

Flying to the Future: Building the Drone Industry in Alaska

March 14, 2023



Photo courtesy of Brian Doben (www.atworkproject.com)

ACUASI

- ACUASI is the University of Alaska's drone Center of Excellence
- Our missions include:
 - Assisting the FAA in the safe integration of drones into the National Airspace System
 - Supporting Alaskan drone users and industry
 - Conducting scientific research



Goal - Complete Integration of Drones Systems with Traditional Aircraft in the National Airspace System



SeaHunter in Inuvik, Canada

Who Are We?

We are a combination of:

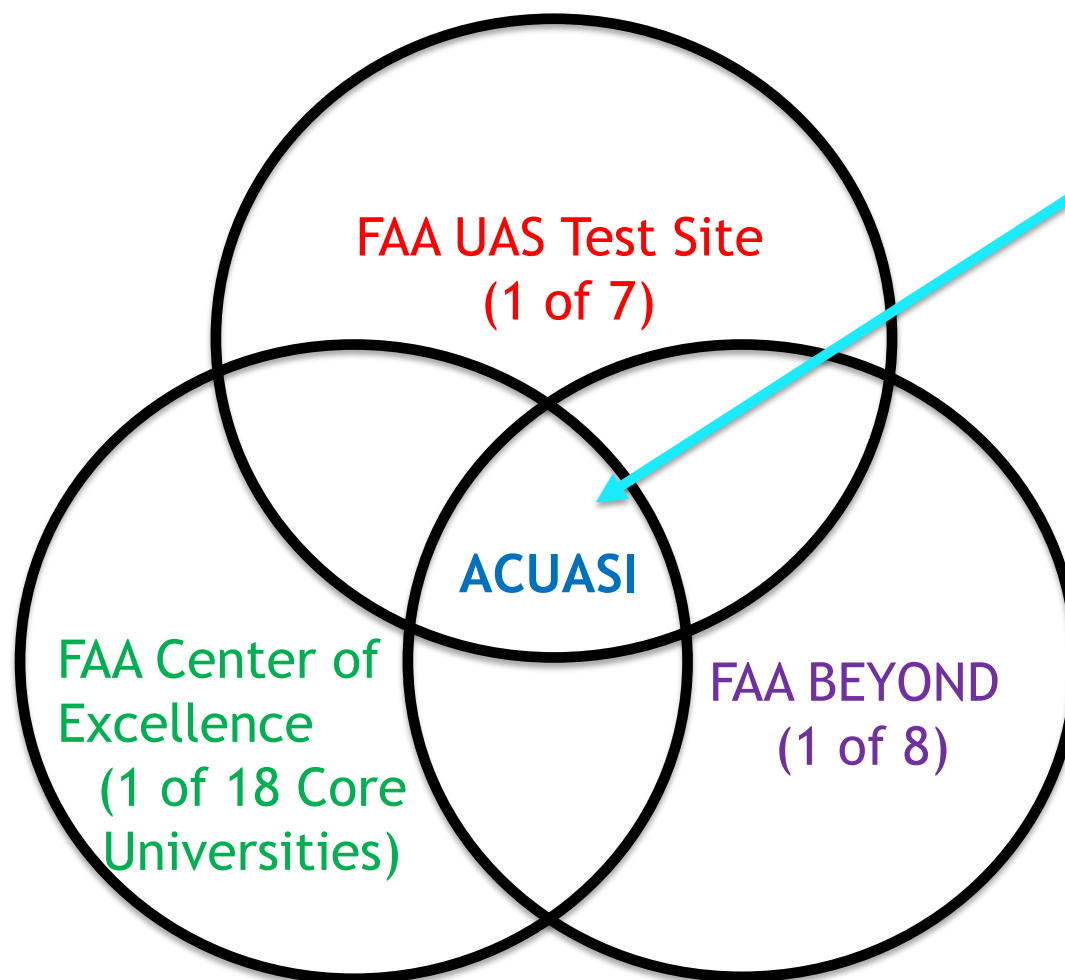
- Veterans and former defense contractors
- Science and engineering faculty, staff, and students
- Pilots (all pilots are manned aircraft pilots)
- Airframe and Powerplant mechanic (IA)
- Retired FAA Air Traffic Control Flight Service Specialist
- Business developer
- Embedded contractors



