

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

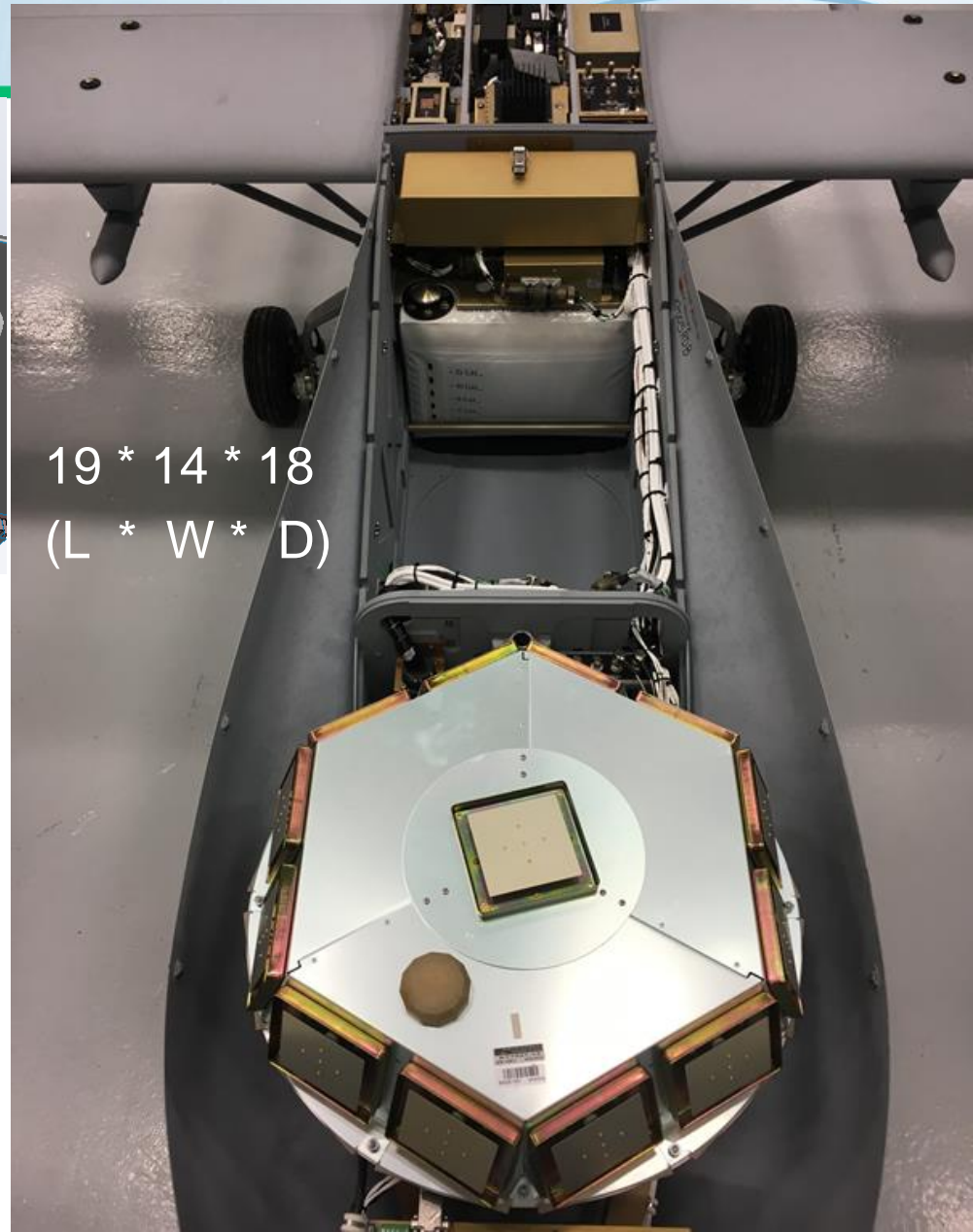
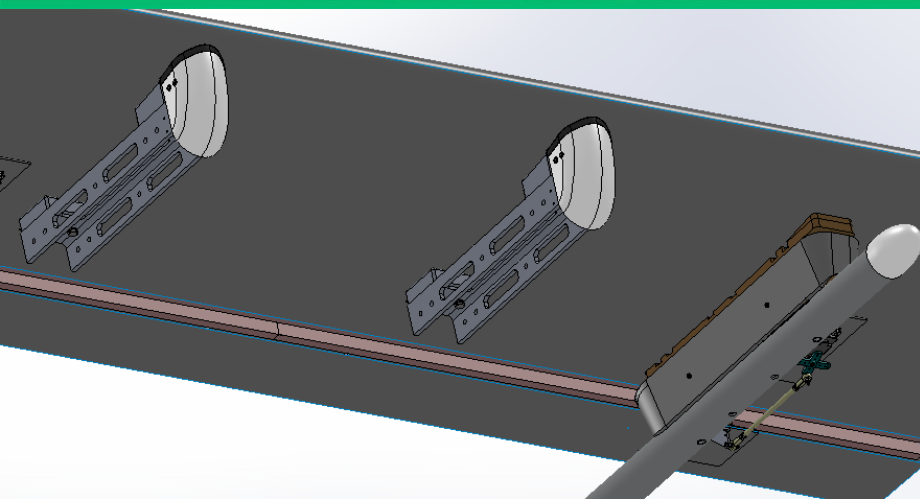
Max Gross Take-off Weight	650 lbs
Full Fuel Weight	120 lbs
Payload(with full fuel and SatCom)	75 lbs
Max Payload (~2.5 hrs endurance)	150 lbs
Underwing Hardpoints	2 at 50 lbs per wing





