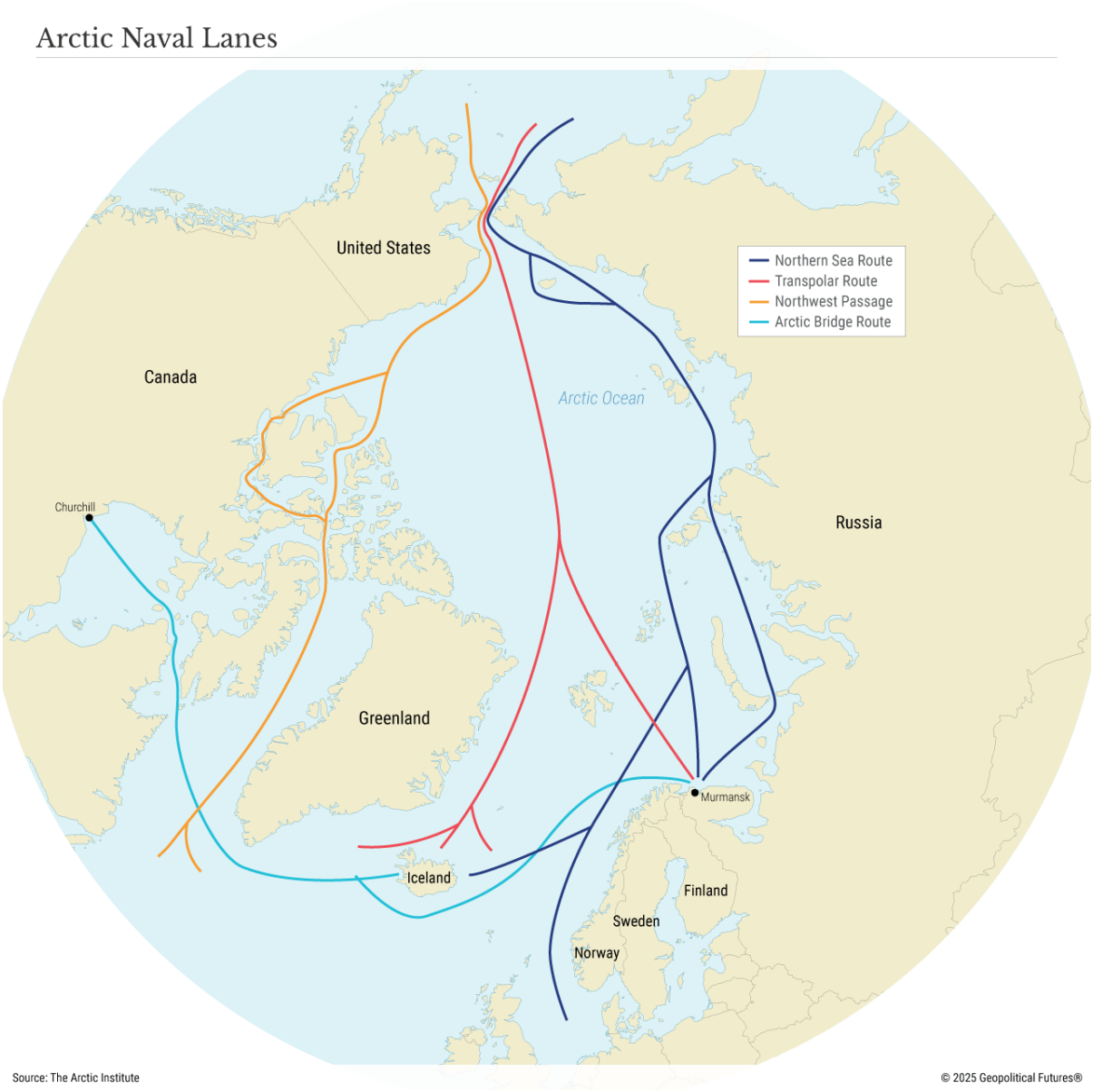
Military Challenges and Opportunities in the Arctic

by Andrew Davidson - March 12, 2025

The U.S.-Russia talks to end the conflict in Ukraine are really about **redefining the overall U.S.-Russia relationship**, a process that will require both to review their interests in all manner of regions and domains. One such region is the Arctic. Long thought to be a peripheral geopolitical issue, the Arctic has become much more accessible to passage and exploitation, so countries that border the region have had to devise military strategies to address these new economic and security concerns. The problem is that success in the Arctic requires special equipment, infrastructure and training far beyond what most militaries are accustomed to. What works in some regions will not necessarily work in the Arctic, making it imperative to develop and deploy purpose-built systems designed to withstand the region's unforgiving environment.

The biggest impetus for the Arctic's newfound relevance is its newfound accessibility. As Arctic ice retreats, the annual period of navigability for the Northern Sea Route and the Northeast Passage has significantly expanded, and the future of the Transpolar Sea Route is looking similarly promising. Once open for perhaps as long as a month, the NSR is now able to accommodate nearly three months of unrestricted passage without vessels having to traverse the sea ice zone. These routes significantly reduce shipping times to and from Asia, Europe and North America. A journey from the Asia-Pacific to Europe through the Suez Canal takes 22 days. Through the Arctic, it takes just 10. However, the rise in maritime traffic brings new risks, including security threats, piracy and the need for stronger territorial control. Ensuring the safety of these shipping lanes requires military oversight from Arctic nations. This need is compounded by the fact that as ice recedes, so too do some of the natural barriers that insulate Arctic nations from one another.



