



# UAS Operations in Alaska

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# What is the Alaska Center for UAS Integration (ACUASI)?

- ACUASI is the University of Alaska's Unmanned Aircraft System (UAS) research program
- ACUASI leads one of the 10 FAA UAS Integration Pilot Program efforts
- The University of Alaska Fairbanks (UAF) is a core member of the FAA's Center of Excellence for UAS Research (ASSURE)

# Alaska Center for UAS Integration (ACUASI)

- Lead for the Pan-Pacific UAS Test Range Complex
  - Alaska, Hawaii, Oregon, and Mississippi conduct maritime UAS activities
  - Kansas conducts UAS research on lakes







# ACUASI's UAS Fleet

(evolution in action)



# Oil and Gas Infrastructure



## Oliktok Point Production Facility

Through the power of UAS, it is possible to fly close enough and capture video showing whether a part has outlived its useful life.

The result - **\$1 to \$3 million in savings per stack** by not shutting down unless replacement is necessary.

## Eni Infrastructure

Part change out on gas flare stacks has traditionally been performed by ordering parts and shutting the stacks down without knowing whether they required replacement.



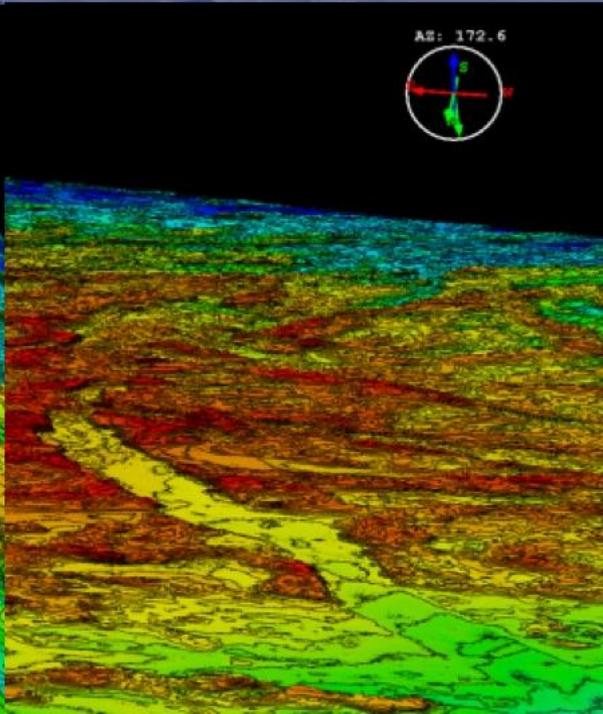
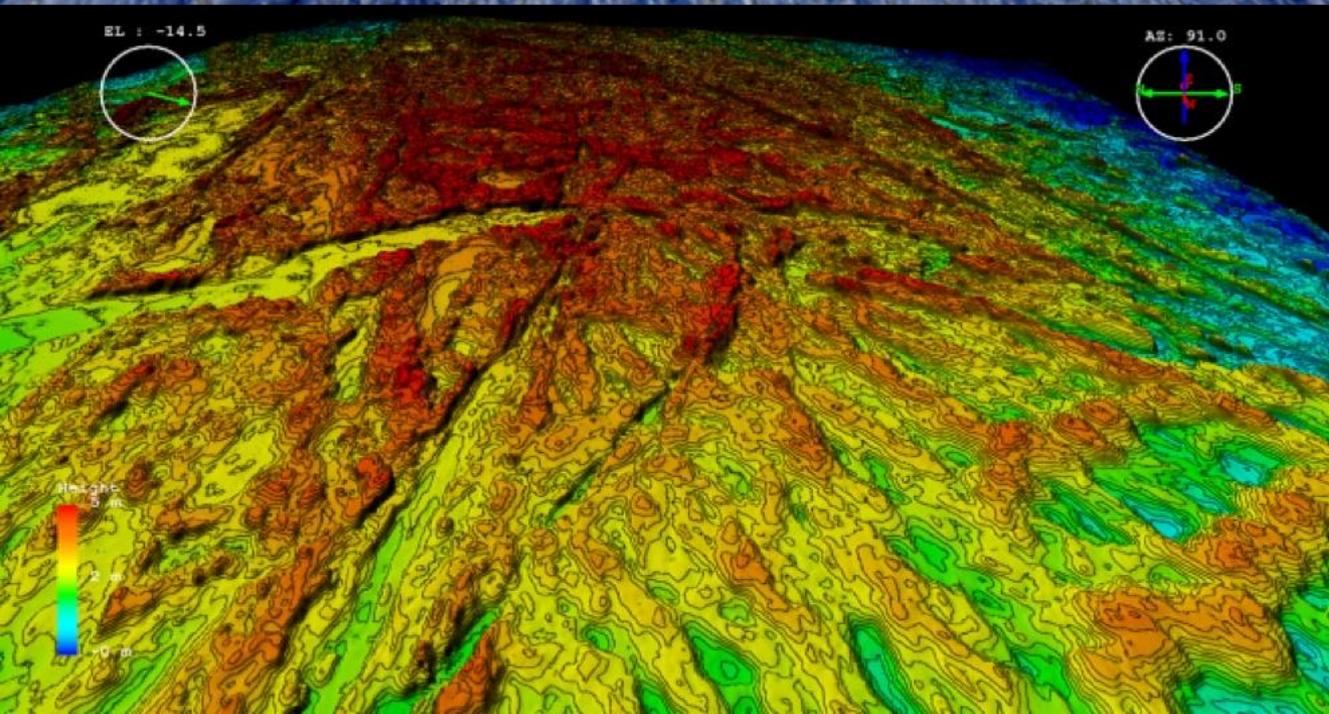
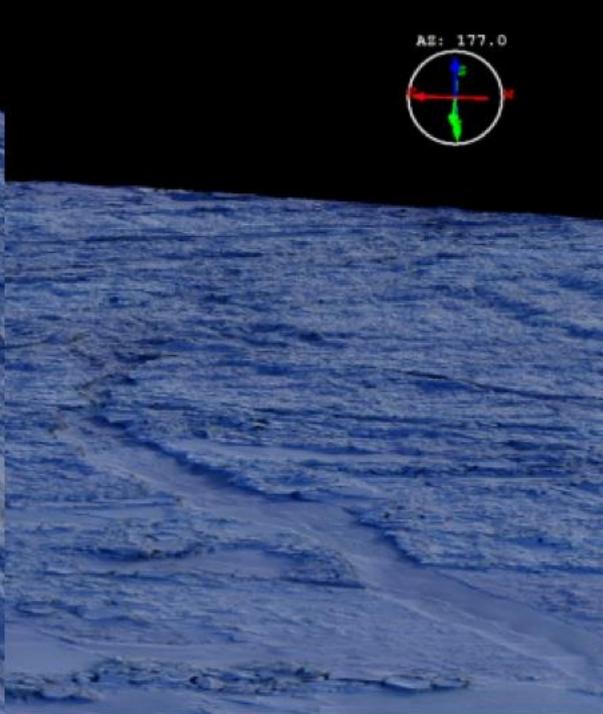
# Sea Ice Survey - Barrow (April 2015)

