



Sandia
National
Laboratories



ARCTIC SCIENCE AND SECURITY INITIATIVE

Sandia initiative addresses emerging and imminent security concerns and research opportunities in the Arctic.

Impacts of a Rapidly Changing Arctic

Rapidly changing conditions in the Arctic have increased access to natural resources and maritime routes. This has significantly elevated geopolitical, economic, scientific, and national security concerns. Issues in the Arctic are exacerbated by the enormity of the region, a general lack of infrastructure (such as communications or the ability to conduct rescue operations), and undefined governance and policy. The evolving Arctic conditions challenge scientists and policy makers as they work to gain a better understanding of the long-term consequences of global climate change. To ensure the security and protection of this critical region, these issues must be addressed.

Arctic Science & Security Initiative

Sandia National Laboratories leads an Arctic science and security initiative to better understand and address science and security issues in the Arctic. Our deep science and engineering experience enables us to discuss technical challenges, possible solutions, partners, collaborators, and Arctic-specific national security concerns.

Sandia-Operated Arctic Facilities

Sandia operates the Atmospheric Radiation and Measurement (ARM) Climate Research Facility (ARM) on behalf of the Department of Energy (DOE) Office of Science Biological and Environmental Research program. The DOE's largest global climate change research effort, ARM, provides researchers with a rare, strategically placed window into the cloud and radiative processes in Earth's atmosphere at high latitudes. Data collected at the ARM Facility refines models and parameterizations as they relate to the Arctic. By focusing on this region, climate researchers are better able to understand the interactions between the atmosphere, land, and ocean systems. Sandia also manages the ARM Mobile Facility 3 at Oliktok Point, Alaska. This facility offers the unique opportunity to collect climate data at various altitudes using tethered balloons and unmanned aerial systems.

Sandia Capabilities Leveraged in the Arctic

In addition to managing the DOE ARM site, Sandia has developed the following Arctic-related capabilities:

- Twenty years of climate measurement on the Arctic Coast
- Energy assessments for Alaska native villages
- Nuclear materials management for the US Air Force
- Search and rescue drills with the US Coast Guard
- Remote sensing of permafrost
- Computer modeling of melting Greenland ice sheet
- Airborne Synthetic Aperture Radar (SAR) to detect landing area crevasses in Antarctica



Collaboration with the University of Alaska Fairbanks

As part of Sandia's Arctic Science and Security Initiative, Sandia partners with the University of Alaska Fairbanks (UAF) on two Arctic initiatives.

The Arctic Infrastructure Simulation Analysis Center

Sandia and UAF collaboratively aim to increase resilience across infrastructure and natural systems through modeling and analysis. The Center's efforts include:

- **Disaster planning:** to enhance planning and response in Alaska and the Arctic
- **Increased resilience:** to improve understanding of risks, adaptation, and engineered and social systems in Alaska and the Arctic to increase resilience
- **Long-term planning:** to adapt to changing climate and environmental conditions, new activities and land uses, and community transitions

Collaborative Arctic Station

A comprehensive, year-round, multi-disciplinary Arctic research station is planned at Oliktok Point to support cooperative scientific research.

Existing assets include:

- **Access:** 1km from the Arctic Ocean with year-round road access from the continental US
- **Controlled airspace:** Restricted and warning areas provide access to the airspace at Oliktok Point and 700 miles across the Arctic Ocean
- **Research support:** Seasonal logistics, operational support, and an unmanned aircraft systems facility

Planned features of the Arctic Station will include:

- **Collaboration:** Collaborative space for Arctic stakeholders, including federal agencies, local governments, industry, and universities
- **Ocean access:** A year-round road from the station to the shoreline will provide direct access to the ocean
- **Shared use:** On-site support equipment, an unmanned systems hangar, real-time observations, logistics, and lodging.



Contact:
Lori Parrott
lkparro@sandia.gov
(505) 844-2745