

## **NORAD: Beyond Modernization**

**Andrea Charron, PhD  
Jim Fergusson, PhD  
Centre for Defence and Security Studies  
University of Manitoba  
31 January 2019**

**With  
Joseph Jockel, PhD  
Chris Sands, PhD  
Joel Sokolsky, PhD**

**All comments/corrections should be directed to  
[Andrea.Charron@umanitoba.ca](mailto:Andrea.Charron@umanitoba.ca)**

**Funded by a Targeted Engagement Grant awarded by  
the Canadian Department of National Defence**

## Table of Contents

Executive Summary.....	3
About the Study.....	4
Introduction and Historical Overview.....	6
Chapter 1: The Geopolitical/Strategic Environment and the Rise of (Near) Peer Competitors .....	11
Chapter 2: NORAD Command and Control .....	15
NORAD CFACC.....	20
Chapter 3: Arctic Modernization .....	24
Chapter 4: Maritime Control/Air Control .....	37
Chapter 5: From Air to Aerospace .....	44
Chapter 6: Political Considerations.....	53
Chapter 7: Summary of Findings.....	60
Bibliography .....	65
Appendix A: Acronymns and Definition.....	69
Appendix B: Approximate U.S. UCP AORs with NORAD’s Aerospace Capabilities’ Reach.....	73
Appendix C: NORAD Regions.....	74

## Executive Summary

This analysis examines current and future issues facing the binational command within the context of the Permanent Joint Board on Defense (PJBD) mandated Evolution of North American Defense (EvoNAD) study. It critically examines the three primary areas of North American defence concerns: the modernization of the North Warning System (NWS), plans for a new NORAD Combined Forces Air Component Commander (NORAD CFACC), and other issues related to the EvoNAD study ongoing by NORAD, Canadian Joint Operations Command (CJOC) and U.S. Northern Command (USNORTHCOM). In addition, it provides political context for these issues in terms of the threat environment, sovereignty considerations on both sides of the border, political and organizational barriers to change, and the tri-command relationship.

The main conclusions of this study are as follows:

- 1) NORAD remains the primary driver of North American defence adaptation;
- 2) It is vital Canada and the U.S. remain fully engaged in NORAD Modernization, North Warning System Renewal, and adapt to the continental threat environment (for example, the sea-launched cruise missile threat);
- 3) Canada and the U.S. need to maintain close attention to the multi-domain threat environment - including cyber, next-generation weapons and terrorism as well as remain abreast of the all-perils threats to North America, and the evolution of the procedures, capabilities and cooperation required to meet these threats head-on.;
- 4) There are still questions regarding the role of the NORAD CFACC (Combined Forces Air Component Commander) and how it will affect/plug into the NORAD structure. A communication and education plan will be essential if it comes to fruition; and
- 5) There is no political appetite to open the binational agreement given the current President and Prime Minister in power.

## About the Study

This represents the third tranche of a research project led by Andrea Charron and James Fergusson from the Centre for Defence and Security Studies at the University of Manitoba investigating the North American Aerospace Defense Command (NORAD). The first report, entitled “NORAD in Perpetuity,”<sup>1</sup> was published in March 2014 and it focused on the “here and now” of NORAD. The second study published in 2015, entitled “Left of Bang: NORAD’s Maritime Warning Mission and North American Domain Awareness,”<sup>2</sup> investigated the newest of NORAD’s missions, maritime warning, and the contribution of other government departments charged with maritime domain awareness in the creation of the North American, and thus NORAD’s, common maritime operating picture (COP). This third study looks at the twin issues of modernization and evolution; modernization of equipment (such as the North Warning System) and evolution of command and control structures and, potentially, new missions in the future in order for NORAD to detect, deter and defeat new threats.

The first two studies were conducted while NORAD was engaged in its own review - NORAD Next - under Commander Jacoby - to consider how NORAD should evolve in the future. When General Jacoby retired in 2014, Admiral Gortney (2014 – 2016) assumed command and continued to consider the future of NORAD by testing, in exercise Vigilant Shield 17 (2016), a new NORAD command and control structure. With a wide scope, and a personnel-intensive agenda, the NORAD Next study was revised and re-branded as the Evolution of North American Defense (EvoNAD) under NORAD Commander General Robinson, following a briefing to the Canada-US Permanent Joint Board of Defense (PJBD) in 2016. The PJBD requested that the EvoNAD study be constructed on the basis of priorities. This study investigates those priorities.

This report is intended for both Canadian and American policy makers and practitioners as well as the academic and general public. **Funding was provided by the Canadian Department of National Defence, through a Targeted Engagement Grant from the Defence Engagement Program.** Our objective is to provide policy-relevant advice that is not encumbered by political, bureaucratic or command priorities and/or loyalties. Uninhibited by connections to any departments or chains of command, the authors are in a unique position to ask the questions others cannot.

---

<sup>1</sup> Available at [http://umanitoba.ca/centres/cdss/media/0\\_NORAD\\_in\\_Perpetuity\\_final\\_report\\_March\\_2014.pdf](http://umanitoba.ca/centres/cdss/media/0_NORAD_in_Perpetuity_final_report_March_2014.pdf)

<sup>2</sup> Available at [https://umanitoba.ca/centres/cdss/media/0\\_NORAD\\_Maritime\\_Warning\\_Mission\\_Final\\_Report\\_8\\_Oct\\_2015.pdf](https://umanitoba.ca/centres/cdss/media/0_NORAD_Maritime_Warning_Mission_Final_Report_8_Oct_2015.pdf)

We were assisted by a team of academics that included Joseph Jockel from St. Lawrence University, Joel Sokolsky from the Royal Military College of Canada, and Chris Sands from Johns Hopkins' School for Advanced International Studies' Center for Canadian Studies.

All errors and shortcomings remain the responsibility of the principal authors, Andrea Charron and James Fergusson. We are very grateful to all of the representatives of government departments and NORAD, who we interviewed on a non-attribution basis, for their time and information. It was clear that the interviewees were driven by an honest and earnest desire to defend both countries. We endeavoured to make this report reflective of that passion. All correspondence should be directed to [Andrea.Charron@umanitoba.ca](mailto:Andrea.Charron@umanitoba.ca) and/or [James.Fergusson@umanitoba.ca](mailto:James.Fergusson@umanitoba.ca).

## Introduction and Historical Overview

Since its operational establishment in 1957, NORAD's foundation continues to rest upon the fundamental shared premise in both Canada and the United States (U.S.), that the defence of North America is indivisible and that the demands generated by the air breathing threat to the continent would be most effectively and efficiently met through a binational command structure. Over time, NORAD has adapted to the evolving threat environment, and to the evolving command structures and political priorities of both nations.

The emergence of intercontinental (ICBMs) and submarine-launched ballistic missiles (SLBMs) in the 1960s expanded NORAD's original air warning mission into the aerospace domain, with its linkage to the U.S. ballistic missile early warning systems.<sup>3</sup> With the development of air-launched cruise missiles (ALCMs) in the late 1970s, the air warning system of ground-based radars was modernized with the creation of the North Warning System (NWS). In 1988, NORAD began aiding with aerial drug interdiction at the same time as the threat of the Soviet Union was diminishing.

After the shock of 9/11, NORAD's attention turned inward with the integration of Transport Canada and U.S. Federal Aviation Administration radar feeds into the NORAD command centre based in Cheyenne Mountain Operations Center (CMOC). Shortly thereafter, NORAD had to adapt to the establishment of U.S. Northern Command (USNORTHCOM) in 2002 which would lead to the creation of the NORAD-USNORTHCOM Command Center (N2C2) at Peterson Airforce Base. This, in turn, was followed by the establishment of the tri-command relationship, consisting of NORAD, USNORTHCOM and initially Canada Command, which was replaced by Canadian Joint Operations Command (CJOC) in 2012.

In 2004, NORAD's aerospace warning mission was connected to USNORTHCOM's ballistic missile defence mission which has remained the case even though Canada chose, in 2005, not to participate in the U.S. missile defence effort (i.e. the kill side of BMD). In 2006 the NORAD binational agreement was signed "in perpetuity", thereby eliminating the political irritants associated with the five year renewal process.<sup>4</sup> It also acquired a

---

<sup>3</sup> The US BMEWS, consisting of the space-based Defense Support Program, and ground-based radars, located at Fylingdales (UK), Thule (Greenland), Clear (Alaska), Beale (California), Cape Cod (Massachusetts), and Cavalier (North Dakota), feeds data into the NORAD threat assessment process, which in turns, provides warning to both National Command Authorities (NCA) of North America being under ballistic missile attack.

<sup>4</sup> In the initial agreement, renewal was set at 10 years. On Canada's request, it was reduced to five years, although renewals have also occurred in shorter periods of time. There were renewals in 1991, 1996, and 2000.

third mission – maritime warning.<sup>5</sup>

At its core, NORAD remains a “functional solution to the problem of how to best coordinate the air defence efforts of Canada and the U.S. to create a single, effective system of continental air defence...”<sup>6</sup> Today, the air breathing threat to North America has returned because of the deterioration in relations of the West with Russia, the resumption of Russian bomber flights over and around the North American Arctic, and the emergence of a new generation of long range, advanced Russian air and sea launched cruise missiles (A/SLCMs). While Russia presents the immediate air breathing threat to North America, future threats may include new adversaries which are likely to present a similar air breathing threat as advanced A/SLCMs technologies diffuse. Furthermore, the threat may include potential non-state actors or terrorist organizations.

This threat environment dictates the need for NORAD to adapt. Focus is on modernizing the soon-to-be obsolete North Warning System (NWS) as it currently exists (which may involve relocating some of the radar stations), as well as deploying a range of ground, air, and space based systems in a single ‘system of systems’ to provide effective deterrence, detection and defence capabilities. In addition, the threat environment has also led to an examination of NORAD’s existing command and control (C<sup>2</sup>) structures, and processes, necessitating a close examination of NORAD’s relationship with other combatant and Canadian commands, especially in terms of air defence within the maritime domain. Finally, the future threat environment, largely, but not exclusively technologically-driven, raises additional issues for NORAD. All of these requirements are central to the ongoing Evolution of North American Defense (EvoNAD) study/process led by NORAD with CJOC and USNORTHCOM, which includes the future of Canada-US defence cooperation from a multi-domain perspective.

NORAD, from its onset, has been simultaneously blessed and cursed by the reality that defence of the national homeland, and thus North America, is often an after-thought for both states. NORAD is blessed **because it placed as the primary driver of North American defence adaptation**, as evident today in its lead role in the EvoNAD study process as mandated by the Canada-US Permanent Joint Board on Defense (PJBD) but cursed because both states, and their respective senior military commands, continue to prioritize the defence of North America as beginning overseas, far away from national territory.

---

<sup>5</sup> *Agreement Between the Government of the United States of America and the Government of Canada on the North American Aerospace Defence Command*. Article I, Para I, & Article III. 28 April 2006. <http://www.state.gov/documents/organization/69727.pdf>.

<sup>6</sup> Allarie, Nic, 2016. “Shelf Life Extended: The Longevity and Continued Relevance of the Binational North American Aerospace Defense Command”, MA Thesis (Winnipeg, MB: University of Manitoba): p. 60.

In this sense, NORAD's aerospace warning and control missions remain a strategic backwater *per se*. Certainly, this changed to some degree after 9/11, reflected in the U.S. by the establishment of USNORTHCOM, and, for a brief period of time, its Canadian equivalent Canada Command (CANCOM). Even so, the primary military response to 9/11 was directed to its overseas origin – Afghanistan – and since then, to military operations across North Africa and the Middle East. USNORTHCOM's activities, along with the Canadian Armed Forces (CAF) at home, have been dominated by defense support to civil authorities (DSCA), or in Canadian parlance domestic operations (or aid/assistance to the civil powers) acting in a second responder role.

This strategic reality, in turn, has been reinforced by political reality, albeit in different manifestations for Canada and for the U.S.. Successive Canadian governments have long been sensitive to domestic political implications concerning Canada-U.S. defence relations in North America. Expanding NORAD's mission suite is always fraught with images of Canadian subservience to Washington, and often elicits domestic political backlash as most clearly evident in the case of ballistic missile defence.<sup>7</sup> At best, for Ottawa, small, marginal steps are the most the political traffic will bear, which is understood in NORAD circles.

The U.S., in contrast, largely takes NORAD for granted (personnel connected to NORAD excepted), and as a back seat to its responsibilities as a global power, and leader of the Western community of democratic states. These relations thus become one of benign neglect, and largely left to the management of the specific actors themselves – NORAD, and today USNORTHCOM. While NORAD is the aerospace warning and air defence arm for both Canada and the United States, USNORTHCOM's place within the U.S. Unified Command Plan (UCP) generates certain impulses to bring North America into line with the other regional combatant commands. The role of Canadian leadership within the binational command is to temper these impulses as a function of the unique nature of this command arrangement.

While USNORTHCOM does share a distinct North American perspective with NORAD, it is also a U.S. combatant command which means it thinks of North America in relation to the other commands. NORAD has never portrayed itself, nor has it been portrayed, despite its aerospace control/defence mission suite, as a combatant command, not least of all due to Canadian sensitivities to such an association. As a combatant command, and part of the U.S. UCP, USNORTHCOM is unique among the geographic commands. Indeed, it struggles with an image of combatant command in name only.<sup>8</sup> Given USNORTHCOM's defense support to civil authorities (DSCA) role and tempo of late,

---

<sup>7</sup> To be clear, NORAD has the role to warn of ballistic missiles incoming to North America. USNORTHCOM has the role to defeat these missiles.

<sup>8</sup> One observer labeled it as SLEEPYCOM, notwithstanding its high DSCA operational tempo. This is no longer a fair characterization of USNORTHCOM.

USNORTHCOM's attention to NORAD is limited. NORAD leadership must be cognizant of any future U.S. combatant command structure changes and be guided by the binational agreement should major changes be proposed. It is likely any changes proposed to NORAD would be worded in such a way as to avoid opening the binational agreement. For the time being, changes are 'exercised' relative to current terms of reference (TOR), but have yet to involve political input and may be stretching, if not straining, the boundaries of the TORs.

The need to re-evaluate current command and control (C<sup>2</sup>) arrangements has been spurred by the growing realization that today's security challenges and threats extend across COCOMs (the Commands that make up the UCP). Threats today are transregional, multifunctional and multi-domain requiring Commanders to focus on transregional coordination with thought to ongoing resource competition. Certainly the flurry of North Korean missile tests in 2017 (16 in total) made this abundantly clear. The new proposed command and control (C<sup>2</sup>) structure for NORAD, which creates a NORAD Combined Forces Air Component Commander (CFACC), as exercised in the most recent annual Vigilant Shield exercises, would make NORAD's command structure largely consistent with USNORTHCOM operational command structure, and the other U.S. regional commands, even though it would remain unique relative to U.S. command relationships with other allies. The creation of the NORAD CFACC is, in the main, about re-orienting to the symmetric (read peer adversary) threat challenge. Nonetheless, concerns, *largely emanating from outside of NORAD*, do exist that this new command structure may marginalize NORAD and create the very outcome feared at the time of the creation of USNORTHCOM – that Canada's contribution to NORAD will actually be for USNORTHCOM and that NORAD will become a subcommand of it. This would have direct implications for Canada-US defence relations writ large in North America because USNORTHCOM has responsibilities in the military domains of land and sea and not just in the aerospace domain for which NORAD is most often associated.

*The perspective of those within NORAD*, however, is very different. They reject this conclusion and point to the critical need to better manage the tactical and operational battle management tempo to allow the Commander of NORAD to coordinate plans at the strategic level and with the other U.S. combatant commands to see "up and out" as opposed to "down and in" which is a consequence of the global threat environment and COCOM arrangement as established in the US *Goldwater-Nichols Department of Defense Reorganization Act* of 1986.<sup>9</sup>

---

<sup>9</sup> Public Law 99-443 (1 October 1986). See especially § 164. Commanders of combatant commands: assignment; powers [http://history.defense.gov/Portals/70/Documents/dod\\_reforms/Goldwater-NicholsDoDReordAct1986.pdf](http://history.defense.gov/Portals/70/Documents/dod_reforms/Goldwater-NicholsDoDReordAct1986.pdf)

NORAD and USNORTHCOM are separate commands because of their different but complementary missions. Pipes and processes (e.g. the ability to push and receive air tasking orders to/from the three NORAD regions namely Alaskan NORAD region (ANR), Canadian NORAD Region (CANR) and Continental (U.S.) NORAD Region (CONR)) need to be improved for the new NORAD CFACC command structure, but the logic of allowing the Commander of NORAD and USNORTHCOM to concentrate on the big picture battle plan is essential in today's 360<sup>0</sup> threat environment emanating from across multiple domains.

In light of this evolution and recent developments, this analysis examines current and future issues facing the binational command within the context of the PJBD-mandated EvoNAD study. It critically examines the four primary areas of North American defence concerns: the modernization of the NWS, C<sup>2</sup>, maritime control, and the merging air and space domains. In addition, it provides a wider political context for these issues in terms of the threat environment, sovereignty considerations on both sides of the border, political and organizational barriers to change, and tri-command relationship.

This report is organized into six chapters with a concluding summary of findings' chapter. Chapter 1 outlines the new multidimensional geopolitical strategic environment. Chapter 2, entitled NORAD Command and Control looks at proposed changes to NORAD's Command and Control arrangements (C<sup>2</sup>). The third chapter is dedicated to Arctic modernization. Chapter 4 reviews maritime control relative to NORAD's air control mission and Chapter 5 continues with the forthcoming merger of air and space and the possibilities for the future. Chapter 6 finishes with political considerations, often the most important but least studied. Finally, we conclude with a summary of findings which are also highlighted in bold throughout this report.

