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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2

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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3

JOIN US FOR COMMUNITY OF PRACTICE WEBINARS

Subscribe to our newsletter for updates on future webinars!

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

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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4


EXPLORE SPACE TECH
NASA Flight Opportunities Community of Practice
August 2025 | Kevin Engelbert and Lynn Harper

5

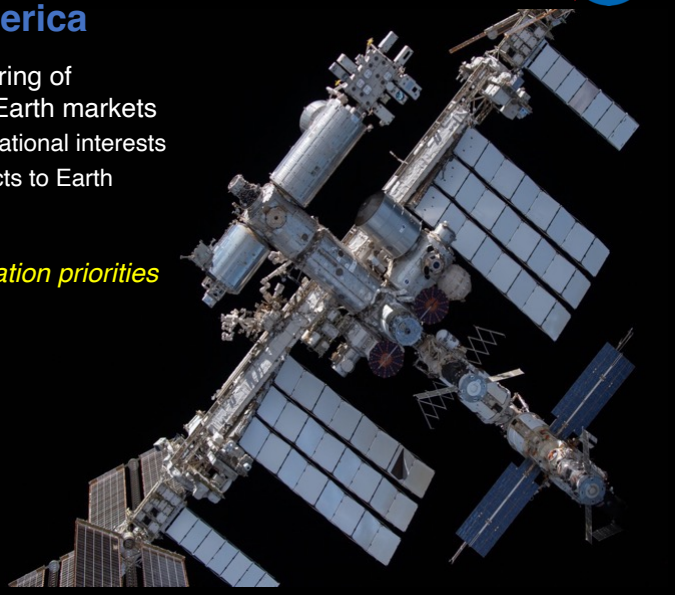

In
Space
Production
Applications
In Space for America
In Space for All of Us
JSC/Kevin Engelbert
InSPA Portfolio Manager
ISS Research Integration Office
ARC/Lynn Harper
InSPA Strategic Advisor
Ames Commercial Space Portal
Technical Monitors & Advisors:
ARC/Dan Rasky (R), David Loftus M.D., Jon Rask
JSC/John Love PhD (R), Liz Warren PhD
LaRC/Narasimha Prasad PhD
MSFC/Ching Hua Su PhD
SMD-BPS/Lynn Harrison (Clary) PhD

6

In Space Production Applications

In Space for America

- Investing in scalable & sustainable manufacturing of microgravity enhanced products that support Earth markets
  - U.S. competitiveness in industries that serve national interests
  - Direct benefits to humanity by returning products to Earth
  - U.S. leadership of a robust LEO economy
- Aligned to National Priorities *– New administration priorities*
  - CHIPS & Science Act (i.e. semiconductors)
  - Cancer Moonshot
  - Domestic Biomanufacturing
  - Maintaining U.S. Preeminence in LEO
  - *Quantum Applications*
  - *Energy Efficiency?*



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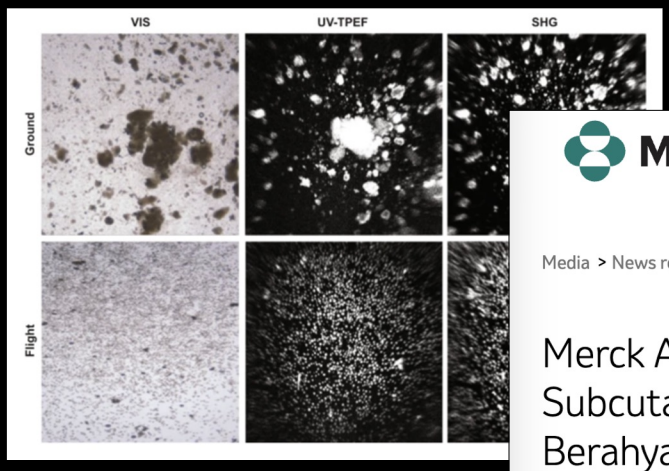


The first solid evidence from ISS of the value of in-space manufacturing for Earth

2019 Sagan Test 0: ISS National Lab: Historic First - Demonstration that Merck's leading

MERCK

18 Nov 2024

Media > News releases > News release

Merck Announces Phase 3 Trial of Subcutaneous Pembrolizumab With Berahyaluronidase Alfa Met Primary Endpoints

Merck's goal was to produce many crystals of uniform size in space in order to develop a safer and more effective product to treat cancer. **It worked extraordinarily well.**

8

United Semiconductors - Semimetal Semiconductor Composites

In Space Production of Bulk Crystal

OVERVIEW

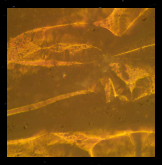
- Supplier of critical electro-optic and IR optical components
- Mission 1 produced 4 ingots from Dec 2024 thru Feb 2025

