah
NE-L6

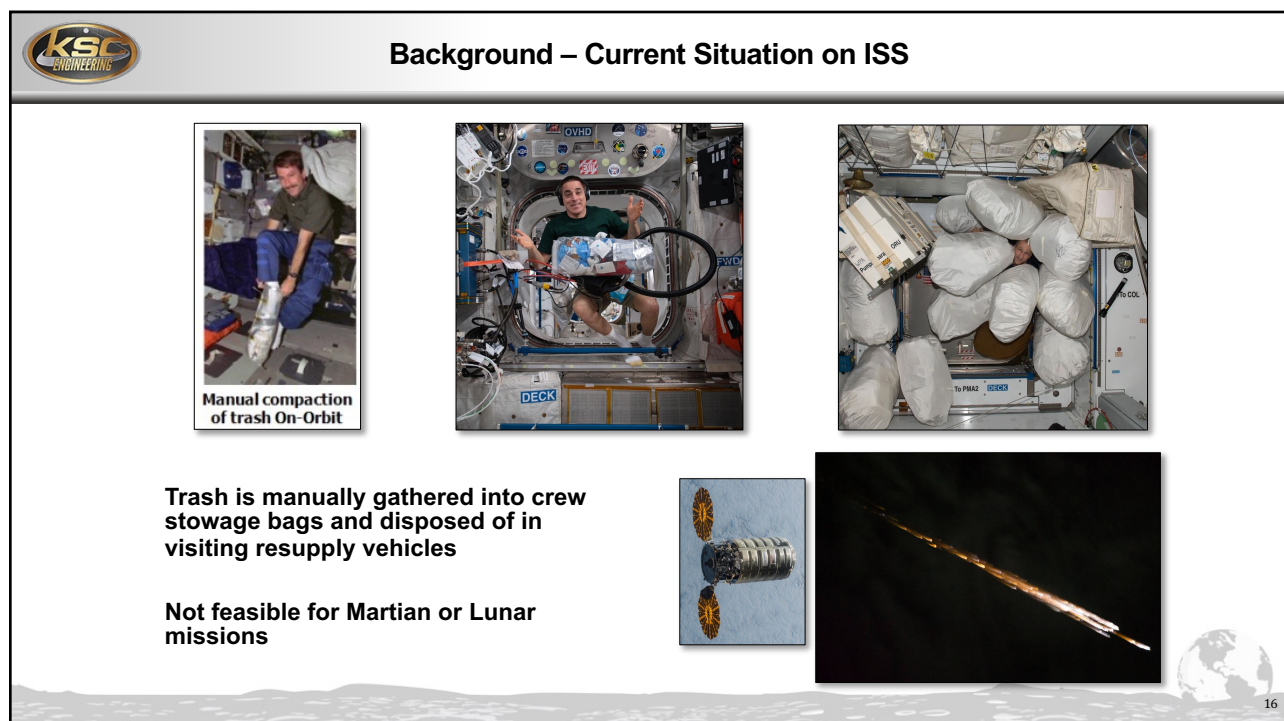


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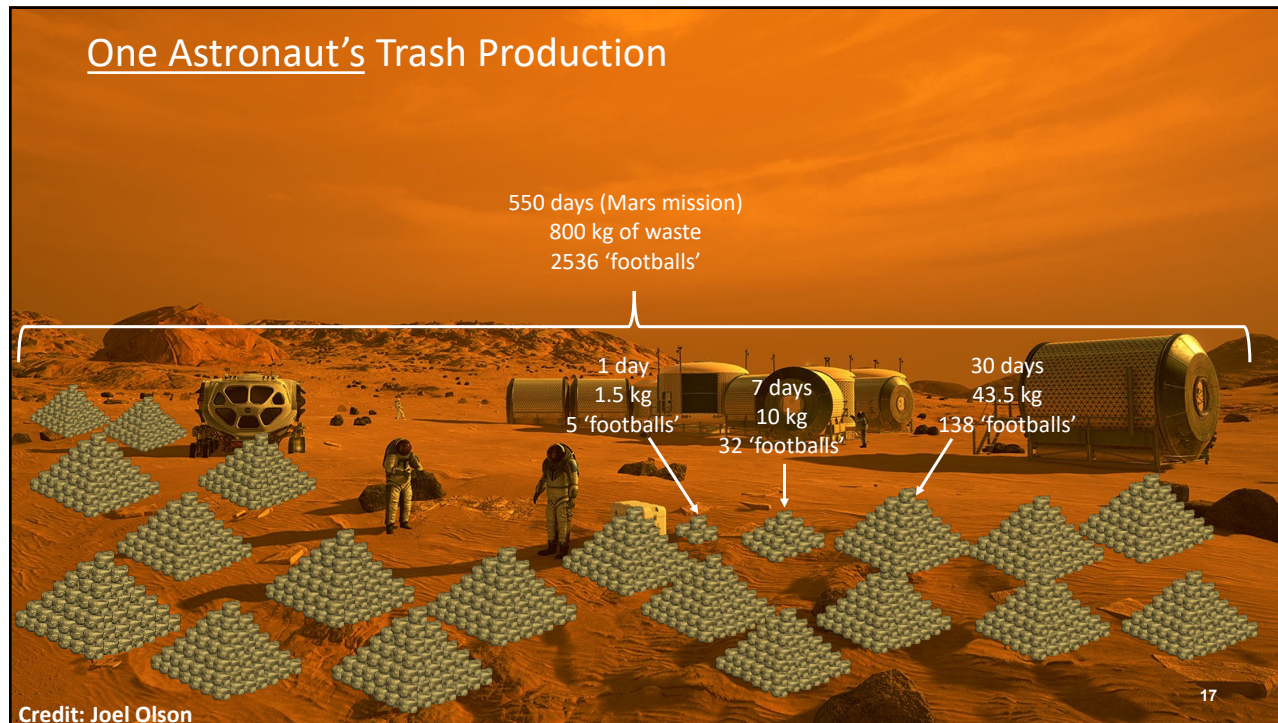
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