



NASA Flight Opportunities

**Tips for Preparing Proposals for Payload Flight Testing**

Stephan Ord, NASA Flight Opportunities  
Brock LaMeris, Ph.D., Montana State University


**Community of Practice Webinar Series – February 3, 2021**

Session will start at 10 a.m. PT – Please mute your microphone and turn off your camera

[www.nasa.gov](http://www.nasa.gov)

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**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

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## 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

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## Today's Speakers



**Stephan Ord**  
Chief Technologist  
NASA's Flight Opportunities Program



**Brock LaMeres**  
Professor | Electrical & Computer Engineering  
Director | Montana Engineering Education  
Research Center  
Montana State University

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**Proposal Tips for Suborbital Testing with Flight Opportunities**  
Stephan Ord, Chief Technologist, Flight Opportunities | February 2021  
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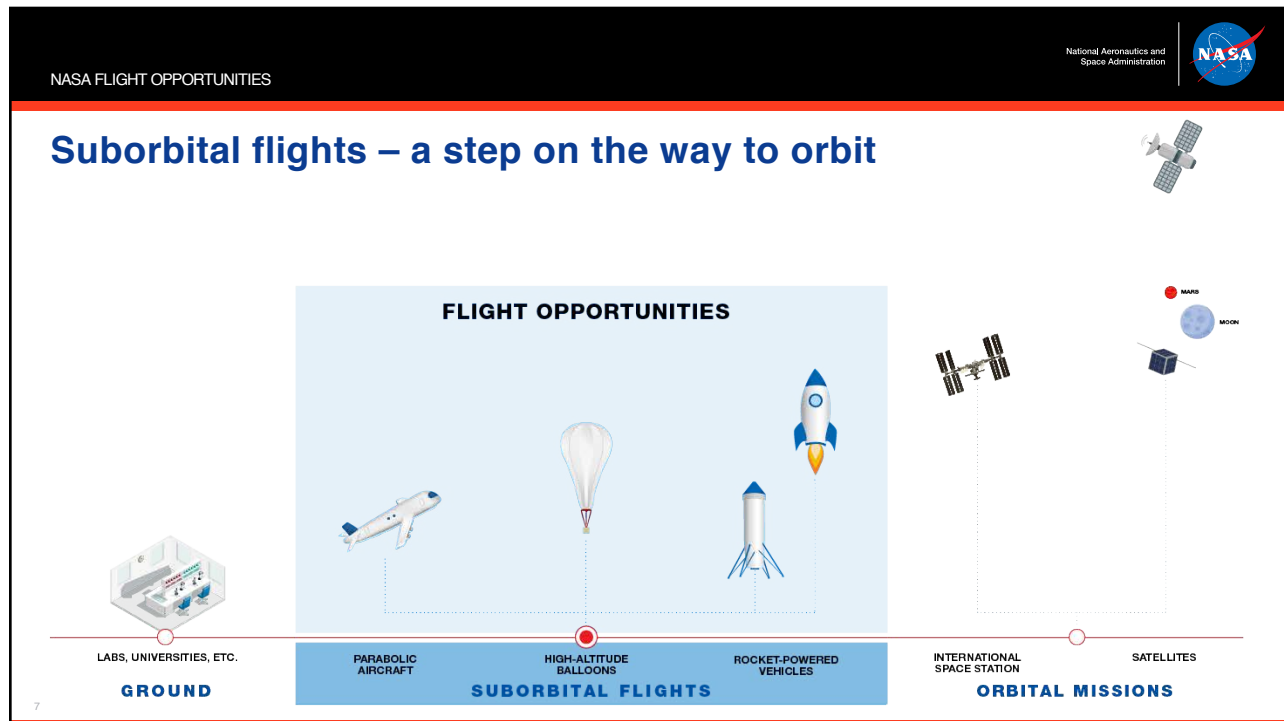
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## Flight Opportunities mission

The Flight Opportunities program facilitates **rapid demonstration** of promising technologies for space exploration, discovery, and the expansion of space commerce through **suborbital testing with industry flight providers**.

