



NASA Flight Opportunities

**Making the Most of Rocket-Powered Suborbital Tests**

Christine Escobar, Space Lab Technologies  
Paula Adhikari, Blue Origin  
Ryan Dibley, Flight Opportunities Campaign Manager


**Community of Practice Webinar Series – December 1, 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 session will be posted on the Flight Opportunities website
- Please engage!
  - Use the chat throughout the session to ask questions

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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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## Join us for future Community of Practice webinars!

Subscribe to our newsletter and watch our website for upcoming topics!

**NASA.gov/FlightOpportunities**

### 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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## Today's Speakers



**Christine Escobar**  
Vice President and CBO  
Space Lab Technologies



**Paula Adhikari**  
Payload Integration Manager  
Blue Origin



**Ryan Dibley**  
Campaign Manager  
Flight Opportunities

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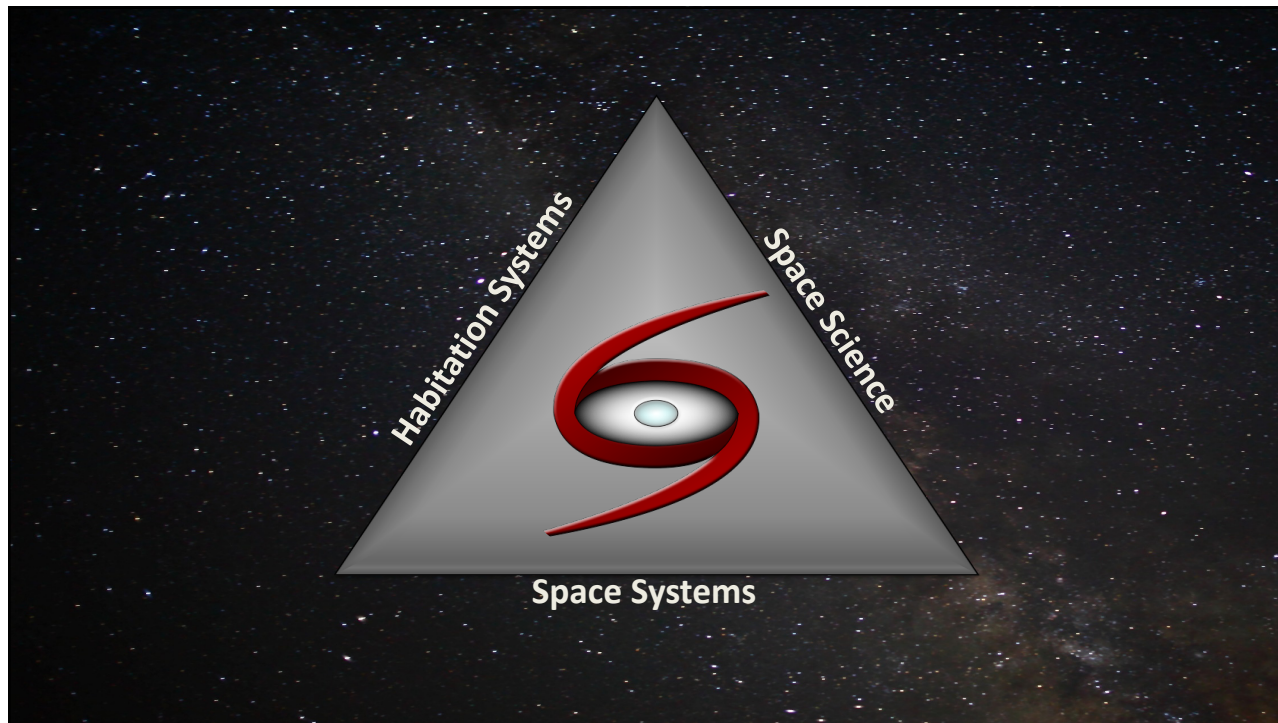


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**Community of Practice**  
Christine Escobar | December 2021

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### What Makes a Good Space Crop?

