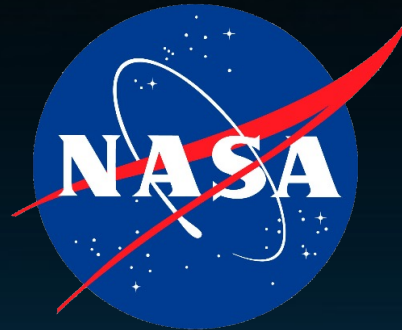


Becoming a NASA Engineer: A Journey

Meghan Chandarana, PhD



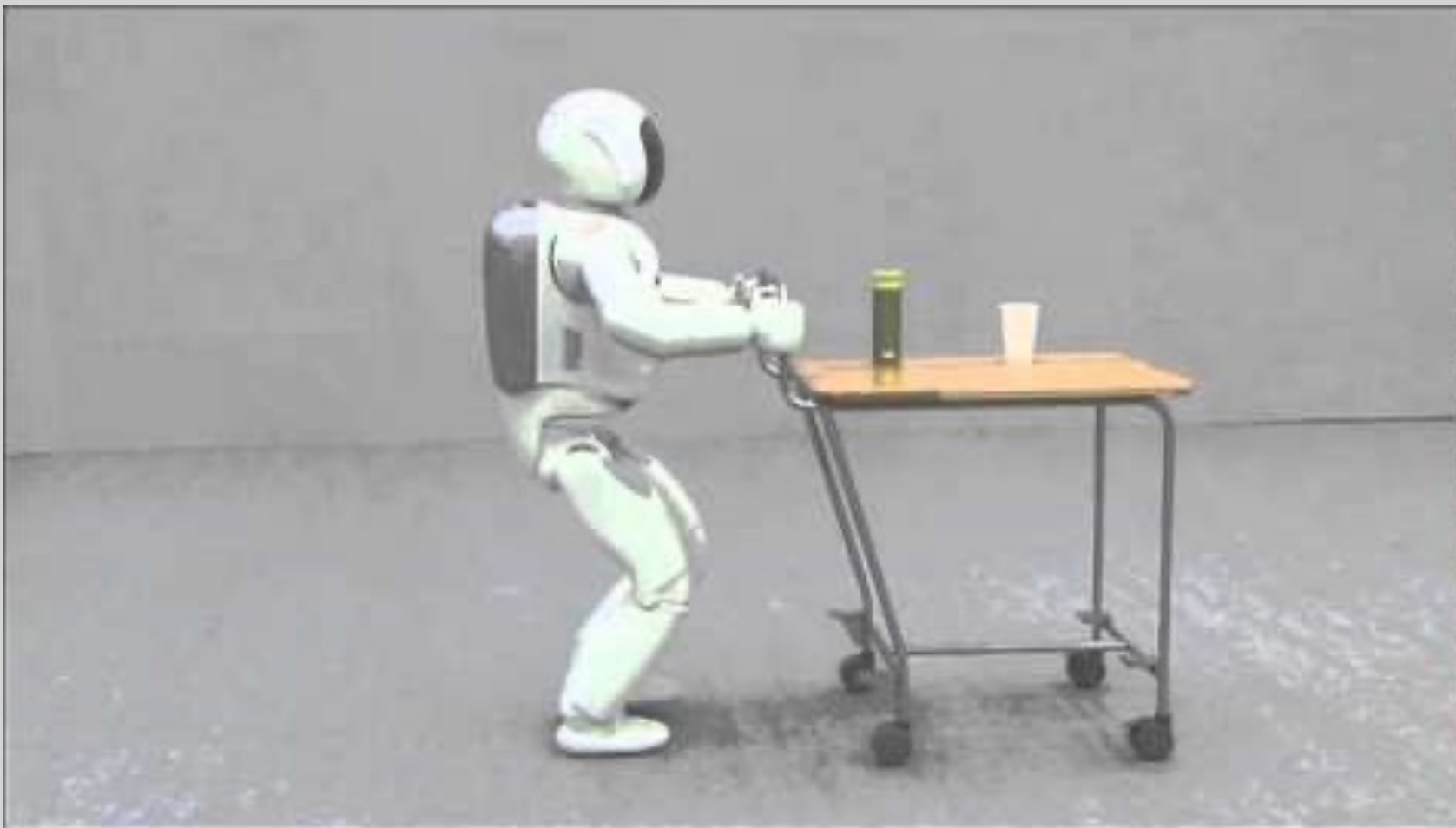
About Me

- **Name:** Meghan Chandarana
- **From:** Stockton, CA
- **Education:**
 - B.S. MechE from UC Berkeley
 - M.S./Ph.D. MechE from Carnegie Mellon University
- **Job:** Computer Engineer at Ames Research Center
 - Human-machine interaction
 - Robotics
- Worked at NASA since 2014 (4 summers, 3 years as civil servant)





Why Robotics?