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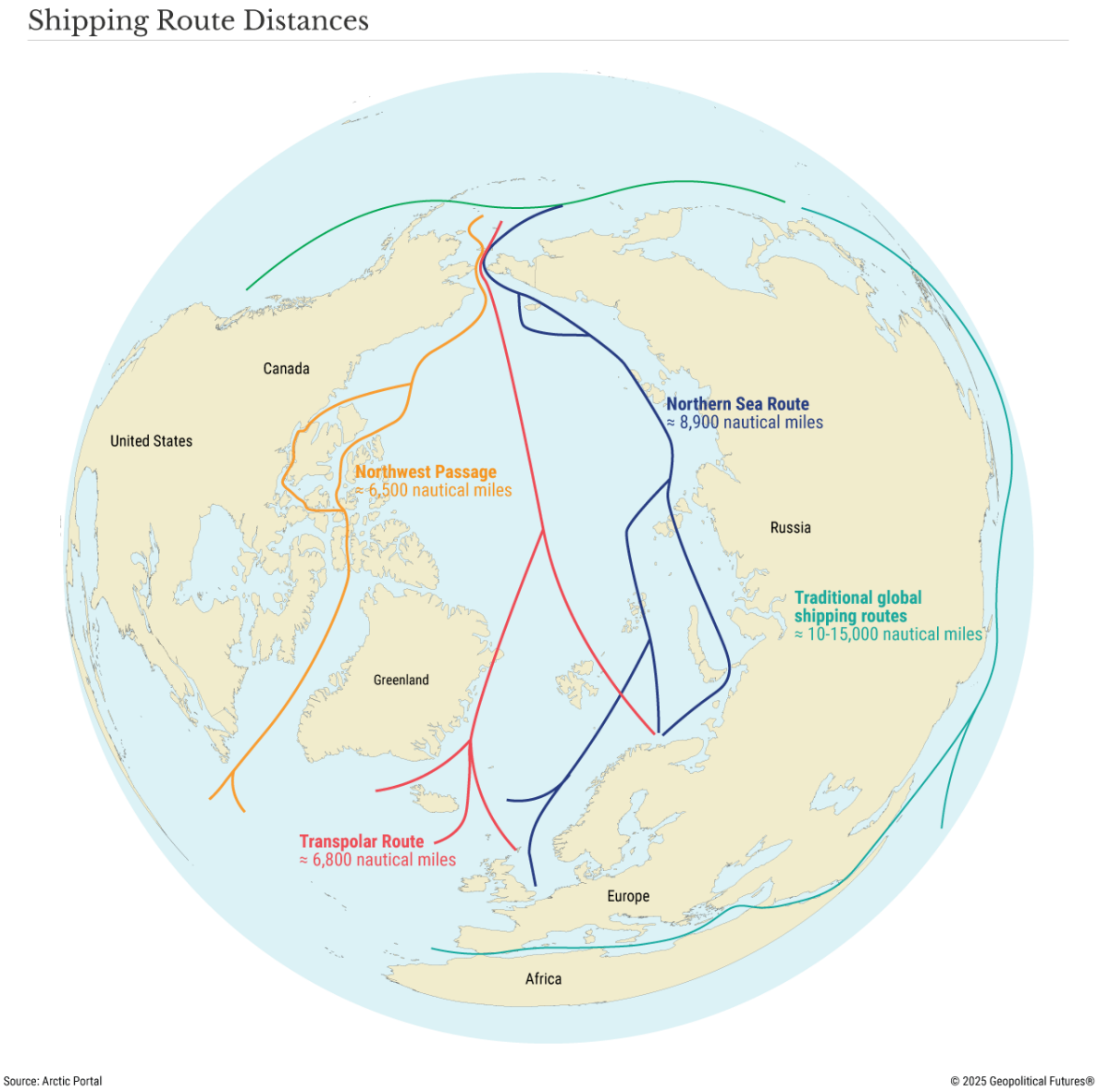
Meanwhile, advancements in technology have made it easier to access the Arctic's vast reserves of oil, natural gas and rare minerals. Improved icebreaker ships with advanced hull designs and stronger propulsion systems now allow year-round navigation in previously inaccessible waters, while enhanced seismic imaging and offshore drilling technologies, such as extended-reach drilling, enable more efficient extraction of resources beneath the ice-covered seabed. (Ice sheets can be anywhere from six to 15 feet thick.) As these extraction capabilities progress, the economic incentives to secure these valuable resources grow, leading to heightened tensions over territorial waters and exclusive

economic zones. And that is to say nothing of the competition over fishing rights and maritime boundaries, which will further aggravate geopolitical disputes as nations seek to protect their access to vital food sources and revenue streams. Even countries outside the Arctic, namely “near-Arctic” nations such as China, will get in on the competition.