## Chapter 1: The Geopolitical/Strategic Environment and the Rise of (Near) Peer Competitors

The Post-Cold War era has been dominated by intrastate conflict and violence, western, primarily U.S.-led or supported, military interventions, and after 9/11 the War on Terror. This era has largely come to an end. In its place, **a new era dominated by Great Power struggles, now termed near-peer competition and rivalry, is evident with concomitant regional inter-state territorial conflicts.** This requires a refocus (or rediscovery) of nuclear deterrence and strategy under new conditions. In this new geopolitical/strategic environment, intrastate conflict and violence as well as terrorism will remain, but largely reside on the margins as they did during the Cold War. Western military intervention in intrastate conflicts will also remain, but will be significantly constrained by near-peer rivalry, as witnessed since 2015 by the Western/U.S.-led and Russian simultaneous interventions in the Syrian Civil War.

For the time being, **the U.S. will remain the dominant global, political-military power** with global power projection capabilities. However, the determination of **Russia** to spend on its military, notwithstanding the sanctions placed against it and its dependence on fossil fuels, and the dramatic growth of **China's** economy have provided **both countries with the means to modernize and develop advanced military capabilities that challenge the U.S. and the West.** Although both currently lack the capacity to project power in a sustained capacity beyond their respective regions, notwithstanding their respective strategic nuclear forces, it is only a matter of time until one or both are able to expand this capacity farther and farther from their national borders. In addition, **India is gradually expanding both its economic and military capabilities**, such that it too is poised to join the ranks of the near peers, further complicating the geopolitical/strategic landscape.

Future political arrangements or relationships among the near peers and between them and lesser regional powers are difficult to predict. Current relationships, largely a hangover from the Cold War, are not necessarily written in stone. Nonetheless, the current expectation remains a three-sided “stand-off” in which U.S.-led alliances (which nominally includes India) are confronted by an adversarial relationship with Russia, a non-allied China whose relationship with the West/U.S. is neither completely adversarial, competitive nor cooperative, and a tense relationship between China and Russia which sees, to date, China dominating. The U.S. and Canada must be prepared for a complicated, unpredictable world where today's potential adversaries may be tomorrow's tacit allies, depending upon the issue and region in play. In other words, **the relatively simple and straightforward geopolitical/strategic environments of the Cold War, and post-Cold War eras are being replaced by a much more complicated and challenging environment of multiple, peer competitors.**

Within this environment, nuclear weapons and nuclear strategy return to prominence, but in a manner distinct from the Cold War and the evolution of nuclear deterrence thinking and practice. The relative simplicity of nuclear deterrence, centered on the prevention of a Great Power war likely emanating from the central front in Europe, is being replaced by a complicated set of deterrence requirements, and thus nuclear strategic postures that must be tailored to a wide range of diverse axes of conflict that exist or may emerge. **The potential, if not fear, is that the escalation of a local/regional conflict involving peers might create the accidental conditions for a nuclear exchange. Attention to both conventional and nuclear deterrence, therefore, is essential.** However, such decisions will also be affected by perceptions regarding their implications for all the nuclear powers.

Into this more complicated nuclear strategic environment is an additional set of technologically-driven factors. Many of the roles and functions of nuclear weapons have now been replaced by new generations of conventional weapons, clearly demonstrated by the U.S. in its wars of intervention during the post-Cold War era. **Advanced, integrated surveillance, reconnaissance, targeting and strike complexes have revolutionized the world of strategic deterrence.** The clear line between nuclear and conventional weapons in national strategies has blurred. While the U.S. continues to lead in this area, these technologies have already begun to diffuse. This diffusion, in turn, generates new challenges for the practice of deterrence and defence.

Ballistic missile defences, once technologically-unfeasible and considered a threat to strategic stability, are not only now a reality, but are also spreading. For the time being, costs alone negate the likelihood that these defences will proliferate to threaten the strategic nuclear forces of the three peer competitors. But, these **defences, particularly at the tactical and theatre level, serve to complicate calculations regarding deterrence requirements.**

At the same time, new conventional and/or nuclear delivery system technologies are collapsing the distinction between air-breathing and ballistic missile threats. Advanced hypersonic non-ballistic delivery systems, which exploit sub-orbital outer space, represent a future, significant challenge. Closely related are future technologies that enable the delivery systems to easily manoeuvre in outer space and between air and space. These, in turn, are facilitated by ongoing advancements in drone technology, facilitated by ongoing artificial intelligence (AI) developments which eliminate the limitations imposed by pilots in exploiting greater speeds and manoeuvrability.

With this new geopolitical/strategic environment also exists implications for national strategy and military forces. Largely attributed to climate change, **natural disasters are growing in number and scope.** While the employment of military forces in support of civil authorities abroad and at home to deal with disasters was rare in the past, it has

become a regular phenomenon challenging the capacity of civil and military forces. Abroad, natural disasters are predicted to become a major driver of conflict and mass migration flows, affecting the interests of the competitors. At home, they are likely to increase the demand on military forces and military resources, including Arctic populations directly affected by global climate change.

This brief outline of the new geopolitical/strategic environment of today and tomorrow creates major challenges for NORAD modernization and the future evolution of North American defence cooperation. Both must be examined not simply in terms of the current environment, but also in terms of the distant future. This is particularly evident in the case of the current focus on Russia relative to North American defence. **The new generation of long range Russian air launched cruise missiles (ALCMs), nuclear or conventional, is the immediate concern for NORAD's ability to deter, detect and defend North America. The North Warning System (NWS) lacks the range to identify and track Russian long range aviation (bombers) prior to their ALCM launch points over the Arctic Ocean, and the capability to identify and track ALCMs in flight.** Thus, the immediate requirement is to modernize/replace the NWS to meet this threat.

The future NWS, however, needs to be much more capable in order to deal with future threats as well. Future ALCM technologies are likely to include long and longer range missiles, flying at supersonic speeds, with advanced stealth technologies. With regard to Russia, notwithstanding the future of the Intermediate Nuclear Forces (INF) Treaty,<sup>10</sup> North America may face the threat of ground launched cruise missiles (GLCMs) located in the Russian Arctic, capable of reaching major military and civilian targets in the heart of North America. In addition, these technologies are also likely to be deployed on surface and sub-surface maritime forces, with launch points in the high North Atlantic, the Arctic and Pacific Oceans.

These technologies are also likely to diffuse to other states, including China, and potentially to non-state terrorist organizations. In other words, **the NWS, which is a primary source of surveillance information for NORAD, cannot be looked at in isolation from North American requirements as a whole.** Furthermore, **future technologies enabling cruise missiles to operate at even higher speeds and exploit sub-orbital space also need to be considered in relation to the NWS and NORAD's capability to deter, detect and defend a wide range of threats from a 360° axis.**

---

<sup>10</sup> Formally the *Treaty Between the United States of America and the Union of Soviet Socialist Republics on the Elimination of Their Intermediate-Range and Shorter-Range Missiles* came into force in 1988. On 20 October 2018, President Donald Trump announced that he was considering withdrawing the US from the treaty although questions remain if or how this will happen. See <https://www.state.gov/t/avc/trty/102360.htm>

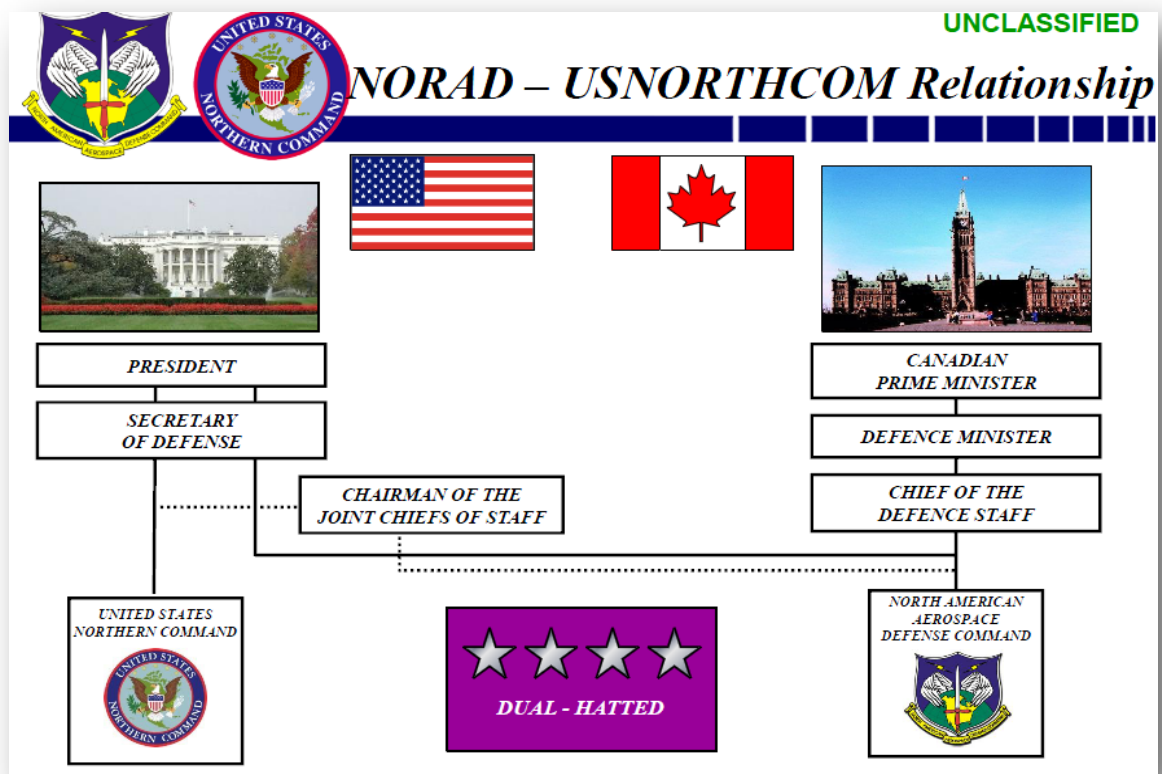
Alongside these future requirements, which have a range of implications for the future NWS and all-dimension aerospace warning and air control, **the opening of the Arctic due to global warming necessitates the development of surveillance, and reconnaissance capability integrated across air, land, sea, and space.** As discussed in the next section, no single system *à la* current NWS will be sufficient to meet future requirements. Instead, an integrated ‘system of systems’ approach is necessary, and, a structure that enables future requirements relative to new technologies to be readily integrated in an evolving construct, rather than a system that in several decades needs to be replaced as a whole.

These considerations are central to the potential expansion and addition of NORAD missions to create an integrated, multi-dimensional North American Defense Command or NOR[A]D. Already, the new threat environment raises issues for NORAD’s role in the maritime sector, its relationship with overseas commands, particularly U.S. commands because of its Maritime Warning mission assigned in 2006, and USNORTHCOM’s area of operations (AOR). As a result of its maritime warning mission, NORAD is now fully engaged with a range of civil agencies tasked with maritime domain awareness and warning. Such engagements will likely continue to expand and be formalized as a consequence of the new threat environment. The blurring of air and space also represents a future driver in the consideration of North American defence requirements because of the need to integrate air and space together in terms of early warning and control.

Naturally, future requirements will confront no shortage of opposition, ranging from concerns about national sovereignty to organizational interests and preferences. These cannot be dealt with overnight. If the past is any guide to the future of North American defence cooperation, as the environment evolves over time, the process, which led to the creation of NORAD and its evolution whereby the militaries of both countries are the leads exercising options in advance of political take-up, is likely to be replicated.

## Chapter 2: NORAD Command and Control

On the surface, the concept of command and control (C<sup>2</sup>) is relatively straightforward. It is the authority (command) to assign, allocate, and employ (control) forces under specified conditions.<sup>11</sup> These conditions, in turn, entail operational, functional and spatial components/processes, established by senior political and military decision-makers, either by legal and/or executive means initially at the national level. In the case of NORAD, these are established through the NORAD agreement (legal) and terms of reference (TOR) established by mutual executive agreement between the Canadian Chief of the Defence Staff (CDS), and the U.S. Secretary of Defense (SecDef).



However, in practice, command and control implementation is a complicated one, as a function of the integration of national C<sup>2</sup> structures and processes into a binational C<sup>2</sup> structure and process. At the national level, these structures and processes, in turn, have two dimensions; one internal to the military services and the other across the military

<sup>11</sup> In even simpler terms: Command= authority and Control = how to exercise authority. Chapter 2 of Richard Goette's *Sovereignty and Command in Canada-US Continental Air Defence, 1940-1957*(Vancouver: UBC Press, 2018) is dedicated to C<sup>2</sup>.

services, which are common to both Canada and the United States. Internally, this entails the C<sup>2</sup> distinctions between a force generator, and a force employer. The former holds C<sup>2</sup> responsibility for preparing forces relative to operational readiness. The latter has C<sup>2</sup> for specific tasks and functions. In some cases, a single commander may hold responsibility for both.

In Canada, the commander of 1 Canadian Air Division (1 CAD) is a force generator for the air component of the Canadian Armed Forces at the operational and tactical levels on behalf of the Commander of the RCAF, and the force employer in her/his role as commander Canada NORAD Region (CANR) in the binational arrangement, and the Joint Forces Air Component Commander (JFACC) for Canada. The Commander RCAF is the overall force generator for CAF Air Forces

As a dual-hatted Canadian force employer (CANR, and national JFACC), the Commander 1 CAD has both a specified AOR as CANR within North America, and a global area of operations (AO) as national JFACC. By contrast, the commander of USNORTHCOM is a force employer across military services (joint command) responsible for all land, sea and air operations, except those within NORAD's mandate, within its defined North American AOR.<sup>12</sup>

Generically, all commands beneath the national command authority (NCA) are both supporting and supported commands. NORAD is a supported command because the assets and provision of information essential for its aerospace and maritime warning, and air control missions are provided by other commands.<sup>13</sup> In turn, it supports the NCAs through its assessment of whether or not North America is under aerospace attack and USNORTHCOM for its ballistic missile defence mission.

The concept of supported and supporting commands is best understood in horizontal, rather than vertical C<sup>2</sup> terms when it comes to the assets the NORAD commander can control. The vertical dimension concerns the delegation of C<sup>2</sup> elements from the overarching commander to subordinate commands/commanders splitting C<sup>2</sup> into its two conceptual components: command and control. Command usually remains vested at the highest level, whereas control is delegated to a subordinate command(s). For example, the Commander 1 CAD generates air forces on behalf of the Commander RCAF. The Commander 1 CAD is delegated Operational Command (OPCOM) of RCAF forces for the purpose of conducting operations. The Commander 1 CAD “chops” forces to

---

<sup>12</sup> The exception is US strategic nuclear forces, which are the responsibility of USSTRATCOM.

<sup>13</sup> For example, ballistic missile warning assets are primarily, but not exclusively provided by USSTRATCOM (Canada nominally provides one asset – the optical Sapphire satellite in low earth orbit). NORAD relies upon the maritime common operating picture (COP), generated by naval and civilian agencies on both sides of the border, fused together into a single North American COP in US Navy North (NAVNORTH)/Fleet Forces Command in Norfolk.

NORAD, and NORAD allocates forces to the region commanders. The commanders of the three NORAD regions (ANR, CONR and CANR) are the commanders that receive forces to execute operations.<sup>14</sup> A mirror process also applies on the U.S. side whereby services allocate forces to NORAD, which then reallocates them to the Alaska and Continental US regions. Note, however, USNORTHCOM is not the force allocation mechanism for NORAD.

The combined integrated USNORTHCOM and NORAD command centre (N2C2),<sup>15</sup> reports to both NORAD and NORTHCOM J3s.<sup>16</sup> On the Command Centre floor, positions are integrated except for the land domain and the BMD mission which are exclusively NCJ3 territory, The N2C2 receives feeds from a variety of agencies and departments, such as the FAA and NAVCAN including a U.S. domestic events network (DEN) – a telephone conference line between the FAA, traffic controllers and airport towers, five-eyes information, and Canadian and U.S. military and security information. Canadians and American personnel in the N2C2 monitor the feeds on 24/7 basis in 12 hour shifts. The N2C2, however is not a combined air operations center (CAOC) – those still reside with the Commanders of the three regional commands – Alaska (ANR), Canada (CANR), and US Continental (CONR). CONR further delegates certain control functions to the Eastern (EADS) and Western Air Defence Sectors (WADS), and the same goes for ANR with the Alaska Air Defense Sector (ADS) and CANR with the Canadian Air Defence Sector (CADS). The delegation of control is reflected in the longstanding NORAD idea of centralized control, de-centralized execution. Control of NORAD operations is performed via Air Tasking Orders (ATOs) published by the Regional Commanders. The NJ3 has no role in the development and execution of the 3 regional ATOs. The regions are allocated force levels in accordance with pre-approved plans. The Commander NORAD sets the force level given threat levels which automatically provides regions with forces for execution of operations. The regional Commanders then publish an ATO which details how those forces will be used and tasks Wings with commensurate missions. Normally, national assets complete the sorties in national territory under national command. There are, of course, provisions for U.S. assets to assist in Canadian territory and vice versa but the transfer of control of these assets is generally via prearranged operational plans and authorized by various

---

<sup>14</sup> Canadian Forces Air Doctrine Note 14/01: Royal Canadian Air Force Air Task Force Commander Definitions, Roles and Responsibilities found at <http://www.rcaf-arc.forces.gc.ca/en/cf-aerospace-warfare-centre/doctrine-adn-14-01.page>

<sup>15</sup> All staff within NORAD are combined and integrated meaning, for example, the J2 (intelligence function) is a USNORTHCOM and NORAD J2 (N&NC J2). The only position that remains separate (as per the NORAD binational agreement) is the J3 – operations. There is a NORAD J3 and a USNORTHCOM J3.

<sup>16</sup> The continental staff system that most NATO countries have adopted uses J for “joint”, C for “combined”, A for Air Force etc. and the number corresponds to a function. E.g. 3 is operations, 2 is intelligence etc.

authorities starting at the Commander NORAD level in the form of a system of NORAD duty General Officers, through N2C2.

Of late, however, NORAD has been experimenting with a NORAD Combined Forces Air Component Command (NORAD CFACC) position based in Tyndall Florida at CONR to harmonize operations across the entire (global) NORAD area of operations (AO) through a single commander, rather than the way it is done today, with 3 independent commanders, generating 3 distinct ATOs.