ACUASI's Military Experience

- Approximately 124 years of combined military service on the ACUASI team
- Over 24,750 combined hours flying and operating military aircraft, approximately 7,100 of those hours are in combat
- The ACUASI team includes crewmembers qualified on over 28 different manned and unmanned military aircraft
- ACUASI is a place that military skills are a direct transfer to civilian employment

FAA Recognition of ACUASI's Expertise

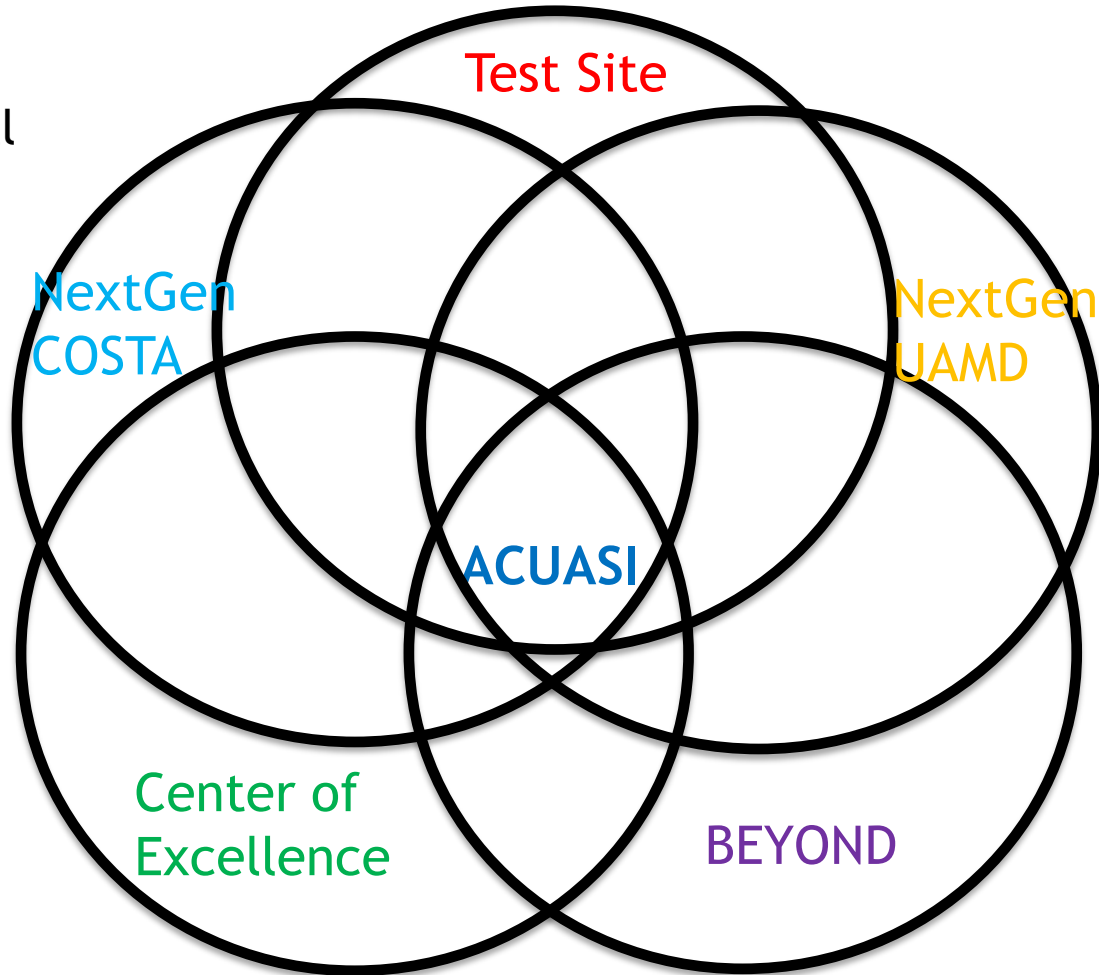


ACUASI is the only organization in the country with all three programs

FAA Recognition of ACUASI's Expertise

ACUASI
participated in
the Beyond Visual
Line Of Sight
(BVLOS) Aviation
Rulemaking
Committee

Cahill is on the
Advanced
Aviation Advisory
Committee



BVLOS Aviation Rulemaking Committee

- We fought to protect Alaska's unique airspace environment for both drones and traditional aircraft
 - There are a lot of planes flying under 500' across Alaska
 - Natural GPS-degraded and no cell phone coverage areas so services are hard/impossible to get
 - Gained friends in AOPA, Alaskan Airman's Association, and other pilot organizations