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In addition to its economic benefits, the Arctic offers unique military opportunities. For example, its geographic position is an advantage for polar-orbiting satellites, which are essential for global

communication, surveillance and missile defense systems. As military reliance on satellite-based technologies grows, access to Arctic infrastructure, including Arctic-based satellite stations, will become a necessary adjunct to space monitoring capabilities. Moreover, the Arctic sits along the fastest air route from Asia to North America – meaning, it sits along the fastest route for intercontinental ballistic missiles and strategic bombers flying from one side of the world to the other. It can thus play a vital role in early warning systems to potential threats.

However, operating in the Arctic will be extremely challenging. The intense cold, permafrost and ice-covered waters create difficulties for personnel and equipment alike. Soldiers must be trained to endure freezing conditions, while vehicles, weapons and aircraft must be modified to function reliably in subzero temperatures. Seasonal variations also complicate military operations; the Arctic experiences months of continuous darkness and months of 24-hour daylight. These unique conditions affect tactical decision-making, surveillance and overall operational effectiveness. The region is so remote that energy infrastructure is woefully underdeveloped, leaving 80 percent of communities in the Arctic reliant on diesel. The harsh climate also has an outsized impact on long-term infrastructure and logistics.

Indeed, infrastructural challenges will hamper any effort to sustain military operations. There are only a few permanent military bases in the Arctic, and resupply options are scarce. Unlike in other military theaters, Arctic forces must operate with a high degree of self-sufficiency, relying on prepositioned supplies and strategic airlifts to maintain readiness. Overland transport is a major challenge as ice, snow and a lack of developed roads make movement difficult and slow. The region's remote nature also affects communication networks, which will require an increased dependence on satellite-based systems and high-frequency radio for secure and effective military coordination. Yet even these are problematic because of the poor conductivity of frozen ground and the magnetic and solar phenomena in the region. Then there is the issue of cybersecurity. Arctic-based networks are vulnerable to attack and have limited access for timely repair and support. All this makes the region extremely expensive to operate in. Transporting fuel, food and supplies to Arctic bases requires extensive logistical planning and financial investment. Nations with Arctic interests will have to weigh the economic feasibility of long-term military presence in the region, balancing national security priorities with the financial costs of Arctic deployment.

A strong Arctic military strategy therefore depends on integrated naval, air and space operations. The navy plays a crucial role, but in the Arctic's harsh and remote conditions, a multidomain approach is essential. Naval forces secure key waterways and project power, while air and space assets provide surveillance, rapid mobility and early warning.

Naval operations in the Arctic require specialized maintenance and rapid-deployment strategies that account for sudden weather changes affecting visibility and mobility. Submarines offer stealth and strategic deterrence, and with expertise operating under ice, they can bypass traditional security measures and use the ice to conceal movements. Additionally, anti-submarine warfare in the Arctic is uniquely challenging due to ice-induced acoustic distortions, requiring advanced sonar and detection tactics. Nuclear-powered icebreakers are vital as well, for both military and commercial activities. They can traverse ice up to nine-feet (nearly three-meters) thick, twice as much as diesel models, which also require refueling. However, nuclear-powered icebreakers are costly to operate and maintain, and only Russia possesses them. In fact, Russia leads the world in Arctic military development. Moscow has reopened Arctic bases and expanded its Northern Fleet, while competitors' limited deepwater ports restrict naval resupply and support capabilities, highlighting the need for expanded infrastructure.

Air assets enable intelligence collection and surveillance, rapid response and logistical support, but again Arctic conditions bring unique difficulties, such as requiring specialized maintenance and equipment. To prevent low temperatures from solidifying fuel, most aircraft must operate below 10,000 feet, where they are easier to detect and target. Cold weather affects engine performance and can threaten aircrafts' structural integrity, reducing their operational range and increasing the risk of mechanical failure. Unmanned aerial vehicles would seem an obvious substitute but require modifications to survive prolonged missions in extreme cold. For example, low temperatures reduce the lifespan of lithium-based batteries commonly used in drones. Finally, existing GPS systems are inaccurate in the Arctic because their orbital patterns typically remain below 55 degrees north latitude.

And for obvious reasons, ground operations in the region are severely limited. Frostbite can occur in under 15 minutes at the winter average of minus 25 degrees Fahrenheit (minus 31.7 degrees Celsius). On winter nights, temperatures can reach minus 50. The additional gear needed to survive this environment slows ground forces' movement. Snow blindness reduces visibility, while the cold backdrop enhances thermal targeting optics and leaves infantry exposed. Military vehicles require specialized tracks. As a result, rather than engaging in conventional combat, Arctic ground forces support long-term operations by maintaining infrastructure (especially communication networks, radar stations and early warning systems), securing bases and providing logistics for naval and air forces. Indigenous and local community cooperation provides valuable insights that improve reconnaissance and operational effectiveness, as seen in Canada's Arctic policy.

The Arctic's rising geopolitical and military significance demands tailored strategies. The opening of sea routes will shift focus to critical access points such as the Bering Strait. Further militarization,

strengthened alliances and advancements in surveillance and defense systems are all likely, shaping the region's role in global security for years to come.

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