

Alaska Center for Unmanned Aircraft Systems Integration - RDT&E

Ro Bailey

Deputy Director, ACUASI

Director, Pan Pacific UAS Test Range Complex



What are Unmanned Aircraft Systems?

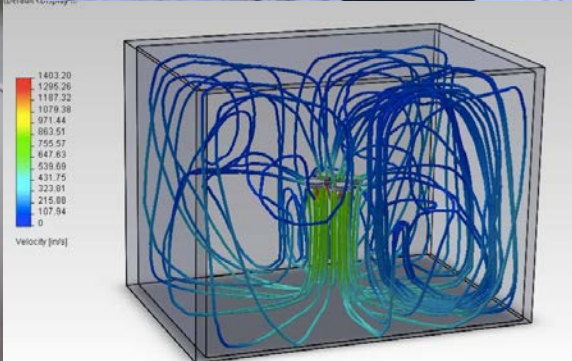
- Any aircraft whose pilot is located outside the aircraft.
- A system comprised of an aerial or aircraft vehicle, a control system located off the platform, the communications links to link them, and the humans who operate it.
- Different from models
 - Advanced autopilots make flying the UAS much simpler given significant (but not total) autonomy is built in
 - Far more sophisticated sensors augment cameras,
 - Not permitted to operate in the national airspace system without specific FAA authority

What are UAS Used For?

- Military applications (“drones”)
 - Surveillance
 - Unmanned strike capabilities
- Civilian applications
 - Research data collection
 - Universities, Federal & state agencies, private businesses
 - Mapping
 - Government agencies, mining & oil industry, surveyors
 - Emergency assessment & response
 - Government agencies, private businesses, search & rescue
 - Precision agriculture, species monitoring, forensics

Example #1: Oil Infrastructure Monitoring

- Flare Stacks
- Pipelines
- Processing Facilities
- Access Roads



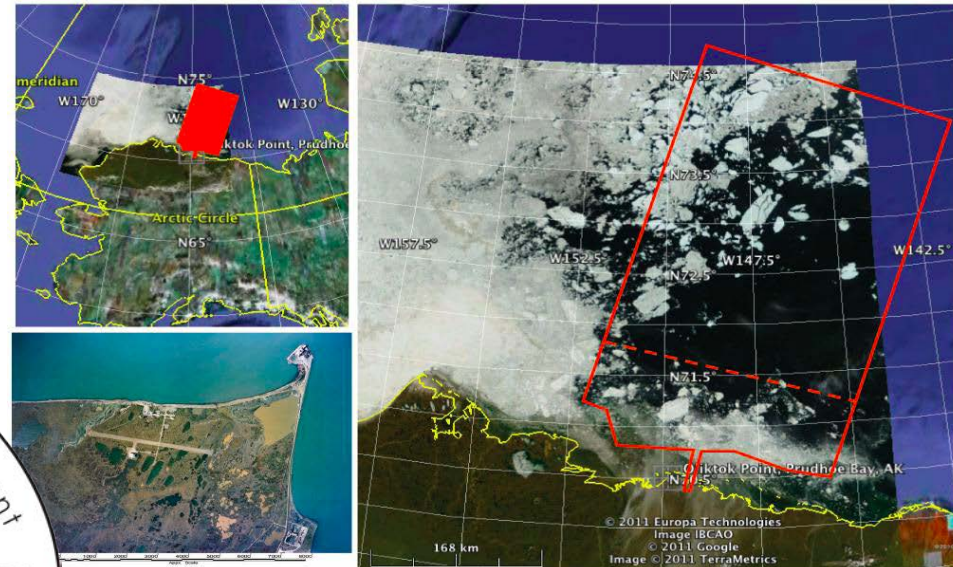
BP North America Partnership

BP Exploration (Alaska) Inc. Partnership

Example #2: Marginal Ice Zone Ocean and Ice Observations and Processes EXperiment (MIZOPEX)

