From Space to Commercial Aviation: Applying Continuous Inventory Monitoring to Everyday Flights

How Much Money Do You Misplace?

- The average person spends 2.5 days a year looking for items they have misplaced.
- $2.7 Billion is spent every year replacing items that were lost.
- If the average person spends an hour a week looking for something, it costs $8+ in time.
- In space, losing things is much more complicated.

Current Life on the ISS

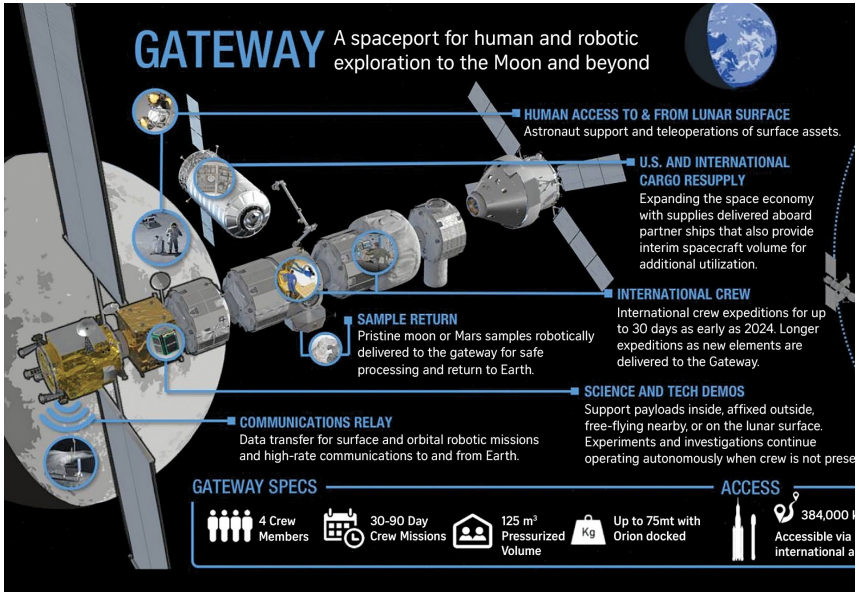
- Storage, inventory management, and lost items are problems aboard the ISS.
- Misplaced items must be hunted down, replaced, or given up on.
- If an astronaut spend one hour looking for an item, it costs ~$ 15,624.
- How much stuff is there in space?

Supply Chain Problems on the ISS

> "The inventory onboard is: vast, **densely-packed**, **packed by other people**, **often behind metal**, **mobile**, **diverse**, and often **small**, **unique**, and **irreplaceable**. And it **costs $30 USD per gram** to launch." – Dr. Patrick Fink, Chief Technologist for Wireless and Communications Systems.

Moving Forward in Space

A Stopping Point for the Future



Lunar Gateway

- Over $10 Billion in funding.
- Small form habitat as lunar satellite.
- Testing capabilities and storage off the surface of the moon.
- Future technology oriented.

RFID in Commercial Aviation: Inventory on Flights

Flyable Parts

- Aircraft Readiness Logs
- Cabin Safety Equipment Compliance

Baggage

- Delta - All bag tags since 2017
- LAS, HKG, EWR – Chose RFID over barcode when selecting a new system
- Expanded pilots and trials ongoing

Catering

- Optimization
  - What do and don't people want to eat or drink?
- Low Touch / No Touch Cabin Experience

Cargo

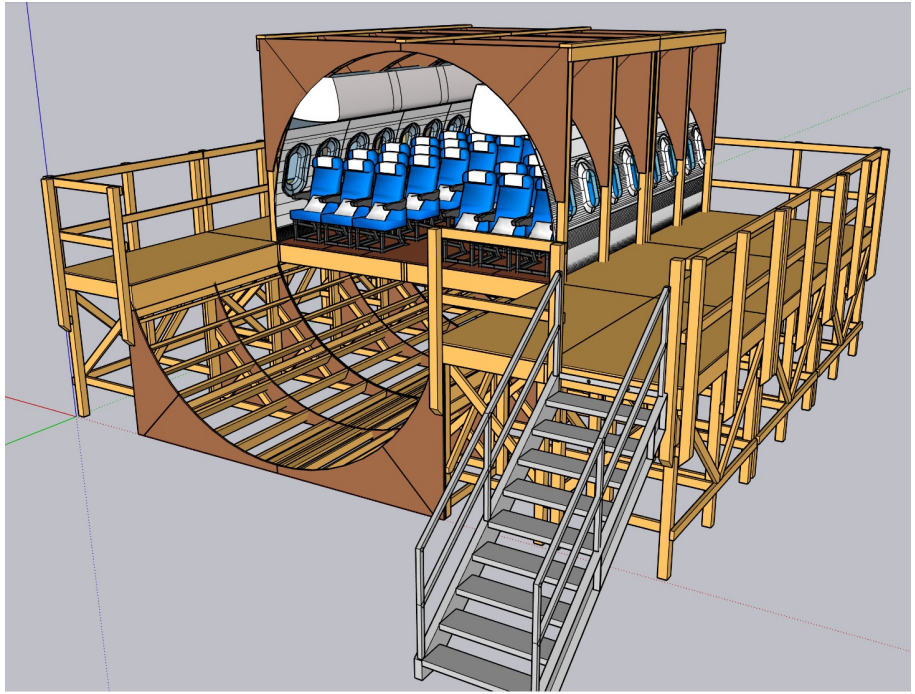
- What's on the plane?