In times of crisis, however, the best laid C<sup>2</sup> plans may not materialize. For example, on the morning of 9/11, all of the hijacked aircraft were in CONR's EADS region, headquartered in Rome, New York. Two alert sites were available (Otis Air National Guard Base in Cape Cod, Massachusetts and Langley Air Force Base in Hampton, Virginia) with 1 pair of fighters each. The FAA contacted EADS to inform them of a high jacked airplane (American Airlines Flight 11), and the 2 F-15s on alert at Otis were launched, after authorization by CONR HQ in Panama City, Florida, without clear headings. CONR then informed NORAD HQ in Colorado Springs.<sup>17</sup> Essentially, EADS served the immediate role as tactical commander. While the initial events of 9/11 were certainly not as planned and exercised, **it reinforces the fact that when a crisis happens, the best laid plans and protocols may not match the immediate decisions that need to be made because of lack of time, lack of information or both not to mention multiple threat vectors.**

Exercise Vigilant Shields 16 and 17 (held in the Fall of 2015 and 2016 respectively) employed a new C<sup>2</sup> process by vesting air tasking authority (control) initially to CONR.<sup>18</sup> The reasons for this seemed to be about capacity rather than operational tempo. In addition, NORAD's C<sup>2</sup> framework is different from standard practices in other U.S. commands and NATO which prefer to have a Combined Forces Air Component Commander (CFACC) to coordinate air tasking orders to ensure "unity of command and effort" rather than temporary or pop-up ATFs.<sup>19</sup> Admiral Gortney, Commander of

---

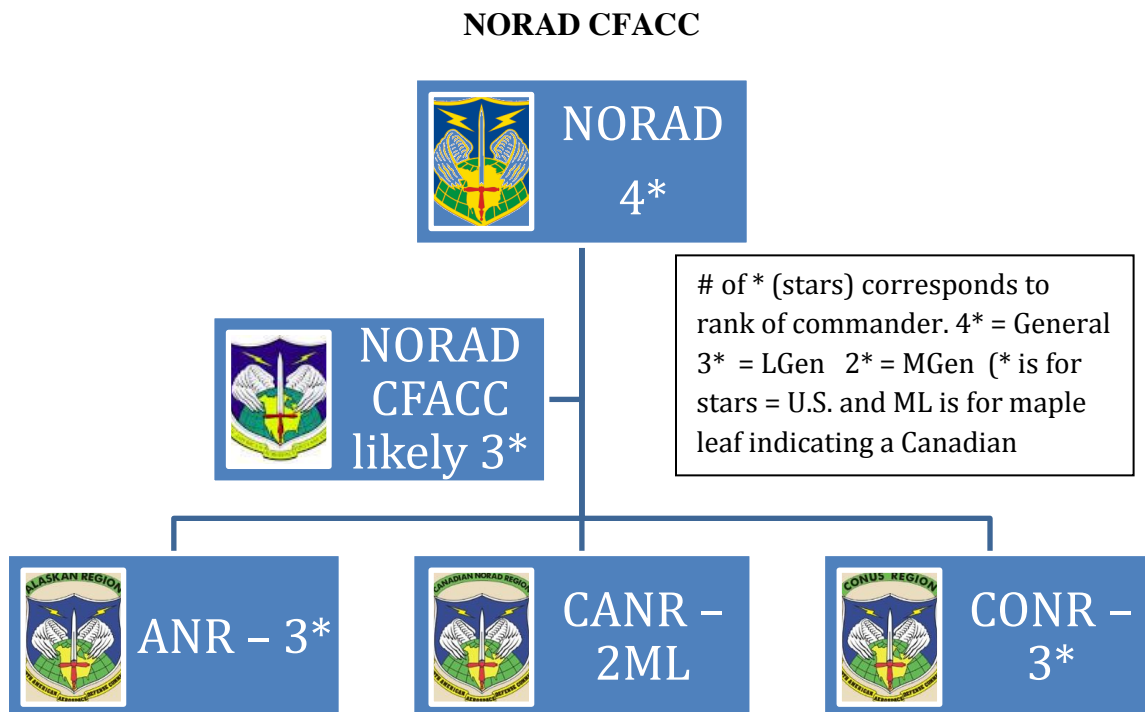
<sup>17</sup> *9/11 Commission Report*. (New York: WW Norton and Company Inc, 2004): 17- 20.

<sup>18</sup> Vigilant Shield are the annual NORAD war gaming exercise, usually held in the fall, which also includes in varying degrees other Canadian and American commands, including on a biennial basis US Strategic Command (USSTRATCOM).

<sup>19</sup> This is now the US standard, adopted by most NATO allies, and consists of air component commander (ACC) and air operations centre (AOC). An air task force (ATF) is a temporary group of units or squadrons or detachments to undertake a tactical operation usually with an accompanying Air Task Force HQ (ATFHQ) commanded by a Joint Forces Air Component Commander (JFACC) - the single officer responsible for the air campaign. He/she can then designate control up to the level provided by senior command. Ideally, the JFACC is located *in situ* in order to for the commander to understand the complexity of the theatre of operation and the battle management tempo. Major coalition operations with multiple states involved and multiple objectives require coordination at a strategic level, and hence the need for a theatre JFACC. See Major Pux Barnes. "The JFACC and the CAOC-centric RCAF: Considerations for the Employment of Air Power in Joint Operations" *RCAF Journal* Vol 3(3). (Summer 2014):3.

USNORTHCOM and NORAD at the time, was the primary driving force behind the decision to shake up the C<sup>2</sup> processes for Vigilant Shield, likely reflecting his own command experience, especially with Central Command in the Middle East. Regardless, **successive NORAD commanders have been the driving force behind developing, exercising and implementing adjustments to NORAD C<sup>2</sup> structures and processes in light of new ‘perils’ and evolving threats in new domains.**<sup>20</sup>

In May 2017, NORAD announced it would exercise an evolving C<sup>2</sup> arrangement to coordinate battle management plans for NORAD. As exercised in Vigilant Shield 18 (Fall of 2017), NORAD deployed a NORAD CFACC to Tyndall Airforce Base (home of CONR) given its CAOC capacity. The NORAD CFACC coordinated all air tasking orders within the 3 NORAD regions. Rather than reporting to the NORAD Commander, ANR, CONR and CANR reported to the NORAD CFACC. The deployment of a dedicated NORAD CFACC in turn allowed the NORAD Commander to concentrate on strategy as opposed to coordinating individual air tasking orders to the 3 NORAD regions.



<http://www.rcf-arc.forces.gc.ca/en/cf-aerospace-warfare-centre/elibrary/journal/2014-vol3-iss3-04-the-jfacc-and-the-caoc-centric-rcf.page>

<sup>20</sup> Implementation will require agreement at the senior levels between Canada (CDS) and the US (SecDef).

## NORAD CFACC

By 2018, the NORAD command team was given authority to continue to develop a CONOPS to exercise the NORAD CFACC concept, blessed by the CDS (General Jonathan Vance) and SecDef (Mr. Shanahan), under existing Terms of Reference. NORAD Headquarters in Colorado Springs can experiment with transitioning into a strictly strategic actor, comparable with the other regional commands as laid out in the U.S. Unified Command Plan (UCP).

Several arguments underpin the logic of adopting this new C<sup>2</sup> structure, notwithstanding the role of successive dual-hatted commanders and their desires to bring NORAD/USNORTHCOM into line with other regional command structures. **In a time of crisis, such as a 9/11 event, the Commander of NORAD needs strategic control of the battle plan and should not be distracted by tactical decisions.** Similar to theatres of operations overseas, the tactical and strategic roles are separated. It is also more efficient and effective to provide a single tactical commander with regular experience doing routine air operations augmented with crises exercises rather than assign a CFACC in a time of crisis, such as was the case during 9/11. From a battle management perspective, a single theatre Air Task Force Commander for operations is tantamount to standard operating procedures recognized by all NATO allies, including Canada, and the other U.S. Commands.

While it may be ideal to have a CFACC in a totally different location (i.e. away from NORAD regional headquarters for redundancy purposes), fiscal and resource constraints discourage building a new, purpose-built CAOC. **The second choice would be to locate the CFACC in Canada with CANR to honour the binational spirit of NORAD**, but that would require a major retrofit of (likely) CANR and would take years to complete. ANR faces similar retrofit challenges. The third choice would be Colorado Springs. The current design and construct of the NORAD and USNORTHCOM N2C2 in Colorado Springs is crammed to capacity both people and technology-wise and is not a true CAOC.

This leaves CONR in Tyndall given it has the larger and more technologically-advanced CAOC. Locating the NORAD CFACC in Florida has challenges too. Often hit by massive hurricanes as was this case in October 2018 by Hurricane Michael requiring the relocation AFNORTH and CONR missions to a new location until at least 2019 because of damage to the Tyndall Air Force Base,<sup>21</sup> there are concerns, with climate change, such DSCA events are only likely to increase in numbers and in infrastructure damage.

Besides natural disaster challenges, there are questions with regard to separating CONR's USNORTHCOM JFACC and 1<sup>st</sup> Air Force US responsibilities from the NORAD

---

<sup>21</sup> Message from Lt Gen R Scott Williams to all 1AF/AFNORTH/CONR personnel.

CFACC role should the CFACC position be twinned. There is an inequity in terms of the ranks between senior Canadian and American positions. This is not new and definitely not unique to NORAD, but it will require some education/adjustments. Among these adjustments is command appointments and rank, which, in turn, has a cascading effect. Assuming the commander of the NORAD CFACC will be at the rank of Lt. General, as exercised in Vigilant Shield 19, the deputy will likely hold the rank of Major-General. Following standard NORAD practice emanating from the provisions of the NORAD agreement, the commander and deputy commander is divided between each nation. While standard practice since its origin has been a US NORAD commander, and Canadian deputy-commander, with the regional commands under a national commander, with the other nation providing the deputy (i.e. CANR is commanded by a Canadian MGen, with a US deputy BrigGen), there is no specific reason *per se* that the CFACC command and deputy positions could not be rotated between the two nations. Simply because the location of the CFACC is in the U.S. is not a case for a U.S. commander in perpetuity. More importantly, rotating the positions between Canada and the US would be useful in eliminating the image and perception that the CFACC structure really is subordinating Canada to the U.S. and NORAD as simply the air component of USNORTHCOM.

Regardless, and assuming at least initially an U.S. CFACC commander, a Canadian Major-General will need to be appointed as Deputy which means **an additional Canadian senior officer position will be required, and along with this individual additional supporting staff.** Of course, a decision could be made to promote and dual-hat the current Canadian deputy commander of CONR (currently a BGen to MGen to match Lt Gen CONR Commander and expected eventual Lt Gen NORAD CFACC). Of course, this might make sense if the NORAD CFACC is also dual-hatted as CONR commander, but this runs entirely contrary to logic behind the establishment of a NORAD CFACC relative to the regional command structures. Moreover, dual-hatted command/deputy command positions generate *a perception* of Canadian subordination in which the primary command is in reality CONR which also ensures that the NORAD CFACC is always an American.

In addition, relative to the existing regional command structure, and the possibility that **the deputy Major-General (Canadian or otherwise) may actually be in command, this individual would be issuing air tasking orders to Lt. Generals commanding the two US regional commands.** Related in this regard is whether CONR, as a co-located regional command, makes sense anymore given that the two US sectoral commands, (EADS and WADS), are not dissimilar from CANR and ANR in terms of duties within the NORAD construct.

Furthermore, **to avoid a 'single point of failure' a backup or redundant CFACC is essential.** Logic would suggest that one of the regional commands, as exercised during

recent Vigilant Shields, have such capacity. Given location and vulnerability considerations, this may fall to CANR, being located in the centre of the continent. Such a decision would replicate the aforementioned situation with a Major-General issuing air tasking orders to Lt. Generals, unless the CANR position is upgraded (which is not likely given that this would require an upgrade of the RCAF Commander's rank but Canada (currently) only has 1 four maple leaf General). Moreover, it also raises issues regarding the capacity of CANR and its CAOC to undertake this role. Of course, there are a range of other possibilities, including a classified backup CFACC. Regardless, this requirement has potentially significant resource implications, especially for Canada.

A NORAD CFACC will require at least a modest increase in the number Canadian personnel in Tyndall, and possibly for CANR<sup>22</sup> and the other regional commands. Ideally, the NORAD CFACC should be personnel neutral as a function of shifting personnel from Colorado Springs to the CFACC. However, indications suggest that this will not be the case. This will present a significant challenge for both armed forces, but likely more for Canada given recruitment and retention problems facing the CAF in general, and the RCAF in particular.

On the other hand, it is argued that, as a strategic HQ, the nature of NORAD in CSprings would not change, and therefore, the status and functions of Canadians in CSprings would not either. NORAD personnel argue Canada would have "a seat at the table/a seat at the console" with command positions in Tyndall.

Nevertheless, there is a serious image problem. The NORAD CFACC concept (as the authors can well attest) is a complicated one to grasp and can be seen to give the impression that NORAD and Canadians, with a smaller footprint, are likely to be 'lost' in the large U.S. base at Tyndall, reinforcing a perception of NORAD subservience to USNORTHCOM. To ensure the "Canadianess" of NORAD, the CFACC should be located in Winnipeg at CANR but this is unlikely given physical space, resource and personnel constraints.

And finally, beyond cross command C<sup>2</sup> consistency, and the burden confronting the dual-hatted NORAD/USNORTHCOM commander, **it is unclear if the current C<sup>2</sup> structure is sufficiently broken to warrant such a structural change at this time.** Perhaps there are other changes that can be made to achieve the unity of effort desired and so there should be no sacred cows when considering options.<sup>23</sup> For example, if the current U.S. geographical combatant command structure, changed in favour of functional or technical commands, its implications for NORAD and its 'new' command structure are difficult to

---

<sup>22</sup> Even if the NORAD CFACC position does not come with additional personnel for Canada, **the CAOC in CANR needs more personnel for current levels of operation** let alone an increase that might come in the future with a CFACC.

<sup>23</sup> For example, the Tricommand structure, location of FOLs, or even the 3 NORAD regions.

predict. At the C<sup>2</sup> level, NORAD is readjusting to keep pace with changing threats, but largely assumes a static, mainly geographically-based U.S. combatant command system. Whether the new NORAD CFACC structure is better able to adapt to new threats compared to the status quo is an open question. The desire for consistency in C<sup>2</sup> structures and processes across the U.S. command structures and NATO is not a sufficient case for a significant change to NORAD practices.

NORAD, as a binational command, is a unique arrangement which, by definition, requires a binational approach (i.e. a North American one) to its operations. The NORAD C<sup>2</sup> issue is largely a remnant of a much larger issue, never fully resolved with the creation of USNORTHCOM, and the overall tri-command relationship. Notwithstanding the value and importance of military exercises, such as Vigilant Shield, **such exercises are not sufficient alone for making major C<sup>2</sup> changes.** Given that NORAD remains largely beneath the radar in both Ottawa and Washington, any changes to NORAD C<sup>2</sup> structure needs to be evaluated carefully for unforeseen strategic and political consequences.

### Chapter 3: Arctic Modernization

The Arctic has never truly been a theatre of operation for the defence of North America. It has been, rather, a location for air warning assets – the Distant Early Warning (DEW) line and its replacement, the North Warning System (NWS) - and the conduct of NORAD's air control mission against Soviet, and now Russian Long Range Aviation (LRA). The probability of major ground operations was, and remain, negligible. While American and Soviet nuclear ballistic missile (SSBN) and attack (SSN) submarines prowled under the Arctic ice during the Cold War, the prospects of a major naval engagement were also extremely low, not least of all due to problems of locating and tracking submarines with the noise generated by ice movements. Except for the ability of large icebreakers to cut slowly through the frozen Arctic Ocean, it was a 'no go' zone for surface combatants.

**Climate change and the shrinking of the multi-year Arctic Ocean ice cap, however, portend a change for the importance of the Arctic in the defence of North America and CANUS defence cooperation.** The Canadian Armed Forces is acquiring a small fleet of Arctic Off-Shore Patrol Vessels (AOPS) with first year ice capabilities<sup>24</sup>, which will allow for restricted year-round access. Nonetheless, the Arctic region is witnessing a slow increase in maritime activity, with projections that the Arctic will become a major destination for goods transiting from Asia to Europe and the North American eastern seaboard as well as for cruise ships, and off-shore resource extraction transits. Canada's Northwest Passage (NWP) is likely to see more tourist-related shipping and destination shipping (i.e., ships deliver cargo to a destination in Canada's Arctic but do not fully transit the NWP such as for resupply of remote Arctic hamlets). With increased shipping activity will come the need for more security and naval operations, given the realities of the harsh Arctic environment and navigational hazards. **This need for more capabilities coupled with increased shipping will pose a challenge for both Canada and the US given the few number of naval and Canadian Coast Guard (CCG) vessels, which can operate in the Arctic but only in the summer.** This naturally raises issues for Canada-US defence cooperation, and thus NORAD, as a function of its aerospace and maritime warning missions, relative to armed forces support to civil authorities.