UAF deployments

NASA Exercise July 2013



Multiple aircraft simultaneously
Many new scientific payloads

Example #3: Bear Bite - SAREX

Mass Casualty Exercise 7-10 February 2013

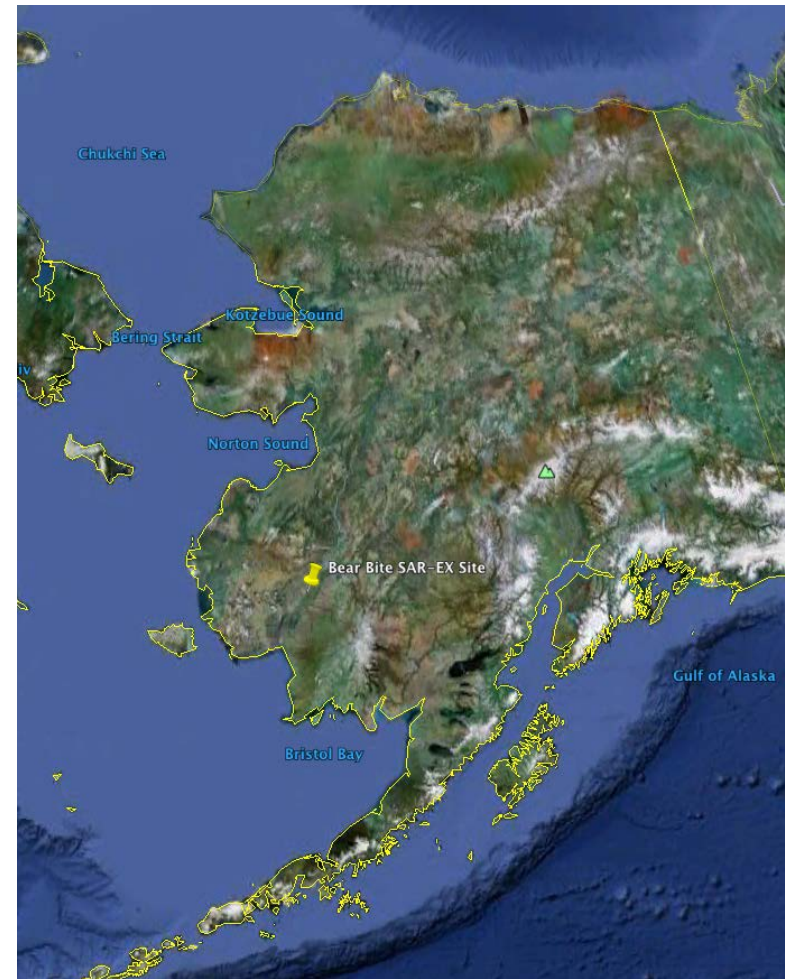
“An aircraft crashed in the tundra roughly 20 miles outside Bethel Alaska many died with some survivors”

Deployed two unmanned aircraft systems
with support team

Coordinated with manned aviation on the
scene

Mission:

- Map scene for event documentation
- Real-time SAR response



How UAF has used UASs

- UAF has 13 years of UAS experience
- Early, partnered with NMSU exploring non-military applications for larger UAS
- Bought first ScanEagle in 2006
- Wide variety of missions since, with many UAS types
 - Marine mammal surveying/monitoring
 - Oil industry work—spill cleanup, infrastructure, etc
 - Mapping—from roads & culverts to archeological sites
 - Disaster response—wildfires, earthquake, aircraft crash
 - First responders—AST, fire, future disasters, Search & rescue

UAF has very robust UAS program

- Believed to be the largest academic fleet
- Diverse fleet
 - 9 ScanEagles
 - 160 Ravens
 - 2 Aeryon Scouts
 - 2 Aquaquad water-landing rotocraft
 - 1 Hexacopter
 - And more in hand and coming
- Strong link with military JPARC ranges
- Broad experience across many users, missions

UAF's UAS program (continued)

- Board of Regents established ACUASI as new research center in December 2012
 - 3 integrated focus areas:
 - Engineering - develop technical capabilities to meet new requirements
 - Application Development - drive system capabilities to expand uses and users
 - Training & Education - develop humans to develop, maintain & operate systems
 - Within GI & UAF, but named as overall for UA
- Became US co-chair of UAS Expert Group under AMAP (Arctic Council)
- USARAK commander and Alaska Command both pledged support for University of Alaska UAS work

UAS are emerging industry

- Lots of interest nationally
- 5 UAS related private companies in Alaska, more coming
- State of Alaska, Fairbanks North Star Borough, UAF collaborate to have a booth at national AUVSI convention
- Fairbanks North Star Borough stepped up to offer assistance to relocating businesses, lead effort for booth at AUVSI, assist with marketing outreach
- AIDEA exploring means to invest in possible industry/technology park