**Efficiency**

CO<sub>2</sub> → O<sub>2</sub>

↑ CO<sub>2</sub> Consumption  
Growth Rate  
Harvest Index  
Nutritional Density  
Palatability

↓ Infrastructure Mass  
Water Use  
Labor (Crew Time)  
Energy Use  
Volume

✓ **ROBUST** to environmental perturbation (temp, pH, light, μG)



#### Water Lentils

- Up to 45% Protein
- High Quality Amino Acids
- Phytosterols
- Antioxidants
- Ω-6/Ω-3 < 1
- Polyunsaturated Fats

**The Next Superfood**

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**μG-LilyPond™ – Vertical Farm for Microgravity**  
**NASA STTR Phase I & Phase II**

Land Plants      Aquatic Plants

Passively Fed Growth Beds

Close Canopy Lighting

Water & Nutrient Recycling

3-Phase Separator for  $\mu\text{g}$

Dual MLE Ortho-Grid Enclosure

Ventilation, CO<sub>2</sub>, Temperature, Humidity, & Biofilm Control

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**Microgravity Testing of Growth Bed**

Phase II EDU

a) Pre-drop      b) post-release      c) end of drop

*Drop Tower Results For Additive Manufactured, Shot Peened Grade 5 Ti Pre-wetted Test Article With 10 Degree Half Angle*

Blue Origin NS13 Suborbital Flight Experiment for  $\mu\text{G-LilyPond}$  Growth Bed and Harvester

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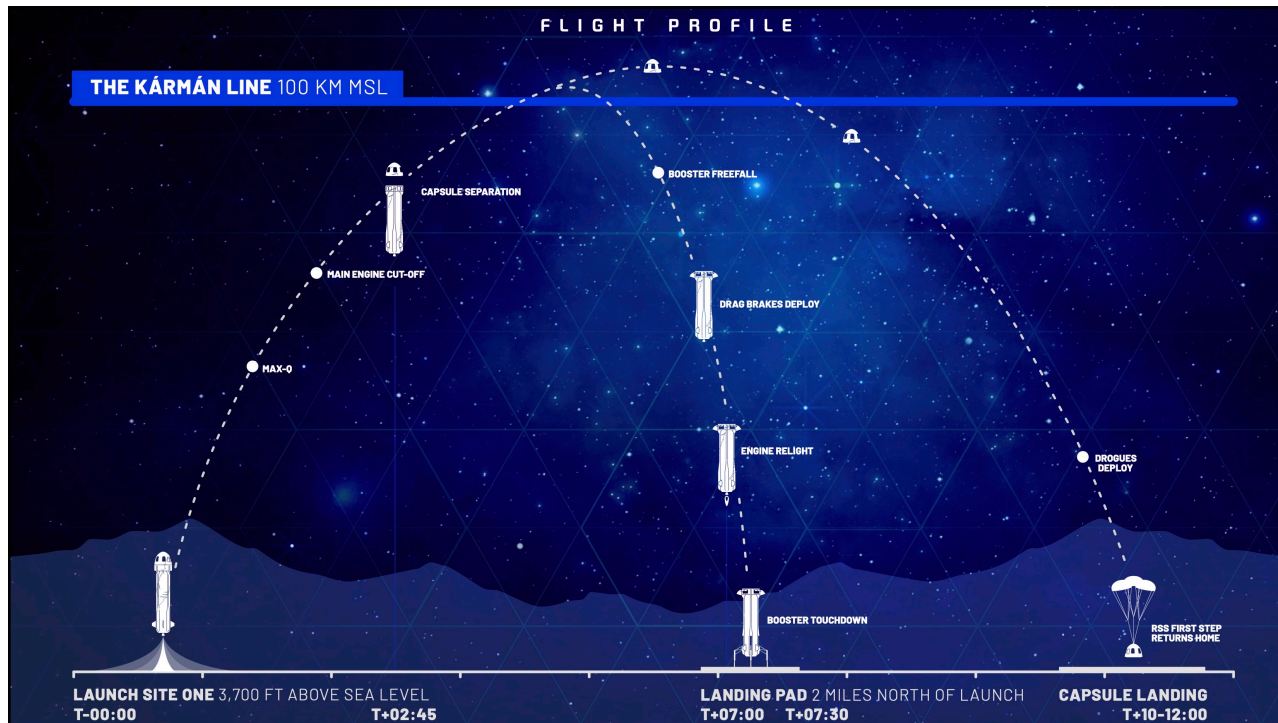
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# Thank you!

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

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



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