In addition, the relationship between the Canadian federal government and the indigenous peoples of the Canadian Arctic has been altered significantly with a recognition by all levels of government that indigenous concerns, especially for the environment, must be heard. Whereas the DEW and NWS early warning radar lines were built with little to no concern for indigenous interests and input and with very little concern for the pollution

---

<sup>24</sup> See <http://www.navy-marine.forces.gc.ca/en/fleet-units/aops-home.page>. It is classified at IACS PC 5+ which means "Year-round operation in medium first-year ice which may include old ice inclusions". See [file:///C:/Users/Charron/Downloads/ur\\_i\\_pdf410.pdf](file:///C:/Users/Charron/Downloads/ur_i_pdf410.pdf). Canada's first AOPS was launched on 15 September 2018 and was officially named the *HMCS Harry DeWolf* on 5 October 2018.

left from the construction and operation of these lines, the modernization of the NWS will not only have to take into account a range of indigenous concerns and interests, but also will face a more complicated and lengthy consultation and environmental impact process. This, in turn, represents another challenge for CANUS defence cooperation and NORAD. **While Canada and the U.S. are at different stages in terms of indigenous reconciliation, neither state seems to ever budget enough for the cost of cleanup and consultations with local residents.**

Until the end of the Cold War, NORAD's primary mission was aerospace monitoring and response to potential Soviet LRA state-based incursions over the Arctic. The clear danger posed by the Soviet threat in the 1950s<sup>25</sup> was thought best countered by the construction of a series of radar networks across the Arctic from Alaska to Labrador. The Distant Early Warning (DEW) radar line was upgraded to a single, northern line - the North Warning System (NWS) in 1985. All of the radar lines aimed to provide early warning of imminent threats. Surveillance was further augmented by regular air patrols.<sup>26</sup>

In addition, both countries shared a common interest to prosecute, if necessary, the air defence of North America as far north as possible, away from the urban industrial centres on the continent. Alongside the NWS in the 1980s, interceptor forward operating locations (FOLs) were developed across the Canadian Arctic, especially in response to the emergence of long-range air launched cruise missiles (ALCMs) for deterrence and defence purposes with the objective of destroying the launchers (archers). In addition, both states agreed to a centralized command and control structure overseeing regional commands, the formal commitment of air defence assets to NORAD on a yearly basis, and a seamless area of operations as required among the regional NORAD defence commands, whereby Canadian assets dedicated to NORAD could be moved, for example, from CANR to ANR and vice versa.<sup>27</sup> Finally, while the legal basis for NORAD resides beneath the 1949 Treaty of Washington, which established NATO, and its Article 5 collective defence commitment, North American defence, and thus the Arctic, remained the strict purview of Canada and the US.

Despite these arrangements, there existed a significant difference between the U.S. and Canadian air defense identification zones (ADIZ) as a function of geography and the location of radars. Whereas the U.S. ADIZ extended from its land territory out to its

---

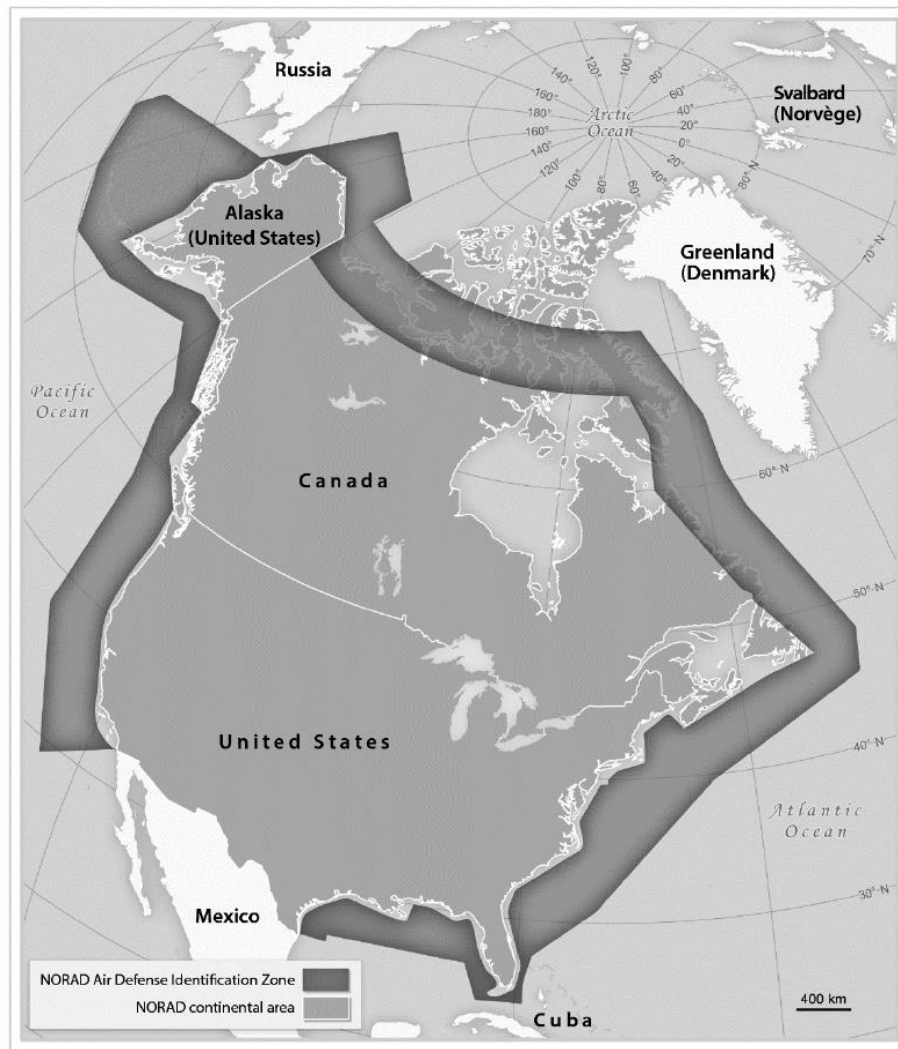
<sup>25</sup> The threats were referred to as "air-breathing" threats (which include jets, bombers, cruise missiles, people... anything that is "air breathing"). The only real naval threat during the early Cold War days was from Russian SSBNs and SLBNs (strategic submarine ballistic nuclear/submarine launched ballistic missiles) launched from the Arctic Ocean but these could not be tracked by air defence radars. Once the Ballistic Missile Early Warning Network (BMEWS) of radars was erected and NORAD received the BMEW mission, sea-based incursions became relevant to NORAD.

<sup>26</sup> For an excellent history of NORAD, see Joseph Jockel's *Canada in NORAD 1957-2007: A History* (Montreal and Kingston: McGill-Queen's University Press, 2007).

<sup>27</sup> For example, when the US F-15 fleet was grounded due to an accident, Canadian CF-18s were moved to ANR.

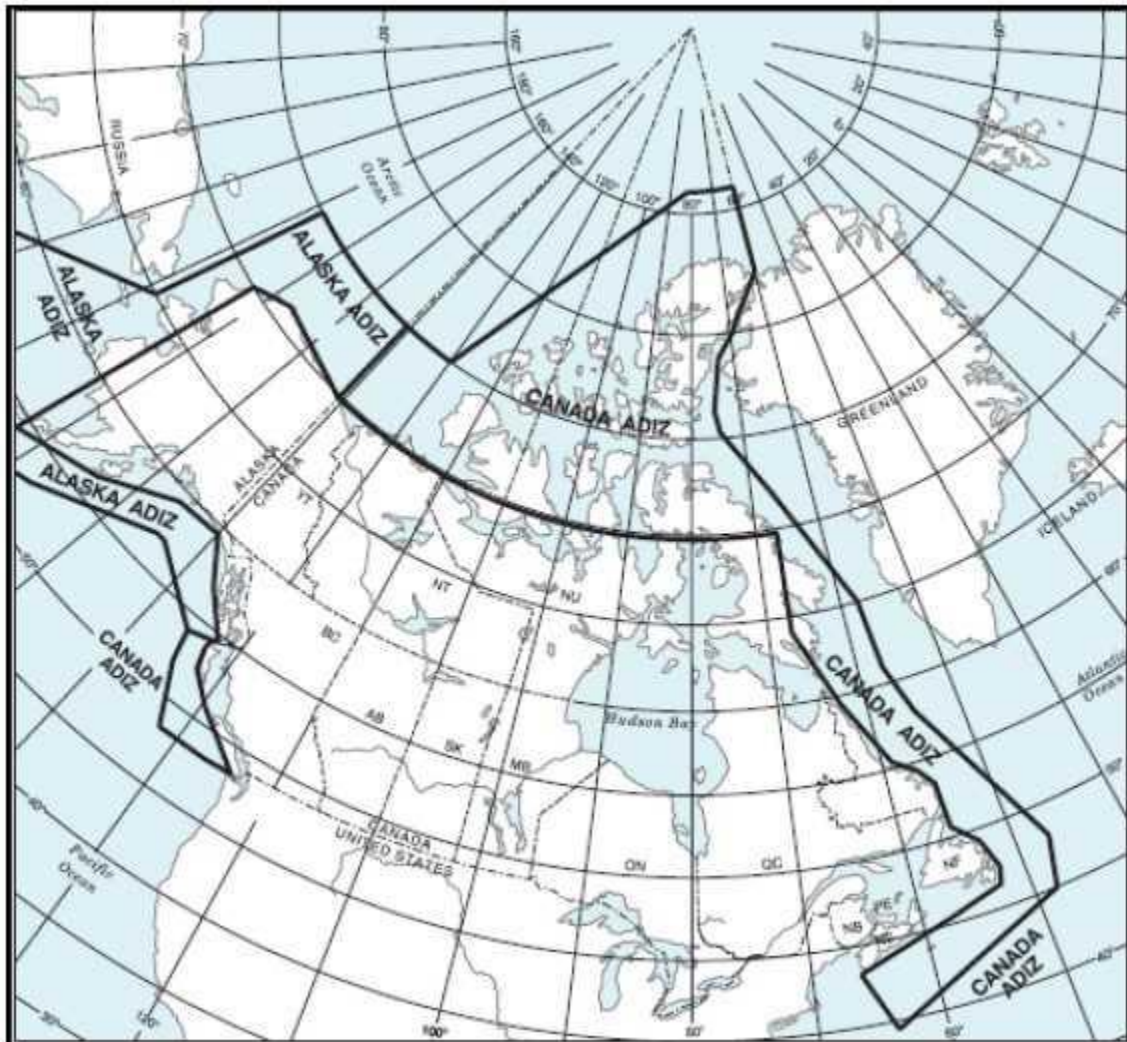
territorial waters limit of 12NM, Canada's ADIZ (CADIZ) was well within Canadian territory. In 2017, the government announced in its new defence policy, *Strong, Secure, Engaged*, the CADIZ's alignment to the outer edge of Canadian Arctic Archipelago. This took effect on 24 May 2018. However, the NWS does not possess the full capability to look that far north, largely due to its location and the technological challenges with radar near the poles.

### Pre-2018 CADIZ Orientation<sup>28</sup>



<sup>28</sup> Source : From Lasserre, Frédéric and Pierre-Louis Têtu (2016). « Russian Air Patrols in the Arctic: Are Long-Range Bomber Patrols a Challenge to Canadian Security and Sovereignty? in *Arctic Yearbook*. 2016: 304-327.

New CADIZ as of 24 May 2018<sup>29</sup>

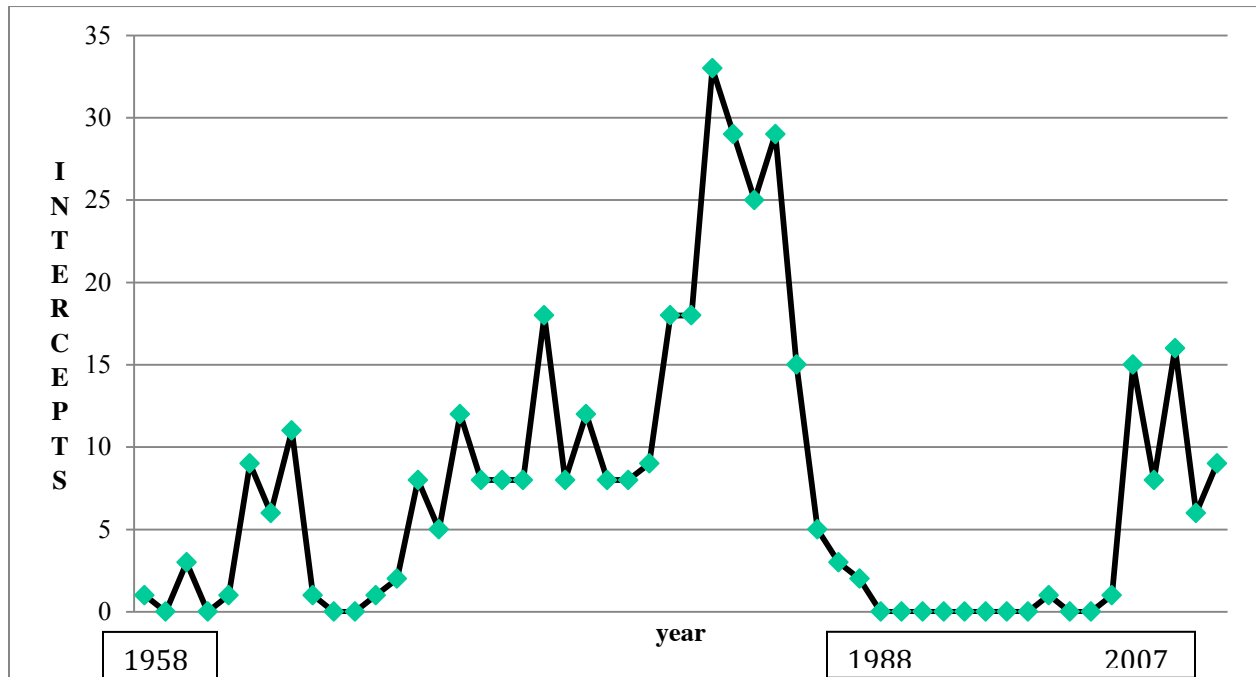


The expanded CADIZ (which includes Hans Island and the disputed maritime zone in the Bering Sea), however, is largely secondary to the issues concerning the modernization of the NWS, except in terms of ensuring that the new warning system is capable of reaching far beyond it. With the resumption of **Russia out-of-area (OOA) patrols via LRA and NORAD fighter intercept activity in response in 2007**, and every indication from President Putin that these patrols would continue ‘from now on’, a modernized NWS for the Arctic needs to be capable of identifying and tracking Russian LRA far into the Arctic Ocean and beyond into Russian territory. Given the reach of new generation Russian ALCMs, the new system will also have to be able to identify and track ALCMs in flight, as well as possible long-range ground launched cruise missiles (GLCMs) from the Russian Arctic, even though these are currently prohibited under the

<sup>29</sup> <http://www.navcanada.ca/EN/products-and-services/Service%20Project%20Announcements/SPA-2018-ADIZ-EN.pdf>

1987 Intermediate Nuclear Forces (INF) Treaty.<sup>30</sup> In addition, extremely high speed hypersonic cruise missiles, travelling at a speed greater than Mach 5 represents another significant challenge. Currently, the NWS is incapable of tracking these threats.

### Intercepts of Soviet/Russian Aircraft by NORAD



Source Rob Huebert, Calgary University.

This new threat environment also has direct implications for the current location of FOLs in the Canadian Arctic, and NORAD's deterrence and defence strategy. In the past, NORAD fighters deployed into these FOLS were in range of intercepting Soviet LRA launch platforms (the archers) prior to their reaching their ALCM launch points. Today, this is not possible given the range of Russian ALCMS. In response, a binational committee, which includes the participation of US European Command (USEUCOM) officials in light of possible Russian launch points within its AOR east of Greenland, is examining alternative FOL locations.<sup>31</sup>

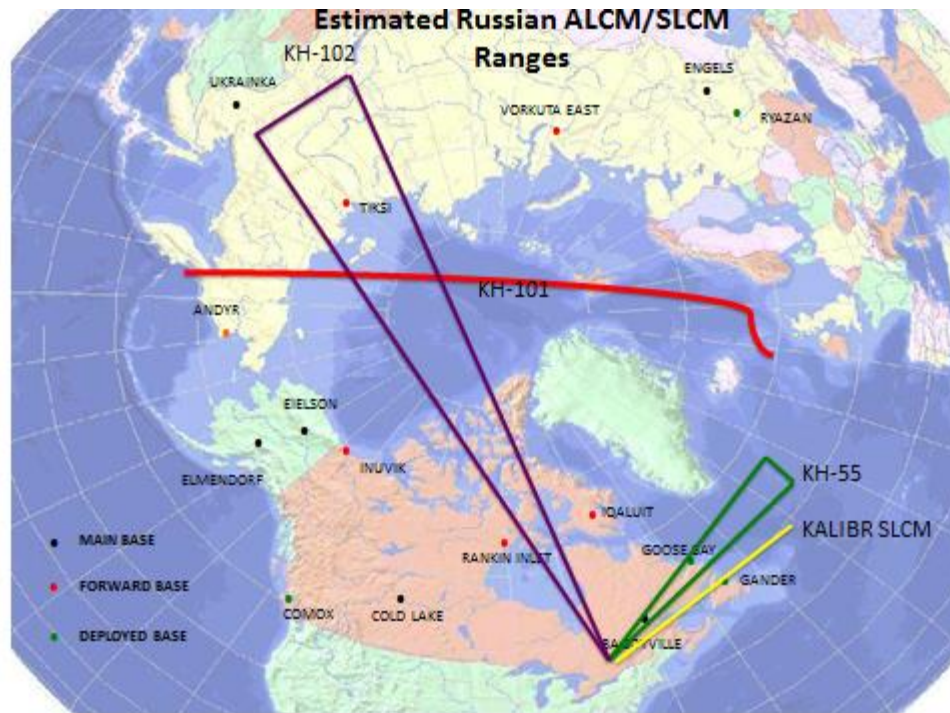
<sup>30</sup> With regard to INF, the United States claims that recent Russian ground based missile test have been in violation of the Treaty. In addition, Russian policy-makers have also raised concerns about the INF Treaty because China is not party to the Treaty, and have threatened to withdraw in response to other strategic concerns, such as the U.S. BMD program. The U.S. beat them to it and announced its potential withdrawal in October 2018.

<sup>31</sup> These could include the U.S. base at Thule, in Greenland, and the Canadian Alert base on the northeastern tip of Ellesmere Island.

Even with interceptors deployed further north, it is questionable whether they would have the range to strike at the archers (platforms), notwithstanding the possibility of a new generation of long range air-to-air missiles or the deployment of air-to-air refueling aircraft, with the latter having significant infrastructure and cost implications for FOLS. Alternatively, consideration could also be given to deploying U.S. LRA, as Canada has no such capability, nor any plans to acquire LRA. Besides the infrastructure costs for FOLS hosting U.S. LRA, there are also political-strategic implications of such deployments being perceived by Russian authorities as a pre-emptive strike posture, and likely Canadian concerns of NORAD, if U.S. LRA were dedicated to it, of the command undertaking an offensive posture.<sup>32</sup> Canada has always stressed the “defence” in NORAD and has tapped into national offensive capabilities to counter Russian LRA activity. Given near peer rivals, can NORAD remain purely defensive?



