COSMIC

THE POWER OF COLLABORATION

CONSORTIUM FOR SPACE MOBILITY
AND ISAM CAPABILITIES

COSMIC Capstone Challenge (C3) Design Track Student On-Boarding

Payton Case
C3 Champion for Track 5

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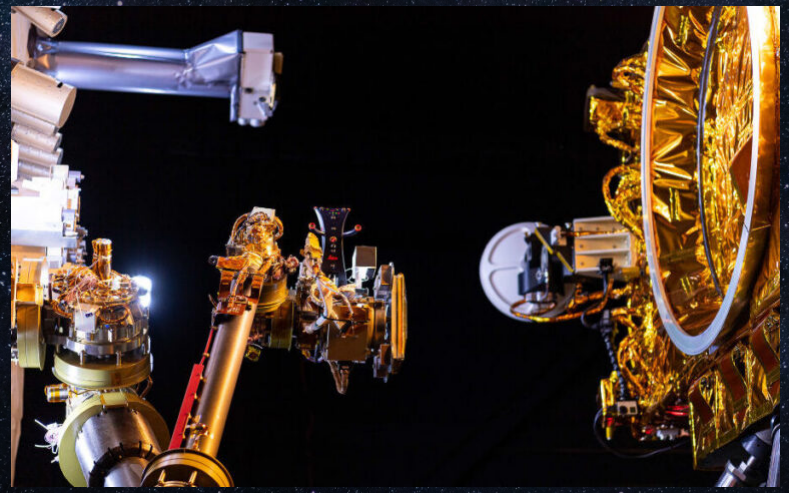
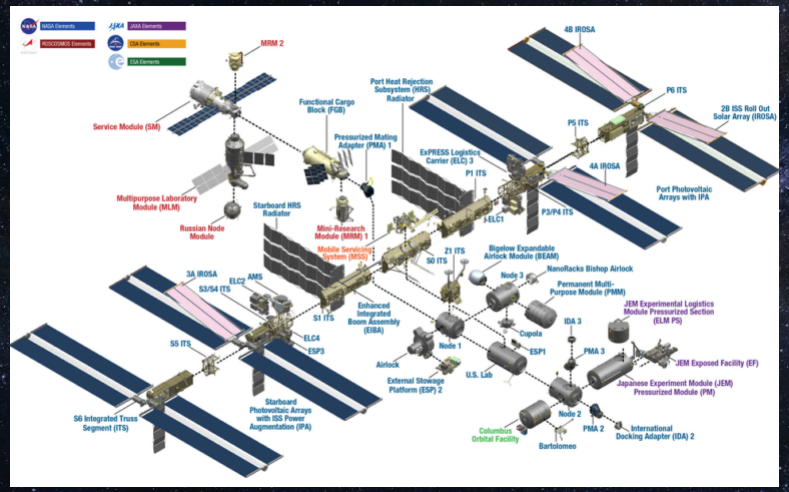
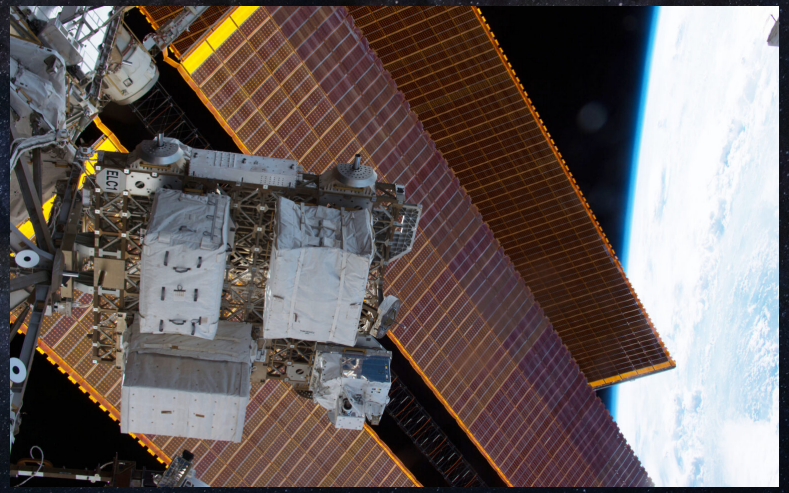
What is ISAM?

In-space Servicing, Assembly, and Manufacturing

- Design of modular, serviceable, upgradeable, and evolvable systems
- Assembly of simple to complex space systems
- Manufacturing in space using Earth- and locally-sourced materials







COSMIC: A Nationwide Alliance for ISAM

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- Vision:
  - Create a nationwide alliance that enables the U.S. space community to provide global leadership in ISAM.
- Mission:
  - Making ISAM a routine part of space architectures and mission lifecycles.