“Ptarmigan”  
UAS was used  
to capture ice  
ridge data



Previously, technology  
providing reduced  
quality imagery had  
been relied on to  
break ice trails







Yukon River during breakup at Circle, Alaska, April 2017. Data collected using Responder.

# COTS Camera Adapted for UAS



# Herder Burner - Oil Spill Research Poker Flat (April 2015)



# Beyond Visual Line of Sight (BVLOS) - Trans-Alaska Pipeline



- Monitoring of critical infrastructure, the Trans-Alaska Pipeline, BVLOS of the Pilot in Command in Class G airspace.
- Complex COA process included coordinating airspace with military, using ADS-B transponders, and requiring daisy-chained observers.

# Beyond Visual Line of Sight (BVLOS) and Beyond Electronic Line of Sight (BLOS)

- In June 2017 ACUASI performed BVLOS and BLOS operations using an Outlaw SeaHunter UAS over land and Lac Saint-Jean in Alma, Quebec
- This was the first flight campaign of a Transport Canada effort to integrate unmanned aircraft into remote airports in the Arctic for maritime and other operations
- The SeaHunter carried an AIS receiver and collected AIS signatures from and images of boats on the lake



# Canada - Northern Airports and Maritime Operations

- UAF is working with Transport Canada and Arctic UAV to integrate unmanned aircraft into remote airports in the Arctic
- In June 2017 and January 2018 ACUASI performed Beyond Visual Line of Sight (BVLOS) operations using a SeaHunter UAS in Alma, Quebec
- SeaHunter has operated out of Gaspé, Quebec, surveying shipping lanes for North Atlantic Right Whales



# Addressing Arctic Needs

Additional needs:

- detecting, identifying, and tracking ships
- improving communications
- surveying arctic land and marine wildlife
- monitoring critical infrastructure
- supporting state emergency management and law enforcement needs
- collecting meteorological measurements
- etc.



# Operational Challenges

- Polar bears
- Cold and dark
- Poor GPS
- Poor satellite coverage (Iridium)
- Limited/no infrastructure
- Navigation in ice
- No land north of Alaskan coast
- No deep water ports
- Only one road north
- Logistics expensive and difficult

# Challenges of Flying under Harsh or Remote Conditions

- Icing of airframes and payloads
- Exposed pilots and observers
- Beyond-visual-line-of-sight permitting
- Winds
- Lack of hardware stores
- Poor communications
- Ships that do not stop
- Significant manned aircraft activity in surprising areas

# Additional Flight Challenges

- Battery life is significantly degraded (iPones too)
- Aviation gas pollution
- Plastics break
- Wood glue (need I say more?)
- Vessels may jam UAS frequencies
- Crashes may occur in sensitive areas
  - Environmental or historical damage
- Not always possible to get the UAS back
- Etc.

# How Do You Successfully Operate in the Arctic?

- Plan, test, and practice
- Many operators would like to take a commercial off the shelf (COTS) systems and operate them under extreme conditions
  - Don't do it! This will lead to failures
- Talk with arctic practitioners
- Modify your equipment and SOPs
- Plan, test, and practice some more

# Integration of UAS into the NAS: Challenges

- FAA Concerns
  - Detect & avoid
  - UAS certification or equivalent
  - Operator licensing
  - Interaction with manned aviation & NAS protocols
  - Separating hobbyists from professionals
- Pathway to resolution of concerns
  - Safety studies examining specific scenarios
  - Developing standards at appropriate levels
  - Advancing flight control & detection technology
  - Lots of flights to provide data + analysis
- Via: FAA Test Sites + Center of Excellence

# ACUASI's Airspace

- As a Public Operator and a Test Site, ACUASI can:
  - Fly any small UAS (UAS<55 lbs) up to 1200' agl in class G airspace anywhere in the U.S., day or night, visual, or extended visual, line of sight
  - Apply for Certificates of Waiver or Authorization to conduct operations in other airspace categories, above 1200', UAS>55 lbs, BVLOS, BLOS, etc.
  - Conduct commercial research, development, test, and evaluation flights
- ACUASI works with international partners (Canada, Iceland, Australia, etc.) to fly under different regulatory conditions

# As of August 29th, 2016

- The FAA implemented regulations to govern the use of UAS for commercial activities.
- There is now a formal route to obtain a remote pilot certificate (Small UAS Rule, a.k.a. Part 107).
- Commercial activities have skyrocketed under these regulations (>60,000 people certified).

# Can I Fly a UAS in the U.S.?

Depends on who you are and what you are doing:

- Military
- Public
- Civil
- Hobbyist

# Part 107

- Under 400'
- In Visual Line of Sight
- Less than 55 lbs
- Daytime
- No operations over people
- Must contact airport if within 5 miles of an airport
- Must have Remote Pilot Certificate
- These conditions can be waived (1,317 waivers granted as of today)

# What about the hobbyist?

- Non-commercial, or recreational, users have easier access, but some limitations
  - Never compromise the safety of other aviation
  - Cannot be for compensation or hire
- Academy of Model Aeronautics and FAA have published guidelines
- AK Legislative UAS Task Force published Alaska Guidelines
- Find all three at [www.alaskadrones.org](http://www.alaskadrones.org)

# IF YOU FLY, WE CAN'T



## DRONES NEAR WILDFIRES ARE NOT SAFE

FLYING DRONES OR UAS (UNMANNED AIRCRAFT SYSTEMS) WITHIN OR NEAR WILDFIRES WITHOUT PERMISSION COULD CAUSE INJURY OR DEATH TO FIREFIGHTERS AND HAMPER THEIR ABILITY TO PROTECT LIVES, PROPERTY, AND NATURAL CULTURAL RESOURCES

FIREFIGHTERS MAY SUSPEND AERIAL FIREFIGHTING UNTIL UNAUTHORIZED UAS LEAVE THE AREA, ALLOWING WILDFIRE TO GROW LARGER.

