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ARM Tethered Balloon System & AALCO Activities at AMF3 Site at Oliktok Point, AK

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Sandia National Laboratories (SNL) operated ARM's tethered balloon system (TBS) as part of the Inaugural Campaigns for ARM Research using Unmanned Systems (ICARUS) Intensive Operations Period (IOP), and as part of the AALCO (Aerial Assessment of Liquid in Clouds at Oliktok) IOP, at ARM's AMF3 site in Oliktok Point, Alaska, from 2016 - 2017. The operation of the TBS during ICARUS and AALCO to altitudes up to 1.5 km AGL in the Arctic spring, summer, and fall is addressed.

Distributed Temperature Sensing (DTS) systems and supercooled liquid water content (SLWC) sondes were deployed under both IOP campaigns. The performance of these sensors is discussed and results are presented. DTS measurements and their relationship to concurrent temperature measurements from unmanned aircraft and radiosondes are shown. The use of fiber optic rotary joints with the DTS systems is discussed and results are presented. SLWC sensor in situ measurements are compared with microwave radiometer and radiosonde-derived measurements. Results from the AALCO IOP include preliminary analysis of using Large Eddy Simulations to compare with the SLWC measurements, which reveals three-dimensional properties of the observed clouds.