Partners



- Alyeska Pipeline Service Company
- Anduril
- Cherokee Nation
- Doyon Limited
- DRONERESPONDERS
- Echodyne
- Fairbanks International Airport
- Fairbanks North Star Borough
- Furie
- Griffon Aerospace
- Insitu
- Iris Automation
- Merck
- Merlin Labs
- North Slope Borough
- Parallel Flight Technologies
- Phenix Solutions
- Pierce Aerospace
- Raytheon (Intelligence & Space)
- Reliable Robotics
- Skyfront
- State of Alaska Department of Transportation and Public Facilities
- Tanana Chiefs Conference
- Turnagain Arm Heavy Lift
- Unmanned Systems Alaska
- Vanilla
- Vigilant Aerospace Systems
- Xwing

ACUASI Strategic Planning

- Stakeholder Charrette
- August 16-17, 2022 at UAA
- 16 stakeholders plus members of ACUASI's Strategic Planning Advisory Board
- Document maps out ACUASI's future efforts to support the safe integration of drones into the airspace and the creation of a drone economy in Alaska



Expanded
Strategic Plan 2023

Alaska Center for UAS
Integration (ACUASI)

University of Alaska – Fairbanks

Version 1.0
Charette Edition

What Really Makes Us Different

- Real-world use cases
 - Diapers and milk to the villages
- Agnostic about what technology we use
 - We just want something that works
- Beyond Visual Line Of Sight (BVLOS) is a requirement for most of our use cases
- We don't fly a box

Advanced Air Mobility

- ACUASI is participating in several Advanced Air Mobility (Large UAS Cargo and Urban Air Mobility) efforts
- Flights and project safety oversight in:
 - Alaska - FAA Test Site and Center of Excellence funding - Merlin Labs (autonomous Cessna Grand Caravan), UAF's SeaHunter, + ...
 - California - FAA NextGen funding - 2 projects Xwing (remotely piloted Cessna Grand Caravan), Reliable Robotics (remotely piloted Cessna Grand Caravan), Aurora Flight Sciences (optionally-piloted Centaur), UAF's SeaHunter

Cargo Delivery

- Goal - To deliver cargo including medical supplies more frequently to remote communities via large drone
- Alaska's last 'hundreds of miles' problem
- Can fly when traditional aircraft cannot
- Partnership with local air carriers
- Requires a Part 135 certification
- Extended careers for pilots



Unmanned Cessna 208 Grand Caravan
<https://evertsair.com/about/our-fleet/cessna-208-grand-caravan>

Fairbanks International Airport

- ACUASI now has a hangar at Fairbanks International Airport (FAI) and will be conducting flights from FAI GA runways



Large Drone (DRS Sentry) at Fairbanks International Airport

- May 22, 2022, 08:21-08:53



Fairbanks to Nenana



Emerging Technology Test Ranges

- ACUASI has started setting up three Emerging Technology Test Ranges:
 - Nenana Municipal Airport (ENN)
 - Palmer Municipal Airport (PAQ)
 - Valdez Airport (VDZ)
- Purpose – To assist companies with testing prototype systems and payloads under Alaskan conditions
- Each range will include an on-site range manager, hangar space, and test and evaluation equipment



Nenana Municipal Airport

- University of Alaska just signed a 50-year lease with Nenana Municipal Airport (ENN)
- The design for a hangar with office space at ENN is being approved before going out to bid
- ACUASI partnership with Raytheon Intelligence & Space Division is resulting in the addition of a research radar for meteorology information and BVLOS testing being set up at ENN

Important News

- On February 6th ACUASI received a waiver from the FAA that greatly expanded our ability to help drone manufacturers get their aircraft approved for use in the National Airspace System
- This is the first such waiver ever granted by the FAA



