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Arctic Infrastructure Research Group (AIRG) & Arctic Infrastructure Research Center (AIRC)

Securing America's Arctic Advantage

The Arctic is rapidly emerging as a strategic frontier. Melting lake and river ice, thawing permafrost, changing coastlines, and intensifying great-power competition are reshaping the region's importance. For DoW, the challenge is clear: **how to operate, survive and dominate in one of the harshest environments on Earth.**

- **The Environment:** -65°F temperatures, high winds, snow and unstable ground.
- **The Threat:** Infrastructure gaps that undermine mobility, force projection and long-term sustainment.
- **The Requirement:** Expeditionary and semi-permanent infrastructure that keeps warfighters safe, agile and mission ready.

Why It Matters

The 2021 U.S. Army Arctic Strategy requires formations equipped to operate at extreme cold for multiple days. Current DoW infrastructure is not fully designed for Arctic extremes—especially thawing permafrost that destabilizes foundations. Without purpose-built systems, U.S. forces risk slowed deployments, costly infrastructure failures and reduced readiness.

Bottom line: Arctic demands infrastructure that is engineered for survival and speed.

Our Approach

ERDC stood up AIRG and AIRC to directly close this gap.

Arctic Infrastructure Research Group (AIRG):	Arctic Infrastructure Research Center (AIRC):
• Established in 2020 as a DoW-wide forum • Includes members from all military branches and international collaborators from other Arctic nations • Meets monthly to classify needs, identify gaps and accelerate solutions	• Located in Fairbanks, Alaska on 134 acres of DoW land • Provides full-scale realistic testing and experimentation • Equipped with roads, power, fiber optic lines, experimental embankments and test pads • Supports rapid prototyping and evaluation of technologies under real Arctic conditions

The U.S. Army Engineer Research and Development Center (ERDC) solves the nation's toughest engineering and environmental challenges. ERDC develops innovative solutions in civil and military engineering, geospatial sciences, water resources, and environmental sciences for the Army, DOW, civilian agencies, and our Nation's public good. Find out more on our website: www.erdc.usace.army.mil.

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Key Objectives

- Provide a DoW-wide platform to collaborate and solve Arctic infrastructure challenges.
- Develop and test next-gen cold region technologies including cold-resistant insulation, flexible foundations, efficient scalable power, Arctic pavements and advanced sensing.
- Deliver scalable solutions for expeditionary, semi-permanent and permanent installations.
- Inform DoW and Army Arctic strategies with actionable science and engineering.

The Benefit

- **Mission Readiness:** Ensure Arctic-capable forces can deploy, survive and operate in extreme cold.
- **Infrastructure Resilience:** Prevent costly failures by designing systems adapted to thawing permafrost.
- **Technology Advancement:** Enable breakthrough solutions in energy, materials, sensing and water systems.
- **Strategic Advantage**: Give U.S. forces the edge needed to compete and win in the Arctic.
- **Speed to Field**: Full-scale testing shortens the lab-to-warfighter timeline.

ERDC's Arctic Advantage

- **Cross-disciplinary expertise:** ERDC's seven laboratories deliver integrated science—from cold regions engineering to mobility, energy and water systems.
- **Realistic testing:** AIRC enables experimentation in true Arctic conditions.
- **DoW-wide impact:** AIRG ensures alignment across services and mission sets.
- **Dual-use solutions**: Civil Works and Homeland Security applications extend beyond the military.

The Bottom Line

The Arctic Infrastructure Research Group and Arctic Infrastructure Research Center are the DoW's premier platforms for closing Arctic infrastructure gaps. Together, they deliver the science, engineering, and real-world testing required to protect U.S. interests, ensure mission success, and maintain Arctic dominance.

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