

Two New ARM Sites in 2013



Azores

The **Azores** are an island group in the **Eastern North Atlantic (ENA)** ocean in a region characterized by marine stratocumulus. Marine stratocumulus have a strong influence on climate yet are poorly represented in global climate models.

Managed by the
TWP/AMF team at
Los Alamos



Oliktok Point

The **Oliktok Point** site is located approximately 300 km Southeast of the existing ARM site in Barrow and provides an opportunity to link coastal conditions from the standard ARM measurement suite with near-coast conditions using an **Unmanned Aerial System (UAS)**.

Managed by the
NSA team at
Sandia

- Sites scheduled to come on line by end of FY13
- The facility at Oliktok Point is a mobile facility deployed for an extended term
- Instruments at these sites match those found at other sites including many of the enhancements added through the Recovery Act and plans to add UAS at Oliktok

Azores Site on Graciosa Island



The new Azores site is expected to be on Graciosa island near the site of the 2009/10 Mobile Facility deployment.

Instrumentation for the New ARM Sites

 <p>Atmospheric and Boundary State</p> <ul style="list-style-type: none"> • MET, PWD, TSI • <u>Sondes</u>, ECOR, 915 RWP (NSA), 1290 RWP (ENA) 	 <p>Oliktok Unmanned Aerospace Vehicles</p>
 <p>Lidars</p> <ul style="list-style-type: none"> • HSRL, MPL, Doppler 	 <p>Oliktok Infrastructure</p> <ul style="list-style-type: none"> • Instrument, Operations, and UAS Enclosures • Electrical Power Generator Module
 <p>Cloud and Precipitation Radars</p> <ul style="list-style-type: none"> • Scanning Cloud, Scanning Precipitation • Ka Zenith Pointing 	
 <p>Precipitation</p> <ul style="list-style-type: none"> • <u>Parsivel</u>, Video <u>Disdrometer</u>, Weighing Bucket, <u>TPS</u> 	 <p>Azores Infrastructure</p> <ul style="list-style-type: none"> • Instrument Enclosures • Operations Enclosure • <u>Electrical Power and Hydrogen Generators</u>
 <p>Radiometry</p> <ul style="list-style-type: none"> • Solar Broadband (Up/Down), IRT • MFRSR, MFR, AERI or <u>ER-AERI</u>, MWR3C 	
 <p>Aerosol Observation System</p> <ul style="list-style-type: none"> • Scattering, Absorption, Size Distribution • Trace Gases 	
<p><u>Azores Research Site</u> Kim Nitschke - Site Operations Manager Los Alamos National Laboratory</p>	
<p><u>Oliktok Point Research Site</u> Mark Ivey - Site Operations Manager Sandia National Laboratory</p>	



Fundamentally New Arctic Measurements



775 Cubic Inch Payload Volume

Unmanned Aerospace Vehicles for Coordinated Multi-Sensor Measurements



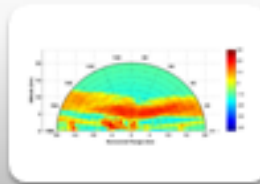
Tethered Sonde and In-Situ Measurement Package

- **Multiple UAVs' and Associated Infrastructure**
- **Instrument Suite Under Discussion Options Include;**
 - ✓ **Condensation Particle Counter**
 - ✓ **Optical Particle Counter**
 - ✓ **Aethalometer**
 - ✓ **Radiometry and Atmospheric State**
 - ✓ **Cloud Condensation Nuclei Counter**
 - ✓ **Stabilization Platform**

Issues under discussion include characteristics of Azores precipitation radar (X- or C-band) and characteristics of the UAS and associated payload.

Cloud and Precipitation Measurements

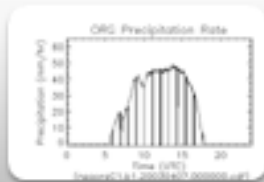
The original AMF deployment included a vertically pointing W-band radar and for a short portion of the deployment, the Scanning W-band ARM Cloud Radar (SWACR). The ENA site will add a cm-wavelength precipitation radar and will include the same type of dual frequency scanning radar now deployed at existing sites.



Cloud and Precipitation Radars

- Scanning Cloud, Scanning Precipitation
- Ka Zenith Pointing

The characterization of precipitation will be aided by several types of ground-based measurements including a reference weighing budget and two types of disdrometers (the Oliktok site only will also include a Total Precipitation Sensor)



Precipitation

- Parsivel , Video Disdrometer, Weighing Bucket, TPS

Lidars at the Azores and Oliktok Point



Both the Azores and Oliktok sites will include three lidar systems (in addition to the boundary layer oriented ceilometer):

- Micropulse Lidar (MPL): Dual Polarization Lidar, standard across all ARM sites, primarily for Cloud Boundaries.
- High Spectral Resolution Lidar (HSRL): Improved measurements of aerosol and cloud extinction profiles.
- Doppler Lidar: Provides radial Doppler velocity. Primarily operated in vertical-pointing mode to observe vertical velocity but is capable of scanning.