U.S. Department
of Transportation
**Federal Aviation
Administration**

Aviation Safety
Flight Standards Service

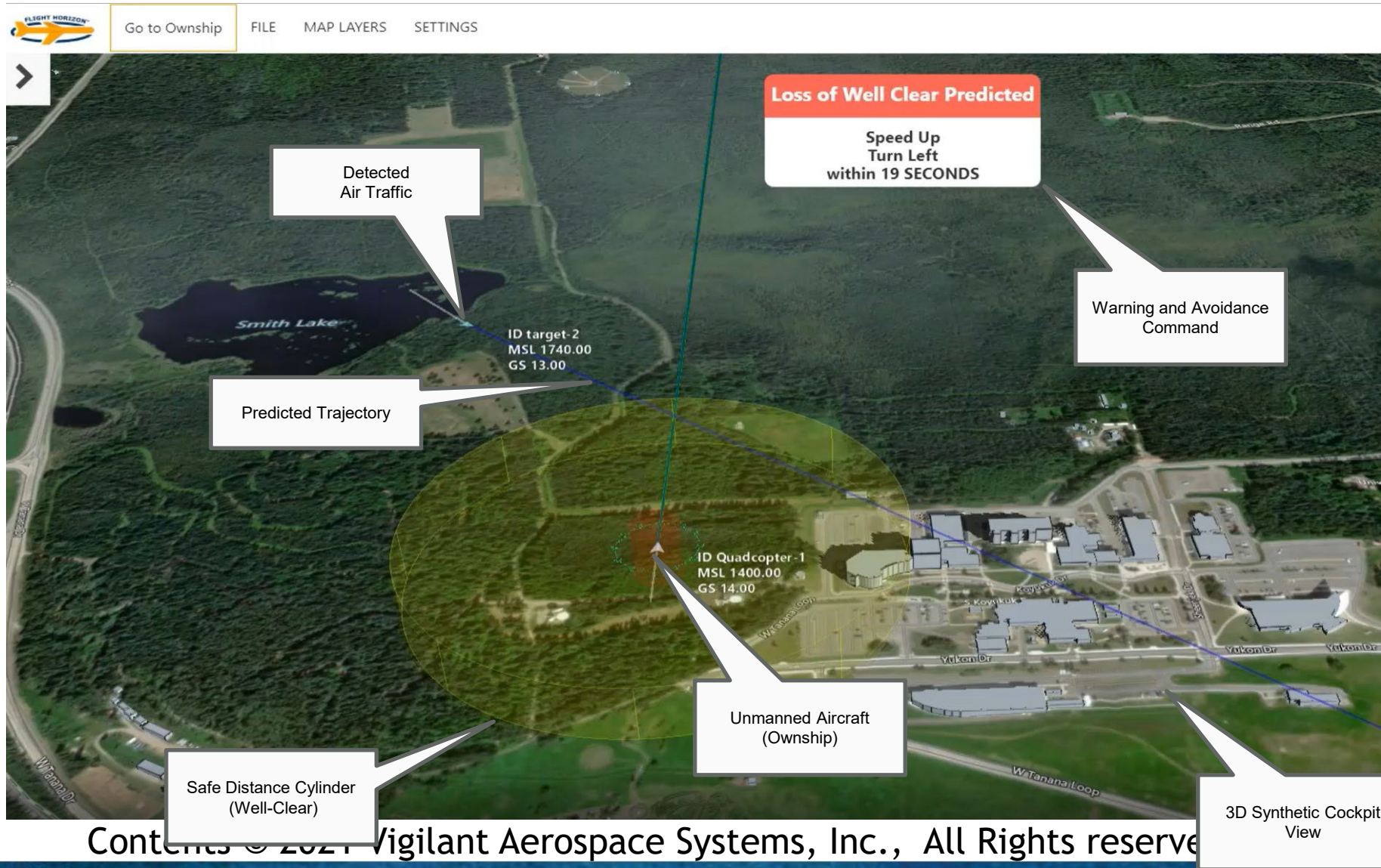
800 Independence Ave
Washington, DC 20591

Dr. Catherine F. Cahill, Executive Director
University of Alaska, Unmanned Aircraft Systems
Test Site (Alaska UASTS)
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Fairbanks, AK 99775
Email: cfcahill@alaska.edu

Dear Dr. Cahill:

This letter is to inform you that the Federal Aviation Administration (FAA) has granted your request for a Waiver (Waiver No. 44803-1) issued under the authority of 49 United States Code (U.S.C.) § 44803(c) for civil operations at an- Unmanned Aircraft System (UAS) test range. This letter transmits the FAA's decision, explains the FAA's basis, and provides the conditions and limitations of the Waiver, including the date it ends.

