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