Payload Stores

ARM



19 * 14 * 18
(L * W * D)

- ▶ 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

ArcticShark Timeline

(updated 3/18/2018)



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

Demonstrated safe operation mixed in with commercial and general aviation traffic



First ArcticShark Payload



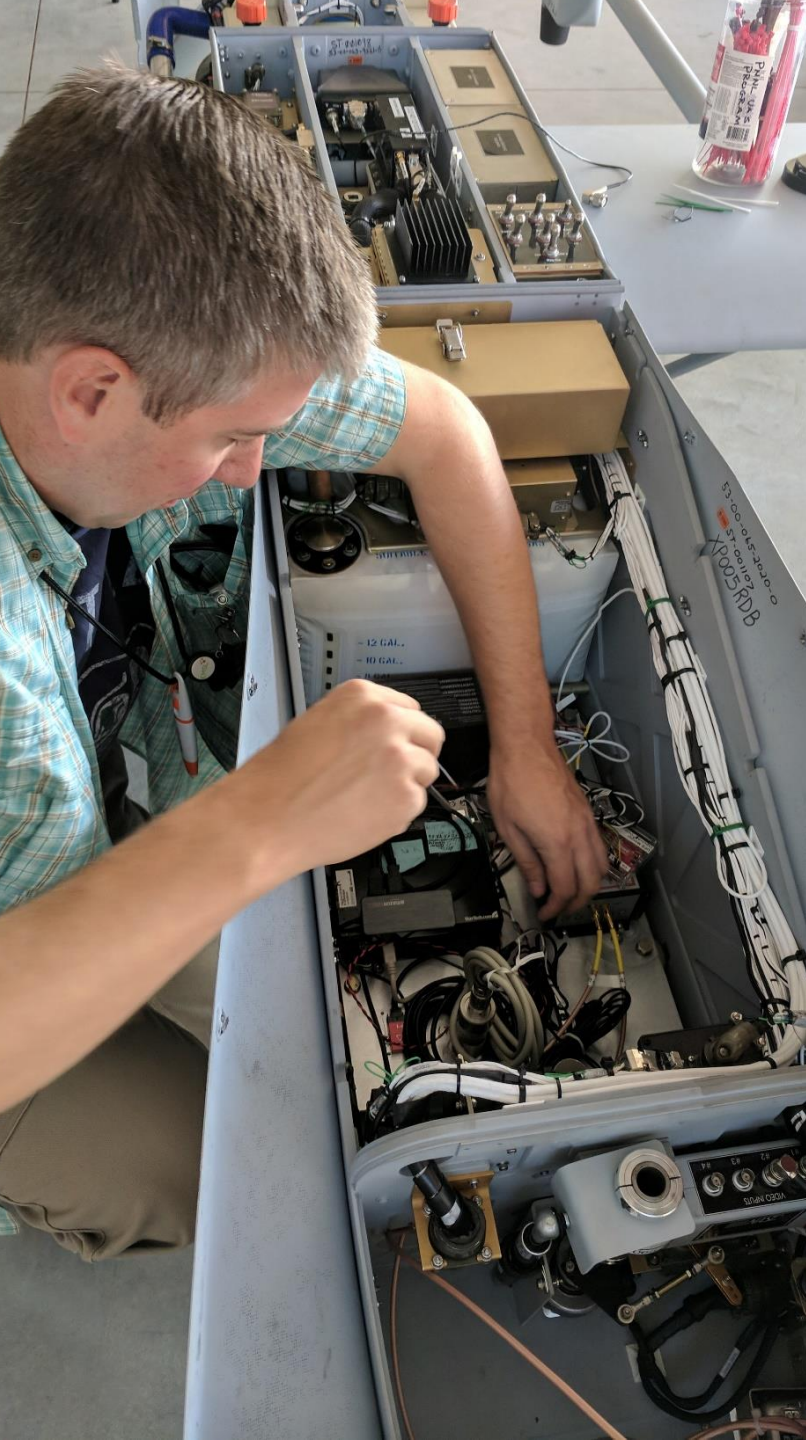
Aventech AIMMS-30

HEITRONICS
