Flying to the Future – Unmanned Aircraft Systems Integration in Alaska
What is a UAS?
The Alaska Center for UAS Integration (ACUASI)

- ACUASI is the University of Alaska’s UAS Research Program

- Our missions include:
  - Assisting the FAA in the safe integration of UAS into the National Airspace System
  - Supporting UAS users
  - Conducting scientific research
Key Partner - State of Alaska Department of Transportation & Public Facilities (ADOT&PF)

• ADOT&PF is working with the Federal Aviation Administration (FAA) to enhance UAS access to Alaskan airspace

• ADOT&PF operates airports across Alaska
  – Facilitating UAS integration at airports
  – Providing ingress and egress from Coastal Launch Sites to Permanent Areas in the Arctic

• ADOT&PF operates UAS for a wide variety of infrastructure monitoring use cases
ACUASI is the only organization in the country with all three programs.
FAA Center of Excellence for UAS Research (ASSURE)

- Involved in multiple projects focused on:
  - Ensuring safety of cargo operations
  - Minimizing risks from operations at airports
  - Safely flying Beyond Visual Line of Sight (BVLOS) of the Pilot in Command
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Essential for many scientific missions, but almost impossible under current FAA rules and regulations
Transport Canada Operations

- Development of Concepts of Operations (CONOPS) for operating at airports
- Road and land surveys
- Marine mammal surveys (Beluga Whales in Inuvik, North Atlantic Right Whales in Gaspé)
- Channel marker locations
- Automatic Identification System (AIS) ship identification
Inuvik Infrastructure Images

Tsiigehtchic NWT – 3 Aug 2019 (3,500 ft)

ITH – 1 Aug 2019 (3,000 ft)

Quarry – 3 Aug 2019 (1,500 ft)

Images captured using Nikon D850
45 Megapixel Camera with 50 mm Lens
BVLOS Marine Mammal Operations over the St. Lawrence Seaway

UAS tracked by normal flight tracking software
Gaspé Artificial Intelligence (AI) Whale Images

AI Detected NARW
22 Sept, 2019 (2000 ft)

AI Detected Submerged Whale
6 Sept, 2019 (2,000 ft)

AI Detected Submerged Whale
28 Aug, 2019 (4,000 ft)

Images captured using Nikon D850 45Mp Camera with 35 and 50 mm Lenses
Artificial Intelligence-Identified Whale in Previous Image
The right of way goes to the #RightWhale! Our #drone is taking off in #Gaspé, #QC to monitor the #NARW population with @FishOceansCAN 🐋
Testing Technology Required to Advance BVLOS Operations

• Detect and Avoid (DAA) systems – systems either onboard the aircraft or on the ground that identify aircraft near the UAS and either alert the UAS pilot to avoid or autonomously move to avoid the aircraft

• UAF has conducted two DAA flight test campaigns at the Poker Flat Research Range

• Intruders – manned helicopter and fixed-wing and small UAS (and bonus F15s)
First FAA-approved, no-human-eyes-on-the-aircraft, BVLOS waiver under the small unmanned aircraft rule (Part 107)

Waiver Specific Special Provisions. sUAS operations beyond the visual line of sight (BVLOS) of the remote PIC and VO(s) may be conducted under this waiver when the operation complies with the following provisions:

OPERATIONAL PROVISIONS

8. Operations under this Waiver must utilize at least one VO. The VO may use unaided human vision or the Detect systems described in the application to identify non-participating aircraft;

9. If not using the Detect systems described in the waiver application, the remote PIC must ensure sufficient VO(s) are used to observe the airspace to detect and track all air traffic or hazards;
First BVLOS in the Nation under the Small UAS Rule - July 31, 2019

Alyeska | FAA | Iris | ACUASI | Echodyne | FAA | FAA
FAA | ACUASI | FAA | ACUASI | FAA | FAA | FAA

Trans-Alaska Pipeline (TAPS)
Next Steps - Advancing BVLOS under BEYOND

• FAA granted UAF a waiver for operations along a 20-mile section over the TAPS for conducting BVLOS flight testing

• Multiple companies intend to fly the corridor to demonstrate various aircraft, DAA, payloads and other technologies when COVID-19 restrictions are lessened
Cargo Delivery - Think of the scientific applications...

• Goal:
  – To deliver cargo to remote communities via UAS
• Last ‘hundreds of miles’ problem
• UAS can fly when manned aircraft may not be able to (e.g., foggy conditions)
• Cargo carrying BVLOS for hire can only be done under a Part 135 certificate
• Unmanned Systems Alaska, a Fairbanks-based UAS company, has applied for a Part 135 Certificate.
ACUASI Future

ACUASI will continue to lead the way to the safe integration of UAS into the National Airspace System

• ACUASI will be flying large UAS from Alaskan airports to demonstrate UAS capabilities and test concepts of operations

• ACUASI and its partners will be developing the technologies needed to collect scientific data

• ACUASI will be transferring its knowledge to partners in the UAS community
The University of Alaska and its partners will lead the way to routine UAS operations!