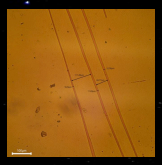
RESULTS

- Superior homogeneity/uniformity
- Container free growth
- Improved needle orientation and larger size

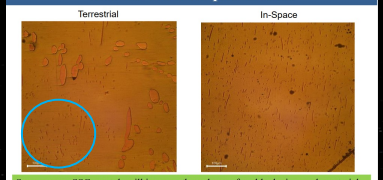
IMPACT

- Increased Yield (from 5% to >90%) and 2X Figure of Merit
- Each ingot provides up to 10,000 devices
- Many new applications within reach (HPC devices, ultra high-speed and low-power radiation hardened electronics)



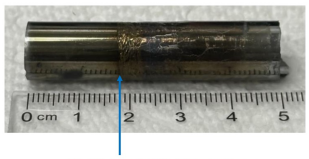


Microgravity Value Proposition #1
Device Yield Improvement



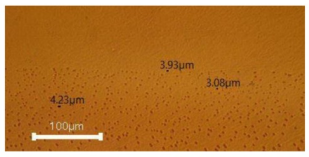
Space grown SSC crystals will increase the volume of usable device grade material from 5% (for current terrestrial grown crystals) to higher than 90%

Extracted SSC Ingot



Solid-Liquid (S-L) Interface
Flight ingots re-melted more than Terrestrial ingots

Crystal Nucleation (In-Space)



Crystal Nucleation (Terrestrial)

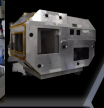
9

9

Flawless Photonics – Flawless Space Fibers

In Space Production of ZBLAN Optical Fiber

4.5m Draw Tower shrunk to <30in to fit ISS MSG



11.8km
Cumulative Fiber Produced
9 Feb - 14 Mar 2024

1,141m
Longest Single Draw
27 Feb 2024

14 of 16 fiber draws produced >100 meters

9 of 16 draws produced >700 meters

3 draws > 1km

OVERVIEW

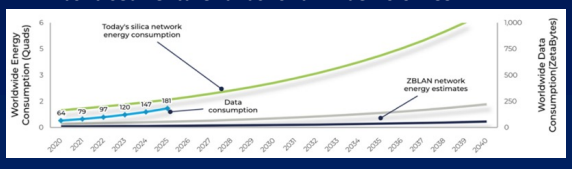
- First to produce commercial lengths of ZBLAN fiber in space.
- "Excalibur" funded by the Luxembourg Space Agency and the Univ. of Adelaide, with sponsorship from ISS National Lab.

RESULTS

- Produced 11.8km of ZBLAN fiber during 25 days of MSG operations.
- Met or exceeded known record for commercial length on Earth (700m) on 9 occasions.
- Attenuation improvement over ground control ~10x for best fiber and 5x on average.

IMPACT

- Demonstrated precise control of high-throughput in-space production processes not possible on Earth.
- FP has raised venture funds for a 2nd demo on ISS.



10

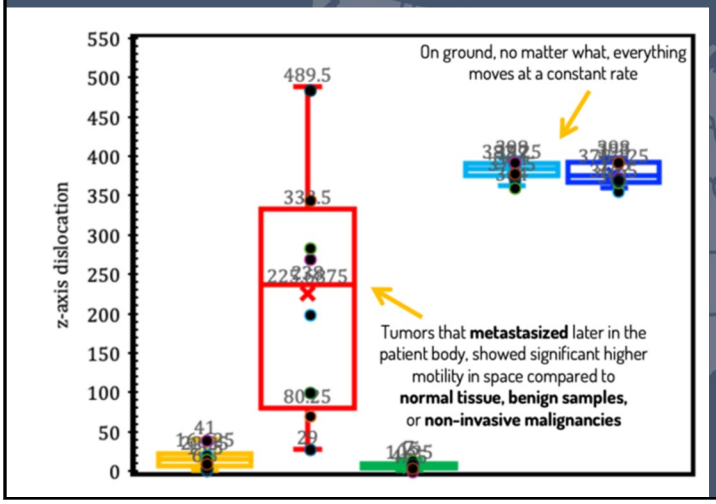
10

ISS National Lab and NASA InSPA

μG Confirmed

Needs many more μG statistics and other medical confirmation tests

August
Sagan Test 9: Encapsulate/Space Tango. Historic First – In Space Detection of Metastasis
reveals important features of cancer cells that cannot be seen on Earth because gravity masks them. Once proven by statistics and clinical trials, this can be used to accelerate and improve diagnoses.



