



# EXPLORE SPACE TECH

## NASA Town Hall – Space Technology Mission Directorate

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Small Spacecraft Technology and Flight Opportunities Programs

August 7, 2023

# SPACE TECHNOLOGY MISSION DIRECTORATE'S STRATEGIC FRAMEWORK



## Go

Rapid, Safe, & Efficient Space Transportation

- ▶ Nuclear Systems
- ▶ Cryogenic Fluid Management
- ▶ Advanced Propulsion



## Land

Expanded Access to Diverse Surface Destinations

- ▶ Entry, Descent, Landing, & Precision Landing



## Live

Sustainable Living and Working Farther from Earth

- ▶ Advanced Power
- ▶ In-Situ Resource Utilization
- ▶ Advanced Thermal
- ▶ Advanced Materials, Structures, & Construction
- ▶ Advanced Habitation Systems



## Explore

Transformative Missions and Discoveries

- ▶ Advanced Avionics Systems
- ▶ Advanced Communications & Navigation
- ▶ Advanced Robotics
- ▶ Autonomous Systems
- ▶ Satellite Servicing & Assembly
- ▶ Advanced Manufacturing
- ▶ **Small Spacecraft**
- ▶ Rendezvous, Proximity Operations & Capture
- ▶ Sensor & Instrumentation



## Lead

Ensuring American global leadership in Space Technology

- ▶ Advance US space technology innovation and competitiveness in a global context
- ▶ Encourage technology driven economic growth with an emphasis on the expanding space economy
- ▶ Inspire and develop a diverse and powerful US aerospace technology community

Learn more about NASA's critical technology needs at [techport.nasa.gov/framework](https://techport.nasa.gov/framework)

# EXPLORE SPACE TECH

## CHANGING THE PACE OF SPACE

Leveraging small spacecraft and responsive launch to rapidly expand space capabilities at dramatically lower costs

### Rapid Leap from Lab to Orbit

Commercial suborbital and orbital test capabilities de-risking technology for future missions. Technology moves from lab to orbit in <9 months.

Responsive deep space access

Expanded space commerce  
On-orbit manufacturing, assembly, and inspection

Sustained deep space presence  
Commercial lunar activity  
In-situ resource extraction and utilization

### On-Demand Missions Beyond Earth

Targeted measurements of Moon, Mars, Venus, and the asteroid belt in response to events and opportunities. Capabilities are competitive with traditional systems but developed for <\$30M in <3 years.

### Unprecedented Deep Space Infrastructure

Modular communications, navigation, and mission support that provides full coverage of Moon and Mars. Each node costs <\$20M to build and deliver to space.

### Unparalleled Sensing Capabilities

Networked spacecraft providing multi kilometer synthetic apertures and massive sensor webs of 30 to 100 spacecraft. Each node costs <\$10M to build and deliver to space.

## SMALL SPACECRAFT TECHNOLOGY & FLIGHT OPPORTUNITIES 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...

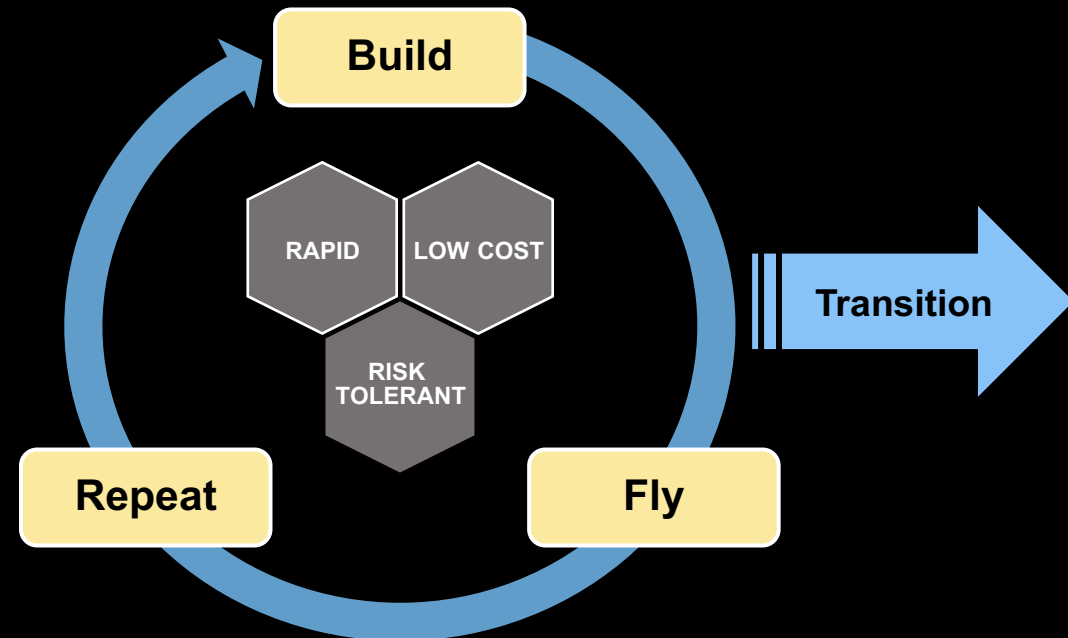
...and **increase the rate of scientific discoveries** within our lifetimes.



