Use of Unmanned Aircraft Systems in the Arctic

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The Alaska Center for Unmanned Aircraft Systems Integration

- ACUASI is the University of Alaska’s unmanned aircraft system (UAS) research program
- ACUASI leads the Pan-Pacific UAS Test Range Complex, one of the six FAA UAS Test Sites, and Marty Rogers runs the FAA Center of Excellence for UAS
- ACUASI has been flying UAS in Alaska and the Arctic for 15 years
## Payloads and Platforms

Making climate-relevant measurements in requires the correct combination of UAS and payload characteristics:

<table>
<thead>
<tr>
<th>Payload</th>
<th>Endurance</th>
<th>Launch</th>
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<tbody>
<tr>
<td>Visible camera</td>
<td>Long (10+ hours)</td>
<td>Catapult</td>
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<tr>
<td>IR camera</td>
<td>Medium</td>
<td>Runway</td>
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<tr>
<td>SAR</td>
<td>Short (&lt;1 hour)</td>
<td>Vertical take off</td>
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<tr>
<td>Gas sensor</td>
<td></td>
<td>Hand thrown</td>
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<td>Black carbon</td>
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ACUASI’s UAS Fleet

ScanEagle, Nanook, SeaHunter, Responder, Scout, Ptarmigan, and others

Mostly catapult, hand, or vertical launch

Counter-rotating propellers, heated pitot tubes, fuel injected engines, or battery-powered

New auto pilot and control station for communication via satellite
Walrus Studies
Ptarmigan, Ship Launch (2015)
Data from the Sea Ice Survey was shared with the community. Mapped ice ridges define the area for ease of determining the best route for an ice trail for whale hunting.
Oil Spill Research - Poker Flat Research Range (April 2015)
Crazy Mountain Wildfire
Alaska Fire Service Incident Command Team Support

- Tasked by Alaska Fire Service Incident Command Team
- Manned aviation not flown for (5) days due to the smoke and limited visibility
- Satellite imagery (MODUS) incapable of showing critical activity
International Partners

Testing of SA-03 in Iceland
Arctic UAS Summary

– UAS ideal for dirty, dull, and dangerous operations
– Capable of *in situ* measurements of numerous climate variables
– Systems need to be hardened for extreme cold and icing conditions
– Partnerships can make deploying UAS in the Arctic more affordable
Thank you!