Infrarot Messtechnik
CT09



Surface Temperature

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



Structural Analysis – Arctic Shark Pylon Bracket

17090-AS-5720-S01

ARTIC SHARK PAYLOAD BRACKET

LC2 CONFIG 4
SUBCASE 8
TOTAL DISPLACEMENT

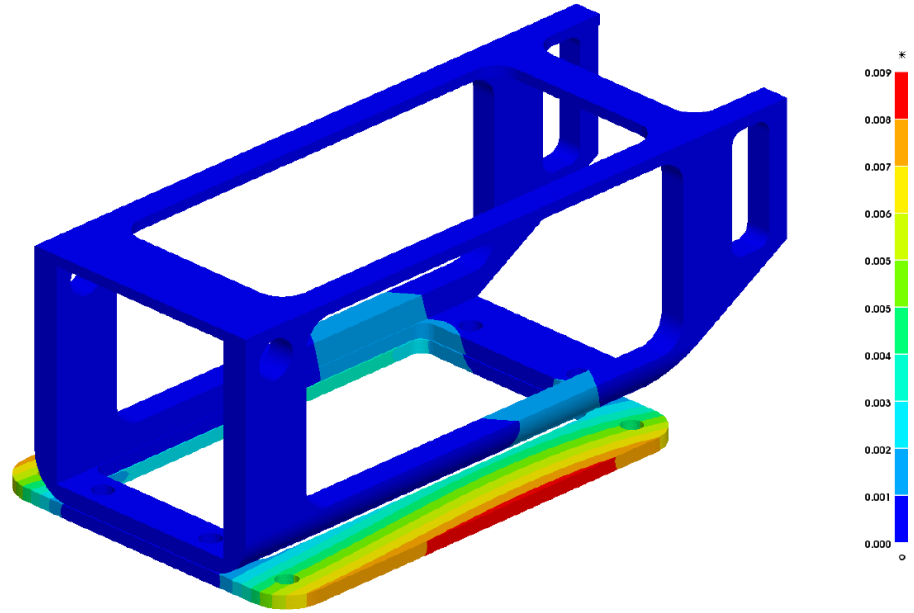
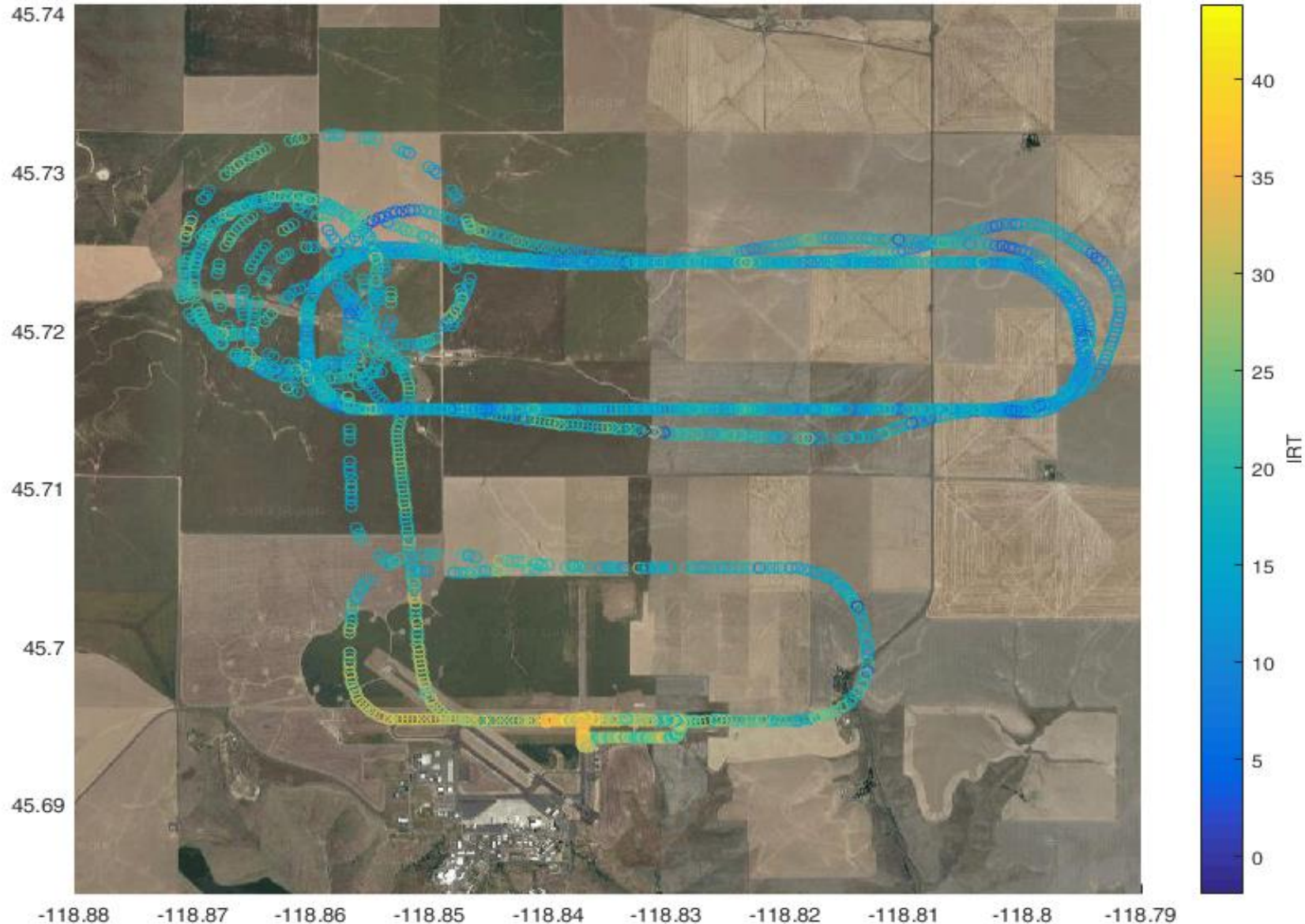
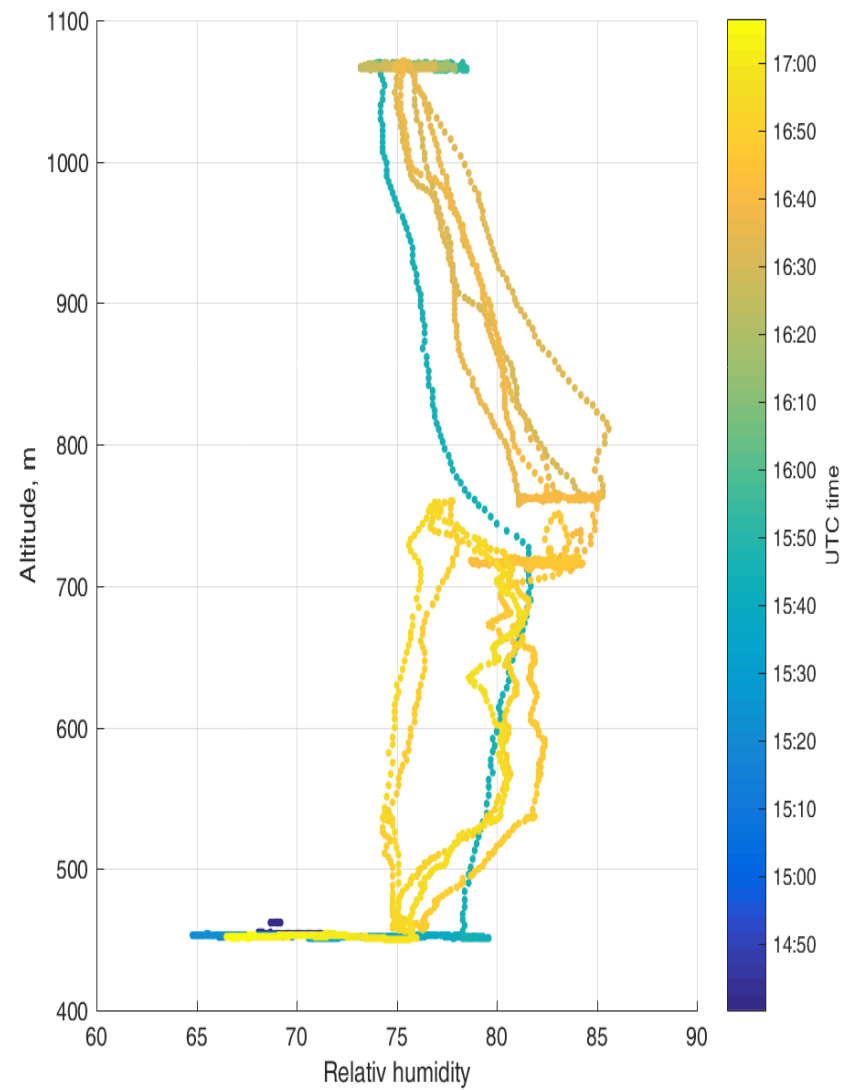
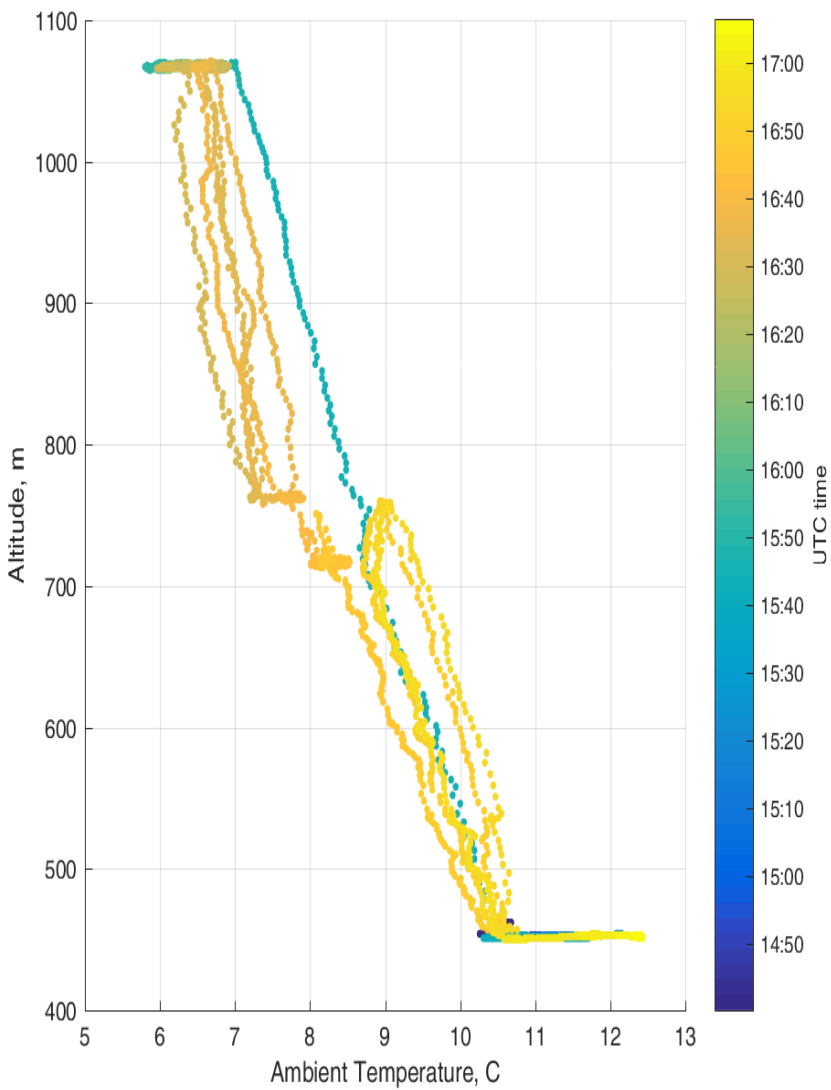