How Can Space and Commercial Aviation Help One Another?

- The primary configuration of aircraft and orbital modules are the same
- The types of inventory are similar
- How do we transfer RFID tech concepts between the industries?

Testbed Video

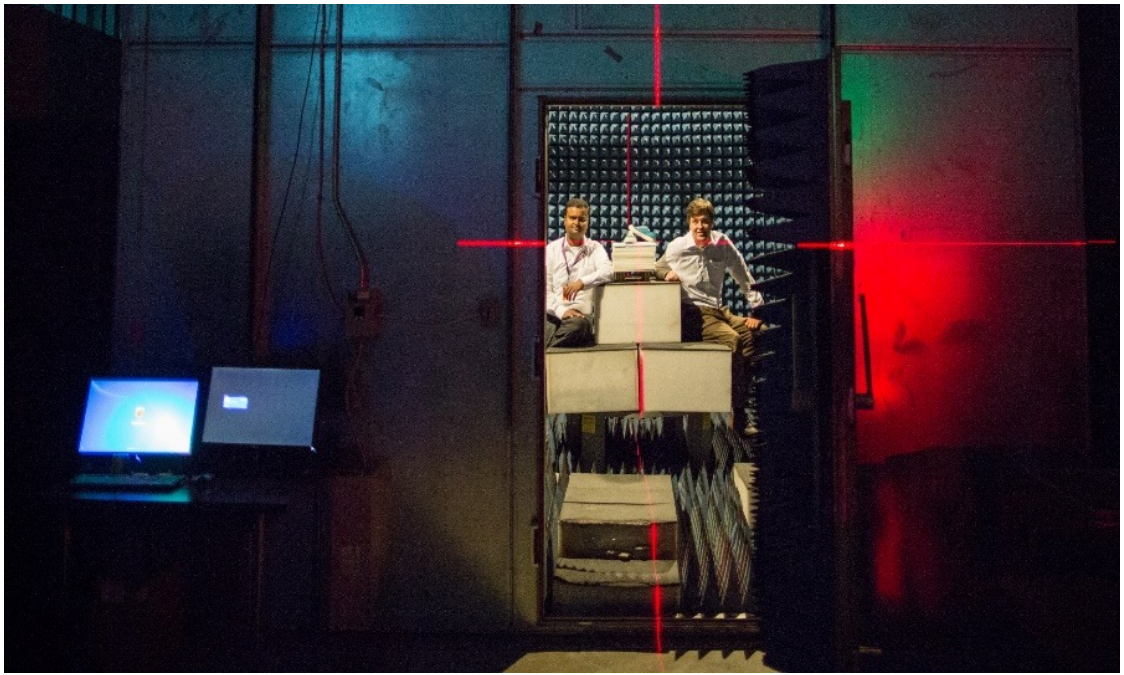
Project Construction



- 1:1 fuselage testbed
  - Commercial aviation research
  - Orbital module research
- ~4.2M Diameter:
  - B737 / A320 equivalent
  - ISS Pressurized Module equivalent
- Removable Deck and Modular Length
- Optional skin material/construction
- 3 Configurations
  - Passenger Aircraft, Orbital Module, Cargo Aircraft

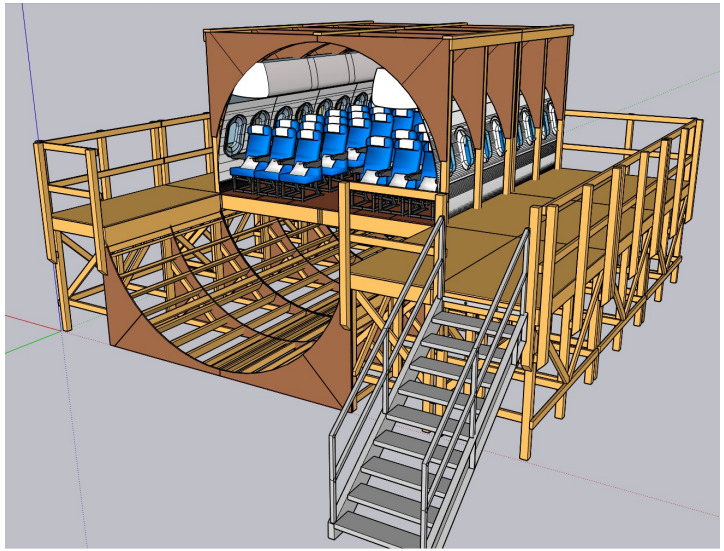
Precedent

- ARC Testing and Quality Assurance Programs
- Co-Development Research in Retail, Manufacturing, Pharmaceuticals, and Supply Chain



Project Goals

- Completion by March 2022
- RFID Testing
  - Fixed Readers
    - Continuous Monitoring
    - Loading/Unloading
  - Mobile Readers
  - Robots/Drones/Free Flyers
- RF Technology Transfer
- Other Projects By Request?



Questions?

THANK YOU