CONTACT YOUR NEAREST LAND MANAGEMENT AGENCY OFFICE TO LEARN MORE ABOUT UAS AND PUBLIC LANDS



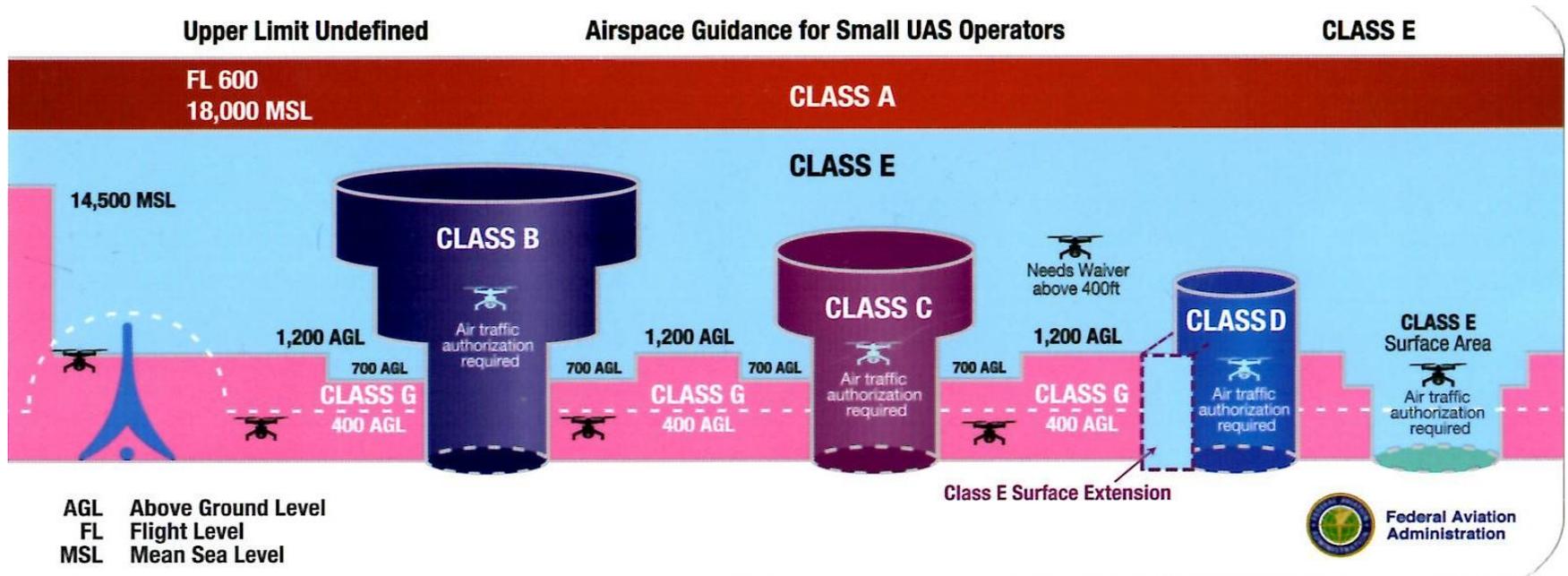
# B4UFLY

- To check airspace



# Types of Airspace

- Limitations on each



# Special Governmental Interest (SGI)

- Designed for first responders and other organizations responding to emergency situations.
- May allow expedited approval through the SGI process.

