Sandia National Laboratories



North Slope of Alaska, Utqiaġvik

ADVANCING ENERGY, SCIENCE, AND SECURITY SOLUTIONS FOR ALASKA AND THE ARCTIC

ADDRESSING LOCAL AND GLOBAL ARCTIC CHALLENGES

Through our enduring presence and partnerships, Sandia advances Arctic energy, science, and security solutions. We work to ensure energy resilience with a focus on remote communities and critical infrastructure. Our researchers seek to resolve key scientific questions around the impacts of the warming Arctic, including characterizing methane releases from thawing permafrost using high-resolution, full system closure through measurement and modeling. In addition, Sandia also develops technologies and platforms to improve domain awareness. We ensure threats to existing and future national security missions are robustly and resiliently addressed in the Arctic, considering situational awareness, geopolitical tensions, Arctic environmental conditions, and human response to those conditions.

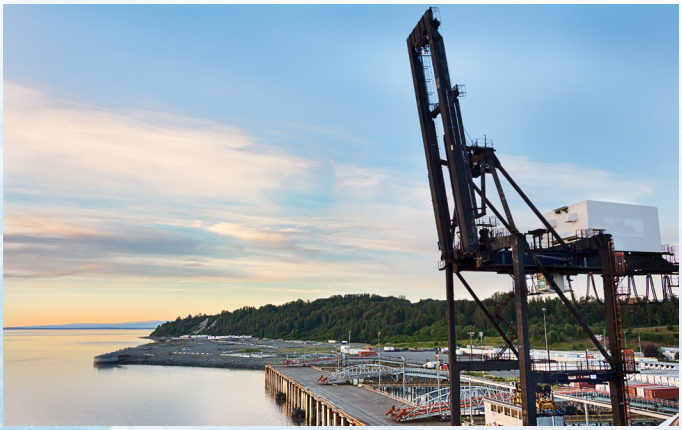


Sandia scientist Diana Bull examines a coastal permafrost bluff along the North Slope of Alaska

SECURE, SUSTAINABLE ENERGY

Sandia is leveraging decades of expertise to advance energy security and sustainability in Alaska. We apply advanced sustainable energy technologies to improve energy resilience in remote and harsh environments and ensure a secure energy future.

Sandia's sustainable energy projects include Port of Alaska grid resilience planning, renewable energy studies in the Upper Cook Inlet, photovoltaic research for Arctic deployment, and demonstrations of decarbonized transportation. Sandia is also committed to ensuring the safety and security of future nuclear energy system deployments in the Arctic.



Port of Alaska

All Alaska engagements are conducted in close partnership with the local communities, industry, and institutions, including the Alaska Center for Energy and Power (ACEP). In Cordova, Sandia partnered to advance grid resiliency through a Grid Modernization Laboratory Consortium (GMLC) project and also helped design, install and commission a new energy storage system to support hydro plant operation. Other examples include partnering with Alaska Village Electric Coop and the Village of St. Mary's to pilot an advanced power electronics system to reduce reliance on diesel fuel. Sandia's newest effort, BOOST, is bringing together national labs, startups, academia, and DOE-developed technologies to find solutions to community-based energy challenges.

Sandia National Laboratories



Cordova, Alaska

ARCTIC SCIENCE AND SECURITY

For over 20 years, Sandia has conducted Arctic research and development to advance the understanding of climate systems and ensure national security. Our deep science and engineering experience enables us to identify technical challenges, develop solutions, and partner and collaborate to address Arctic-specific science and national security concerns. Capabilities and expertise that facilitate and inform our Arctic initiatives include:

- Sandia-operated Arctic research facilities
- Arctic-capable measurement platforms, including tethered balloon systems and uncrewed aerial systems
- Airborne and satellite-based remote sensing
- Submarine and ocean acoustic monitoring
- Physics-based computer modeling, including regionally refined climate simulations and ice sheet, permafrost, and coastal erosion predictive models
- Testing and development of Arctic resilient technologies, including robust and ruggedized communications
- Situational awareness

SANDIA-OPERATED ARCTIC RESEARCH FACILITIES

Sandia operates two major Arctic research facilities in the North Slope of Alaska (NSA), one in Utqiaġvik and the other in Prudhoe Bay at Oliktok Point. We have over 25 years of experience supporting and conducting Arctic research operations for a wide variety of science and national security missions.

In Utqiaġvik, Sandia manages the Atmospheric Radiation and Measurement (ARM) User Facility NSA site on behalf of the DOE Office of Science Biological and Environmental Research (BER) program. The NSA observatory provides researchers with a unique and strategic window into the Earth's atmospheric processes at high latitudes.

Data collected at an ARM NSA facility is used to refine Earth system models and parameterizations as they relate to the Arctic. Interested researchers can propose new instruments and experiments for NSA by contacting BER.

Sandia's Oliktok Arctic Research Center (OARC) operates as a fee-based user facility available to the science and security communities for seasonal or year-round experiments and exercises. The OARC is located on U.S. Air Force property adjacent to the Arctic Ocean in Prudhoe Bay and access to the site is controlled.

The OARC provides an array of unique research capabilities, including a controlled airspace corridor that extends out over 1,200 kilometers from Oliktok towards the North Pole. Sandia maintains base meteorological and geophysical instrumentation, which can be extended by users in partnership with Sandia and the Air Force. Distributed acoustic and temperature sensors are deployed on a submarine communications cable, allowing high-fidelity monitoring over 40 kilometers out into the Arctic Ocean. The OARC can be accessed through daily flights to Deadhorse, or by road from southern Alaska and the Lower 48 via the Dalton Highway.



Arctic research facility at Oliktok Point, Alaska

CONTACT:

arctic@sandia.gov
energy.sandia.gov/programs/arctic

U.S. DEPARTMENT of ENERGY NNSA National Nuclear Security Administration

Sandia National Laboratories is a multimission laboratory managed and operated by National Technology & Engineering Solutions of Sandia, LLC, a wholly owned subsidiary of Honeywell International Inc., for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-NA0003525. SAND2025-06229M

Sandia National Laboratories