FAA's role

- FAA still considering how to manage interactions between UASs and traditional aircraft
- UAS currently very restricted in airspace
- Congress authorized FAA to select six pilot sites to test UAS issues
- FAA issued SIR for 6 test sites in early 2013
- UAF formed "Pan Pacific Coalition" with 58 partners including Alaska, Oregon, and Hawaii to apply for one of the FAA test site slots
- December 30, 2013, UAF coalition selected as a test site
- Test sites working with FAA now
- No federal funding yet for this project

State of Alaska's role

- Balancing regulation and economic development
- Privacy issues
 - 2013 UAS resolution (HCR 6) & subsequent task force
 - Lt. Governor Treadwell Aviation States Association study on privacy
- Economic development
 - Co-sponsor a booth at national convention
- Legislative funding - \$5 million in FY 2014 to UAF
- Some state agencies partnering in UAF's Pan-Pacific UAS Test Range Complex

What Alaska Offers

- Vast open airspace with little traffic
- Wild, extreme, unpopulated, diverse terrain
- Access to large military ranges with data gathering ability
- History of pioneering aviation technology
- Culture of innovative use of aviation
- Close relationship with regional FAA
- Perhaps most important, willingness to be thoughtful and methodical in potential policy decisions
- State government taking balanced approach
- Extensive experience pioneering UAS in new applications & gaining new levels of FAA approvals

UAF's Prioritization of state's \$5M investment

- Moved into the former OEM building
 - But collected surplus furniture, printers, etc. from the warehouse to minimize costs
- Hired a professor to advance our educational outreach
 - But split the costs with College of Engineering so we have room to do more
 - Funded student research that resulted in a new & better rotorcraft
- Expended technology development funds for the MIZOPEX project
 - But now have a unique capability and upgraded aircraft to offer for future jobs
- Advancing our tools to state-of-the-art for Arctic use

Pan Pacific UAS Test Range Complex

- UAF's ACUASI is lead
- Thirteen ranges around the three states proposed
 - 9 accepted as is, 4 being modified, others may be requested
- With integration the goal, FAA favoring civilian airspace
 - But we still may access restricted airspace
- Key questions to answer:
 - Procedures to protect manned aviation
 - Policies to protect privacy
 - Technical testing to assure control, detect & avoid, lost link procedures, airworthiness, etc

PPUTRC Board of Directors
ACUASI Director
Senior State Representatives

Chief Executive Officer

Alaska
COO

Oregon
COO

Hawaii
COO

Alaska Range/Site
Management Team

Hawaii Range/Site
Management Team

Oregon Range/Site
Management Team

Integrated Process Teams

Airspace
Integration

FAA
Requirements

Maintenance

Operations

Facilities

Information
Technology

Safety

Range
Access

Technology

Systems
Integration

Quality
Control

Standardization

Logistics

Risk
Management

Communications

Recent Missions (2013)

- MIZOPEX
- Idaho Power
- ENI Petroleum (multiple)
- BP (multiple)
- Coast Guard aboard the Healy
- Pilgrim Hot Springs
- Ugak Island
- NEX7 Payload Evaluation in California
- Iceland mapping flights
- Bethel Aircraft Crash exercise
- Demo for DOT road mapping
- For FEMA, data upload demonstration
- Outreach to scouts, public, with demos

Sample of Projected Missions for 2014-15

- Southern Company
- Oil Companies (Conoco, BP (continued), ENI (expanded))
- Idaho Power
- Test missions for PPUTRC (multiple inquiries)
- Sikuliaq Ice Trials
- Oden methane sensor test
- North Slope Borough demonstrations
- Oklahoma power & energy opportunities
- Moose & Dall sheep surveys
- Possibly on retainer for FEMA - response to wildfires, etc

ACUASI Priorities for Next Year

- Stand up the test site
- Refocus energy on high latitude activities
 - Of benefit to Alaskans
 - In support of research
 - To attract technology businesses to Alaska
- Sharpen our technology focus on improving and advancing the state-of-the-art of sensors



In Short...

- PPUTRC is working hard to get set up, organized, establish IPTs, understand FAA needs, define more fully our interactions
- Reaching out to partners & team members to develop robust, flexible, safe processes, procedures, standards
- Responding to interest from future users
- Working out how to collaborate with other test sites

Thank you for your support

Questions?