



A CC-138 Twin Otter from 440 Transport Squadron, Yellowknife takes off from base camp on Little Cornwallis Island, Nunavut during Operation NUNALIVUT, April 10, 2016.

Photo: P02 Belinda Groves

U.S. & Canadian Airpower and the Future of the Arctic—Rethinking Existing Paradigms:

Reflections from the Ted Stevens Center for Arctic Security Studies

MAJOR-GENERAL, USAF (RETIRED) RANDY “CHURCH” KEE, CODY DEES, AND HANNAH SMITH

Major-General Randy “Church” Kee, United States Air Force (retired) was appointed as the Director of the Ted Stevens for Arctic Security Studies in December 2023. Prior to this position, he served as the TSC Senior Advisor, Arctic Security Affairs and established early operations for the Center at Joint Base Elmendorf-Richardson, Alaska. His distinguished 30-year military career has taken him through several leadership roles and staff assignments and also include service as a command pilot with 4,700 flying hours. He holds three master’s degrees. Following his military service, he held a Presidential appointment to the US Arctic Research Commission and was the Executive Director of the Arctic Domain Awareness Center at the University of Alaska Anchorage.

Cody J. Dees is a Professor of Security Studies at the Ted Stevens Center and previously served as an Air Force 1A8 (Linguistic Cryptologist). Dees holds an interdisciplinary PhD in Second Language Acquisition and Teaching, and his work pioneered values theory. He used his academic background and experience with education program administration to modernize the Defense Language Institute English Language Center. Residing in Anchorage, AK, he enjoys various artistic pursuits.

Hannah Smith joined the Ted Stevens Center in February 2023 as a Strategic Communications Specialist. Prior to joining the Stevens Center, Smith worked as an Academic Specialist for the College of International Security Affairs at the National Defense University and as a Strategic Communications Consultant. Smith holds a Master of Arts in Security Studies with a concentration in Military Operations from the Georgetown University Walsh School of Foreign Service as well as a Bachelor of Arts in Political Science from Dickinson College.

U.S. & Canadian Airpower and the Future of the Arctic—Rethinking Existing Paradigms

What do we defend? Why should we defend it? How can we defend it? The future of defence of the North American Arctic begins with asking these three strategic questions and ends with searching for possible answers.

This article is the culmination of over 30 years of experience of a USAF pilot and former navigator—who also served in strategy and policy on the Joint Staff in the Pentagon and in Combatant Commands—combined with the contributions of a scholar and a strategic communicator. In authoring this work, we recognize the priority of defending the American and Canadian homelands in North America from armed attack, and that we need to get it right.

A Foreboding Future

Consider the following scenario set in the year 2050. For approximately 10 months of the year, the Arctic waters surrounding Nunavut and the Northwest Territories in Canada are free of ice and relatively easy to navigate. Accelerated permafrost thaw and changing soil stability could make it possible to build new infrastructure. These climatic factors are facilitating the discovery of valuable mineral deposits, and causing populations across the Far North to expand.

Still, operating in the Arctic environment is challenging due to low temperatures, difficult weather, and a lack of support capabilities and infrastructure. Even after accounting for these variables, aerial platforms must still overcome physical distance. Warmer air, higher seas, and more violent weather may challenge operators in ways not previously experienced in the region.

The greatest driver of conflict for democracies stems from antagonistic behaviour by adversarial states attempting to keep international tensions high in hopes of maintaining domestic control. Consequently, North Atlantic Treaty Organization (NATO) and North American Aerospace Defense Command (NORAD) defence pacts remain more important than ever for their members. A perpetually agitated security state has emerged due to an increasingly global divide between NATO-aligned countries and those under the sway of a union of illiberal states that includes China, Russia, North Korea, and Iran. Constant posturing and challenging of NATO's borders keep tensions high and drive

investment in new military capabilities on both sides. This has led to considerable advances in maritime and aerial denial technologies which are so plentiful and lethal that penetrating defended domains are no longer feasible with crewed platforms and is largely avoided.

The scientific community warns of a warming Arctic, geophysical changes in the high latitudes, and geopolitical trends that make future scenarios such as the one described above a fairly realistic projection given today's trajectories. Why does this matter? What are the potential catalysts for change, to alter our trajectory away from such undesirable future conditions? Looking at motivations instead of actions, we see that much of the future scenario above is motivated by climate shifts that increase access to northern latitudes, which are wholly unprepared for dramatic shifts in population and resource extraction. This commentary will discuss these trends as they pertain to developing a new, robust defence of the North for Canada and the United States.