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The diagram illustrates the progression of flight opportunities. It is divided into three main sections: GROUND, SUBORBITAL FLIGHTS, and ORBITAL MISSIONS. The GROUND section includes 'LABS, UNIVERSITIES, ETC.' with an icon of a laboratory. The SUBORBITAL FLIGHTS section includes 'PARABOLIC AIRCRAFT', 'HIGH-ALTITUDE BALLOONS', and 'ROCKET-POWERED VEHICLES'. The ORBITAL MISSIONS section includes 'INTERNATIONAL SPACE STATION' and 'SATELLITES'. A central box labeled 'FLIGHT OPPORTUNITIES' contains icons for a parabolic aircraft, a high-altitude balloon, and a rocket. To the right, there are icons for a satellite, the International Space Station, Mars, and the Moon. A red line at the bottom marks the transition from ground to orbital missions.

## Accessing suborbital flights


- **Tech Flights Solicitation**
  - Awards and agreements for flight tests are open to researchers from industry, academia, and non-profit research institutes.
  - Awardees select a flight provider of their choice and work directly with this provider.
- **NASA's Established Program to Stimulate Competitive Research (EPSCoR)**
  - An amendment to the existing 2021 EPSCoR International Space Station Flight Opportunity solicitation allows proposal of suborbital flights to further EPSCoR-funded research.
  - Proposals are due by February 22, 2021 (more info on [NSPIRES](#)).
- **Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR)**
  - Flight Opportunities can be an "external investor" for SBIR/STTR Post Phase II activities with suborbital flight testing.
  - Funds can be used for services from any viable U.S. commercial flight vendor that best meets the project's needs.
- **NASA-Supported Technology Development**
  - NASA researchers should reach out to Flight Opportunities at any time to discuss their need for suborbital flight tests.

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## Talk to us at any time!

### Get in touch with Flight Opportunities early in the technology development cycle

- Talk with us about technologies in development
- Identify the earliest opportunities to fly prototypes and preliminary hardware
- Discuss the best available flight platforms/profiles to help de-risk key components of hardware or software
- Contact Stephan Ord, Chief Technologist for Flight Opportunities, to learn more: [stephan.f.ord@nasa.gov](mailto:stephan.f.ord@nasa.gov)




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## Tips for successful Tech Flights proposals

- **Communicate the connection to NASA's goals**

How will your technology and flight experiment benefit NASA's missions and the agency's strategic goals? Stay up to date on NASA's priorities and clearly communicate how your technology may help the agency achieve them.
- **Explain why your technology is outstanding**

Know the state of the art, and clearly explain why your technology is superior to what has been done before – or may be superior by maturing the technology via flight testing.
- **State your case for flight**

Why does your experiment need a test flight, and why now? Communicate what you will learn or gain by doing a flight experiment and why it cannot be done on the ground.
- **Don't overlook the basics**

Pay close attention to flight plan and cost details, and word/page limits. (Extra pages are eliminated and will not be reviewed by the selection committee, regardless of the information they contain.)
- **Be clear and to the point**


Make sure your writing is clear and cogent. Ask for peer reviews to give feedback before you submit your proposal, and make sure you allow enough time to make revisions before the deadline.

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## Best practices for preparing for a solicitation

- 1 Leverage the Flight Opportunities website.
  - Review Q&A presentation from prior solicitation.
  - Check out the Resources page on the website, which has program factsheets, annual reports, and more.
  - Review previous solicitations, keeping in mind that each solicitation may vary.
- 2 Subscribe to the Flight Opportunities newsletter and monitor NSPIRES to keep up with the latest news about calls and solicitations.
- 3 Gather your proposal information and line up colleagues to help with peer reviews.
- 4 Reach out to fellow community members.


[www.nasa.gov/flightopportunities](http://www.nasa.gov/flightopportunities)

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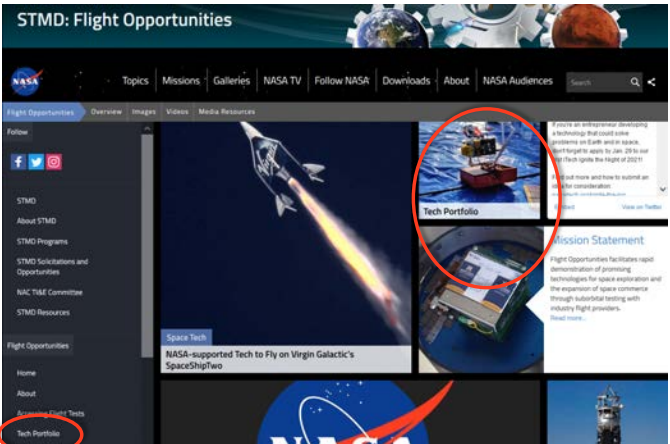
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## Leverage the Flight Opportunities community

