ArcticShark - Update

BEAT SCHMID
Manager, ARM Aerial Facility
ARM/ASR Meeting March 19, 2018
ArcticShark Technical Data

- Navmar Applied Sciences Corp. (NASC)
- TigerShark – RQ-23
- DOD Group 3 UAS
- Modified for ARM → TigerShark Block III XP-AS
- Autonomous w/Piccolo autopilot
- Transponder

Rotary Engine UEL 801 56 hp
Propeller 4 Blades, Diameter 37”
Cruise Speed ~60 kts
Alternator 4,200 W
Payload Power 2,500 W

Wingspan 22”
Length 14’ 3”
Max Altitude 18,000 ft
Max Endurance 8 hours

Range (Radio Line of Sight) 100 nm
Iridium SatCom (BLOS, fuel limited) 420 nm

Max Gross Take-off Weight 650 lbs
Full Fuel Weight 120 lbs
Payload(with full fuel and SatCom) 75 lbs
Max Payload (~2.5 hrs endurance) 150 lbs
Underwing Hardpoints 2 at 50 lbs per wing
 Payload Stores

- 2 hard points/pylons per wing (inboard and outboard)
- 250 W per station, 28 (VDC), 10 A
- Max weight inboard, 35 lbs
- Max weight outboard, 30 lbs
- Max weight combined, 50 lbs

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# ArcticShark Timeline
*(updated 3/18/2018)*

<table>
<thead>
<tr>
<th>Milestone</th>
<th>Date</th>
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<tbody>
<tr>
<td>Contract award to NASC</td>
<td>Feb 6, 2016</td>
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<tr>
<td>Maintenance technician and pilot training, Rome NY</td>
<td>Nov/Dec 2016</td>
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<tr>
<td>Completed “Advanced Systems” class</td>
<td>Feb 17, 2017</td>
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<tr>
<td>Delivery of ArcticShark, Pendleton, OR</td>
<td>Feb 28, 2017</td>
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<td>Completed acceptance test flights, Pendleton, OR</td>
<td>Mar 5, 2017</td>
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<td>Media Day, Pendleton, OR</td>
<td>Mar 8, 2017</td>
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<tr>
<td>Completed pilot training, Pendleton, OR</td>
<td>Mar 17, 2017</td>
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<td>Acceptance flights with new radio, Pendleton, OR</td>
<td>Aug 31, 2017</td>
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<tr>
<td>Engineering/test flights with small payload, Pendleton, OR</td>
<td>Sep 22, 2017</td>
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<tr>
<td>Training/test flights, Pendleton, OR</td>
<td>Nov 21 - 22, 2017</td>
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<tr>
<td>Training/test flights, Pendleton, OR</td>
<td>March 19 -23, 2018</td>
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<td>Science/engineering flights with more complete payload into clouds, Yakima, WA</td>
<td>Apr-May 2018</td>
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<td>Additional science/engineering flights: Yakima, Pasco, Pendleton</td>
<td>Jun 2018 – May 2019</td>
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<td>ArcticShark available for missions proposed: Yakima, Pasco, Pendleton</td>
<td>May - Aug 2019</td>
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Demonstrated safe operation mixed in with commercial and general aviation traffic
First ArcticShark Payload

Atmospheric state and thermodynamics
T, RH, 3D winds and turbulence

Surface Temperature

Aventech AIMMS-30

HEITRONICS
Infrarot Messtechnik
CT09
Map of surface temperatures (in °C) measured with a Heitronics CT09 Infrared Thermometer aboard the ArcticShark at Pendleton Regional Airport on 9/21/2017.
Temperature and Relative Humidity profiles at Pendleton Regional Airport measured by ArcticShark on 09/22/2017.
Next step – flights into clouds
Next Steps for ArcticShark Instrumentation

Aerosols

Printed Optical Particle Spectrometer (POPS), Handix

Aerosol Counting, Composition, Extinction and Sizing System (ACCESS), Brechtel
Integration into NAS
Science requires flying where it is important not just where it is possible

- Pendleton, OR: UAS Range designated by the FAA (part of the Pan-Pacific UAS Test Range Complex, led by UAF)
  - Current COA: 5 nm, 3500 ft asl, VLOS

- Yakima Firing Range
  - COA for access from nearby airports

- KPSC
  - Phase I, VLOS Operations at low altitudes – Summer 2018
  - Phase II, VLOS Operations to 10,000’ – Fall 2018
  - Phase III, Equipment Updates – 2018 & 2019
  - Phase IV, BVLOS – Summer 2019
  - Phase V, IFR – Fall 2019
    - Dependent upon regulations

- DOE Blanket COA weight increase would be helpful
Considerable interest from ~6 SBIR investigators, 3 have visited ArcticShark
Considerable interest from science community. When can I propose my instrument, payload, mission?