# Special Governmental Interest (SGI)

Operations that may be considered:

- Firefighting
- Search and Rescue
- Law Enforcement
- Utility or other critical infrastructure restoration
- Damage assessments supporting disaster recovery
- Media coverage providing crucial info to the public

# Special Governmental Interest (SGI)

## How to apply for an SGI:

- Must be either a 107 Remote Pilot or have a COA
- Fill out the Emergency Operations Form  
[https://www.faa.gov/uas/advanced\\_operations/emergency\\_situations/](https://www.faa.gov/uas/advanced_operations/emergency_situations/)
- Send the form to FAA's System Operations Support Center (SOSC) at [sosc@ffa.gov](mailto:sosc@ffa.gov)
- If approved the FAA will send the Waiver or Authorization



## FAA REQUEST FORM FOR EXPEDITED SGI WAIVER OR AUTHORIZATION FOR UAS OPERATION

### Basic Qualifications

- The requesting operator must possess a Certificate of Waiver or Authorization (COA) or Part 107 Pilot License
- The UAS operation must support an emergency response or other effort being conducted to address exigent circumstances and that will benefit the public good
- The requested FAA approval cannot be secured via normal processes in time to meet urgent operational needs

### Operator Information

#### Mandatory entry

Operator Organization (e.g., agency or company)
Operator Address
Operator Point-of Contact (including name, office + mobile phone number, and email)
Pilot and Observers (including names, mobile phone numbers, and emails)
Type of UAS

### Documentation

If the requested UAS operation will be flown under a pre-existing COA, please attach it hereto and provide the COA number below.
If the request UAS operation will be flow under Part 107, please provide the Part 107 Pilot License number below.

### Requested Flight Details

Enter the date(s) of the proposed UAS operation (e.g., 03/18/2018 or 03/18/2018-03/21/2018) <span style="color: red;">Mandatory entry</span>
Enter the times of the proposed UAS operation (be sure to confirm time zone; e.g., 1200L-1400L daily) <span style="color: red;">Mandatory entry</span>
Enter the location of the proposed flight (reference the nearest city or town, and state; e.g., Gulfport, MS)
Enter the distance and direction from the nearest airport, and FAA identification of the same (e.g., 6 NM W of GPT)
Identify the class(es) of airspace in which the flight will be conducted (e.g., Class G/E/D/C/B/A)

Requested altitude of UAS flight: <span style="color: red;">Mandatory entry</span>	
Enter GIS details defining location of proposed flight (only one area type description needed) <span style="color: red;">Mandatory entry</span>	
For those flights remaining within a general contiguous area, which can be described as a circular polygon, provide the latitude and longitude, expressed as <b>degrees/minutes/seconds</b> , of the center of that area and the radius of that same area (e.g., XX:XX:XXN / XXX:XX:XXW - .25NM radius)	
For those flights remaining within a general contiguous area, which cannot be easily described as a circular polygon, provide the latitude and longitude, expressed as <b>degrees/minutes/seconds</b> , of the vertices of the general area starting with the most northerly point and then progressing clockwise (e.g., [XX:XX:XXN / XXX:XX:XXW; XX:XX:XXN / XXX:XX:XXW; XX:XX:XXN / XXX:XX:XXW] - .25NM radius)	
For those flights following an extended route, provide the latitude and longitude, expressed as <b>degrees/minutes/seconds</b> , of the key waypoints of the route, and, as appropriate provide the width of the route (e.g., XX:XX:XXN / XXX:XX:XXW; XX:XX:XXN / XXX:XX:XXW; XX:XX:XXN / XXX:XX:XXW; XX:XX:XXN / XXX:XX:XXW - .25NM wide)	

### Nature and Description of Event

Enter the type of urgent UAS operation to be flown	Description of event
<input type="checkbox"/> Firefighting	
<input type="checkbox"/> Law Enforcement	
<input type="checkbox"/> Search and Rescue	
<input type="checkbox"/> Local / National / Natural Disaster	
<input type="checkbox"/> Other (specify below)	

### Additional Pilot Qualifications

Enter additional pilot qualifications	
<input type="checkbox"/>	Sport/Recreational/Private pilot certificate
<input type="checkbox"/>	Commercial/Airline pilot certificate
<input type="checkbox"/>	Flight instructor certificate

### Contacting the SOSC

The SOSC office and email are staffed/monitored 0600-2400 Eastern Time. For all emergencies, please follow up any email with a phone call to 202-267-8276, which is answered **24/7**.

# Questions?



[ncadkins@alaska.edu](mailto:ncadkins@alaska.edu)