



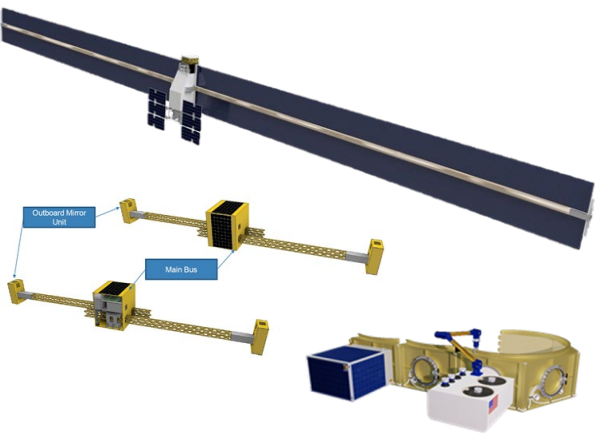
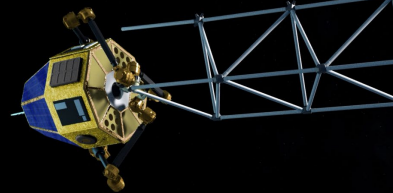
# MADE IN SPACE

B U I L D   A B O V E

ADVANCED MANUFACTURING PROJECTS ON THE ISS – JULY 2019

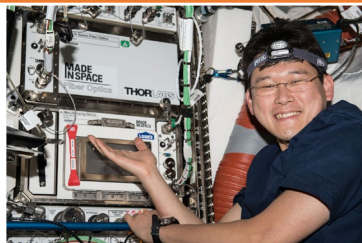
# MADE IN SPACE

## INDUSTRIALIZING SPACE FOR INNOVATION, EXPLORATION, & DEFENSE



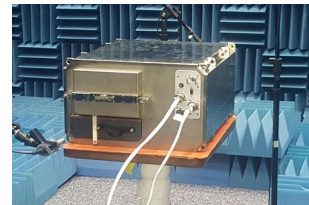
### IN-SPACE ROBOTIC MANUFACTURING

- Extended Structure Manufacturing
- Autonomous Robotic Assembly & Integration
- Functional Space Structures from ESPA-class to Space Stations



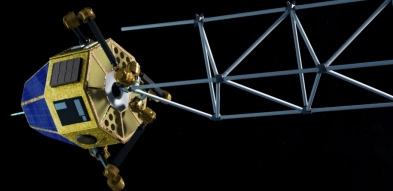
### SPACE-ENABLED MANUFACTURING

- Microgravity Commodity Products for Terrestrial Use
- Exotic Optical Fiber Production
- High-Grade Metals, Ceramics, and Industrial Crystals



### EXPLORATION MANUFACTURING

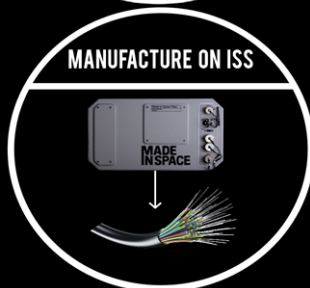
- Manufacturing at Point-of-Use for Space Exploration
- Precision Metal, Polymer, & Electronics Manufacturing
- On-Orbit Recycling



PREPARE



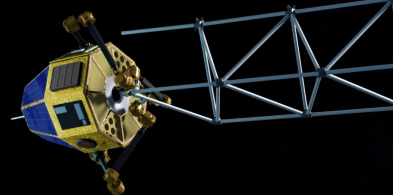
MANUFACTURE ON ISS



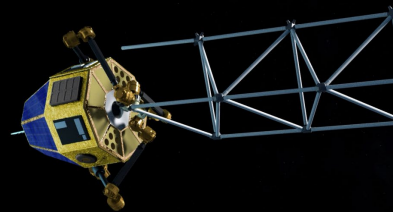
RETURN & USE



- PRIVATELY-FUNDED EXPLORATORY PAYLOAD
  - ZBLAN Manufacturing in Microgravity
  - Focused on stepwise experiments to perfect industrial processes & payload automation
  - Flown to ISS 4x in 16 months through ISS National Lab as an internal R&D (IRAD) project
- NEXT STEPS
  - Currently building scalable production facility
  - Based on lessons learned from IRAD efforts



- **INDUSTRIAL CRYSTALLIZATION FACILITY**
  - High-value single crystal materials in microgravity
- **SUPERALLOY CASTING MACHINE**
  - High-temperature alloy processing and casting in microgravity
- **CERAMIC MANUFACTURING MACHINE**
  - Uniform stereolithography of pre-ceramic resins



### VULCAN Phase II SBIR (NASA)

- Hybrid automated metal & polymer precision manufacturing in microgravity

### MELD Phase I SBIR (NASA)

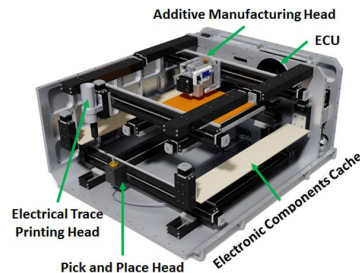
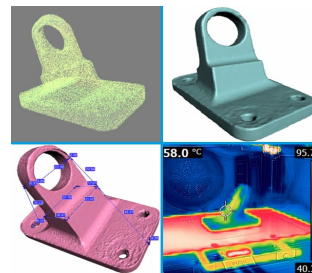
- Automated on-orbit welding tool development

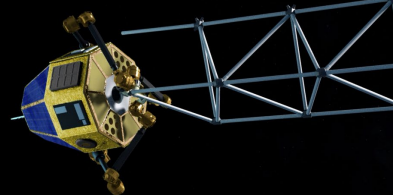
### AULE Phase II SBIR (DLA) & Horizon Phase I SBIR (US Air Force)

- Automated part certification and in-situ V&V tools

### EMMA Development (Space Florida)

- Completed ground prototype for printed circuit board production





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Kevin DiMarzio	<a href="mailto:Kevin@madeinspace.us">Kevin@madeinspace.us</a>	VP, Business Development	Technology & Services Sales
Juli Lawless	<a href="mailto:Juli.lawless@madeinspace.us">Juli.lawless@madeinspace.us</a>	BD Director, National Defense	Defense Applications and Services