ARM North Slope of Alaska Facilities: Unmanned Aerial Systems and Tethered Balloon Operations

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The Department of Energy Atmospheric Radiation Measurement program (ARM) North Slope of Alaska (NSA) Science Mission is to collect high latitude atmospheric data to refine climate models as they relate to the Arctic. The ARM NSA facilities have been operated by Sandia National Labs (Sandia) to provided scientific infrastructure and data to the international Arctic research community since 1997. The newest site was installed in 2013 at Oliktok Point, Alaska. The infrastructure at Oliktok is designed to be mobile and it may be relocated in the future to support other ARM science missions. Unmanned aerial system (UAS) and tethered balloon system (TBS) operations near Oliktok are enabled for all approved users by activating FAA-designated restricted air space (R2204) and international warning area (W220) activated by Sandia. UAS operations out of Barrow have also been done with FAA approval. The controlled airspaces at Oliktok Point provide for aerial measurements within a 4 nautical mile diameter around Oliktok Point, up to 7,000 feet altitude; and a 40 x 700 nautical mile corridor towards the North Pole, up to 20,000 feet altitude. Sandia operates a TBS program for atmospheric measurements in the Arctic. Test flights were begun in 2014, and TBS operations are evolving to provide regular Arctic data sets. The TBS collects high vertical resolution *in situ* atmospheric data and operates within clouds for data that improves understanding of Arctic atmospheric processes and to improve climate models. Data on aerosols, cloud properties, ice microphysics, thermodynamics and winds are now being collected and used. The TBS is also being tested to improve radar calibration for the ARM facilities. This poster will introduce recent and planned campaigns employing UAS and TBS at the ARM NSA facilities, examples of data and instrumentation, and future plans to improve or expand Arctic measurements and capabilities.

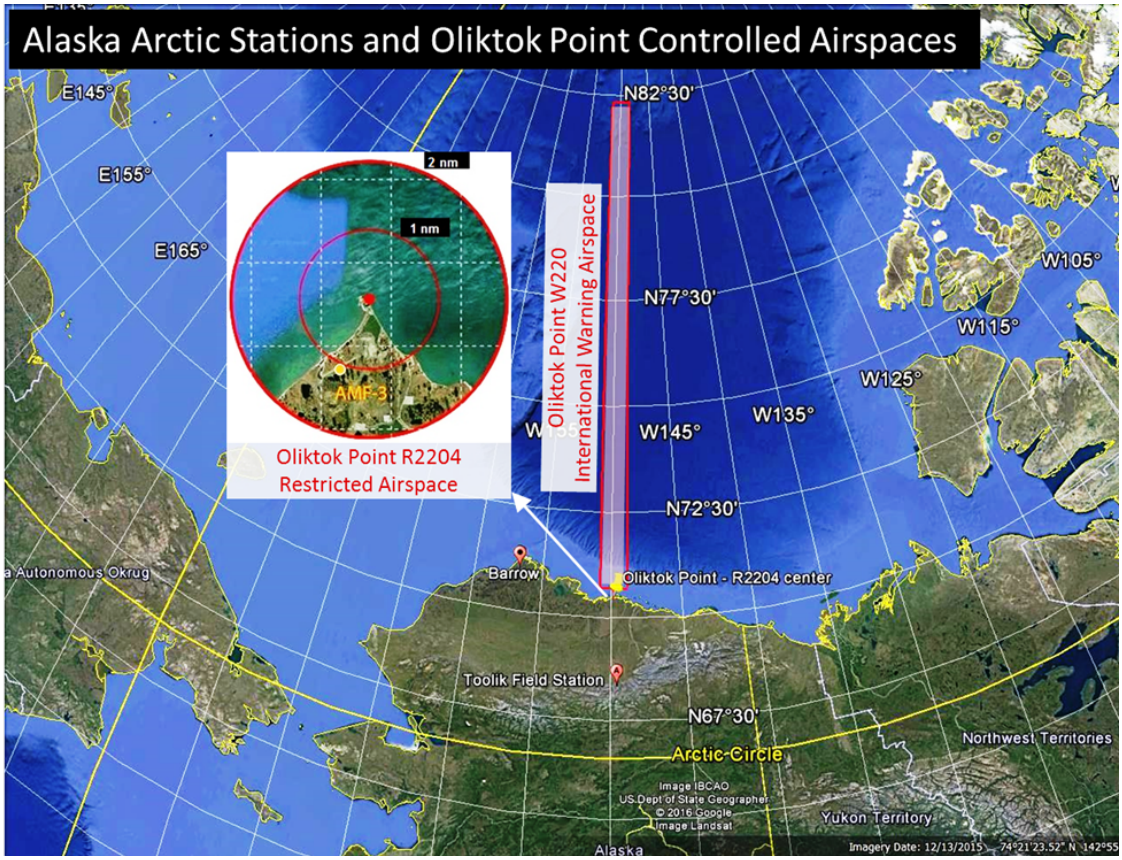

Figure 1. Alaska Arctic Stations and Oliktok Point Controlled Airspaces.