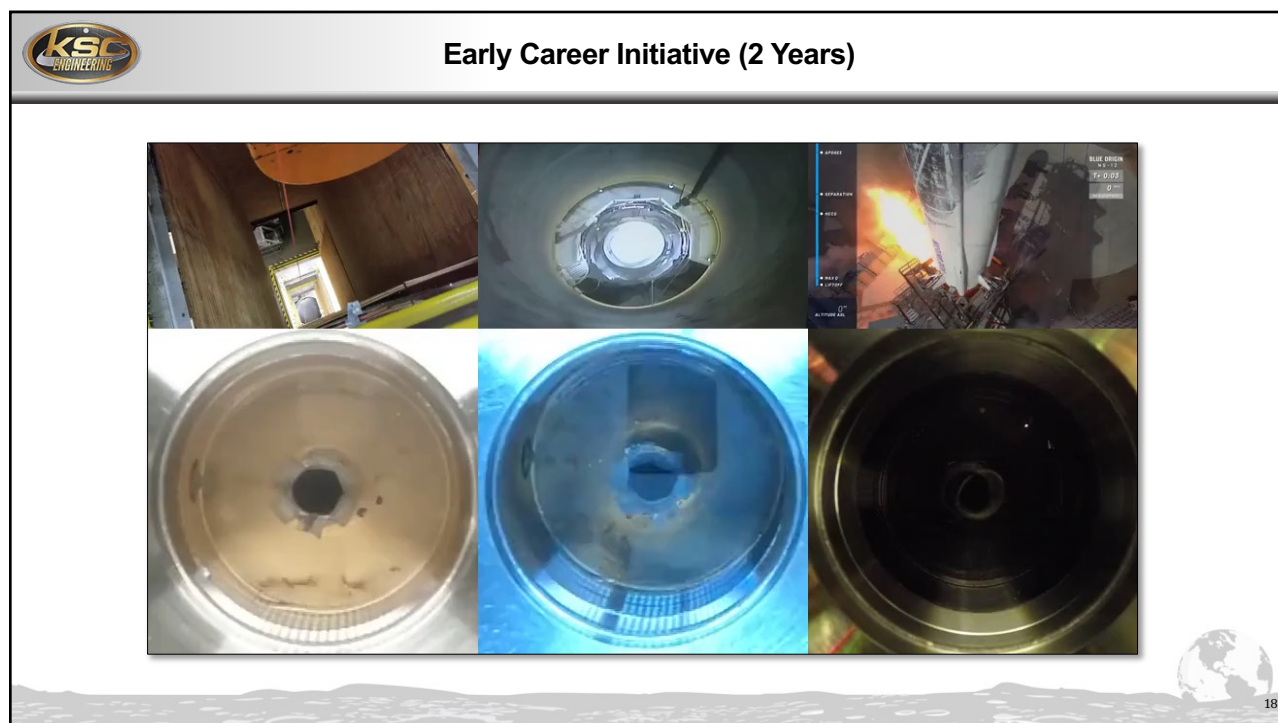
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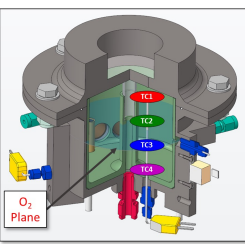
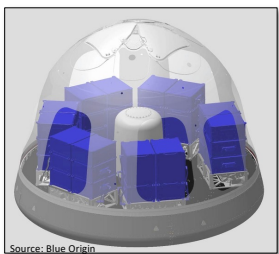


