

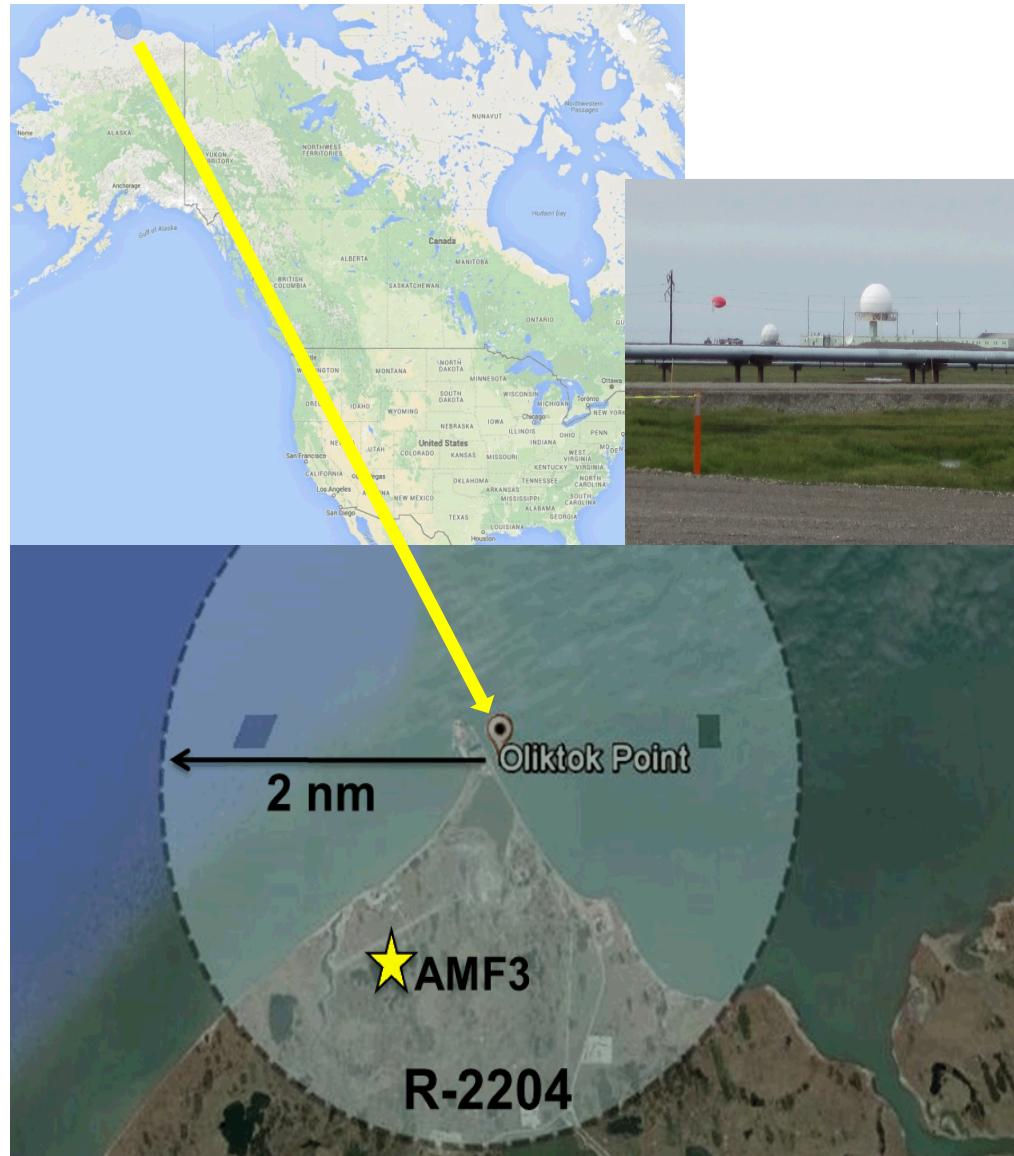


# Atmospheric Distributed Temperature Sensing Measurements Using UAS and Tethered Balloons

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# ARM Tethered Balloon System (TBS)

- A tethered balloon system (TBS) is operated by Sandia National Laboratories (SNL)
  - on behalf of the U.S. Department of Energy's (DOE) Atmospheric Radiation Measurement (ARM) Climate Research Facility
  - to collect in-situ atmospheric measurements within mixed-phase Arctic clouds
  - at ARM'S Advanced Mobile Facility 3 (AMF3) at Oliktok Point, AK in Restricted Airspace



# TBS Flights at Oliktok Point, AK

- Periodic TBS flights have been conducted since 2015
  - as part of AALCO (Aerial Assessment of Liquid in Clouds at Oliktok) & ERASMUS (Evaluation of Routine Atmospheric Sounding Measurements using Unmanned Systems) campaigns
  - AALCO was a SNL campaign from April 2016 – October 2017,
    - used in-situ cloud measurements from the TBS to improve the parameterization of SNL high-resolution Arctic cloud models

Dates	TBS Flight Hours	Relevant Sensors	Campaign
October 22-28, 2015	33.5	SLWC sondes	ERASMUS
April 3-20, 2016	9.3	SLWC sondes	AALCO, ERASMUS
May 13-16, 2016	14.8	SLWC sondes, SensorNet Oryx DTS	AALCO, ERASMUS
June 5-11, 2016	24.0	SLWC sondes, SensorNet Oryx DTS	AALCO, ERASMUS
July 24-27, 2016	7.4	SensorNet Oryx DTS	AALCO, ERASMUS
October 10-20, 2016	33.0	SLWC sondes, SensorNet Oryx DTS	AALCO, ERASMUS
November 14-17, 2016	10.5	SLWC sondes	AALCO
April 2-10, 2017	8.5	SLWC sondes	AALCO, ERASMUS
May 15 – 24, 2017	30.8	SLWC sondes, SensorNet Oryx DTS with Fiber Optic Rotary Joint (FORJ)	AALCO, ERASMUS
August 4 – 9, 2017	17.0	SLWC sondes, SensorNet Oryx DTS with Fiber Optic Rotary Joint (FORJ)	AALCO, ERASMUS
October 13 – 22, 2017	9.7	SLWC sondes, Silixa XT DTS with Fiber Optic Rotary Joint (FORJ)	AALCO, ERASMUS
TOTAL	198.5		

# TBS Flights using DTS