2024

11

PARTICIPANTS IN TODAY'S CONVERSATION WITH FLIGHT OPPORTUNITIES

In Space Production Applications (InSPA)

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NASA's Johnson Space Center

Lynn Harper
NASA's Ames Research Center

In-Space Manufacturing (ISM) Project

Christopher Roberts, Ph.D.
NASA's Marshall Space Flight Center

Austin Fox
NASA's Marshall Space Flight Center

Cadre Francis
NASA's Marshall Space Flight Center

Steven Peeples
NASA's Marshall Space Flight Center

Advanced Toolplate, Electrohydrodynamic Inkjet Printing (EHD), Space Enabled Advanced Semiconductors (SEADS) Teams

MSFC ISM

Paul Deffenbaugh, Ph.D.
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Andy Kurk
Redwire

Hantang Qin, Ph.D.
University of Wisconsin

Shan Jiang, Ph.D.,
Iowa State University

Ying-Chen (Daphne) Chen, Ph.D.
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Nirmala Kandadai, Ph.D.
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Texas A&M University

In-space manufacturing researchers

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Auburn University

David Niedzwiecki, Ph.D.
Goeppert

Jessica Frick, Ph.D.
Astral Materials

Ken Savin, Ph.D.
Redwire

Ram Prasad Gandhiraman
Space Foundry

Anna Brady-Estevez, Ph.D.
American DeepTech

Tim Hall, Ph.D.
Faraday Technology

Rose Hernandez, Ph.D.
International Space Station National Laboratory

Ajay "AJ" P. Malshe
Purdue University

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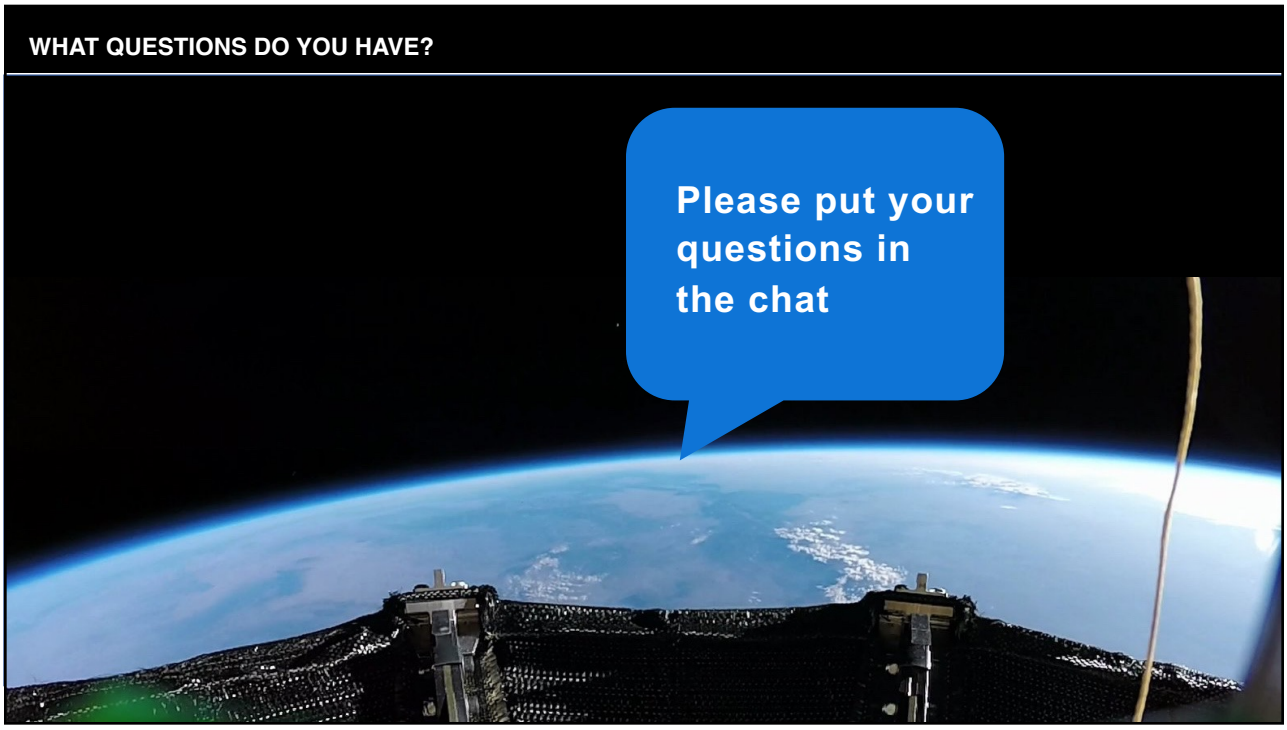
12

12


WHAT QUESTIONS DO YOU HAVE?
Please put your questions in the chat

13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14