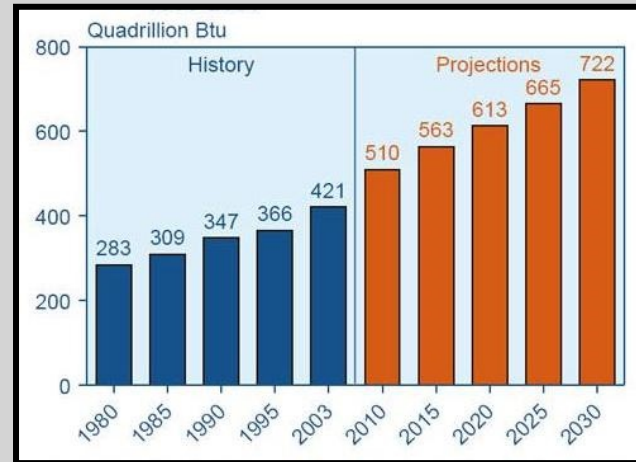




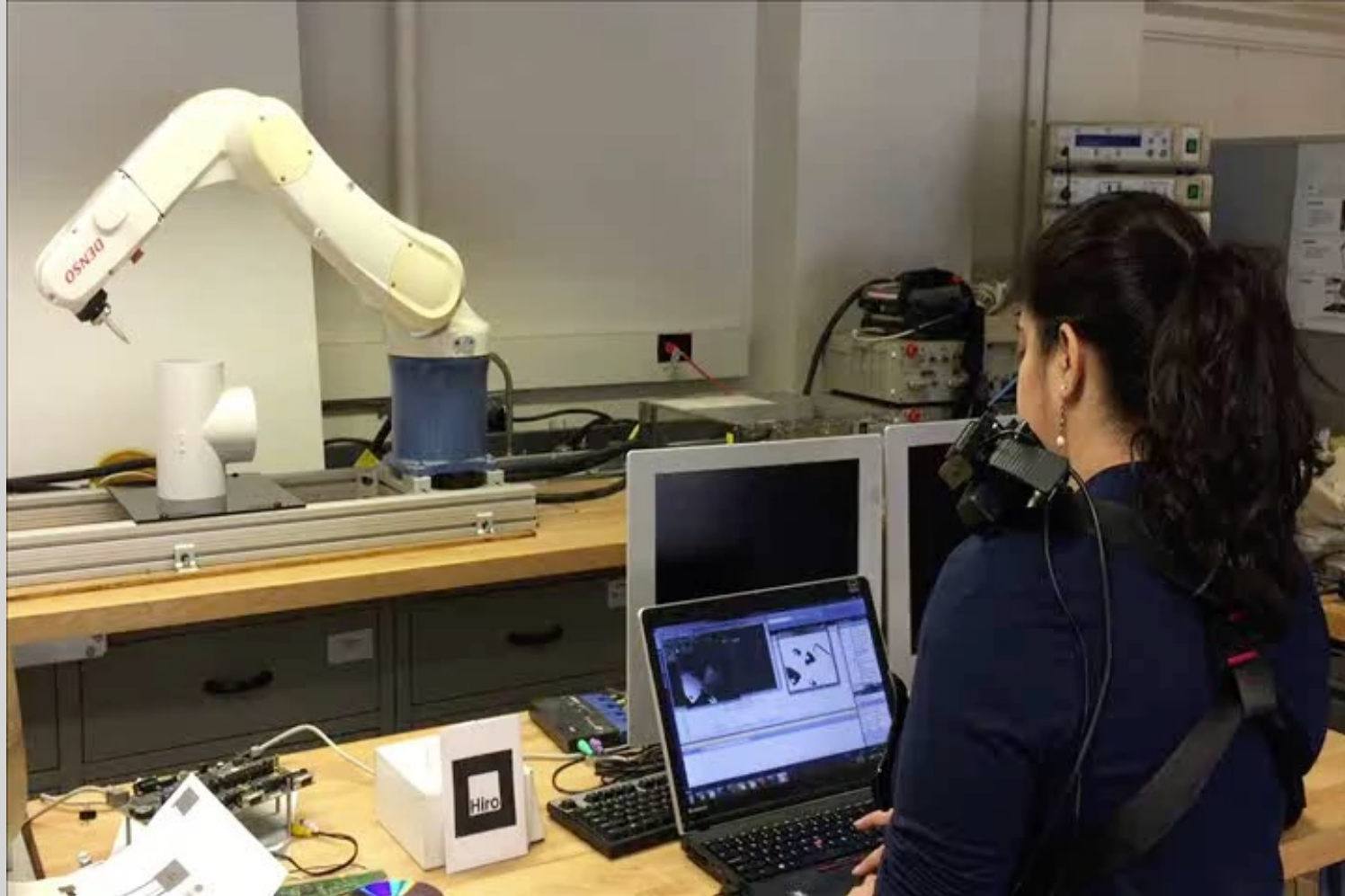
Tennis Dynamics - Mechanics



PV Cell - Controllers



Gesture Interface - Industrial Robot





NASA Internship - MSFC



