

Witness The ARCTIC

ARCUS Member Highlight

Sandia National Laboratories



Sandia National Laboratories, an ARCUS Member Institution since the early 1990s, develops science and technology-based solutions to national and global security problems. Sandia is a government-owned/contractor operated (GOCO) facility managed by Lockheed Martin, a Fortune 500 company, for the U.S. Department of Energy. The GOCO partnership allows each partner to focus on its strengths: the government establishes mission areas, and the private sector implements the missions using best business practices.

Sandia's mission is to meet national needs in five key areas, one of which is "Energy, Climate, and Infrastructure Security." Researchers working on the

Climate Security program strive to understand and prepare the nation for the national security implications of climate change. The program focuses on four specific areas: sensing and monitoring, modeling and analysis, carbon management, and water. Much of the sensing and monitoring component focuses on the Arctic, via the Atmospheric Radiation Monitoring (ARM) Climate Research Facility.



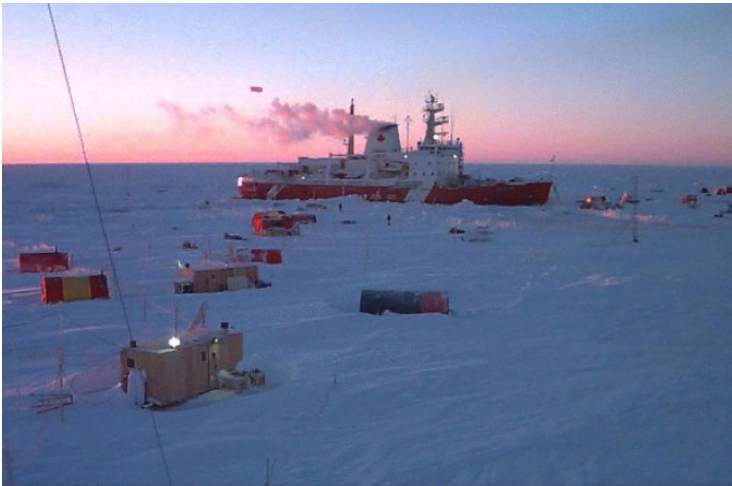
Research facilities are located at various places on Alaska's North Slope, including the towns of Barrow, Atkasuk, and Oliktok Point. Image courtesy of Sandia National Laboratories.



An Atmospheric Radiation Monitoring sensor array outside of Barrow, Alaska. Photo courtesy of Sandia National Laboratories.

THE ARM CLIMATE RESEARCH FACILITY

As the Department of Energy's largest global climate-change research effort, the ARM Program was initiated in 1989 to address the most significant uncertainties in atmospheric climate models. To this end, ARM established Cloud and Radiation Testbed (CART) sites in various places around the world to gain a better global understanding



The Canadian ice breaker N.G.C.C. Des Groseilliers drifted with the arctic ice pack for a complete annual cycle (approximately 13 months) during the NSF-funded SHEBA project. Photo courtesy of Sandia National Laboratories.

of clouds and their impact on atmospheric radiative energy transfer. Sandia National Laboratories agreed to take on the implementation and management of a cold region CART site, developing facilities on the North Slope of Alaska to provide data about cloud and radiative processes at high latitudes.

PAST AND CURRENT PROJECTS

The North Slope of Alaska (NSA) ARM site at Barrow has been the base for many research efforts including the Surface Heat Budget of the Arctic (SHEBA) project, in which an icebreaker was intentionally embedded in a large ice floe and drifted with the pack ice; and the Mixed-Phase Arctic Cloud Experiment (M-PACE), which used an instrumented tethered balloon as well as instrumented aircraft to acquire data from arctic clouds.



USAF Oliktok Point Long Range Radar Station which serves as the base for ARM's mobile research facility at Oliktok Point, a location for ARM NSA field campaigns requiring restricted airspace. Photo courtesy of Sandia National Laboratories.

Upcoming projects include an extended field campaign at Oliktok Point, where the Federal Aviation Administration (FAA) has granted Restricted Airspace status, allowing for deployment of tethered balloons, use of unmanned aircraft, and instrument package drops from aircraft. Oliktok Point is the location of a U.S. Air Force (USAF) Long Range Radar Station. In the past, the USAF has granted Sandia, via the Department of Energy, a permit to use selected facilities helping to eliminate redundancy in research infrastructure.

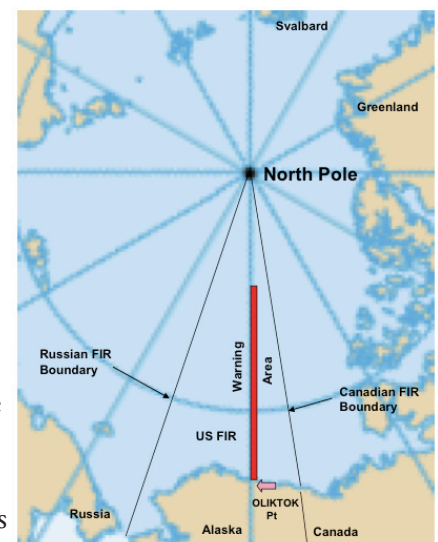
FUTURE PLANS

Oliktok Point is also an attractive potential base for similar operations conducted over and on the arctic sea ice. Looking towards the future, the U.S. Department

of Energy has a request pending with the FAA to use a strip of airspace offshore of Oliktok Point. One possibility under discussion is designation of this airspace as a Warning Area. One of the most pressing climate change questions researchers face is why the arctic sea ice is melting so

much faster than current models predict. If granted, this Warning Area would permit the types of research required to obtain answers to that question.

Further information on the ARM Facility, including data access and details on how researchers can use the ARM facilities, is available on the ARM website: <http://www.arm.gov/>.



Proposed warning area in red. Image courtesy of Sandia National Laboratories.

To learn more about Sandia National Laboratories, please visit their website: <http://www.sandia.gov/>.

For questions about Sandia's arctic programs, please contact Dr. Mark Ivey, ARCUS Board of Directors, at: mdivey@sandia.gov.