



ALPs – Arctic Lab Partnerships for Resilience and Security: DOE National Labs & University of Alaska Fairbanks

Alaska and the Arctic are changing and may be ice free for periods of time in the near future. Research and development are needed to address new threat networks and pathways emerging as sea ice and permafrost no longer provide structural support and access deterrence.

VISION

Together, U.S. Department of Energy (DOE) national laboratories with the University of Alaska (UA) bring research strength to the national concerns in Alaska and the Arctic. Only a partnership could leverage the combined assets of these S&T leaders to address long-term challenges of societal resilience and national security concerns in the face of natural and adversarial threats.

APPROACH

Four DOE national laboratories—Los Alamos National Laboratory (LANL), National Renewable Energy Laboratory (NREL), Pacific Northwest National Laboratory (PNNL), and Sandia (SNL) National Laboratory—are working with UA Fairbanks to establish an Arctic Lab Partnerships (ALPs) consortium. UA's main and rural campuses, field stations, and technical leadership provide an



**Sandia
National
Laboratories**



unparalleled wealth of Arctic insight and research capability, and broad/deep connections to the people and places of Alaska.

By working together, the national laboratories can harness their diverse and complementary strengths with UA leadership to address enduring national security and resiliency challenges while identifying economic growth opportunities for S&T developed in Alaska. The consortium can work as a coordinated entity with state and federal partners to identify gaps and priority research areas, leveraging insight offered by the multidisciplinary, trans-regional engagements.

CAPABILITIES

Together, the members of this consortium possess key capabilities that can enable Alaska to thrive:

Energy/Infrastructure Resilience	Earth System Science & Modeling	National Security
Micro grid modernization and energy storage	Atmosphere, hydrosphere, cryosphere, biosphere, and subsurface modeling	Nuclear deterrence, counter and nonproliferation
System design and optimization	Multi-scale integrated modeling for earth and human systems	Intelligence, surveillance, and reconnaissance
Modeling and analysis for all hazards	Interdependencies: Sociopolitical, risk, and economic analysis	High-performance computing, data science, and analytics to support modeling and aiding the warfighter
New materials for extreme conditions	Decision-relevant modeling at scales	Homeland security and border protection
Remote field operations	Anticipating future impacts through integrated modeling: energy, food, and water	Autonomous systems integration and security

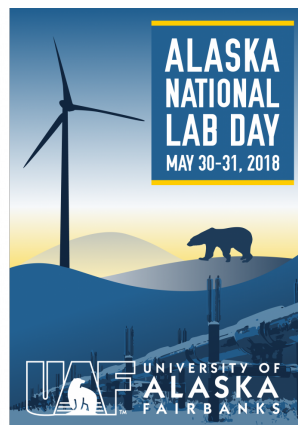
IMPACT

The partners are actively engaged in the growing discourse around Alaska/Arctic resilience. By participating in events such as the Alaska National Lab Day, American Geophysical Union, and the Arctic Circle Assembly, they seek to increase awareness and understanding of Alaska's unique energy-related resources, infrastructure, and environment and the ways national laboratories and UA can address Alaska's energy-related challenges.

Looking forward, key initiatives and opportunities for this consortium to pursue include:

- **Blue Economy** with early priorities addressing sensor development/deployment, communications and data system, local systems for power, and heat and local manufacturing.
- **High Arctic Research Center** to leverage ongoing work with unmanned systems, networking distributed research stations, oil/gas extraction, and expanding northern maritime traffic.
- **Arctic Infrastructure Resilience** focusing initially on assessing and enhancing defense and civilian infrastructure security and surety.

- **Grid Modernization Lab Consortium** with an emphasis on resilient, multi-resource electrical grid technology and its integration, microgrids, and battery storage.



Alaska National Lab Day brought together UA and DOE national laboratories to explore research collaboration opportunities to build energy solutions for the changing Arctic.

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