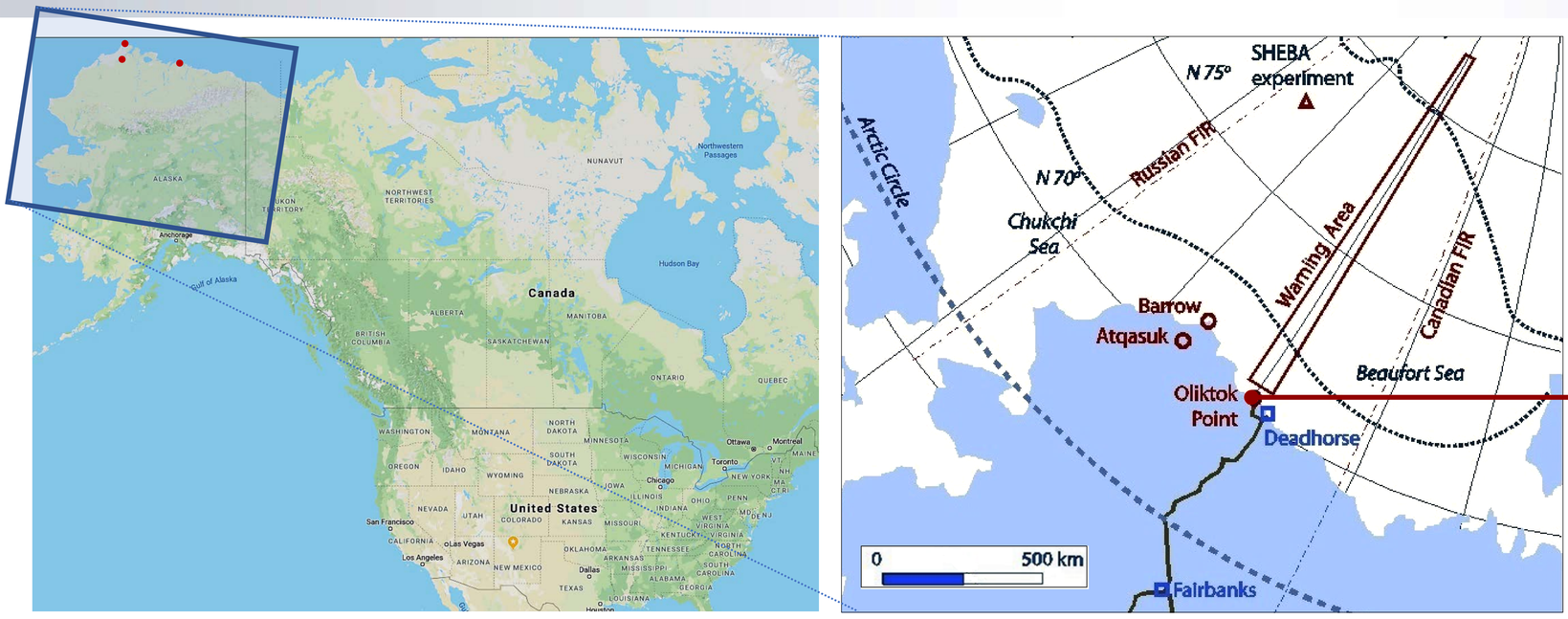
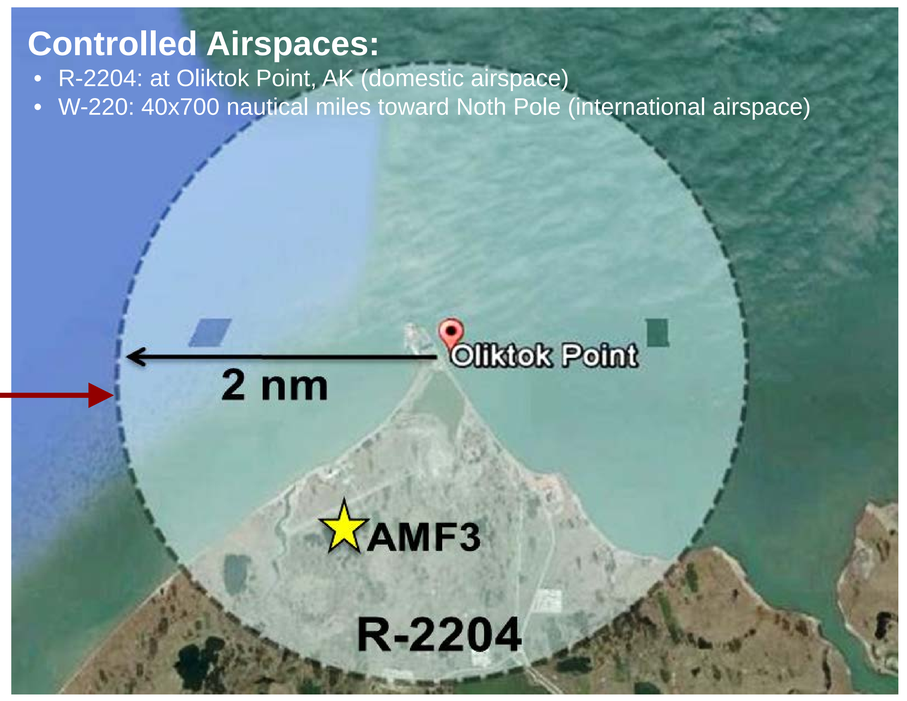
SAND2018-2712C

North Slope Alaska ARM Research Facilities

CLIMATE RESEARCH FACILITY

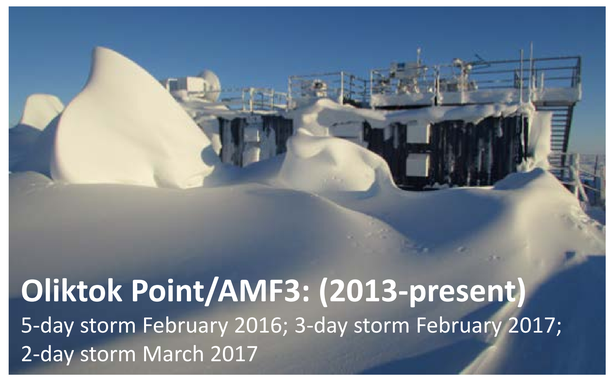




2017 = 20 years of ARM at Barrow/Utqiagvik (NSA) !