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Flight 1 System Overview

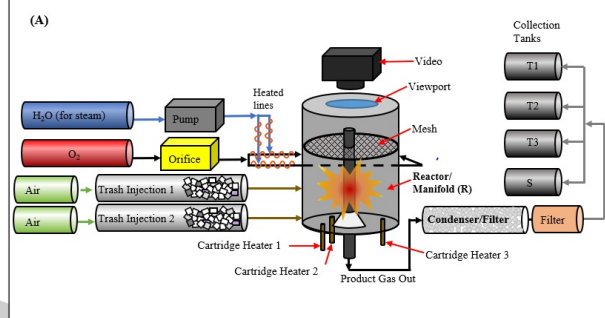
- ♦ OSCAR was Blue Origin's first full stack payload
- ♦ Rapid development over 8 months from initial design to first flight
- ♦ Whole slew of V&V requirements

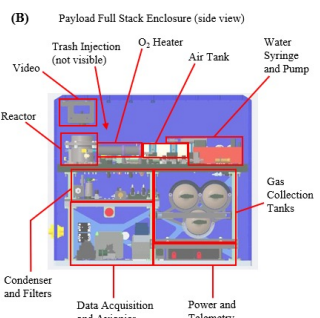
Source: Blue Origin



(A)



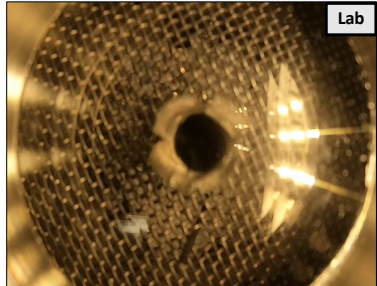
(B) Payload Full Stack Enclosure (side view)



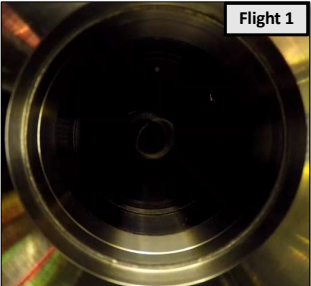
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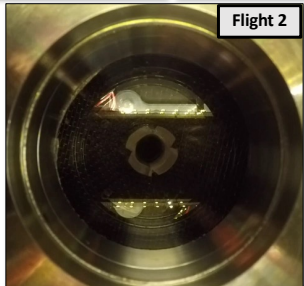
Blue Origin NS 17 (OSCAR Flight 2)



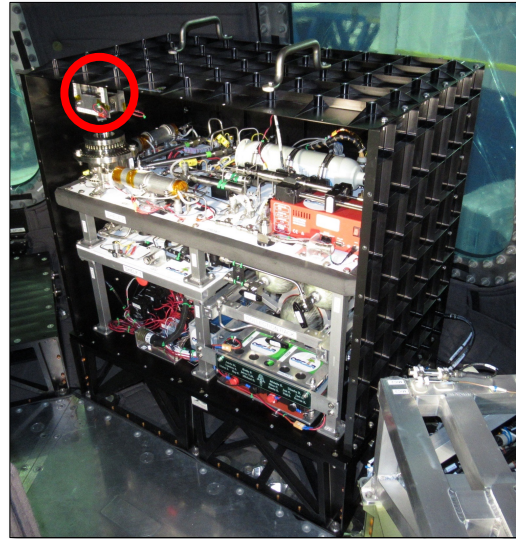
Lab



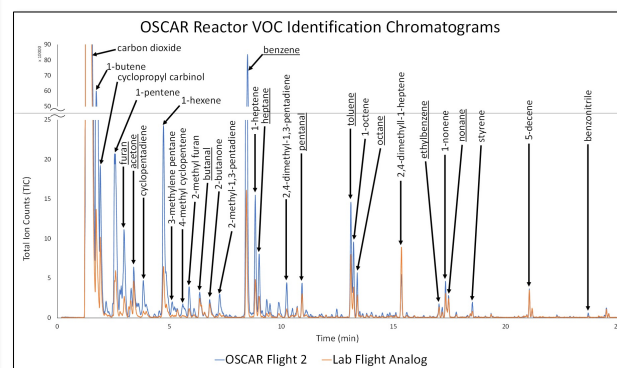
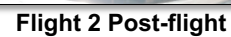
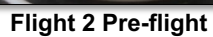
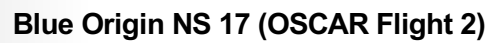
Flight 1