DAA System: User Interface



Pipeline Monitoring

- FAA granted ACUASI a Part 107 waiver for operations along a 20-mile stretch of TAPS for conducting BVLOS pipeline monitoring testing
- We will be using this area to test DAA and larger Vertical Takeoff and Landing (VTOL) aircraft for surveillance



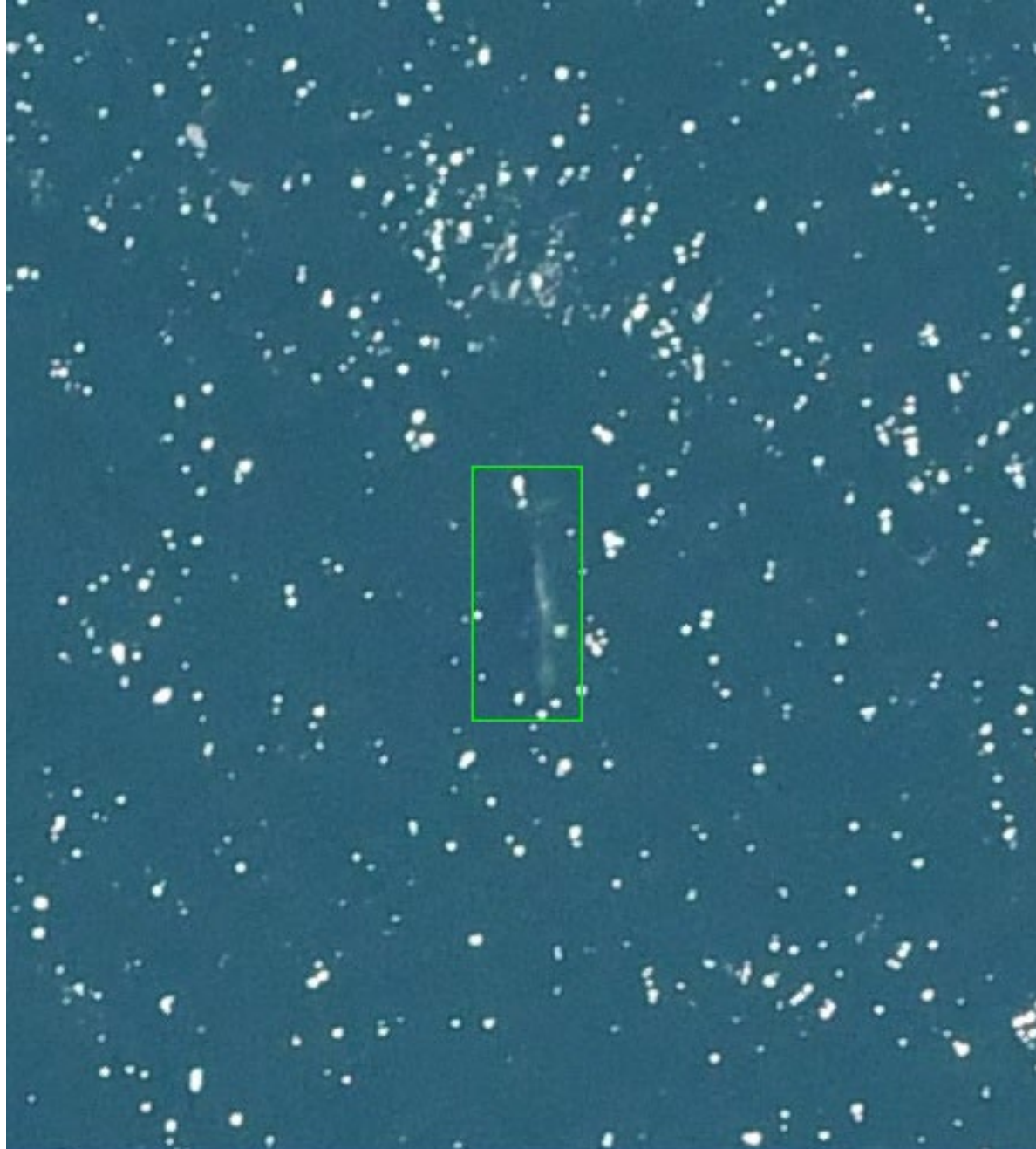
Experience Flying Large Drones

BVLOS - Transport Canada Operations

- >30,000 nautical miles of BVLOS flights
- North Atlantic right whales, Gaspé, Canada
- Infrastructure monitoring







lat[48.77876] lon[-64.01167] quad[NW] zone[-]

Disaster Response

- ACUASI is part of an FAA project that aims to develop a concept of operations for how different federal, state, and local governments, civil operators, and others can deploy drones cooperatively after disasters, such as earthquakes, volcanoes, ice jams, river flooding and oil spills
- ACUASI and the Alaska Department of Transportation and Public Facilities (DOT&PF) are using drones to identify areas with high avalanche potential



Counter-drone (FAA, DOJ, DOD, ...)

