



The Arctic is a hallmark of Canadian identity; the tundra landscape and the frigid temperatures are a point of pride for the resilient and frosted Canuck. In fact, Arctic territory makes up 40% of Canada's sovereign land and the Northern Arctic coastline is a key facet of Canada's borders¹. Canada has also pursued further Arctic territory recognition through its 2019 submission to the Commission on the Limits of the Continental Shelf at the United Nations. In addition, there are 200,000 people, the majority of whom are Indigenous, who live in the Arctic. The Arctic is an essential part of Canada's economy as well as its identity with the famous Northwest passage flowing through the islands of Nunavut and monitored by Canadian Rangers and other search and rescue teams². As a result, the Arctic has become a beloved and vital part of Canada's nationhood and statecraft—one which it places high priority on protecting^{3 4}.

Concerningly, threats to the Arctic are on the rise. The most traditional of these threats include Russian and Chinese posturing and dual-use, meaning it can respond to both civil issues and security threats, development of former Cold War bases, new missile systems, and monitoring buoys. In particular, the Russian invasion of Ukraine has straightened the spines of other Arctic nations concerned about their own sovereign and contested lands being targeted. However, threats from other states are not the only concern in the



The existing Canadian Northern strategies have all been released in the past five years. The first framework, outlining the basics of how Canada seeks to treat the Arctic, is *Canada's Arctic and Northern Policy Framework*. The strategy does not just outline the sovereign security of the Arctic but also the development of the region as a whole. The North American Aerospace Defense Command (NORAD) has also released an *Executive Strategy* to modernize the alliance to protect the Arctic and its subsequent planned development⁵. The Arctic is also a consistent theme in the latest Canadian Defence Policy update, *Our North, Strong and Free*. Lastly, the Canadian senate recently released a report entitled *Arctic Security Under Threat* which analyzes the security and climate implications of the region. Notably missing from these documents are specific answers to the intelligence collection approaches of Canadian adversaries.

Russia, as a prominent Arctic state, has pursued an assertive Arctic policy aimed at expanding its territorial claims and securing access to strategic resources. The Russian military has modernized its Arctic infrastructure, establishing military bases and conducting large-scale military exercises in the region¹⁹. These actions underscore Russia's commitment to safeguarding its Arctic interests and projecting power in the North.

In the cyber domain, Russia has been accused of engaging in state-sponsored cyber operations targeting Western democracies, including Canada²⁰. Russia has employed cyber espionage, disinformation campaigns, and disruptive cyber attacks to influence public opinion, undermine democratic processes, and gather sensitive information about both its partners and adversaries²¹. The integration of cyber capabilities into Russia's broader geopolitical strategy highlights the dual use of technology for both defensive and offensive purposes.

Similarly, China has emerged as a significant player in Arctic affairs and cyberspace. Despite not being an Arctic state, China has shown interest in the region's economic potential and maritime routes. Through its Belt and Road Initiative (BRI), China seeks to enhance infrastructure connectivity and expand global trade networks, including Arctic shipping routes²². This economic ambition aligns with China's broader strategy of global influence and resource acquisition.

In cyberspace, China has been accused of conducting cyber espionage against Western countries to steal intellectual property, gain technological advantage, and influence global governance structures²³. The integration of cyber capabilities into China's foreign policy toolkit reflects its growing assertiveness in international relations and its willingness to challenge established norms and institutions.

State adversaries' involvement in Arctic and cyber realms underscores the complex interplay between geopolitics, technology, and national security. Understanding these dynamics is essential for Arctic Council members and other stakeholders to navigate challenges, mitigate risks, and promote cooperative solutions in both Arctic and cyber domains.

The increased relevance of Arctic and cyber politics in the 21st century reflects profound shifts in global dynamics driven by climate change, technological advancements, and geopolitical rivalries. The Arctic Council serves as a critical platform for multilateral cooperation among Arctic states, despite challenges posed by environmental changes and geopolitical tensions. Canada, as a middle power, faces cyber vulnerabilities that intersect with its Arctic interests, highlighting the interconnected nature of contemporary international politics. State adversaries, such as Russia and China, leverage Arctic and cyber domains to advance strategic interests and influence global governance, underscoring the importance of addressing these multifaceted challenges through diplomacy, innovation, and international cooperation.

The Arctic is set to benefit from NORAD's \$38.6 billion modernization plan, with a new Over-The-Horizon radar, expanded military infrastructure, and other critical infrastructure developments tied to quality of life of local civilians working on such developments and service members posted to maintain them. In addition to this development, procurement operations for ground-based air defences and new ships for the Royal Canadian Navy are underway²⁴. There are noted risks in Canada's NORAD and Northern strategies, including

the continual issue of climate change as well as adversarial nations with which Canada and the United States are actively competing^{25 26}.

The name of the game in the Arctic is surveillance, and at present the combination of a lack of investment in NORAD and the effects of climate change are putting Canadian territory into positions vulnerable to foreign spying. There have been previous records of state-sponsored Russian and Chinese attacks on Canadian infrastructure that is far more protected than its Northern counterparts²⁷. The reactivation of Russian Cold War bases and increased investment in Chinese Arctic technology make it clear that Canada's primary adversaries are interested in the movements of NORAD and NATO ally behaviour in the North. While Canada's Five Eyes allies are vital to its surveillance prevention, only the United States is a pertinent Arctic ally²⁸. As a result, NORAD's investment in security is Canada's most logical pathway towards the new era of climate change-informed surveillance and intelligence in the Arctic.

Climate change has directly impacted the ability of Canada's adversaries to make headway in the Arctic: the continual melting of ice has made the Arctic increasingly accessible, and the current military infrastructure is remnant of the Cold War. The new military infrastructure required must be dual-use. This can be done through simultaneously providing for the local Arctic population and coordinating with their knowledge of the region to preserve the ecosystem. A better-preserved ecosystem will mean that the infrastructure required will not be harmed by extreme weather. Critical infrastructure like energy, food services, further healthcare, and more communications technology are all needed to increase the quality of life and the quality of service for both citizens and service members in the Arctic. Part of this process will require the essential protection of new critical infrastructure from potential attacks which is complicated by the fact that these kinds of critical infrastructure are made vulnerable by climate change, thus making them easier targets for adversaries^{29 30}.

For Canada, the biggest risk to infrastructure developed through its Arctic strategies is extreme weather. Climate change in the Arctic has increased extreme weather events which pose distinct challenges to critical infrastructure projects and emergency management. For instance, infrastructure that is not cold weather resilient has less of a livelihood in Arctic temperatures. Thus, Canada is presented with the challenge of developing critical infrastructure constantly at risk for damage and targeting by both climate change and adversaries.

Given

Canada's vulnerability to cyber threats in its Arctic territories, it is crucial to bolster cybersecurity infrastructure and resilience in these remote areas. This could involve:

- Increasing investment in cybersecurity resources specifically tailored for the Arctic regions.
- Establishing specialized cybersecurity training programs and support for local communities and businesses.
- Implementing comprehensive monitoring and response mechanisms to detect and mitigate cyber threats effectively.

2.

- Implementing robust mechanisms to safeguard intellectual property and sensitive information exchanged with allied countries.
 - Promoting transparency and accountability in scientific and technological collaborations to mitigate risks of exploitation or misuse of shared knowledge.
7. **Addressing the Issue of the Continental Shelf:** Canada should continue to assert its sovereign rights over the continental shelf in the Arctic region through diplomatic and legal channels. This includes:
- Strengthening scientific research and data collection to support Canada's claims to extended continental shelf areas in the Arctic Ocean.
 - Engaging in negotiations and dispute resolution processes under the United Nations