Design Tracks for C3

- There are 6 design tracks that teams can participate in:
  - Track 1 Challenge: **Orbital Manufacturing and Assembly** (C3-Manufacturing)
    - Design a payload to be hosted aboard Arkisys's Bosuns Locker that would demonstrate a chain of 3 or more operations providing a capability important for orbital manufacturing or assembly.
  - Track 2 Challenge: **Lunar Operations** (C3-Lunar)
    - Design a payload to be delivered by Astrobotic's Griffin lander that can prepare the lunar surface for a Fission Surface Power reactor with humans residing within 1km. Prototype required.
  - Track 3 Challenge: **Orbital Servicing** (C3-Servicing)
    - Using Northrop Grumman's Mission Robotic Vehicle (MRV) and Mission Extension Pod (MEP) as a fixed servicer capability, design and analyze candidate on-orbit attachable components (OACs) that the MRV could use to alter a client spacecraft already on-orbit in geostationary orbit (GEO) or cislunar space.
  - Track 4 Challenge: **In-Space Construction** (C3-Construction)
    - Design orbital or surface infrastructure element(s) and outline the mission describing its construction using autonomous robotic assembly technologies. Teams should leverage previous work in modular building blocks and "builder robots" as referenced; teams may choose NASA's Project ARMADAS or other types of building blocks and robotic systems to address their mission needs.
  - Track 5 Challenge: **In-Space for Earth** (C3-Return)
    - Design a manufacturing payload hosted by Dispatch's Free Flyer 1 reentry vehicle to produce materials in space with properties that are impossible to achieve on Earth.
  - Track 6 Challenge: **Architecture of Autonomous Space Clusters** (C3-Cluster)
    - Develop an architecture and key elements that would enable a cluster of vehicles that would autonomously perform important functions in orbit or on the lunar surface (U.S. persons only).

Track 5: In Space for Earth

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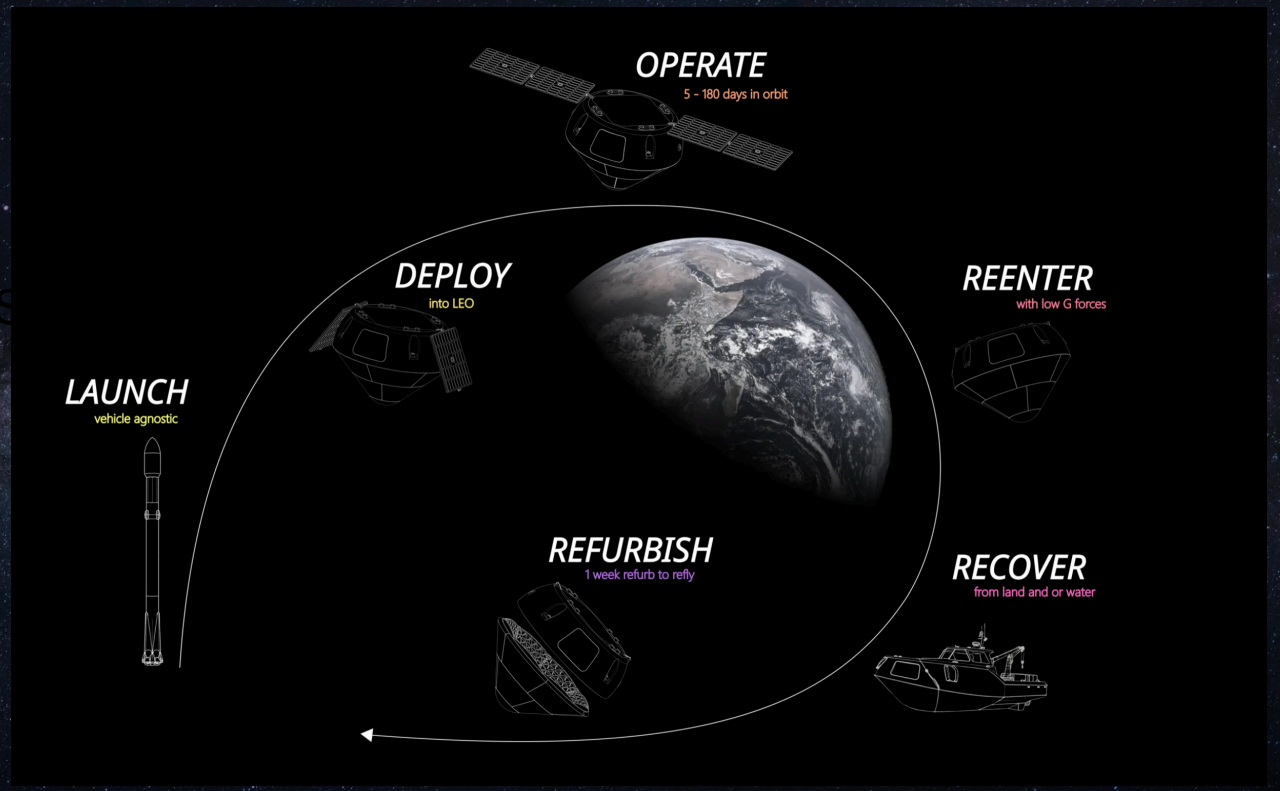
- Launch into 550 km circular SSO orbit
  - 97.6° inc
- Vehicle commissioning
- Operate in orbit for ~2 months
  - Conducting manufacturing mission
  - 100 W payload power available.
- Maneuver to 600 km x 300 km phasing orbit
- Deorbit burn to 600 km x 50 km final orbit
- Reentry vehicle capsule separation from host bus
- Host bus burns up on reentry
- Reentry vehicle deploys parachutes and lands on water
- Reentry vehicle recovered by boat



Next Step & Questions

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Questions?

LinkedIn Group: https://www.linkedin.com/groups/14485139/