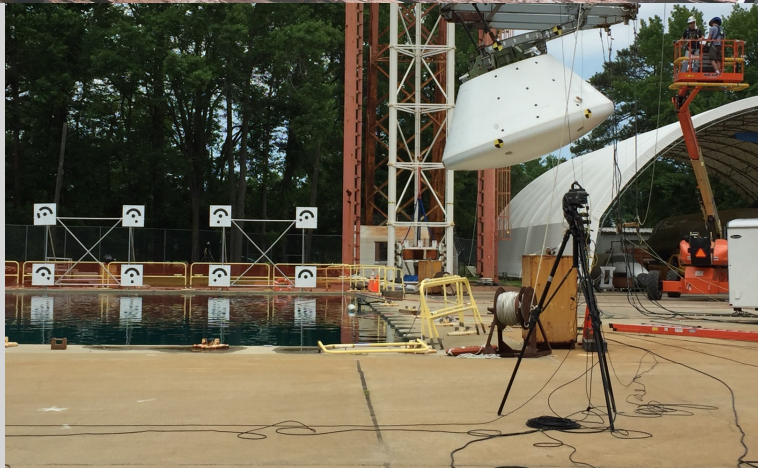


Cubesat Gesture Interface

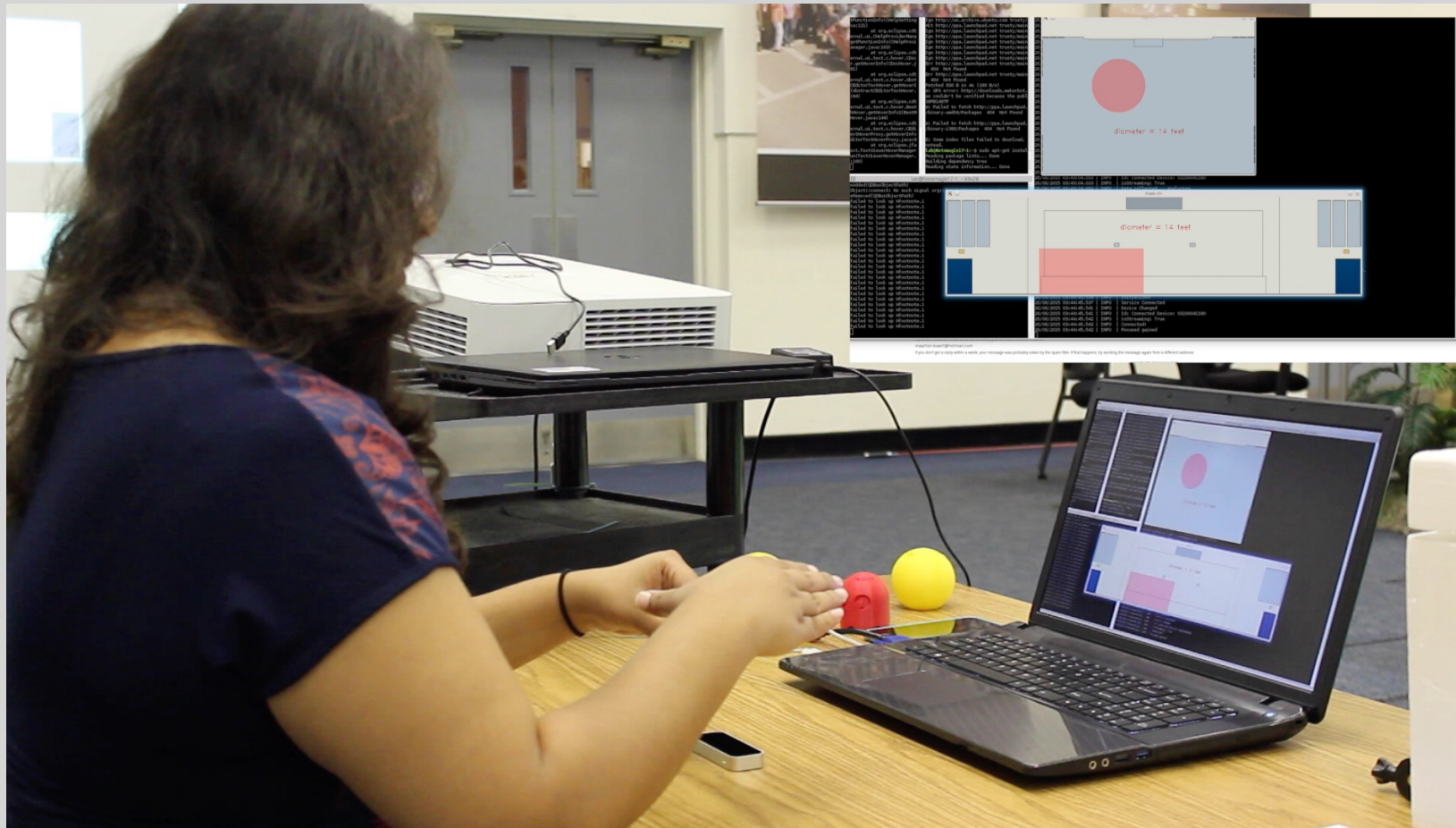




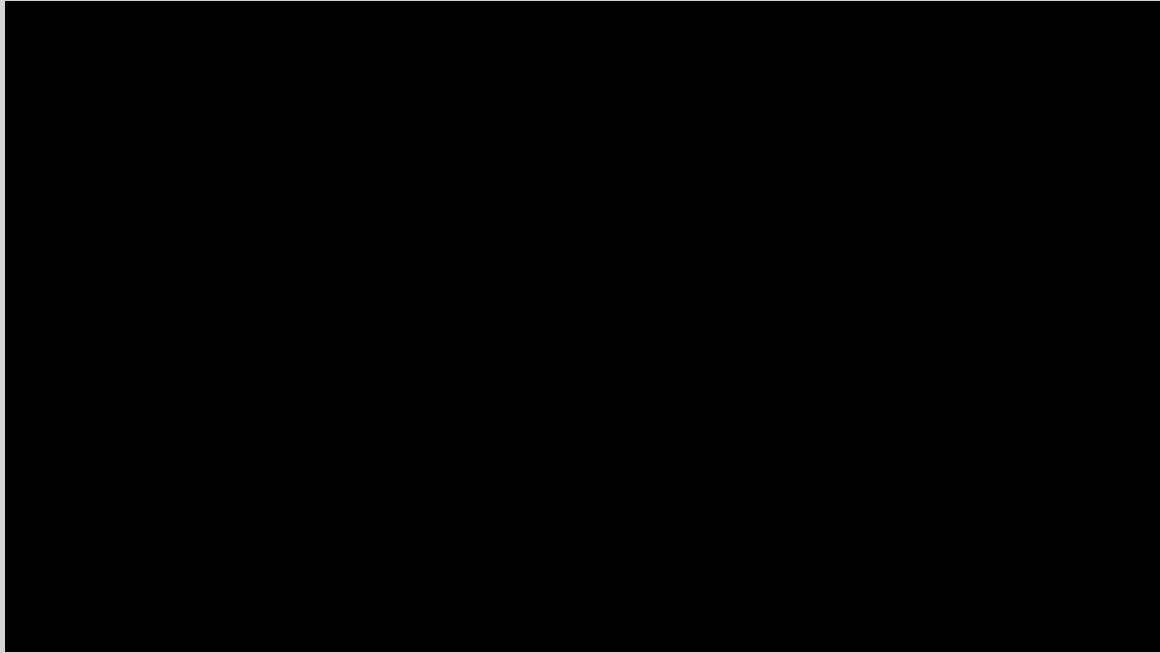
NASA Internship - LaRC



Gesture Interface - UAV



Swarm Robots