From the Future to the Present

Despite heightened tensions globally, the Arctic remains a region characterized by stability and security. European security continues to be strained due to a now two-year-old war launched by Russia against Ukraine. This conflict has shaken the European security landscape, but the crisis has not yet spread into the Arctic. However, Moscow and Beijing are increasing their military cooperation in the air and on the sea in and near the Arctic region.

The People's Republic of China (PRC) has launched significant efforts to expand the size and scope of national interests to the Arctic, causing Canada, the United States, and many European Allies within NATO to become concerned about the rising Arctic ambitions of the PRC. However, defending national interests in the Arctic has never been easy, or cheap.

In consideration of previous assertions related to a warming Arctic, climate risks in the higher latitudes will eventually become reciprocal climate realities in the lower latitudes. Even if we successfully mitigate such eventualities, NORAD and NATO member states will still need to consider what kind of defence force will be relevant to the operational threat environment of the future Arctic—not only to protect national and allied interests, but also the freedoms of citizens.

“ Even today, the Arctic is not a completely barren wasteland of snow and ice, inhabited by the occasional polar bear or two. While sparsely populated, the region hosts hundreds of thousands of U.S. and Canadian citizens in an area roughly equivalent in size to Europe.”

Even today, the Arctic is not a completely barren wasteland of snow and ice, inhabited by the occasional polar bear or two. While sparsely populated, the region hosts hundreds of thousands of U.S. and Canadian citizens in an area roughly equivalent in size to Europe. Yet the distances between settlements and environmental challenges make it difficult to undertake traditional campaigns utilizing capabilities such as navies and armies to capture and hold territory.

This is why the former Commander of NORAD and USNORTHCOM, General Glen VanHerck, stated in his congressional testimony that the Arctic is an avenue of approach that adversaries can readily access to attack through strategic airpower.¹ Threats to North America through this approach include attacks by ballistic and long-range cruise missiles, the latter principally launched from bomber aircraft. While the ability to detect and defeat these systems remains an enduring challenge, detecting



A polar bear is spotted on the ice from HMCS MARGARET BROOKE, in the Davis Strait during ice trials on March 01, 2022.

Photo: S2 Taylor Congdon

and responding to defeat missile attacks is ever more vexing due to the development of hypersonic systems and small-target-size missiles.

Furthermore, if the international community is unable to arrest global climate change, it threatens to expose the Arctic to international competition over increasingly accessible settlements and previously unattainable natural resources. As communities grow and become more accessible, their potential as staging bases for military operations grows for both allies and adversaries. They may be able to support larger units than what is presently possible, which in turn could project larger forces in the surrounding area. Whereas once only missiles, aircraft, and submarines operated in the region, in the future, more permeating capabilities such as surface vessels or even land forces will play a more significant role. Furthermore, greater international competition over resources may also place northern sovereignty at risk as foreign states may seek to control these resources for their interests.

In addition to these environmental factors, rival states are becoming more sophisticated, which may reduce our ability to assess the threats, risks, and/or capabilities we may be confronted with in the near future. As of yet, there is no roadmap to address the challenge of adversaries, which puts Canada and the U.S. at risk of being unable to defend their respective homelands.

So, we cannot count on nature to be an enduring deterrent to adversarial forces by barring access to our shores. We must therefore assess needs and pioneer new defence force capabilities to deny adversarial access to sovereign U.S. and Canadian air, land, and sea space. This requires leveraging new and emerging technologies in the fields of sensors, communications networks, quantum computing, artificial intelligence, machine learning, and remote and/or autonomous weapon systems. In sum, we must resolve the comprehensive defence and network capability deficits, which are strategic vulnerabilities that can be exploited by the advanced posture of Canada's and the U.S.'s strategic competitors.

Searching for New Responses to Defending the North

The Arctic theatre has long been an afterthought compared to the Middle East or Indo-Pacific. No one state can fortify it alone. By examining the current challenges of the operating environment and considering the potential future capabilities/sophistication of potential adversaries, the U.S. and Canada, as the closest of allies, may collaboratively design, program, and field a new defence paradigm that is capable of deterring future aggression, and should deterrence fail, effectively defend the North American homelands.