## Changing the Pace of Space

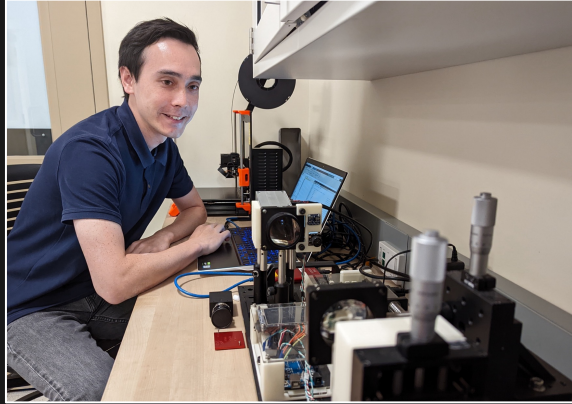
**HOW** will we achieve it?

- Leverage commercial capabilities and best practices
- Embrace risk-informed decision making and risk tolerance
- Minimize NASA processes but leverage agency expertise
- Apply constraint-driven mission philosophy (cost / schedule)
- Rapidly move from benchtop to flight test to de-risk technology
- Maintain programmatic agility to ensure responsiveness to disruptive innovation and the changing geopolitical landscape



# EXPLORE SPACE TECH

WITH SMALL SPACECRAFT



## Stanford University

Autonomous and Distributed Navigation Development and Demonstration

University SmallSat Tech Partnership (2016 -> 2018)

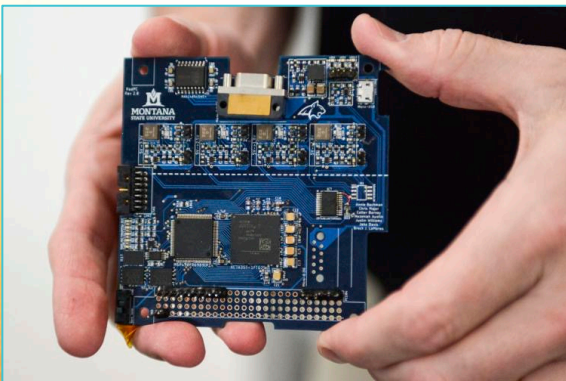
Orbital Demo Starling Mission (StarFox 2023)

Orbital Demo via CubeSat Launch Initiative (VISORS & SWARM-EX) 2023



# EXPLORE SPACE TECH

THROUGH SUBORBITAL FLIGHT



## Montana State University

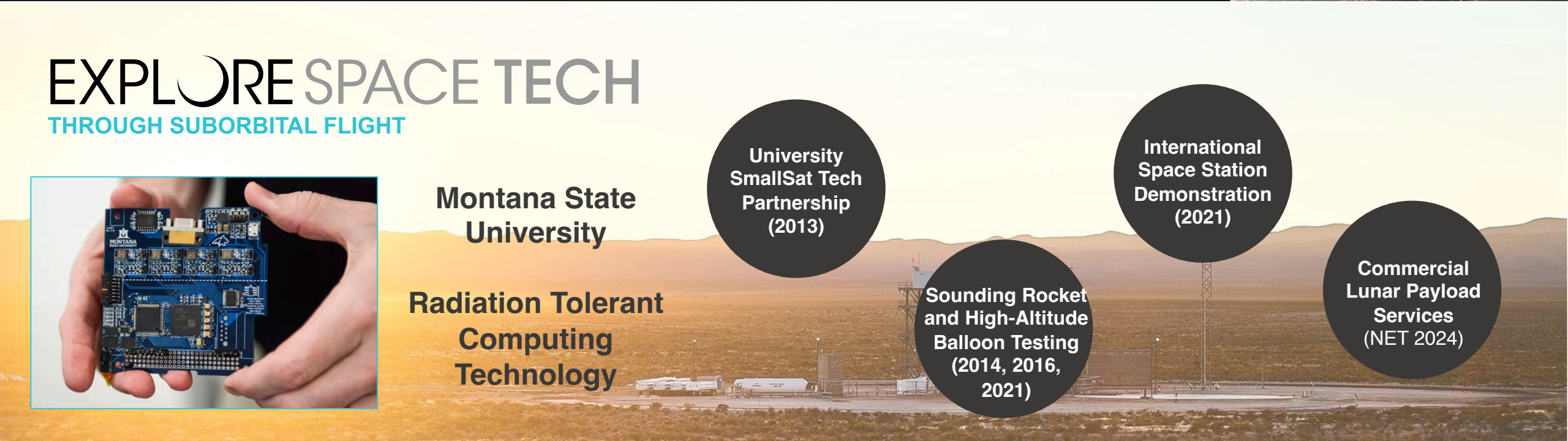
Radiation Tolerant Computing Technology

University SmallSat Tech Partnership (2013)

Sounding Rocket and High-Altitude Balloon Testing (2014, 2016, 2021)

International Space Station Demonstration (2021)

Commercial Lunar Payload Services (NET 2024)



## STAY ENGAGED:

[NASA.GOV/SMALLSPACECRAFT](https://nasa.gov/smallcrafter)

[NASA.GOV/FLIGHTOPPORTUNITIES](https://nasa.gov/flightopportunities)

Visit our websites for more information and resources, including our newsletter and monthly Community of Practice webinars.

Reach out:

[ARC-SST@mail.nasa.gov](mailto:ARC-SST@mail.nasa.gov)

[NASA-FlightOpportunities@mail.nasa.gov](mailto:NASA-FlightOpportunities@mail.nasa.gov)