<sup>32</sup> Of course, U.S. LRA, under USSTRATCOM, would not necessarily need to be assigned to NORAD. Throughout the Cold War, the U.S. received permission from Canada for LRA overflights, and this could be extended to provide permission for U.S. LRA to use Canadian northern bases in the event of a crisis, thereby leaving NORAD strictly in a defensive posture.



If for capability, cost, or political-strategic reasons, NORAD is incapable of threatening Russian LRA (the archers) then NORAD will have no choice but to ensure it has the capability to identify, track, and intercept Russian long range ALCMs (the arrows), in flight. Currently, the NWS and Canadian interceptors (CF-18) assigned to NORAD lack such a capability, although one would expect that the CF-18 replacement project will place a premium on an anti-ALCM capability.

In effect, the current NWS, which provided a single solution for the threat environment of its day, cannot be replaced simply with the same technical capability of long and short range radars, even **if** a portion of it were to be moved farther North in the Canadian Arctic archipelago to meet the new CADIZ. It is even doubtful that much larger and longer-ranged ground-based radars will suffice to meet the ALCM threat environment due to their low signature, higher speeds and greater manoeuvrability, notwithstanding the potential development and capabilities of quantum radar. Nor will FOLS moved farther north necessarily resolve NORAD deterrence and defence requirements. Importantly for both, **the costs of building large infrastructure in the Arctic remains highly prohibitive, and also needs to take into account the impact of the melting permafrost and the challenges this poses to all infrastructure.**

Overall, ground-based radar will remain a vital requirement for the Arctic, if only to deal with the potential growth in civilian Arctic aviation. But, it alone will be insufficient to meet NORAD's aerospace warning mission in the new threat environment. **It will have to be augmented by a range of other systems, including a greater commitment of**

**airborne, such as U.S. AWACs, maritime and space-based assets. Specifically, the future NWS requires a significant ‘look-down’ capability to ensure that NORAD meets its mission to deter, detect and defend, and these capabilities will need to be integrated into a ‘systems of systems’ solution.**

Whatever the final technical solution, the costs of NWS modernization, which in reality is NWS replacement, will be extremely high, with some informal estimates around \$11 billion Canadian. Replicating the funding arrangement for the current NWS, the costs of this solution is to be shared on a 60% US, 40% Canadian basis.<sup>33</sup> This reduces the burden on the Canadian budget. But, Canada’s new defence policy, *Strong, Secure and Engaged*, and the 2018 Canadian *Defence Investment Plan* are silent on these costs. More importantly, a key issue is the scope of the funding arrangement.

With the NWS modernization/replacement solutions still in initial stages, what will and will not be covered by the funding arrangement is an open question, especially given that air, maritime and space-based solutions will be multi-functional and (should) also entail maritime surveillance capabilities. For example, one can envision a possible role for the Canadian radar satellite constellation in polar orbit, depending upon potential new technologies, and it is currently entirely Canadian funded and under the Canadian Space Agency (CSA). Moreover, it also raises the issue of the role of other government agencies, which will benefit from the ‘systems of systems’ solution not to mention interaction with a proposed U.S. Space Force in the event it materializes.

Furthermore, it is unlikely that the funding arrangement will also include environmental clean-up costs. In this regard, NWS assets on Canadian soil are Canadian assets, suggesting that these costs will be borne entirely by Canada. Past practices of simply leaving equipment and infrastructure to disintegrate in the Arctic environment are non-starters today. Moreover, the government will have to take into account indigenous concerns regarding possible future locations and environmental clean-up. As such, the final bill is extremely difficult to predict, but the modernization/replacement process, as noted above, is likely to be fairly long and involved. This all has to be completed by roughly 2025, when the current NWS reaches the end of its life-span, and given today’s and the near future threat environment, the solution cannot be pushed off, as has happened with the CF-18 replacement.

Finally, with regard to the threat environment, it is important to recognize that Russian LRA flights have remained within international airspace, suggesting that the flights are

---

<sup>33</sup> See *The Agreement between the Government of the United States and the Government of Canada on the North American Aerospace Defense Command* (or Binational Agreement) 28 April, 2006. Found at <https://www.state.gov/documents/organization/69727.pdf>. “The financing of expenditures connected with the integrated headquarters of NORAD and in support of NORAD-assigned personnel at other U.S. and Canadian commands to perform NORAD missions shall be arranged by mutual agreement between appropriate agencies of the Parties. (Article IId)”

designed for training purposes and as a means of diplomatic-military signalling. While the aligned CADIZ has been tested by Russia (for example, the 26 January 2019 flight of 2 Russian TU-160 Blackjack bombers into the northernmost reaches of the aligned CADIZ), a major crisis in Eastern Europe could create a surge in Russia LRA activity for signalling purposes. The U.S. Bomber Assurance and Deterrence missions (BAAD)<sup>34</sup> probe Russia's periphery, especially along the Baltic Sea in 2017. More such missions might be required in the future.

In this context, it is also important to recognize that Russian behaviour, in its near abroad, as evident in Georgia, and Crimea Eastern Ukraine, is distinct from Russian behaviour in the Arctic. Conflictual and adversarial in the former, Russia is a cooperative actor in the Arctic. It shares a range of common interests with the seven other Arctic states, cooperates with them in Search and Rescue (SAR) and is committed to a legal solution to de-limiting the Arctic Ocean continental shelf through the Law of the Sea process.<sup>35</sup> Russia also perceives the Arctic as a location for its strategic LRA, rather than as a specific theatre of military operations *per se* (although we continue to watch activities of Russia's Arctic Joint Strategic Command established in 2014). Certainly, a crisis in Eastern Europe would have implications for the Arctic, as suggested above, but in and of itself, it is highly unlikely that a crisis would portend the use of force in the Arctic. In this regard, it is important that neither Canada nor the U.S. engage NATO in Arctic military exercises; these would only be provocative, and undermine regional cooperation. Instead, key allies should continue to be invited to Arctic exercises in North America as either Arctic states or as individual allies rather than as members of NATO.

Beyond these considerations, as noted above, the changing Arctic environment is also likely to see a growth in civilian aviation, and with it, an increased likelihood of accidents.<sup>36</sup> Although Search and Rescue (SAR) is not a NORAD mission, two considerations are important here. First, NORAD is engaged on the periphery as a function of its post-9/11 Noble Eagle operations, even though the probability of a 9/11-type terrorist attack in the Arctic is near zero. Second, aerial SAR in Canada is an RCAF mission,<sup>37</sup> but its primary SAR assets are largely located in the south. While it is likely that some of the new generation of RCAF SAR aircraft will be deployed to the Arctic,

---

<sup>34</sup> General Robin Rand, "Fiscal Year 2018 Priorities for Nuclear Forces and Atomic Energy Defense Activities: Presentation to the House Armed Services Committee" (25 May 2017). P. 5 <https://docs.house.gov/meetings/AS/AS29/20170525/106038/HHRG-115-AS29-Wstate-RandR-20170525.pdf>

<sup>35</sup> See Troy Bouffard and Andrea Charron, "A Tale of Two Russias?", *Vanguard* (August/September 2018). See <https://vanguardcanada.com/2018/08/21/aug-sep-issue-our-changing-north/>

<sup>36</sup> All commercial aircraft are required to provide flight plans to FAA/NAVCAN but civilian aircraft do not need to do so. These aircraft may operate over water outside of the territorial sea limits (12nmi) and are not required to self-identify.

<sup>37</sup> Note, via the Agreement on Cooperation on Aeronautical and Maritime Search and Rescue in the Arctic agreed to by the 5 Arctic States in 2011, more than the U.S. may come to the aid of Canada.

probably at Yellowknife, the home of CAF Joint Task Force North, the expanse of the Canadian Arctic and harsh operating environment will likely strain limited RCAF resources. In this regard, CANUS cooperation, which enables the smooth and rapid movement of resources across borders, à la NORAD's air control mission, is likely to become a necessity. **While some form of NORAD solution may be premature for now, not least of all for political reasons as noted in the Political Considerations section, both the U.S. (via USNORTHCOM) and Canada (via CJOC) provide direct support to civilian agencies. Examining possible enhanced cooperation, especially relative to resource constraints and the expanse of the North America Arctic, is an imperative. This also extends into the maritime dimension.**

The presumed, or expected, increase in maritime traffic as a function of the reduction in the multi-year ice coverage, potentially resulting in the Beaufort Sea, Chukchi Sea and NWP becoming ice-free for longer periods *in the summer*, poses two implications for CANUS defence cooperation and NORAD.<sup>38</sup> Increased vessel traffic is assumed to bring with it an increased likelihood of criminal gangs and other threats that NORAD needs to monitor because of its maritime warning mission. Second, increased traffic is assumed to increase the likelihood of maritime accidents, not least of all due to the current lack of navigational aids and bathymetric information and charting. Although NORAD does not possess a maritime control mission, and national responses entail the engagement of other governmental agencies and departments, both nations' armed forces have a significant role to play, as evident, for example, with the Royal Canadian Navy acquisition of Arctic Offshore Patrol Vessels.

For now, however, there have been only modest increases to traffic in the Canadian and U.S. Arctic, mainly due to longer "shoulder seasons".<sup>39</sup> The increase in vessel traffic is not of the scale, or type to warrant a significant sea change in NORAD's or both nation's military attention, nor is the shipping related exclusively to the melting of the ice.<sup>40</sup> According to NORDREG<sup>41</sup> data for 1990 to 2012, annual vessel count trends are

---

<sup>38</sup> Elisabeth Rosenthal, "Race Is On as Ice Melt Reveals Arctic Treasures", *International New York Times*, (18 September 2012).

<sup>39</sup> The weeks before and after peak shipping season in the summer months.

<sup>40</sup> Many government vessels (Danish, Russian, American and Canadian), often working together, were taking soundings and collecting other data throughout the Arctic for submissions to the UN Commission on the Limits of the Continental Shelf and/or completing other research as part of the UN's International Polar Year (2007-2009), various university-based research programs etc. See Larissa Pizzolato and Jackie Dawson "There's more behind Arctic shipping than climate change" *Globe and Mail*, (3 February 2014) and Larissa Pizzolato & Stephen E. L. Howell & Chris Derksen & Jackie Dawson & Luke Copland, "Changing sea ice conditions and marine transportation activity in Canadian Arctic waters between 1990 and 2012", *Climatic Change*, (December 2013). Note, the authors conclude: "...[there is] a lack of correlation between increasing vessel count trends and sea ice trends over the full period of study [1990-2012]."

<sup>41</sup> Canada's Vessel Traffic Reporting Arctic Traffic Zone (NORDREG zone) is now mandatory. Vessels of 300 gross tonnage or more; vessels that are engaged in towing or pushing another vessel, if the combined gross tonnage of the vessel and the vessel being towed or pushed is 500 gross tonnage or more; and vessels

increasing, but not in the hundreds projected. For Government vessels, icebreakers and pleasure crafts, the increase only exceeds eight vessels per decade, and the number of bulk carriers and passenger ships has increased only a rate of three vessels per decade.<sup>42</sup> As well, the new mandatory Polar Code, effective 1 January 2017 with a year's grace period, may actually dissuade vessels (other than small crafts which are exempt from the Code) from venturing to the Arctic that are not Polar Code compliant. For example, the *Crystal Serenity* cruise ship, which transited the NWP in summer of 2016 and 2017, is non-compliant, and thus no longer able to transit the Arctic.<sup>43</sup> The lack of any port facilities in Canada's Arctic also limits vessel activity.<sup>44</sup> Below is a snapshot of activity in the Arctic on 14 August 2017 considered the "high" season for shipping in Canada's Arctic. (The now mandatory International Maritime Organization's Polar Code requiring considerable hull changes for ships came into effect 1 January 2017 but allowed a grace period for existing ships. Fewer ships will transit the NWP in the coming summers as companies seek to comply with the new code). In total, fewer than 45 vessels are noted in Canada's Arctic. The vast majority are smaller merchant ships engaging in fishing activity.

---

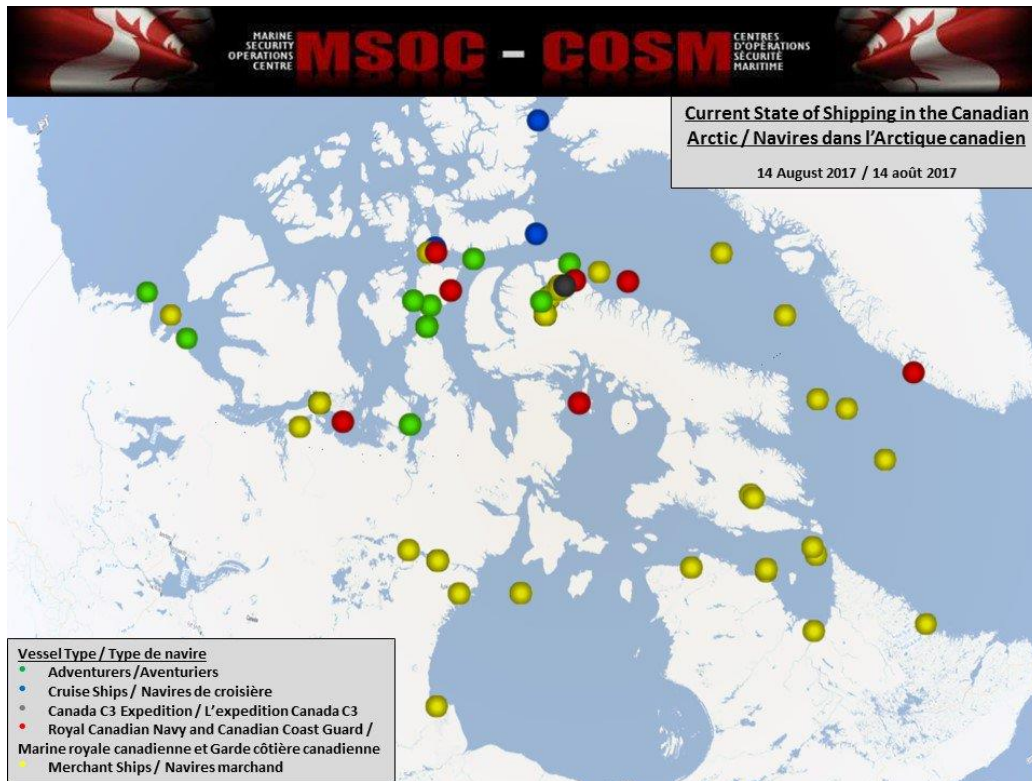
that are carrying as cargo a pollutant or dangerous goods, or that are engaged in towing or pushing a vessel that is carrying as cargo a pollutant or dangerous goods, must report to the Canadian Coast Guard if entering through the NORDREG zone.

<sup>42</sup> See Pizzolato et al. Table 2.

<sup>43</sup> The company is looking to purchase ice strengthened hulls for future voyages.

<sup>44</sup> A port is projected to be built in Iqaluit. The port of Churchill is too far south, although it may become a shipping destination now that the rail line is being repaired and ownership has been transferred to a Canadian firm.

## Canadian Arctic Shipping Picture 14 August 2017



In contrast to the Canadian Arctic, vessel traffic in the U.S. Arctic is increasing both in number of vessels and length of season. In the U.S. Bering Strait, the U.S. Coast Guard (USCG) reports a 118% increase in maritime traffic between 2008 and 2012, although the type and purpose of the vessels is not provided. The USCG report states that: “The nature of maritime activity in the Arctic is indeed evolving from exploration and scientific research to resource extraction, commercial shipping, and a broad array of other pursuits”<sup>45</sup> suggesting that the U.S. anticipates an Arctic shipping boom. However, limited port facilities discourage vessel traffic and a limited population size means that the US Arctic is not considered on the same homeland security threat scale as is the mainland.

For the time being, projections of increased maritime traffic, as well as resource extraction activities, remain simply projections. This provides time for Canada and the U.S., individually and together, to identify and plan future actions and cooperative responses. As with civil aviation, this does not necessarily imply a NORAD-type solution. But, as a function of its maritime warning mission and legacy of success, NORAD certainly needs a seat at the table.

<sup>45</sup> US Coast Guard, “Arctic Strategy” (May 2013): 7.  
[http://www.uscg.mil/seniorleadership/DOCS/CG\\_Arctic\\_Strategy.pdf](http://www.uscg.mil/seniorleadership/DOCS/CG_Arctic_Strategy.pdf)

There are significant barriers facing current and future CANUS defence and security cooperation in the Arctic especially on the Canadian side. From a governmental standpoint, there are significant jurisdictional issues, competing organizational interests, and the fact that the CAF does not possess constabulary powers. The current state of relations between Ottawa and Washington related to the negotiations of USMCA and the highly negative views of the Trump Administration and the President are also problematic. But above all else, **future CANUS Arctic cooperation is constrained by Canada's Arctic sovereignty concerns, which, implicitly at least, portrays the U.S. as the threat not least of all as a function of different positions on the characterization of the NWP.**

In some ways, the Arctic is tied up within broader Canadian concerns or fears related to the land dimension of CANUS defence and security cooperation; concerns which led to the land component of the EvoNAD study process to be undertaken last. Indeed, there is some indication on the Canadian side that an expansion of NORAD missions into other domains or dimensions will never extend into the land domain because of Canadian sovereignty fears. If this is the case, then it is highly unlikely that NORAD missions will evolve beyond air and maritime warning in the Arctic, which is functionally problematic.