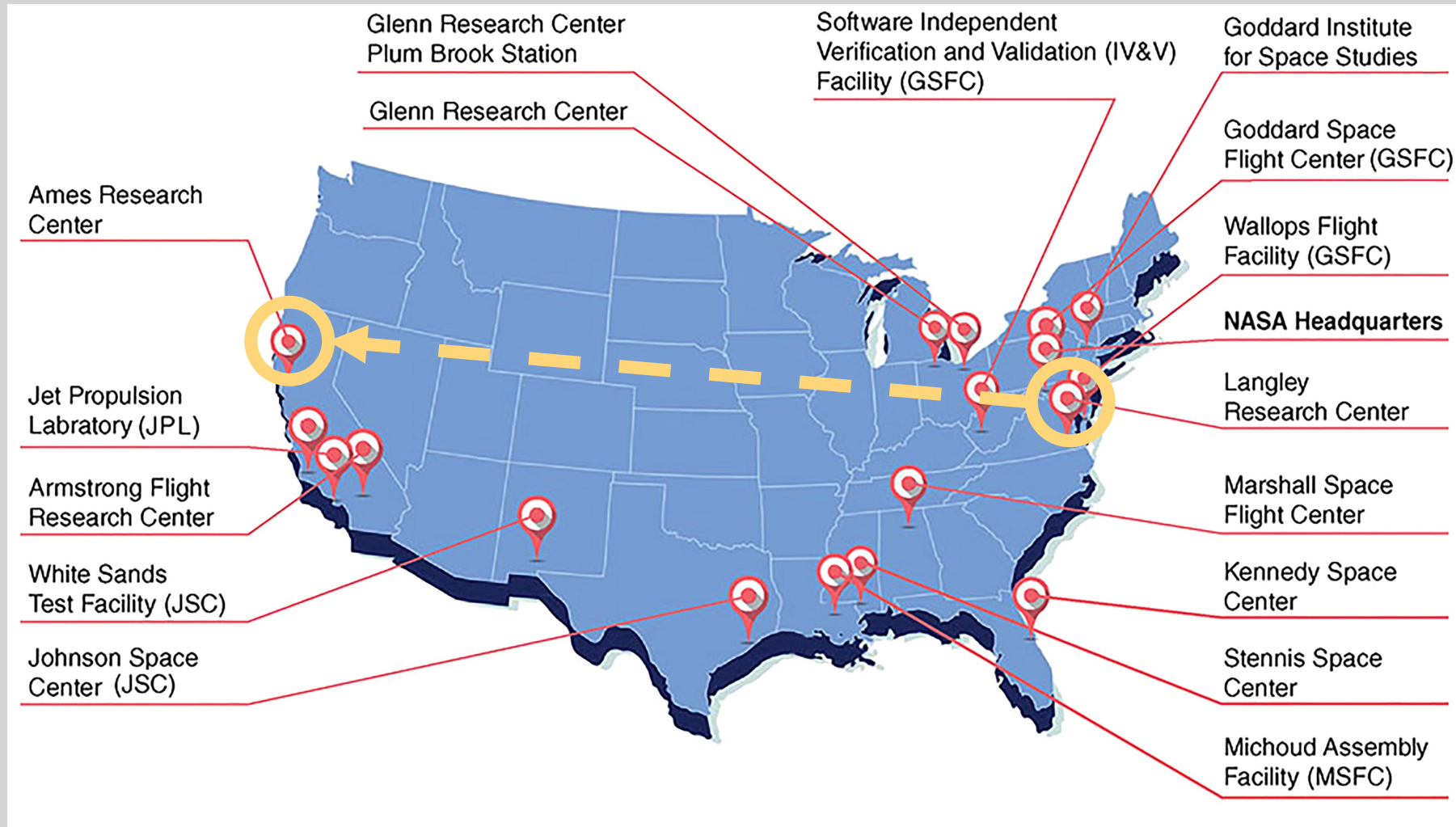


Ground Agents



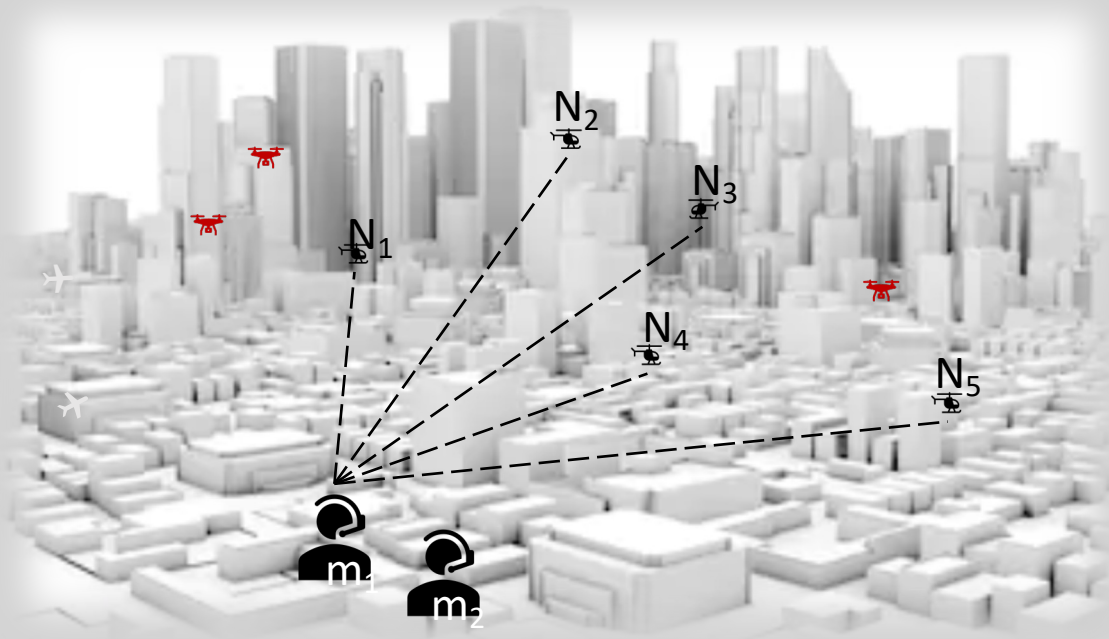
UAVs

Transferred to Ames

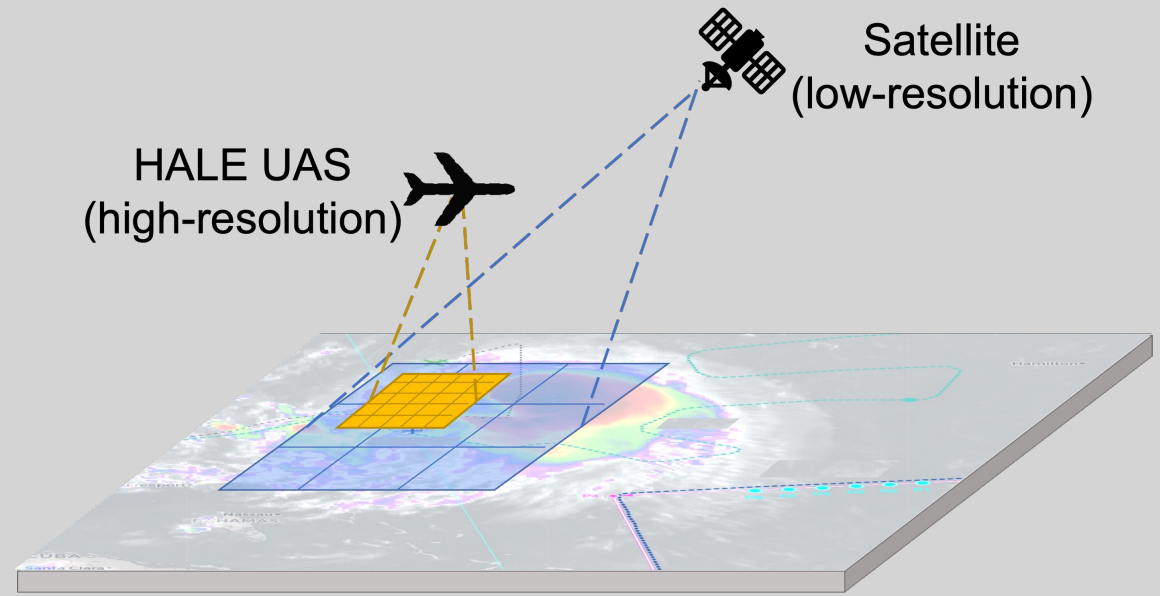


Current Projects

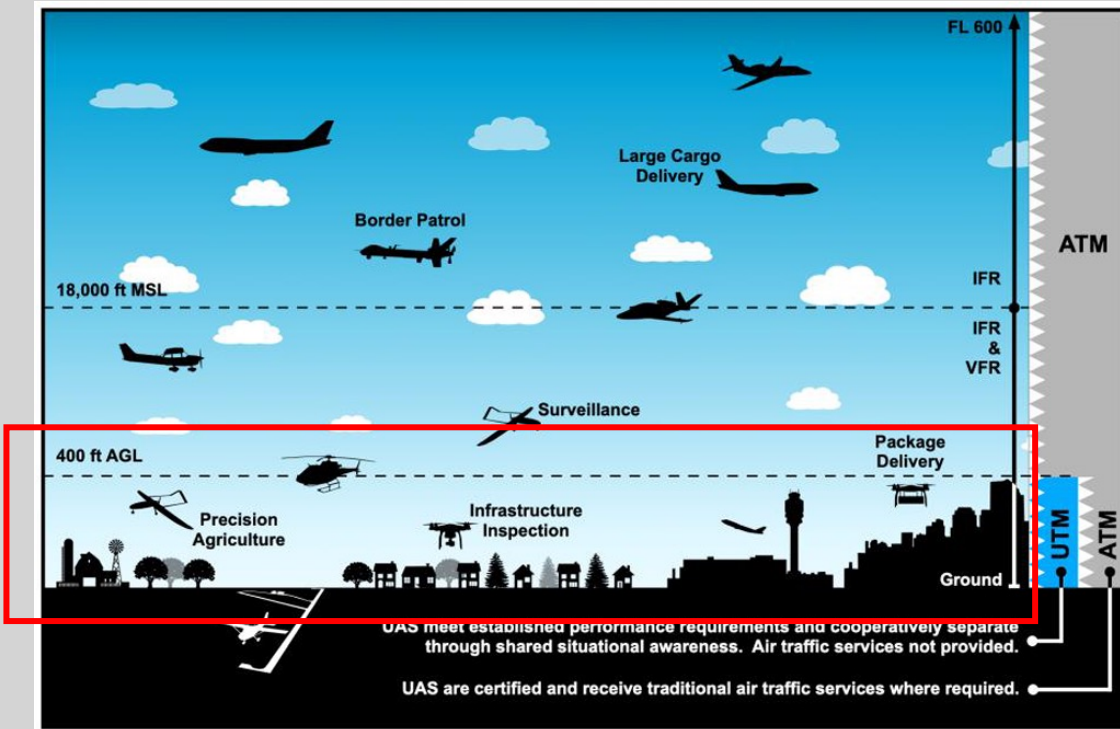