Figure 8-8 Total Displacement – Baseline – Subcase 8



Map of surface temperatures (in °C) measured with a Heitronics CT09 Infrared Thermometer aboard the ArcticShark at Pendleton Regional Airport on 9/21/2017.

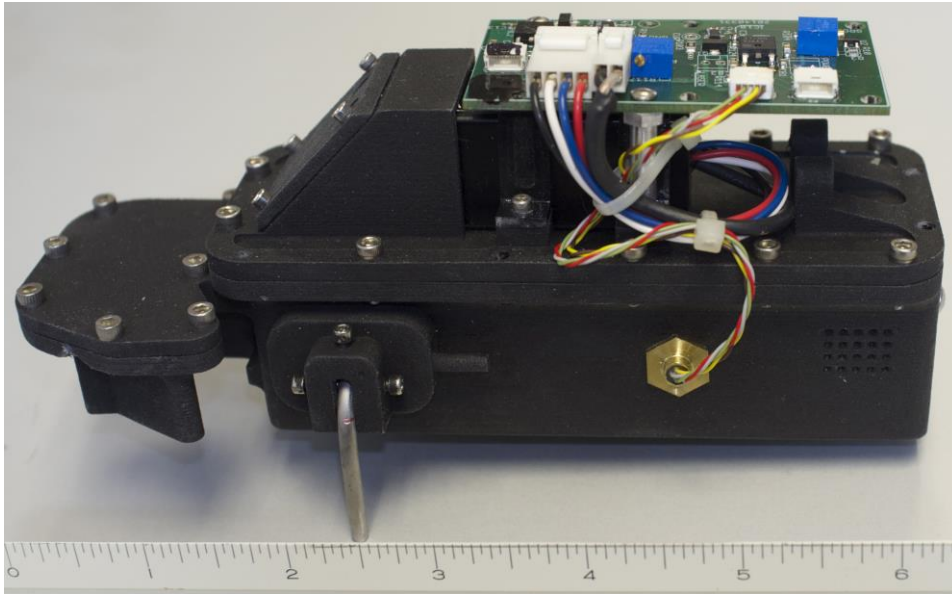


Temperature and Relative Humidity profiles at Pendleton Regional Airport measured by ArcticShark on 09/22/2017.