In this regard, it is vital that the Canadian government significantly alter its messaging with regard to Arctic sovereignty, not least of all because there is no threat to Canadian sovereignty in the Arctic (and neither in the land domain). Disagreements exist, such as over the status of the NWP, but these are legal questions for both nations that do not amount to a challenge of Canadian sovereignty. Sovereignty, in this regard, is about ultimate authority, not about the means a nation like Canada adopts, alone or in cooperation with the U.S., to manage the complex security environment in the Arctic.<sup>46</sup>

---

<sup>46</sup> For a detailed analysis, see Andrea Charron and James Fergusson "Arctic Sovereignty: Preoccupation vs Homeland Governance and Defence" *CGAI* (September 2018).  
[https://www.cgai.ca/arctic\\_sovereignty\\_preoccupation\\_vs\\_homeland\\_governance\\_and\\_defence](https://www.cgai.ca/arctic_sovereignty_preoccupation_vs_homeland_governance_and_defence)

## Chapter 4: Maritime Control/Air Control

In the wake of NORAD's acquisition of a maritime warning mission in 2006, the existing maritime security community in both Canada and the U.S. were suspicious of the true intent of an aerospace organization's entrance into the maritime domain. At one level, the mission implied some degree of problems within the existing community, despite the steps that had been taken after 9/11 to enhance maritime domain awareness (MDA) and warning (MW).<sup>47</sup> The community wondered out loud what value-added NORAD could bring to a domain distinctly different from aerospace. The community also feared that this would be the first functional step on the path to NORAD assuming the maritime control mission for North America, placing the existing actors, military and civil, in a subordinate, subservient role to a binational command. Finally, at the sub-conscious political level, especially within Canada, NORAD's new mission was a potential harbinger of not only its acquisition of maritime control, but also the expansion of binational cooperation into the land domain, with all its attendant implications as witnessed, for example, in reactions among some Canadian academics, that the establishment of USNORTHCOM would bring the Canadian Forces under a US command.

Nevertheless, it is clear that maritime defence and security is on the North American bilateral, and NORAD's binational agenda. It is part of the PJBD EvoNAD study package, tasked to NORAD, and traced back to former General Jacoby's<sup>48</sup> omnibus NORAD Next study. Whether this means that one can expect significant forward movement towards NORAD's acquisition of a maritime control mission in the future partially depends on the definition of maritime control. For example, there might be room for binational surveillance. In this regard, the Canadian government is fully committed to "work closely with the United States to ensure NORAD is fully prepared to confront rapidly evolving threats, including by exploring new roles for the command, taking into account the full range of threats."<sup>49</sup> Of course, the "new roles" are unspecified, "exploring" is open-ended, and the majority of NORAD references in the defence policy document refer to modernization. Furthermore, the political appetite in Canada for expanding binational cooperation is very low, especially given Canadian attitudes towards the current U.S. administration, and, as of yet, there is no clear indication of a U.S. drive for an expansion in the number or type of NORAD missions.

---

<sup>47</sup> For further details, see Andrea Charron, James Fergusson, and Nicolas Allarie. *Left of Bang: NORAD's Maritime Warning Mission and North American Maritime Domain Awareness*. Winnipeg: Centre for Defence and Security Studies. 2015.  
[http://umanitoba.ca/centres/cdss/media/0\\_NORAD\\_Maritime\\_Warning\\_Mission\\_Final\\_Report\\_8\\_Oct\\_2015.pdf](http://umanitoba.ca/centres/cdss/media/0_NORAD_Maritime_Warning_Mission_Final_Report_8_Oct_2015.pdf)

<sup>48</sup> General Jacoby was Commander of NORAD and USNORTHCOM from 2011-2014.

<sup>49</sup> Government of Canada. *Strong, Secure and Engaged: Canada's Defence Policy*. 2017. p. 61.

Moreover, maritime control is not the priority for North American defence cooperation. That place is occupied by the modernization/replacement of the NWS at a very high investment cost for both parties. There is also a range of other defence priorities confronting senior military leadership within an environment of large demand and limited supply. Finally, if the MW mission is any indication, there is no shortage of organizational and bureaucratic obstacles to binational maritime defence cooperation.

Nonetheless, North American maritime defence cooperation has clearly moved from the defence and security margins and addressing the relatively narrow potential maritime terrorist threats of the post 9/11 era to a central concern, largely driven by Russian naval developments, and to a much lesser degree Chinese. In particular, **the North Atlantic and the sea lines of communication (SLOC) to NATO Europe are returning to prominence.**

The end of the Cold War removed the North Atlantic from the defence and security agenda. Supreme Allied Command Atlantic (SACLANT), the primary structure for allied North Atlantic defence stood down and was replaced by the generic Allied Transformation Command (ATC). Atlantic allied naval cooperation moved to the periphery, concentrating on missions in the Persian Gulf and off the Horn of Africa (Somalia and the Gulf of Aden) related to conflicts that captured allied attention. More recently, allied naval attention has concentrated on the Mediterranean, the Black, and Baltic Seas in response to Russian activities, attended by the two Standing NATO Maritime Groups (SNMG), under Allied Maritime Command (MARCOM), located in Northwood, United Kingdom.<sup>50</sup>

With the North Atlantic returning to the defence agenda, several priorities emerge, that naturally raise issues for the CANUS relationship. The Royal Canadian Navy (RCN) and United States Navy (USN) have a long history of cooperation, dating back to World War II, and through the Cold War. Since then, the RCN has remained actively engaged with the USN, particularly evident in the ability of Canadian vessels to integrate, and thus replace American vessels, in U.S. Carrier Task Forces. This also extends to select NATO nations, especially the United Kingdom and the Royal Navy (RN). However, this capability has been largely limited to the tactical level of cooperation. Command and control arrangements, like those under Supreme Allied Commander Atlantic (SACLANT) during the Cold War, and with them related exercises among the allied navies, and the formal division of areas of responsibility in protecting the SLOC are largely absent.

---

<sup>50</sup> SNMG1 and 2 were established in 2005, replacing the NATO Standing Naval Force Atlantic and Mediterranean. They rotate as the NATO Reaction Force, and undertake a range of missions, training and exercises among the NATO allies. SMNG2 has largely been dedicated to maritime security in the Aegean and Black Sea. There are no USN vessels formally attached to either Group.

At the same time, anti-submarine warfare (ASW), especially related to the North Atlantic, and former Soviet threat, are also absent as a training priority. The Royal Canadian Navy (RCN), in particular, once an allied exemplar, has largely lost its ASW expertise. Post-Cold War tasks naturally obtained priority over ASW, reflecting the threat environment of the last two plus decades, even though submarines proliferated within the developing world. Nor was there any pressing need to exercise the reinforcement of NATO's northern flank.<sup>51</sup> Limited, and shrinking naval resources on both sides of the Atlantic relative to political and operational demand required choices to be made, and the obvious choice was to neglect the North Atlantic. Moreover, Russian naval activity in the North Atlantic largely disappeared as a function of the end of the Cold War adversarial relationship, and the lack of resources in the context of the political, social and economic upheavals following the collapse of the Soviet Union. Even with the emergence of the post-9/11 terrorist threat, and its maritime dimension,<sup>52</sup> there was no need to resurrect these arrangements. The maritime terrorist threat to the east coast of North America in particular was primarily an area for intelligence cooperation.

Over roughly the last decade, however, political relations between NATO and Russia deteriorated, especially following the Russian actions in Crimea, eastern Ukraine and Syria. Russian naval activity in the North Atlantic has increased substantially. New generations of Russian naval capabilities, including longer range surface and sub-surface cruise missiles (SLCMs), pose a growing maritime threat. As a result, NATO's northern flank has re-emerged as a security concern. Maritime defence cannot be ignored, and this issue, especially over the Atlantic, brings the coastal European allies and thus NATO into play. Reflecting this new environment, NATO re-established a North Atlantic Command, once again in Norfolk, and the USN as re-created the U.S. Atlantic 2<sup>nd</sup> Fleet.

The specific command structures and processes of these two new developments remain to be seen relative to those of Supreme Allied Command Atlantic (SACLANT) during the Cold War. More importantly, as a function of new military technologies and a new U.S. command, USNORTHCOM, since the Cold War, there now exists two distinct, albeit inter-related, perspectives on North Atlantic maritime control: NATO Europe (with an emphasis on the members bordering the North Atlantic), and USNORTHCOM/NORAD. For European North Atlantic Treaty Organization (NATO), the central objective is to secure the SLOC in the case of war in Europe, even if its location would be far east of the Cold War inter-German border. The requirement to ensure the movement of personnel

---

<sup>51</sup> During a large portion of the Cold War, Canada committed to providing reinforcements to northern flank (Norway)

<sup>52</sup> The post-9/11 concern is that a dirty bomb will be hidden on a cargo vessel or that the terrorists will launch some form of missile from a maritime platform.

and resources from North America to reinforce standing forces is vital, especially for Norway in particular, which borders Russia.<sup>53</sup>

USNORTHCOM, in contrast, is responsible for maritime threats (surface and sub-surface) within its AOR extending 500 miles into the Atlantic, which represents the seam, or hand-off point to EUCOM, and thus by default NATO. In this regard, NAVNORTH (USNN) is the naval arm of USNORTHCOM, and FLEET FORCES COMMAND (USFFC), co-located at Norfolk, is the naval force generator for all of the US regional commands, including EUCOM. NORAD is responsible for air-breathing threats emanating from surface and sub-surface platforms – SLCMs. (See Appendix B)

Meeting the organizations different objectives is a function of the maritime strategy adopted by the key actors, especially the USN and USFFC. In this regard, the strategy is to threaten or target surface and sub-surface platforms prior to their reaching their launch points in the North Atlantic. Reminiscent of the 1980's U.S. forward Maritime Strategy, it requires the movement of naval strike forces far north of the Greenland, Iceland, United Kingdom (GIUK) gap driven by two considerations. First, surface and sub-surface platforms (archers) are relatively easier to detect than their weapons (the arrows), especially SLCMs. Second, Russian naval forces are bastioned in the far north, relatively close to the main Russian naval base at Archangel.

This strategy raises several issues for NORAD and CANUS defence cooperation. First of all, it does not eliminate the Russian SLCM threat. There is no guarantee, in a worst-case scenario, that an offensive naval forward strategy would eliminate all hostile surface and sub-surface platforms. There will be 'leakers'. As such, the requirement for SLCM detection and interception systems remains. A SLCM in flight tracking towards North America is an air breathing threat, and thus a NORAD responsibility. Second, this requirement raises key issues about command, control and communication (C<sup>3</sup>) relationships among the various commands. With NORAD land-based interceptors far from likely launch points, which in turn are north of the GIUK, the first line is naval air defence forces. Arguably, these naval assets should be transferred to NORAD C<sup>2</sup> to ensure proper coordination between maritime and land based air defence.<sup>54</sup> Canada, however, is not likely to be able to respond to such a mission in the GIUK gap given current Canadian resources and its TOR with NORAD. Such scenarios also reinforce the requirement to extend the NWS down the eastern coastline, and possibly forward deploy

---

<sup>53</sup> The most recent study is John Andreas Olsen. ed. *NATO and the North Atlantic*. Whitehall Paper #87. London: Royal United Services Institute. 2017.

<sup>54</sup> During the Cold War, procedures were in place for 'cutting over' naval assets to NORAD for air defence purposes. During 9/11, a US aircraft carrier off New York was placed under NORAD command. The extent to which these have been exercised recently is unclear.

warning system components into Greenland and Iceland which would directly engage two NATO allies.<sup>55</sup>

The logic of centralizing North American air defence under NORAD C<sup>2</sup> also extends into the land-based surface-to-air defences. In both the Canadian and American cases, such defences are an army responsibility. While Canada currently possesses no such capabilities, it is part of the Canadian long-term investment plan for the army, even though it is formulated in terms of protecting force elements, rather than national territory.<sup>56</sup> If NORAD were to integrate ground-based air defence systems (e.g. in EX Vigilant Shield 17 held in the Fall 2016, 60 members of the South Carolina Army National Guard's (SCNG's) 263rd Army Air and Missile Defense Command (263rd AAMDC) and 10 civilian defence contractors carried out air defence artillery scenarios)<sup>57</sup> then NAV Canada, Transportation Canada and other agencies will need to be part of the discussions and coordination.

Integrating all air defence assets under a single NORAD command raises a range of significant issues, which need to be addressed through the CANUS tri-command relationship. In the past, the engagement of land and maritime assets in NORAD's annual Vigilant Shield exercise appears to have been on the margins. In the 2017 exercise, the U.S. did deploy a land-based air defence unit to North Bay, Canada, indicating the recognition of the need to integrate more than just air interceptors for the air control (defence) mission. At the same, it appears that naval assets, or the engagement of the RCN and USN/USFFC has been very limited to date.

While the details of recent Vigilant Shield exercises remain classified (and were disrupted by Hurricane Michael in the Fall of 2018) the threat environment and North American air control/defence requirements indicate the need for closer engagement and integration of all air defence capabilities and their respective force generators into future exercises. This raises the issue of integrating land and naval air defence assets into the new NORAD CFACC structure, if it is adopted, or into the existing operational command structure. This, in turn, raises issues about the current state of Canada-US naval cooperation, and by extension cooperation with NATO in the North Atlantic.

---

<sup>55</sup> The arrangements for the US Ballistic Missile Early Warning (BMEWs) radar in Thule, Greenland, which feeds data into NORAD's aerospace early warning mission, provides a foundation for deploying NWS radars. In this case, costs would be assumed by NORAD, possibly under the existing 60 (US) – 40 (CAN) infrastructure funding arrangement. Russian SLCMs also represent a 'backdoor' threat to NATO Europe, which suggests the need for close aerospace warning cooperation between NORAD and NATO.

<sup>56</sup> "Acquire ground-based air defence systems and associated munitions capable of protecting all land-based force elements from enemy airborne weapons." Government of Canada. *Strong, Secure and Engaged: Canada's Defence Policy*. 2017. p. 16.

<sup>57</sup> "22 Wing Hosts Air Defence Exercises", Skies Magazine (7 September 2016) <https://www.skiesmag.com/news/22-wing-hosts-u-s-army-air-defence-exercise/>. The 263rd AAMDC is based in Anderson, S.C., and deployed to North Bay with two full independent short-range air defence systems, which use Sentinel radars and Avenger missile launchers.

Currently, tactical cooperation between the RCN and USN, as well as select NATO navies, is well developed. However, operational and strategic level cooperation is not. This is partially a function of the absence of a command structure à la SACLANT during the Cold War, and with it a regional division of responsibility in the North Atlantic. Even though operational protocols appear to exist, these are not fully developed, updated, nor apparently annually exercised. At the same time, both navies possess an organizational preference towards a concentration on defeating an adversary's naval forces – platforms - *per se*.<sup>58</sup> In addition, both face constrained resources, and Canada no longer possesses naval air defence assets with the retirement of its TRIBAL Class destroyers. Finally, both navies are reluctant to commit or dedicate specific naval forces to North American air defence and command, even though USNN is the naval arm of USNORTHCOM.

While the detailed issues surrounding Canada-US-NATO naval cooperation and C<sup>2</sup> are beyond the purview of this study, an offensive USN naval strategy for the North Atlantic raise similar issues to an offensive strategy against Russian LRA/ALCMs. Not only is NORAD a defensive command, but it is unlikely that the Canadian government would be comfortable engaging in an offensive strategy. This then raises the issue of limited Canadian capabilities and the unlikely case that the RCN (via CJOC), despite its naval preferences, would be able to engage in a US-driven offensive strategy in the North Atlantic.<sup>59</sup> The RCN may well have to undertake a defensive posture in the western Atlantic, which should prioritize not ASW, but air defence (which would also likely require AEGIS capability). The net result may well then be a division of maritime defense responsibility in which CJOC provides the first layer of maritime air defence, while the USN devotes it resources to maritime offense. In such circumstances, close cooperation with NORAD becomes essential by bringing RCN assets under NORAD C<sup>2</sup> under the principle of unity of command.

Of course, this does not necessarily preclude the involvement of USNORTHCOM naval assets especially with its AOR extending into the North Atlantic. This generates two existing C<sup>2</sup> seams, alongside the C<sup>2</sup> air-maritime gap. The seam between NAVNORTH and the Canadian Maritime Component Commander (MCC), where the latter's national AOR extends only to Canada's maritime extended economic zone (200NM), and between USNORTHCOM and USEUCOM, with the latter including NATO's allied Maritime Command (MARCOM). In sorting out C<sup>2</sup> responsibilities, which may include the creation of a new overarching command structure, whether through a geographic or lead nation command approach, it is imperative that NORAD has a seat at the table as a

---

<sup>58</sup> Naval air defence, especially for the USN, is concentrated on the requirement to protect carriers within its carrier task forces, rather than national territory.

<sup>59</sup> Like all modern naval combatants, the Future Surface Combatant will be capable of undertaking multiple combat missions. However, these vessels will only possess a limited number of launch tubes. In addition, these combatants for anti-SLCM purposes will require a radar suite capable of SLCM tracking.

function of its relationship with USNORTHCOM and its air control mission for North America.

In addition, **developing protocols for the transfer of naval air defence assets to NORAD, and exercising these protocols in future Vigilant Shield exercises is essential.** This does not mean, however, that either the RCN, or USN/USFFC must dedicate standing naval assets to NORAD on a permanent basis. Rather, both need to create ‘virtual’ air defence task forces, which would serve the basis for future exercises, and provide a foundation for the effective air defence of North America during times of crisis.

Most importantly, these steps forward do not imply NORAD’s acquisition of a maritime control mission, even though many within the naval community on both sides of the border are likely to perceive it as such. Nor does it necessarily imply the expansion of the binational command into the maritime dimension, or by virtue of integrating land-based (army) air defence assets imply a step towards a fully integrated North American Defence Command. Rather, NORAD remains within its vital air warning, air control, and maritime mission suite in responding to the new air threat environment distinct from the Cold War.