Transformational Tools and Technologies (TTT) - ARMD



Intelligent Long Endurance Observing Systems (ILEOS) - AIST



TTT Human-Autonomy Teaming



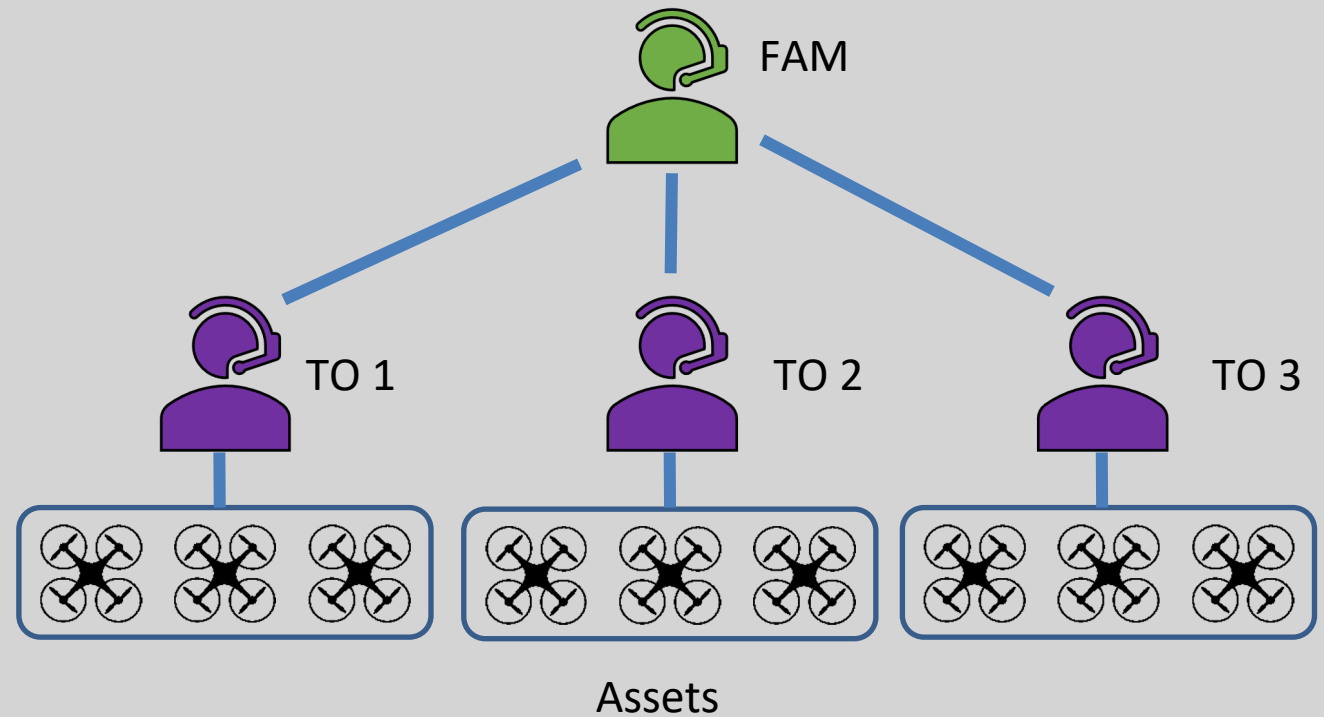
Future Envisioned Airspace

- Urban Air Mobility (UAM) aims to decrease congestion on roads
- Current work is exploring how Unmanned Aircraft Systems (UAS) Traffic Management (UTM) systems can be used for UAM operations