### Search the technology portfolio

- Identify technologies similar to yours
- Familiarize yourself with tests performed on various vehicles
- Identify community members to connect with



[www.nasa.gov/flightopportunities](http://www.nasa.gov/flightopportunities)

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## RadPC – Radiation Tolerant Computer

Technology Maturation Through the NASA Flight Opportunities Program


### Principal Investigator

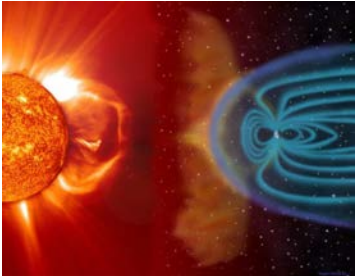
**Dr. Brock LaMeres**

Montana State University



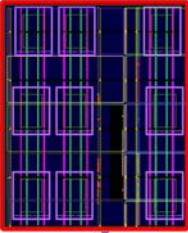
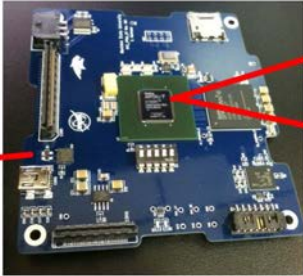

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**RadPC** 




### A Novel Computer Architecture Implemented on a COTS FPGA

- A modern COTS part (<65nm) provides ~600krad TID immunity inherently.
- A modern COTS parts significantly reduces cost over custom, “Rad-Hard” parts.
- SEUs are handled via the redundant processing cores, each that can be partially reconfigured to a healthy state if faulted by radiation.



9-Tile MicroBlaze System (TMR + 6 Spares)

 **RadSat** 14

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**Flight Opportunities Testing** 

**Sounding Rocket Testing #1**

- Flown on an *UP Aerospace* vehicle on 10/23/2014 out of New Mexico.




**RadSat** 15

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**Flight Opportunities Testing** 

**Sounding Rocket Testing #2**

- Flown on a *NASA Terrier-Orion* vehicle on 3/7/2016 out of Wallops.



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## Flight Opportunities Testing

**High Altitude Balloon Testing #1**

- Flown on a World View Stratocraft on 9/22/2019.



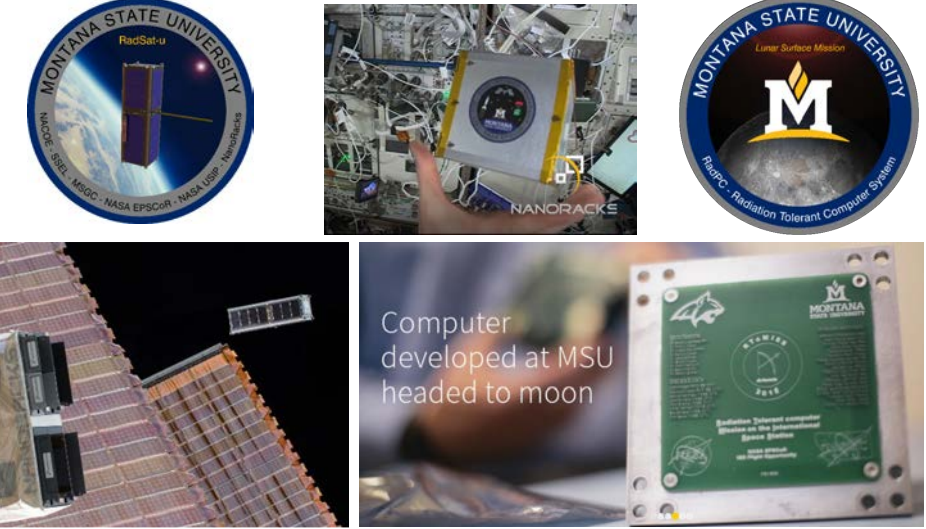
**RadSat**

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## What's Next for RadPC?

**FOP Enabled Demos on CubeSats, the ISS, and the Moon**




**RadSat**

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## Join us for future Community of Practice webinars!

**Look for the March topic in our newsletter & on the website**

 March 3, 2021 at 10 a.m. PST


**Future webinars**

- Webinars are held 1<sup>st</sup> 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

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## Thank you!

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

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



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