## Chapter 5: From Air to Aerospace

Since its origins, NORAD's mission suite reflects a clear domain division between air and space, even though the term aerospace is somewhat misleadingly applied to both its warning and control mission.<sup>60</sup> Two elements clearly reflect this division. The assets supporting the air warning component are distinctly different from the space (ballistic missile) component, which, in turn, has traditionally been reflected in the structure of NORAD.<sup>61</sup> The control mission is strictly an air one. Continental ballistic missile defence (BMD) is a US only mission.<sup>62</sup> Tasked to USNORTHCOM, it is structurally reflected in the separate NORAD and USNORTHCOM J-3 operations positions in the integrated command centre. NORAD is connected to this mission in providing integrated tactical warning/attack assessment (ITWAA).

At its roots, the domain division is the product of the distinct legal, physical and technological differences of the two environments. Politically, it is also a product of a range of considerations, especially Canada's unwillingness to engage early on in the development phase of the U.S. ballistic missile defense programme, followed by the formal Canadian decision not to participate in the U.S. programme in 2005. In part, this unwillingness and decision is also the product of underlying, implicit Canadian concerns that linked ballistic missile defence to the future weaponization of space; concerns likely to be amplified as a function of the emphasis on future space-based interceptors in the 2019 Ballistic Missile Defence Review.

Alongside other considerations, as discussed below, NORAD's space component has been frozen in the warning mission, even though in the 1980s the likelihood of an expanded space mission appeared on the horizon. For Canada, NORAD's ballistic missile warning mission, which entailed data on the tracking of objects on orbit in outer space, had been the essential access point for Canadian military space.<sup>63</sup> Moreover, the stand-up of US Space Command (USSPACECOM) in 1985, with its commander dual-hatted as the commander of NORAD, suggested that NORAD would in the future remain the centerpiece of Canada-US military space cooperation.

---

<sup>60</sup> With NORAD's acquisition of the ballistic missile warning mission in the 1960s, initial discussions were held about replacing air with aerospace in the lead up to the 1968 renewal; a term adopted by the USAF in the late 1950s. In 1981, aerospace was formally adopted. Since then, the USAF has dropped the term, and separated air and space.

<sup>61</sup> Beneath the Command Centre, a separate air warning and ballistic missile warning centres existed.

<sup>62</sup> The US BMD program is multi-faceted, consisting of forward deployed tactical and theatre systems, under the overall command of USSTRATCOM. The continental system consists of mid-course phase, ground-based interceptors deployed at Fort Greely, Alaska (main site) and Vandenberg Air Force Base, California, and associated radars (land and sea-based).

<sup>63</sup> In order to undertake the ballistic missile warning mission, it is necessary to track objects on orbit to ensure that de-orbiting satellites, for example, would not be interpreted as a re-entering ballistic missile warhead. Canada's contribution to this mission during the Cold War was two Baker-Nunn ground-based optical cameras located in Alberta and New Brunswick respectively.

Of note during this same period, Canadian engagement in space took a significant leap forward with the development of the CANADARM for the US space shuttle and RADARSAT I, involvement in the International Space Station, and the establishment of the Canadian Space Agency (CSA). Even though these resided on the civilian side, it also entailed the development of a relationship between CSA and DND. In 1992, DND released its first space policy, created the Directorate of Space Development (DSPACED), and agree to the now defunct Joint Space Plan with the US.

Since then, several developments have embedded Canada-US military space cooperation in the bilateral arena, effectively limiting NORAD to its warning mission. In 2002, USSPACECOM was eliminated in the US UCP, and its missions transferred to USSTRATCOM, which has long been the most national, unilateral US command, primarily as a function of its nuclear deterrence mission. Alongside this mission, USSTRATCOM also obtained overarching responsibility for BMD and the US Global Strike missions.<sup>64</sup> With Canada's longstanding desire to keep the US nuclear deterrent at 'arm's length' distance, on the outside of ballistic missile defence, and the offensive nature of the US Global Strike mission with NORAD as a defensive command, any possible expansion of NORAD's engagement in military space was a non-starter.

Although US Air Force Space Command (AFSPACECOM) remained, co-located with NORAD at Peterson Air Force Base, Colorado Springs, its organic link to NORAD was for all intents and purposes severed. In addition, as a function of Canadian indecision on the BMD file, Canadian access to US military space shifted from meaningful to marginal. For example, Canadian personnel attached to USAFSPACECOM's 50<sup>th</sup> Space Wing, located at Schriever Air Force Base,<sup>65</sup> outside of Colorado Springs and tasked with the operational support of DoD satellites, were limited in the late 1990s to the unclassified domain.

DND's move into space was also very slow and gradual, partially a function of the dire budgetary situation facing the Department in the 1990s' 'decade of darkness', and the subsequent priority set to other pressing requirements related to re-equipping the CAF, along with the costs of the war in Afghanistan. For example, it took roughly twenty years from the identification of the space surveillance project to its actual deployment – Sapphire, a space-based optical satellite deployed in 2013, designed to observe the geostationary belt and contribute to the US Space Surveillance Network (SSN). As SSN supports NORAD's warning mission, similar to the NWS relationship to NORAD, it

---

<sup>64</sup> USSTRATCOM has the overall ballistic missile defence mission, which is operationally devolved to regional commands within the UCP. Thus, USNORTHCOM has operational control over the ground-based mid-course phase system located in Fort Greely, Alaska, and Vandenberg Air Force Base California. Similarly, USPACOM is responsible for the forward deployed systems in the Pacific, including the defence of Hawaii.

<sup>65</sup> Named after General Bernard Schriever, father of the USAF space and missile program.

made no sense to assign the asset to NORAD. Thus, the Canadian contribution logically would be bilateral.

Bilateral military space cooperation between Canada and the US is thus the function of several considerations. First, it is as much as the political traffic will bear to date, especially in Canada. Second, it is as much as the US command structure with military space assigned to USSTRATCOM will allow, and is further reflected by the recent engagement of the other members of the 'five eyes' community in US military space.<sup>66</sup> Third, it provides Canadian access to US military space on a selective basis as a function of specific and limited Canadian contributions, evident not only in the case of Sapphire, but also in terms of the planned Canadian RADARSAT constellation project.<sup>67</sup> Finally, there was nothing in actuality to add to NORAD's existing ballistic missile warning mission, especially with Canada on the outside of the US ballistic missile defence programme.

A reversal of Canadian policy on ballistic missile defence is clearly the necessary condition for NORAD's acquisition of some form of a control mission alongside its space warning one. However, it is not a sufficient condition for several reasons. During negotiations on possible Canadian participation in 2003-04, the US made it clear that even with Canadian participation, BMD C<sup>2</sup> would not be assigned to NORAD, and the US would not assign any formal priority to the defence of Canadian cities.<sup>68</sup> There is no reason to expect, beyond perhaps good will, that the US would change its position simply in response to a Canadian policy reversal. Rather, Canada would likely have to create the conditions in which the US would have little choice, but to agree to assign C<sup>2</sup> to NORAD for the mid-course phase element, currently under USNORTHCOM.<sup>69</sup> This, in turn, would require significant Canadian investment in national missile defence capabilities, including a possible Canadian interceptor site, which would replicate the role of

---

<sup>66</sup> In 2014, the 'five eyes' signed a multilateral MOU to cooperate on combined space operations, which subsequently led to the renaming of the US Joint Space Operations Centre (JSpOC) into the Combined Space Operations Centre (CSpOC) at Vandenberg Air Force Base in California. See . <https://www.defense.gov/News/Article/Article/603303/stratcom-dod-sign-space-operations-agreement-with-allies/>

<sup>67</sup> For Canada, the planned RADARSAT constellation, of three satellites in polar orbit, is to provide relatively persistent wide-area surveillance of the Canadian arctic, and was originally embedded in the Harper government's Northern Strategy. For the US and USSTRATCOM, it also provides a degree of global coverage potentially useful for its Global Strike mission.

<sup>68</sup> This was despite every indication, evident in the exchange of letters between the Canadian Minister of National Defence, David Pratt and US Secretary of Defense, Donald Rumsfeld, that NORAD would acquire C<sup>2</sup>. In addition to C<sup>2</sup>, the US would also not provide any guarantee that the defence of Canadian cities would be prioritized relative to US cities. The negotiations, however, collapsed largely for domestic Canadian political reasons. For details, see James Fergusson. *Canada and Ballistic Missile Defence 1054-2009: Déjà vu all over again*. Vancouver: University of British Columbia Press. 2010.

<sup>69</sup> Assigning C<sup>2</sup> to NORAD would potentially eliminate the separate NORAD and USNORTHCOM J-3 operations position in the integrated command centre. However, consideration also has to be given to USNORTHCOM's other missions, especially its DSCA one.

Canadian air defence interceptors underlying an original incentive driving the US towards the NORAD solution in the 1950s. Moreover, such an investment would reflect the key driver in Canada's military space engagement with USSTRATCOM, whereby key Canadian capabilities, such as Sapphire and RADARSAT, have significant value for the US.

The US has kept the door open for Canada to initiate discussions on possible BMD participation, and Canada's new defence policy, *Strong, Secure and Engaged*, states that Canada will "engage the United States to look broadly at emerging threats and perils to North America, across all domains, as part of NORAD modernization." However, the government also clearly states that "Canadian policy with respect to participation in ballistic missile defence has not changed."<sup>70</sup> Moreover, there is little, if any budgetary headroom for Canada to invest in BMD capabilities given current defence investment priorities, including NWS modernization, new fighters, and the future surface combatant, nor is the government likely to increase defence spending further.<sup>71</sup> Neither is there any significant internal DND support to alter investment priorities to make room for BMD, and there is no pressure whatsoever from the US for Canada to act.

Current conditions strongly indicate that NORAD's space role will remain limited to warning. Nonetheless, new emerging technologies currently in the development stage are likely to force Canada to re-think its position, and the US to consider an expanded NORAD role. Hypersonic or hyperglide weapon systems, earmarked for operational deployment over the next decade, blur the tidy divide between the air and space domains, and thus the distinction between air and space control.<sup>72</sup> They are specifically touted by Russia as a means to defeat the US ballistic missile defence system.

For NORAD's warning mission, the issue of hypersonic weapons is somewhat moot, as it operates in both domains. They do, however, have implications for the separate assets, which support the air and space side of the mission. The US Defense Support Program (DSP) and Ballistic Missile Early Warning System (BMEWS) are likely able to identify

---

<sup>70</sup> Government of Canada. *Strong, Secure, and Engaged: Canada's Defence Policy*. 2017. p. 90.

<http://dgpaapp.forces.gc.ca/en/canada-defence-policy/docs/canada-defence-policy-report.pdf>

<sup>71</sup> Some detail of Canadian planned defence investments is provided in National Defence. *Defence Investment Plan 2018: Ensuring the Canadian Armed Forces is well-equipped and well-supported*. Ottawa. 2018. <https://www.canada.ca/content/dam/dnd-mdn/documents/reports/2018/defence-investment-plan-eng.pdf>

<sup>72</sup> Hypersonic weapons generally refer to two different types, cruise missiles and glide missiles, even though sometimes the term hypersonic is used to label either. Whereas the cruise missile variant flies at high speeds within the atmosphere, and can be launched by an air, land, or sea platform, the glide variant flies in sub-orbital space (roughly 100km above the surface, and are launched by a ballistic missile). In the 1970s in conjunction with the development and deployment of multiple independently targeted re-entry vehicles (MIRVs), research was also conducted on maneuverable re-entry vehicles (MARVs), but never proceeded further primarily for technological reasons. Hyperglide is simply the modern term for MARVs, and designed to defeat current missile defences technology.

and track the ballistic missile launch side of the hypersonic threat.<sup>73</sup> The ‘systems of systems’ solution for the future NWS, however, will also need the capability to identify air-launched launched hypersonic weapons, along with ALCMs and SLCMs. In effect, this solution requires the integration of air and space warning support capabilities in order to ensure that an adversary cannot exploit the seam between air and space.

On the aerospace control side, much hinges upon whether or not these weapons are conceptualized within the realm of ballistic missiles, air platforms, or both. For now, current hypersonic technology falls within the missile defence realm, and thus with regard to the defence of North America, is a U.S.-only mission. However, technology does not stand still, and one can envision a future in which hypersonic cruise missiles and hypersonic warheads merge into a weapon system capable of maneuvering across the air-sub-orbital space divide, and launchable from a diverse range of platforms.

In addition, much also depends upon the maneuverability of current hypersonic technologies as manoeuvre as they descend to lower altitudes. In other words, these new weapon systems may not simply affect ballistic missile defence capabilities, but also NORAD’s aerospace control problem in terms of the requirements and capabilities vital to deter, defend and defeat this new threat. NWS modernization and future air control investments, therefore, need to consider requirements beyond the current cruise missile defence realm, whether in terms of fighter interceptors or ground-based point defences, to be able to deal with future hypersonic threats. Above all, the future indicates that as in the case of aerospace warning, the division between air control and BMD will become unsustainable as BMD capabilities potentially serve as a first layer of defence, with air as the second layer. Whether Canada likes it or not, this new threat necessitates a major re-consideration of its current BMD policy, and potentially its planned future investments; a re-consideration likely to be a centerpiece of the EvoNAD aerospace component, and discussions within the tri-command arrangement, the Military Cooperation Committee (MCC) and the PJBD.

Despite longstanding fears that a Canada outside of BMD would result in irreparable harm to NORAD, the forthcoming merger of the air and space (ballistic missile) domains because of these new weapons will likely raise similar fears regarding the future of NORAD if Canada seeks to limit its aerospace control mission to LRA and cruise missile defence. On the one hand, as long as this mission remains strategically vital for the defence of North America, Canada on the outside of hypersonic defence, like BMD, is not likely to harm NORAD and the relationship. On the other hand, if Canadian territory is vital for hypersonic defence assets, a Canadian ‘no’ is likely to do significant damage if

---

<sup>73</sup> BMEWS refers to ground-based radars, which are cued by the US Defense Support Program (DSP) of infrared satellites in geostationary and polar orbit.

it is perceived as undermining U.S. security. Much will depend upon the types of defence capabilities essential to deter, defend and defeat hypersonic threats. Regardless, like BMD, Canada on the outside will cede its defence to American unilateral decisions; contrary to the longstanding Canadian principle at the heart of NORAD to ensure that Canada has a say in how it is defended.

Of course, a Canadian commitment to cooperate in the defence of North America against hypersonic threats will have resource implications on a strained budget, even with the planned increases outlined in the SSE. This does not necessarily mean, however, that Canada will need to invest significantly in hypersonic defence capabilities, as one can image a possible division of labour between Canada and US in terms of modernization.<sup>74</sup> Nonetheless, NORAD provides the only C<sup>2</sup> arena to manage this new multi-domain environment, in which air and space merge into a single domain, in the interests of both nations.

This new multi-domain environment also raises, or ‘opens the door’ to the consideration of an expanded NORAD role in space control – the defence of vital military, public and commercial space assets. BMD and hypersonic intercept capabilities effectively merge into a ‘system of systems’, and these, in turn, can provide kinetic defence for satellites in orbit.<sup>75</sup> Such capabilities can also be employed to intercept enemy satellites, as is the case for some BMD systems today. This, of course, would alter NORAD from a purely defensive role into potentially an offensive one as well. It also raises the politically contentious spectre of space weaponization.

Despite longstanding Canadian opposition to the weaponization of space, there exists no agreed international consensus on its meaning and nature. Roughly at the turn of the century, officials from (then) External Affairs posited that it entailed the deployment of weapons on orbit.<sup>76</sup> In this case, air, ground and maritime based interceptors are outside

---

<sup>74</sup> In discussions regarding the Canadian response to the US invitation to all the allies to participate in SDI research in 1985, the Canadian Air Force representative on the working group suggested that Canada take responsibility for the costs of the modernization of the NWS, and leave BMD to the US in a division of labour. As SDI was simply a research programme, this option was put to the side. See. James Fergusson. *Canada and Ballistic Missile Defence 1954-2009* “Déjà vu all over again. Vancouver: University of British Columbia Press. 2010.

<sup>75</sup> In the 1980s, the US deployed an air to space missile from a US F-15 capable of destroying satellites in low earth orbit. With new technologies, such a system could be employed against hypersonic weapons, as well as ballistic missile warheads and satellites. This system was canceled and retired by the US with the end of the Cold War.

<sup>76</sup> This directly reflected the prohibition on the placing on orbit of weapons mass destruction in space found in Article IV of the Outer Space Treaty. United Nations. *United Nations Treaties and Principles on Outer Space*. <http://www.unoosa.org/pdf/publications/STSPACE11E.pdf>

This policy position is found, for example, in Robert McDougall and Phillip Baines. “Military Approaches to Space Vulnerability: Seven Questions.” *Future Security in Space: Commercial, Military and Arms Control Trade-Offs*. Occasional Paper #10. Monterey: Center for Non-Proliferation Studies. 2002. <https://pdfs.semanticscholar.org/6c5e/dc4c6e6d819485dc0725706590e50f1fd6d2.pdf>

of weaponization, and thus should not represent an obstacle for NORAD in terms of a space control mission. However, this is not the official policy of now Global Affairs, or the Government of Canada. Nor is it part of the out-dated 1998 space policy of DND. A similar official policy vacuum exists in the U.S.

Regardless, it is clear that DND, reflecting overall Canadian policy to date, views military space investment strictly in the realm of non-kinetic capabilities. DND officials are fully aware that any hint of involvement in kinetic capabilities is a political non-starter.<sup>77</sup> For now, however, DND remains saddled with an out-dated Space Policy, and no formal space strategy or investment plan, notwithstanding the recognition in *Strong, Secure and Engaged* of the importance of space for the defence of Canada. Even so, the government has clearly placed outer space in the non-kinetic realm as a function of its repeated references to the peaceful use of outer space.<sup>78</sup>

Whether this is sustainable is an open question, especially with the beginnings of the merger of the two domains, which is only likely to accelerate in the near future as technology advances. Furthermore, the nice, clean divide between offensive and defensive postures and capabilities will become increasingly problematic.<sup>79</sup> Notwithstanding the pleas to keep outer space a sanctuary from war, the practical concerns of pollution resulting from the destruction of satellites producing debris currently have no solution. In the future, space will become more polluted and it will need to be cleaned up.