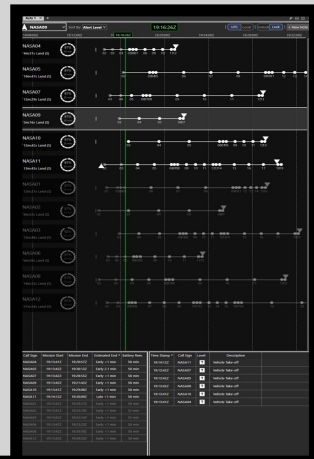
How can operators manage multiple Unmanned Aircraft Systems?

m:N Operations

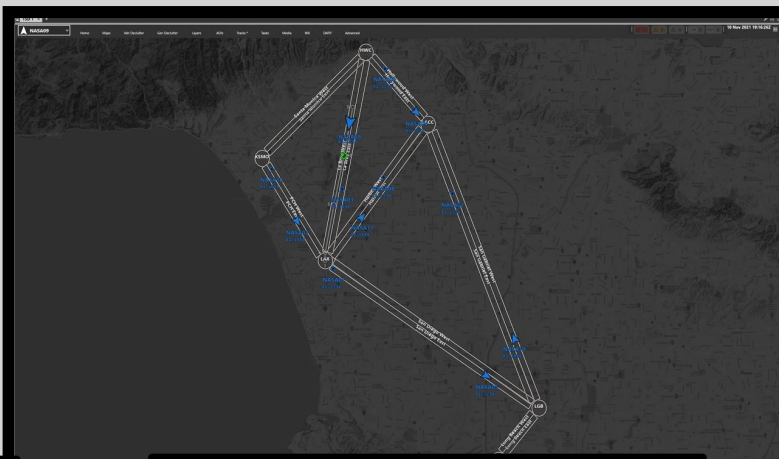
- m:N Paradigm
 - Multiple operators managing multiple vehicles, where:
 - m = # of operators
 - N = # of vehicles
- Primary roles in m:N operations:
 - Tactical Operator (TO)
 - Pilot-in-Command (PIC) of multiple assets
- Fleet Area Manager (FAM)
 - Responsible for overseeing a select number of PICs in a specific area



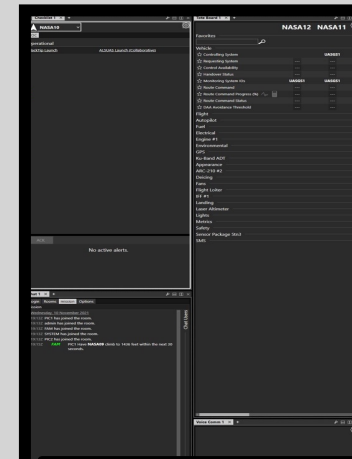
- Develop tools and capabilities to enable operators to manage multiple vehicles more effectively