A next-generation strategy is a function of sufficient resources to support creating and fielding next-generation technologies. Without a breakthrough to create more affordable

defence approaches, levels of assumed risk will elevate in proportion to the limitations of national budgets. As such, allied states will need to find approaches to national defence that are more sustainable than current practice. The cost of defence is high, especially in the Arctic, given the region's challenging environment and associated infrastructure costs. Costs will only increase as more advanced technologies are required, which limits the ability of states to field a defence capability programmed to defend against and defeat today's and tomorrow's sophisticated attack forces. In other words, the potential to deter competitors becomes much weaker without sustainability being programmed into defence plans and capabilities. Therefore, tomorrow's RCAF, USAF, and, potentially, NATO Air Forces will need to address the right capability, at the right force size, and at the right price.

Defending the North American Arctic today is largely a combined Air Force mission, supported by the now-autonomous Space Force. Naval and land forces also contribute and assist with securing northern borders against invasion. Canada and America's focus on Arctic defence has long been its bi-national military command, NORAD. Since the 1950s, NORAD has been operating as a defence system to monitor, characterize, and respond to airborne threats to North America. While primarily defending the homelands of Canada and the United States from air attack, it also monitors maritime approaches, including those from the Arctic. Yet for NORAD to continue to play an important role into the future, it must reform itself to better address changing threats to the region.

Although F-22s and F-35s represent the most advanced fighter aircraft in the Western world, victory is not at all assured. China and Russia are both developing and fielding advanced systems that strive to narrow the technological gap. However, the North American Arctic approaches are an unlikely location for classic aerial dogfights in a future contest. This raises the question: Are advances in fighter technology really the most effective solution to the looming problem? Instead, what may matter most is the ability to deter, defend against, and defeat non-traditional forms of attack, as well as those seen in traditional warfare.

The concept represented by the F-35 and F-22 generation of aircraft may well be supplanted in the future. The U.S. Air Force is openly contemplating future fight constructs wherein force packages will consist of crewed planes providing tactical command and control to dispatch unmanned weapon platforms to swarm enemy attackers. When envisioning a 6th generation force to defend the homelands, which includes the ability to contend with the challenges of the North American Arctic, we need rigorous analysis of future designs and to ask challenging questions that focus on the "what's" and "how's" of defence.

Since the 1970s, the U.S. Air Force has considered a "high-low" mix of more expensive platforms in smaller numbers, complemented by less expensive platforms in greater numbers. This trend will likely remain constant as today's RCAF capabilities evolve to suit tomorrow's needs. We can therefore safely assume that the Air Force required to fight tomorrow's wars will need to be mostly, if not fully, unmanned. Yet, this raises a strategic question: What happens when crewed aircraft serving in tactical command and control of unmanned platforms become an unnecessary risk in a highly kinetic environment?

As the RCAF (and USAF) consider future defence challenges for the Arctic, perhaps one useful approach is to arrange mission needs, existing solutions, required infrastructure, on-the-horizon research knowledge, known capability gaps, and future resources to contend with the threat and derive a comprehensive solution that is useful for homeland defence overall, which includes defending the Arctic.

Conclusion

When envisioning the future and attempting to understand what kind of challenges the U.S. and Canadian Air Forces will need to defend against in the future, the key lies in understanding how threats are evolving. Efforts must start with analyzing the associated risk and respective vulnerabilities of competitors and potential aggressors. Appreciating the future of aerial defence also involves threat vectors not previously seen in the Arctic, across the maritime, land, and even orbital domain.

Predictions are difficult, especially when they involve a nuanced combination of geophysical and geostrategic futures. Still, the enduring need to design, field, and maintain a networked set of capabilities that deter, dissuade, and if necessary, defend against and defeat North America's would-be attackers remains of paramount importance. Canada and the U.S. share a primary national interest: the enduring freedom and security of our respective citizens, regardless of the challenges posed by an increasingly unpredictable enemy in an unknowable but increasingly volatile and uncertain (Arctic) future.

Notes

- 1 *United States Southern Command and United States Northern Command Testimony before the Senate Armed Services Committee*, 117th Cong. (2021) (statement of General Glen VanHerck, Commander, U.S. Northern Command).