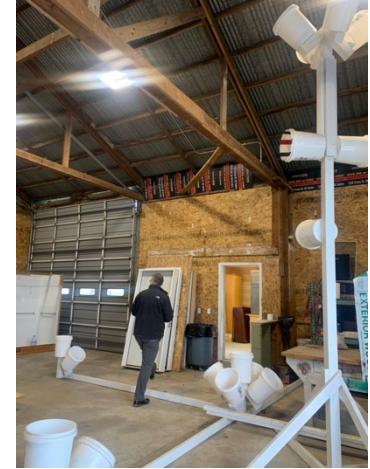
The ACUASI team has entered the realm of counter-drone (C-UAS):

- FAA - ASSURE - Effect of detection and mitigation systems on first responder communications, navigational aids, and other systems critical to the safety of the NAS
- DOJ - The use of passive radiofrequency drone detection systems to support local law enforcement agencies
- Army - The development of a mobile prototype system for detection of drones near a column of troops under motion



Education

- UAA, UAF, and UAS are all developing drone courses
 - UAA: Remote Pilot w/operations over people
 - UAF: Certificate in UAS operations and additional degrees in aerospace engineering
 - UAS: Drones in environmental studies
- ACUASI conducts STEM outreach events



What's Next?



In the six months we will:

- Assist partners in flying the first converted Cessna Grand Caravans in Alaska (with safety pilots on board)
- Fly our first drone mission between Fairbanks and Nenana
- Fly numerous drone missions between Fairbanks and Nenana for DAA testing

What's Next?



- Conduct several counter-drone flight campaigns in Alaska and other locations
- Develop metrics for evaluating the success of ACUASI's efforts to spur economic development in the drone industry
- Continue our work with the State of Alaska DOT&PF
- Conduct STEM outreach across Alaska

Update on FY 23 Funding



We received \$10 M in the State of Alaska FY 23 budget.
We have used/will use it to:

- Hire faculty and instructors to support drone/aerospace curricula delivery across UA
- Engage UAA's Institute of Social and Economic Research to evaluate the economics of drones in Alaska
- Identify locations for and begin establishing the three emerging technology test ranges
 - Nenana Municipal Airport received the bulk of the infrastructure money this year

Update on FY 23 Funding

- Accelerate the DAA testing and pioneering flights needed to prove the safety of BVLOS operations in Alaska through the FAA's BEYOND program
- Purchase a large Vertical Takeoff and Landing drone for testing drone deliveries that do not require runways
- Conduct the **Global Autonomous Systems Conference** in Anchorage August 9-11th - Theme: *Trailblazing Autonomous Paths for a New World Economy*

FY 24 Funding Request



The Governor put \$10 M in the FY 24 budget for ACUASI. If the funding survives the budget process, we will use it to:

- Hire faculty, a certified flight instructor, and curriculum developers to create a workforce-focused drone certification program for delivery across Alaska
- Initiate drone-focused, dual enrollment programs for high school students
- Conduct the 2nd Annual Global Autonomous Systems Conference

FY 24 Funding Request



- Implement the three emerging technology test ranges
- Hire additional pilots and engineers to help emerging technology test range users test and refine their prototype systems
- Accelerate the DAA testing and pioneering flights needed to prove the safety of BVLOS operations in Alaska

ACUASI's Future Impact on Alaska's Drone Economy



- ACUASI will be flying large drones from Alaskan airports to test and evaluate drone capabilities and evaluate business cases
- ACUASI and its partners will be developing the technology and processes for monitoring essential infrastructure and other BVLOS missions
- ACUASI will be transferring commercial operations it pioneered to Alaskan companies
- ACUASI's partners are planning to set up branches in Alaska
- The University of Alaska will create workforce development opportunities across Alaska

The University of
Alaska and its partners
will lead the way to
routine, safe drone
operations in Alaska!