Next step – flights into clouds



Aerosols



Printed Optical Particle Spectrometer (POPS), Handix



Aerosol Counting, Composition, Extinction and Sizing System (ACCESS), Brechtel

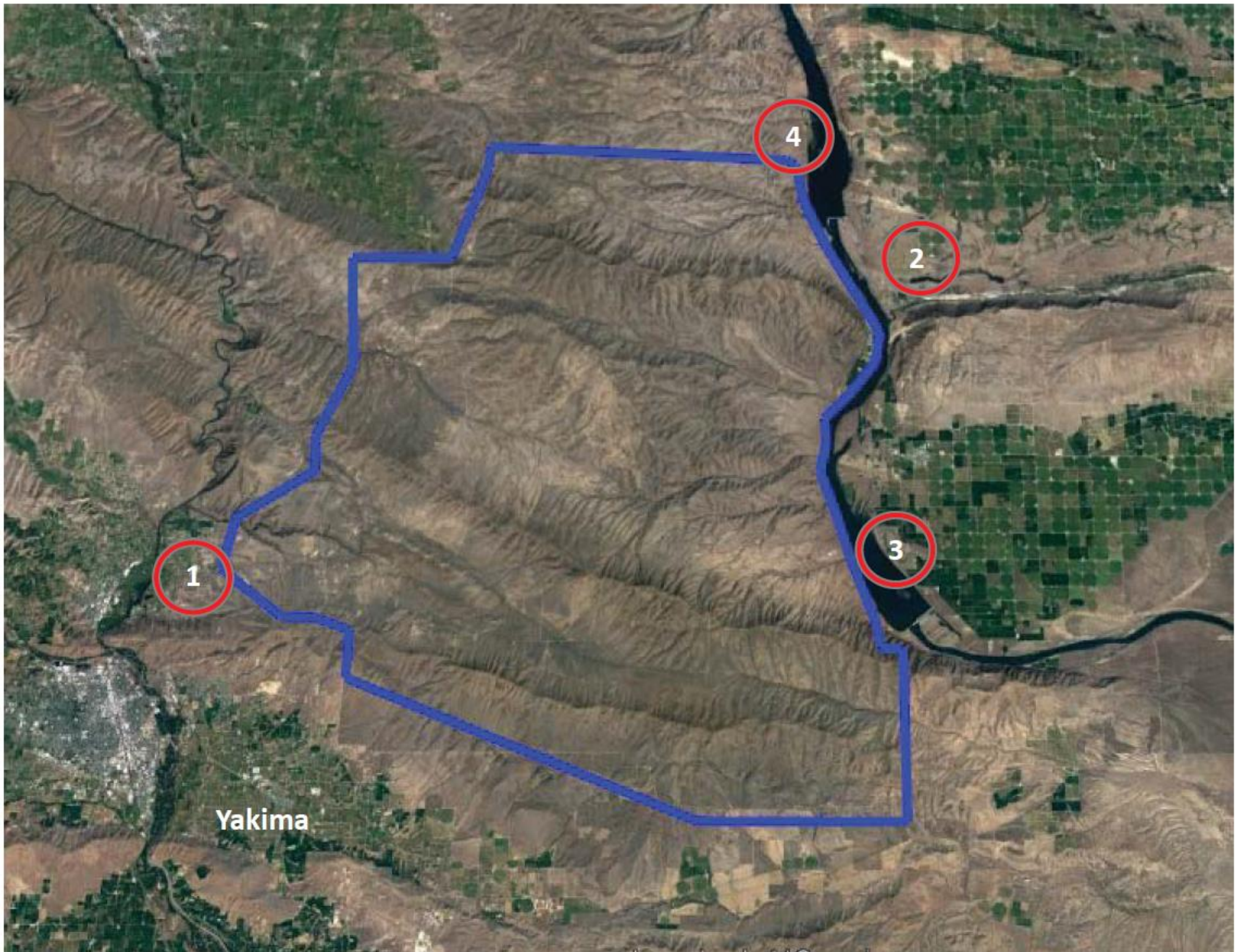
Integration into NAS

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





Yakima

1

2

3

4



- ▶ Considerable interest from ~6 SBIR investigators, 3 have visited ArcticShark
- ▶ Considerable interest from science community. When can I propose my instrument, payload, mission?