Timeline & Mission



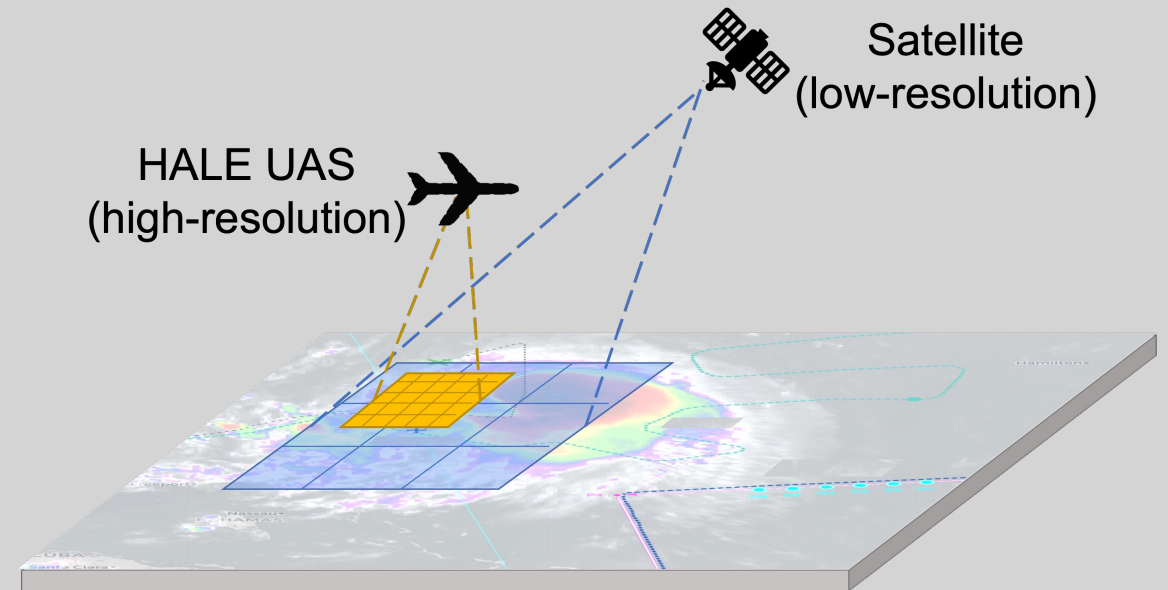
Tactical Situation Display

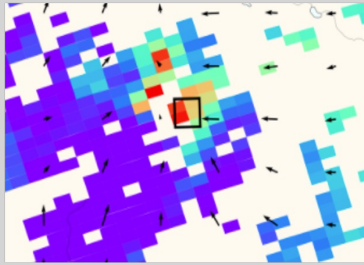


Chat

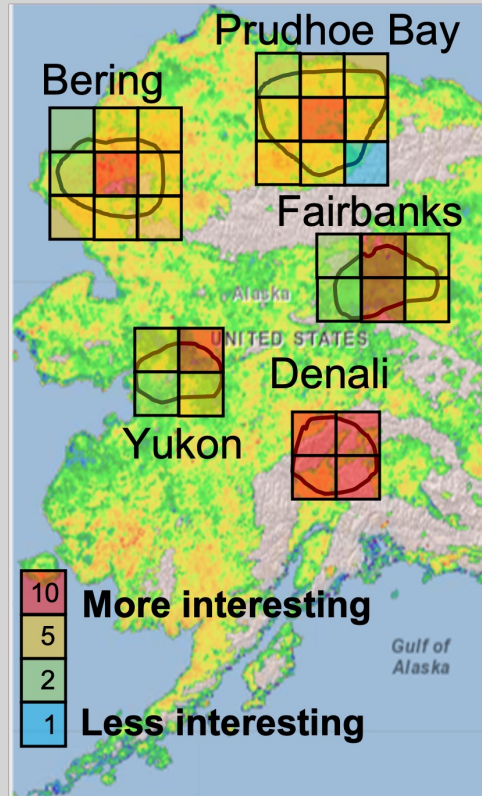
Intelligent Long Endurance Observing System (ILEOS)

- **Satellites** - coarse-grained data w/ limited collection times
- **Current in-situ** - higher spatial resolution data in small regions, but for shorter periods
- **High altitude long endurance (HALE) UAS** – loiter for months over targets to provide continuous data at higher resolution

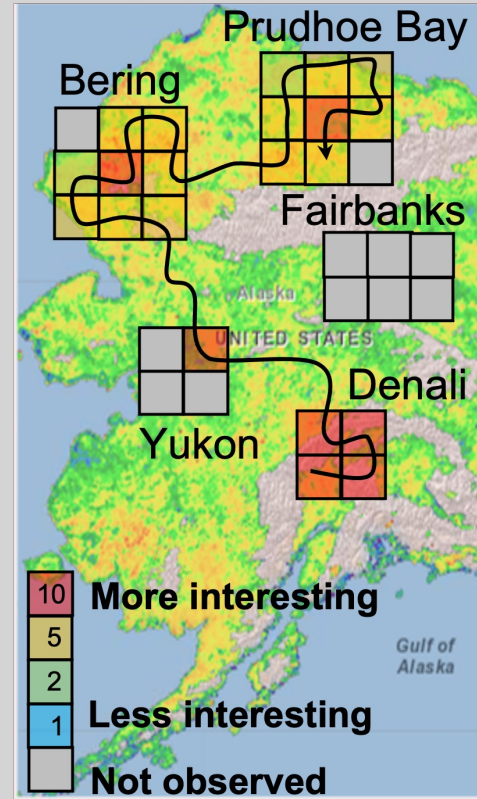




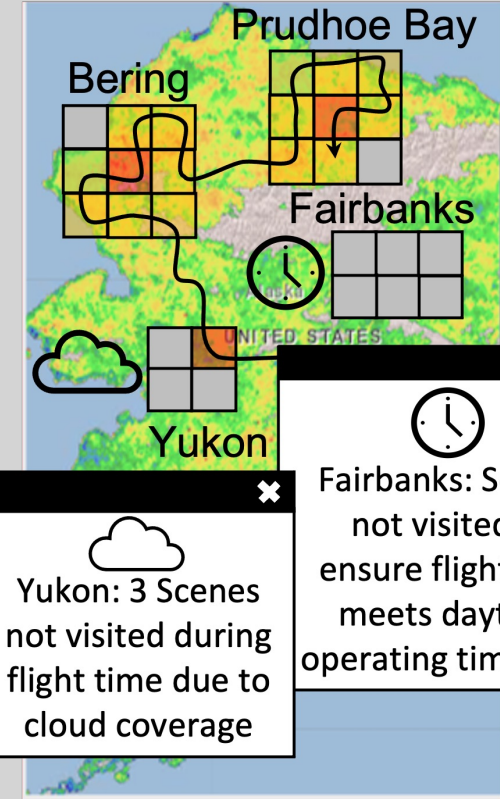
Data Sources



Targeter



Planner



Reporter

Yukon: 3 Scenes not visited during flight time due to cloud coverage

Fairbanks: Scenes not visited to ensure flight plan meets daytime operating time limit