Instrument Systems

Instrument	NSA	AMF3
Surface Meteorology		
-Meteorology tower (MET)	●	●
-Eddy Corr. Flux (ECOR)	●	●
-Ameriflux (AMC)	●	●
-Multi-angle Snow Camera (MASC)		●
Atmospheric Profiling		
-Balloon Sounding (SONDE)	●	●
-Automated SONDE	●	
-Tethered Balloons (TBS)	○	●
-Unmanned Aerials (UAVs)	○	●
Cloud Properties		
-Micropulse Lidar (MPL)	●	●
-Microwave Radiometer HF/Prof.	●	
-Microwave Radiometer 3Chan		●
-Total Sky Imager (TSI)	●	●
-Vaisala Ceilometer (VCEIL)	●	●
-Ka-band Scanning Cloud Radar	●	
-W-band Scanning Cloud Radar	●	
-Ka-band Zenith Radar	●	●
-X-band Scanning Precip. Radar	●	
-mm λ Cloud Radar (MMCR)	●	
-Doppler Lidar (DL)	●	●
-Hi-Spec/Raman Lidar (HSRL/RL)	●	●
Radiant Flux Measurements		
-Atmos. Emit. Rad. Interf. (AERI)	●	●
-Infrared Thermometer (IRT)	●	●
-Multifilter Shadowband Rad.	●	●
-Upwelling Radiation (GRNDRAD)	●	●
-Downwelling Radiation (SKYRAD)	●	●
-Multifilter Radiometer (MFR)	●	●
-Cimel Sunphotometer (CSPHOT)	●	●
Aerosols		
-AOS shelter/instruments	●	●



Tethered Balloon systems (TBS)

- Can operate in clouds
- 35m^3 helikites: 30 lb payload; up to 2,000’ (610 m) AGL
- Aerostat: 80 lb payload; up to 6,000’ (1,830 m) AGL

Distributed Temperature Sensing:

- Fiber-optic hi-res measurement of permafrost, active layer, atmosphere, sea ice, and ocean interfaces or profiles

TBS ARM Instruments: *(also fly guest instruments)*

Aerosols:

- POPS/Printed Optical Particle Spectrometer: aerosol concentrations and size distributions
- Mini-SASP/Miniature Scanning Aerosol Solar Photometer: aerosol optical depth/AOD profiles
- CPC/Condensation Particle Counter: aerosol size distribution

Meteorology & Thermodynamics:

- Tethersondes: for pressure, RH, temp., wind speed/direction, altitude, lat/long
- DTS/Distributed Temperature System: temperature profiles

Ice and Liquid in clouds:

- SLWCs/Supercooled Liquid Water Content sensors: cloud liquid water content
- VIPS/Video Ice Particle Sampler: ice microphysics

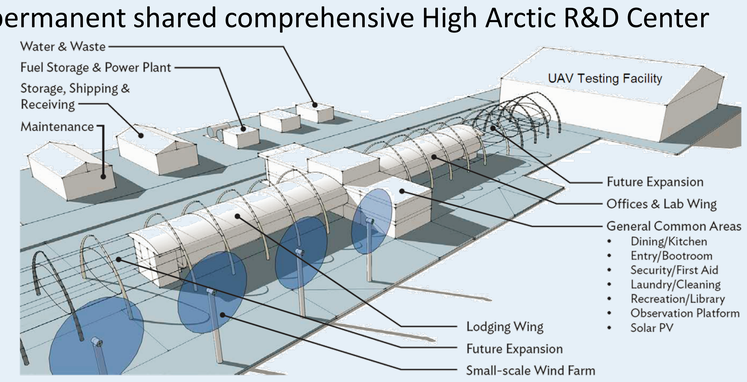
Key North Slope Alaska Partners

- **Oliktok Science Team**
  Gijs de Boer, Matt Shupe, Allison McComiskey, Amy Solomon, Sergey Matrosov, Jessie Creamean, Dave Turner, Chris Williams, Max Maahn, Carl Schmitt, Hagen Telg

- USGS, NOAA, NASA, USAF, BLM
- CU-Boulder, Univ. of AK Fairbanks (UAF)

Future Plans and Capabilities:

- ARM ArcticShark UAV (PNNL)
- Routine TBS data collection and joint TBS-UAV flights
- WMO Year of Polar Prediction (YOPP) 2017-19 campaigns
- Expanded collaboration (e.g. NGEE) and outreach (e.g. STEM)
- Future permanent shared comprehensive High Arctic R&D Center



Joe Hardesty ● Mark Ivey ● Fred Helsel ● Al Bendure ● Darielle Dexheimer ● Erika Roesler ● Todd Houchens ● Ben Hillman ● Valerie Sparks

Sandia National Laboratories

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