Flight 2

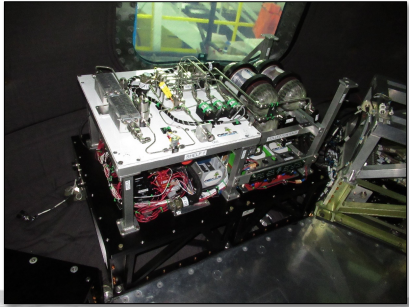
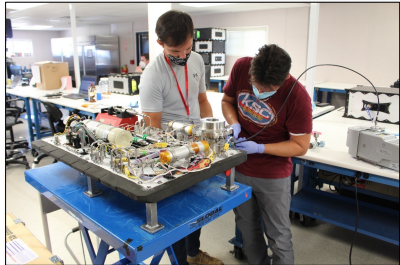


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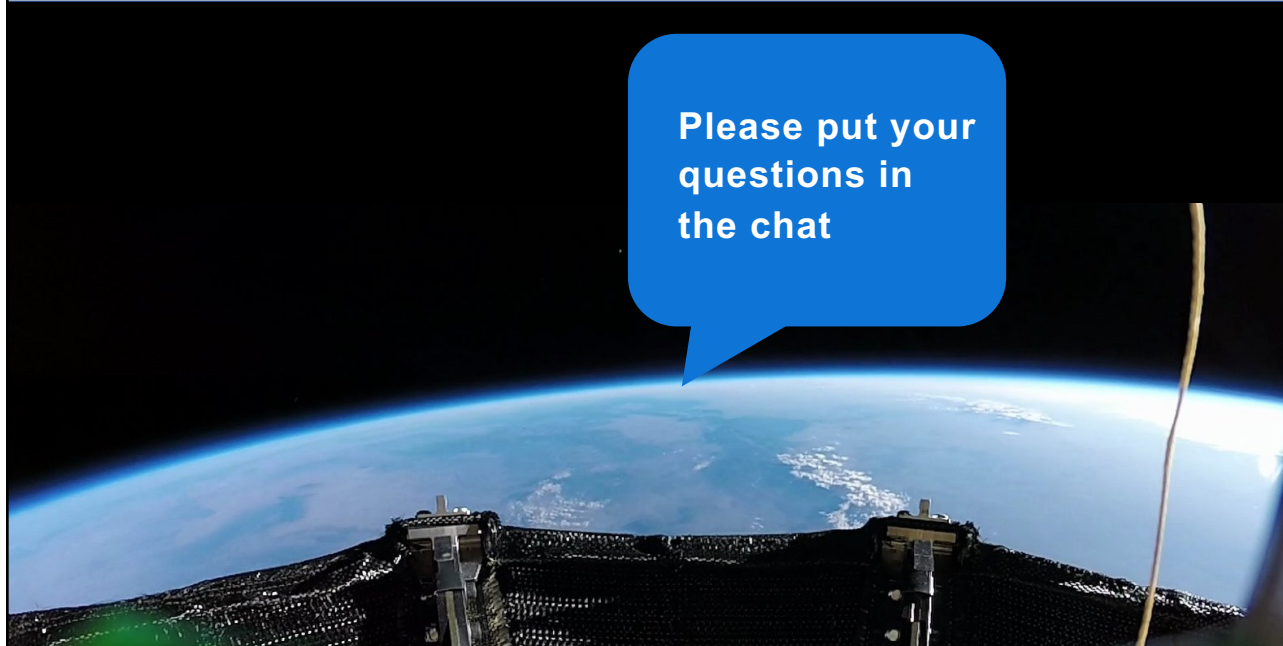


Questions?



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WHAT QUESTIONS DO YOU HAVE?



Please put your questions in the chat

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Reach out:

NASA-FlightOpportunities@mail.nasa.gov