Finally, some brief consideration should be given to the implications of President Trump's recent proposal to establish an independent United States Space Command (USSC) and Space Force (USSF) for NORAD and Canada. While details are sketchy, the new command and force entails the merger of US Air Force Space Command (USAFSC), the US Navy's Space and Naval Warfare Systems Command, the Naval Satellite Operations Center and the US Army's 1st Space Brigade.<sup>80</sup> It is also likely that the space component of USSTRATCOM would transfer to the new space command and force.

---

<sup>77</sup> Located in low earth orbit to track moving objects in the geo-stationary belt, its optical sensor holds the potential to track objects in other orbits, as well as warheads passing through outer space to terrestrial targets, if its orientation is change to look elsewhere.

<sup>78</sup> Government of Canada: *Strong, Secure and Engaged: Canada's Defence Policy*. 2017. p.56.

<sup>79</sup> Indicative is the ongoing development of an on-orbit satellite servicing capability. Like the CANADARM for the space shuttle, this capability can serve non-military and military functions. A Canadian company, MacDonald Detwiller, is currently developing a prototype, funded by the US Defence Advanced Research Products Agency (DARPA). Caleb Henry. "MDA restarts satellite servicing business with SES as first customer." *Space News*. June 29, 2017. <http://spacenews.com/mda-restarts-satellite-service-business-with-ses-as-first-customer/http://spacenews.com/mda-restarts-satellite-service-business-with-ses-as-first-customer/>

<sup>80</sup> Valerie Insinna, "Pentagon presents recommendations on Space Force to Trump". *Defense News*. October 23, 2018. <https://www.defensenews.com/space/2018/10/23/pentagon-presents-recommendations-on-space-force-to-trump/>

For NORAD, and thus Canada, it would likely result in moving NORAD's current links to USSTRATCOM to the new command, without affecting significantly either NORAD's aerospace warning mission, or Canada's current bilateral approach to military space cooperation with the U.S. Whether the transfer would also include or significantly affect USSTRATCOM's global ballistic missile defence mission is hard to say, especially in terms of the proposal in the *2019 Ballistic Missile Defense Review Report* to develop and deploy space-based missile defenses.<sup>81</sup> If the North American ground-based system currently assigned to USNORTHCOM simply transferred beneath the new USSC, Canada could remain at 'arm's length' distance from space-based defenses, similar to its relationship with the US strategic nuclear deterrent. If, however, system command moved entirely from USNORTHCOM to USSC, then this would add an additional barrier for potential future Canadian participation. Regardless, space-based defenses independent of whether or not a USSC is stood up would add another barrier to any expanded NORAD role in space.

Beyond the lack of detail, the probability of a USSC and/or USSF for the foreseeable future, or at least during the life of the current US Administration is low. On the space force side, as well as the proposal to establish a Space development Agency (akin to the Missile Defence agency), it is doubtful that Congress will provide sufficient funds, especially given the state of relations with the Administration and a Democrat-controlled House. Moreover, such a decision is likely to face significant internal opposition from the existing military services, as well as likely the Joint Chiefs of Staff. It would also require a significant overhaul of the UCP. Finally, while one can potentially envision a future USSC and USSF in the long-term, the current proposal is simply too premature given the state of technology. Nonetheless, NORAD and Canada need to track possible developments in this area for the future. (The authors have given up hope that the moribund PJBD will track such developments).

For the time being, some form of space control mission for NORAD awaits future technological developments. **Canada-US military space cooperation is likely to remain bilateral, reflecting the interests of both parties.** It will enable DND to select 'safe' political investments in the non-kinetic realm, ensuring access to US military space. It will enable the US via USSTRATCOM to restrict key areas of military space unilaterally. Nonetheless, the emergence hypersonic threats 'opens the door' to a NORAD solution. While the threat posed by new weapons demands innovation and an adaptation from a continental defence point of view, there still remains an essential

---

<sup>81</sup> Department of Defense. *Ballistic Missile Defense Review Report*. Washington D.C. February 2019. [https://dod.defense.gov/Portals/1/features/defenseReviews/BMDR/BMDR\\_as\\_of\\_26JAN10\\_0630\\_for\\_web.pdf](https://dod.defense.gov/Portals/1/features/defenseReviews/BMDR/BMDR_as_of_26JAN10_0630_for_web.pdf)

requirement, in the view of many defence experts, to tackle the BMD issue. The launch of SSE without considering BMD is clearly a missed opportunity.

## Chapter 6: Political Considerations

The success of NORAD has long benefitted from its relative insulation from political winds. Of course, since its creation, there have been occasions when it has been buffeted by politics, especially prompted by and associated with discussions concerning the Agreement's renewal.<sup>82</sup> Since its indefinite extension in 2006, these peaks of political attention have largely disappeared.<sup>83</sup> Since then, NORAD has largely operated beneath the public political radar, somewhat out of political sight and mind.

This does not mean, however, that little to no political attention is paid to NORAD. Both Canadian and American parliamentary/congressional committees examine the relationship from time to time. The dual-hatted Commander of NORAD and USNORTHCOM regularly testifies to relevant Congressional committees. Similarly, the Canadian House of Commons Standing Committee on National Defence (NDDN), and Standing Senate Committee on Security and Defence (SECD) have examined NORAD in the context of the Canadian-US defence relationship, and issued several reports over time. Most recently, this occurred in the context of the development of the Liberal government's new defence policy, *Strong, Secure and Engaged*, released in June 2017 and another focusing on Canada's abilities to defend itself and allies in the event of an attack by North Korea on the North American Continent.<sup>84</sup>

Even so, testimonies, examinations and reports of NORAD's role and/or performance have rarely been accompanied by any critical political fallout. For example, on the occasion of NDDN's examination of the North Korean ballistic missile threat in the fall of 2017, LGen St. Amand, then Deputy Commander of NORAD, when asked the question by Conservative defence critic James Bezan whether USNORTHCOM (the command with responsibility to defeat an incoming missile) would defend Canada against a ballistic missile attack, replied: "We're being told in Colorado Springs that the extant U.S. policy is not to defend Canada. That's the policy that's stated to us, so that's the fact that I can bring to the table".<sup>85</sup> While this statement, with its potential significant political implications, was picked up by the media, it had no real public or political impact, and quickly disappeared.

---

<sup>82</sup> The initial exchange of notes set renewal at ten years. This was modified to five years in 1968, and on several occasions since then, renewal took place over a shorter period of time at the request of the Canadian government.

<sup>83</sup> In agreeing to an indefinite extension, the agreement is open to review upon request of either party, can be terminated given six months' notice.

<sup>84</sup> NDDN 2017. (2nd Parliament, 1st Session (December 3, 2015 - Present))

Found at <http://www.ourcommons.ca/Committees/en/NDDN/StudyActivity?studyActivityId=9637426>

<sup>85</sup> Ibid. <http://www.ourcommons.ca/DocumentViewer/en/42-1/NDDN/meeting-58/evidence>

The conclusion that **NORAD operates largely beneath the political radar** is derived from several considerations. At one level, NORAD, and North American defence in general, has always been a secondary defence priority. For Canada and the United States, the first line of defence remains overseas. This reflects historical experiences, as especially evident in both World Wars, and the Cold War. Even following 9/11, when greater attention and resources were paid to homeland defence and security including the creation of agencies focused on nothing but the homeland, more attention was paid by both governments to take the fight to the enemy overseas. Moreover, neither country faced or faces any significant defence threat on the continent or in the hemisphere. Traditional threats continue to originate across the oceans primarily on the Euro-Asian continent.

**Politically, there is also little value for either government to concentrate upon North American defence.** In the American case, domestic defence debates largely revolve around overseas commitments and requirements, rather than continental defence despite the fact that defense support of civil authorities in response to weather and climate events is growing in frequency, complexity and resources. The Canadian case is similar, yet different. Arguably, international commitments and requirements also dominate defence debates. But whereas defence is a politically salient issue in the United States for a wide range of reasons, it is rarely, if ever, in Canada.

It is not just an issue of lack of political salience that leads Canadian governments to ignore/overlook defence issues in general, and North American defence cooperation in particular, in favour of economic and social ones. Rather, defence issues, especially related to North America, are perceived, consciously or not, as politically dangerous; they raise the spectre of a domestic debate on Canadian independence and sovereignty which represents a potential lose-lose proposition for governments. The government loses if it cannot demonstrate its protection of Canadian sovereignty (really defence of the homeland), and it loses if it is seen to desert its core friend and ally, with unsubstantiated fears that the United States will punish Canada irreconcilably for undermining its defence and security.

On rare occasions, voices are raised in Canada which link defence with non-defence issues in the CANUS relationship. Thus, for example, the 2005 Canadian decision not to participate in the U.S. BMD programme was linked to the American decision to ban Canadian beef access to the U.S. market fearing the ‘mad cow’ virus as well as perennial tariffs spats concerning softwood lumber.<sup>86</sup> To be clear, the connection of defence to

---

<sup>86</sup> <https://www.theglobeandmail.com/news/national/promises-made-promises-broken/article1115162/>

trade issues is oblique and often erroneously and causally made by media and pundits. Today, a similar linkage has been made regarding the future of NAFTA versus other issue areas including the CANUS security and alliance relationships.<sup>87</sup>

Of course, President Trump is a unique President and it might be suggested that his erratic/impulsive decision-making behaviour could impact the future of NORAD, and North American defence cooperation, especially related to burden sharing. However, allied defence burden sharing has been an issue for every administration since Nixon, with little direct impact on the spending commitments of the allies. Burden sharing has also been an issue directed more pointedly at Europe, rather than Canada. Finally, at the first meeting of the two leaders, they agreed that “North American Aerospace Defense Command (NORAD) illustrates the strength of our mutual commitment. United States and Canadian forces jointly conduct aerospace warning, aerospace control, and maritime warning in defence of North America. We will work to modernize and broaden our NORAD partnership in these key domains, as well as in cyber and space.”<sup>88</sup> This, in turn, was further reflected in the SSE defence policy.

This does not mean that there are no potential roadblocks, challenges or dangers facing the future of NORAD. A failure by Canada to meet NORAD modernization commitments could generate an image of Canada as a liability in the defence of the continent which would likely marginalize NORAD resulting in US decisions to act unilaterally. Similarly, in the context of EvoNAD, differences may emerge between Canada and the US on the expansion of NORAD missions. If US officials conclude that the expansion of NORAD missions is essential to the defence of North America, and Canada balks for political reasons related to sovereignty and independence, then NORAD will also likely be marginalized.

---

David Burney, “Canada Among Nations 2005: Splitting Images

[https://books.google.ca/books?id=QvMpwqMLRwC&pg=PA53&lpg=PA53&dq=2005+%2B+Canada+%2B+US+ballistic+missile+defence+%2B+mad+cow+disease&source=bl&ots=fspsQo9jV\\_&sig=2XzkyRJj\\_paiM1V1Q5wKEHUpVco8&hl=en&sa=X&ved=2ahUKEwjv1rG\\_q6TdAhWmwcQHHY9XC1wQ6AEwBXoECAEQAAQ#v=onepage&q=2005%20%2B%20Canada%20%2B%20US%20ballistic%20missile%20defence%20%2B%20mad%20cow%20disease&f=false](https://books.google.ca/books?id=QvMpwqMLRwC&pg=PA53&lpg=PA53&dq=2005+%2B+Canada+%2B+US+ballistic+missile+defence+%2B+mad+cow+disease&source=bl&ots=fspsQo9jV_&sig=2XzkyRJj_paiM1V1Q5wKEHUpVco8&hl=en&sa=X&ved=2ahUKEwjv1rG_q6TdAhWmwcQHHY9XC1wQ6AEwBXoECAEQAAQ#v=onepage&q=2005%20%2B%20Canada%20%2B%20US%20ballistic%20missile%20defence%20%2B%20mad%20cow%20disease&f=false) and Library of Parliament “Lumber I to IV: History of the Canada-U.S. Softwood Lumber Dispute”. (19 September 2005).

<https://lop.parl.ca/content/lop/ResearchPublications/tips/tip134-e.htm>

<sup>87</sup> Perhaps foremost among these is the US tariff on steel and aluminum imports on national security grounds. There is, however, no evidence of direct spillover into the formal defence relationship with Canada specifically. The US continues to insist all NATO members commit more resources to NATO for example, but this call predated Trump.

<sup>88</sup> *Joint Statement from President Donald J. Trump and Prime Minister Justin Trudeau*. Washington D.C. February 13, 2017. <http://pm.gc.ca/eng/news/2017/02/13/joint-statement-president-donald-j-trump-and-prime-minister-justin-trudeau>

However, marginalization, effectively amounting to freezing NORAD in place, does not mean that NORAD would cease to exist, or that Canada-US North American defence cooperation would come to an abrupt end. The current threat environment ensures that North American defence is indivisible. NORAD's aerospace warning and control missions will remain functionally essential to the security of both nations. The binational relationship has readily adjusted to differences in Canadian and US positions. As evidence, Canada's rejection of the US proposal following 9/11 to create a multi-dimensional North American Defense Command (which to be fair, many in the US defense world also rejected), and the Canadian BMD decision had no major effect on the relationship.

At worst, a NORAD frozen in time would simply result in greater bilateral efforts in the maritime, cyber, land, and space domains. Bilateralism has dominated the relationship since the end of World War II and this is unlikely to end for some time at least. **Nonetheless, it is this very bilateralism, as evident in the roughly decade-long process leading to the establishment of NORAD itself that contains the seeds of expanded defence binationalism.**

The functional logic, which underpins a temporal process of cooperation evolving from deepening and broadening bilateralism to binationalism in the case of North American defence, is the product of the overarching political environment that leaves the respective militaries in general, and NORAD, in conjunction with its partner USNORTHCOM as the initiator and driver. As the functional, technical experts, the new international political environment of near-peer competitors, new advanced military technologies blurring the traditional separation of distinct military domains, and constrained military resources, in theory, should take them down the logical path to binational solutions.

Of course, nothing is inevitable, and there exists numerous political and organizational obstacles on the path to a multi-dimensional, overarching binational solution. Nonetheless, unless there is a fundamental political 'parting of the waves' between Canada and the US, which is highly unlikely given the integrative nature of the relationship as a whole, the real issue is not if, but when and how. Even in the case of the land domain, where no real external military threats exist, and is the most political contentious in terms of sovereignty and independence, especially for Canada, it may be only a matter of time.

Bilateral arrangements or protocols currently governing the provision of military support to civil authorities across the border, such as, for example, American military support in the case of the 1997 Ice Storm and the Vancouver Olympics (notwithstanding NORAD's role in the latter) or Canadian military support in the wake of Hurricane Katrina, may be sufficient for now. However, whether they are sufficient in the wake of a major catastrophe, natural or manmade, in the future that simultaneously affects both nations, is

an open question. Specifically, a massive earthquake in the Pacific Northwest, long overdue according to scientists, devastating southern British Columbia, Washington and Oregon state may necessitate a coordinated binational response, rather than a piecemeal bilateral one. Indeed, one might expect this possibility would be a central consideration in the last of the EvoNAD study process on the land domain.

Politicians on both sides of the border may be loath to even consider a binational solution in the land domain, but they can't or shouldn't ignore the political fallout of a massive failure to respond quickly and effectively to a major disaster. Importantly, binationalism does not eliminate or undermine national sovereignty defined in terms of the highest authority within national territory. As evident in the nature of NORAD and the agreement itself, binationalism is the product of national authority, both parties respect the sovereignty of each other, and both parties retain the option to withdraw.

With the military in general, and NORAD, USNORTHCOM and to a lesser degree CJOC, because of limited resources and its overseas focus, as the initiators and drivers of North American defence cooperation, the specific manner in which evolution occurs will also be significantly affected by any developments related to the overarching US command structure as embodied in the US UCP. As the global political and military power, NORAD and Canada have always had to react and respond to changes in the American command structure driven by its global role. Thus, for example, both faced a significant new command environment with the stand-up of USSPACECOM in the 1980s, its dissolution and transfer of missions to USTRATCOM in the 1990s, and, of course, the creation of USNORTHCOM itself, which significantly altered the entire North American defence environment. As such, any potential future changes in the US UCP will potentially have a significant impact on NORAD and the North American CANUS defence relationship.

Despite changing geopolitics, there is no indication yet to suggest a fundamental overhaul of the UCP, notwithstanding some Congressional concerns related to costs. There are, however, voices within the U.S. military that perceive the regional command structure, dating back to the Goldwater-Nichols Act, as outdated and dysfunctional due to technological change and the fact that threats are rarely, if ever, regionally contained, partially conceptualized around the problem of command seams. While issues surrounding the future of the UCP and overarching US command structure are beyond the purview of this study, the future of the UCP is likely to be a, if not the key driver in the future of NORAD.<sup>89</sup> At a minimum, the profile and status of NORAD needs to be

---

<sup>89</sup> For example, in the 1993 UCP, a decision was made to downgrade the Commander of NORAD from a four to a three star position, which would have implications for the status of NORAD and Canadian ranks in the NORAD chain of command. The Canadian Chief of the Defence Staff objected on the basis of the NORAD agreement, and the decision was reversed. See James Fergusson. *Canada and Ballistic Missile*

raised on par with other combatant commands given its mandate and role as fulfilling an essential role within the UCP. Indeed, NORAD, in many ways, is Canada's window into the US UCP.

The political reality of the CANUS North American defence relationship, which places the military in general, and NORAD, in conjunction with its partner, USNORTHCOM, as the initiator and driver of current and future defence cooperation, unfortunately, can create a misguided image of a military 'conspiracy' undermining civil control, notwithstanding the fact that NORAD was up and running before the Agreement was signed. However, the military remains firmly embedded beneath civil control reflecting the healthy state of civil-military relations in both countries, and the manner in which both states' armed forces reflect their societies. It is also a function of historical experience, and the nature of the North American threat environment primarily embedded within the aerospace domain. Except for the requirements to deter, detect and defend in this domain, which account for a relatively small portion of each state's military capabilities, the primary role of armed force in North America will likely remain in the realm of assistance to domestic authorities – domestic civil operations in Canada and DSCA in the United States.

Canadian and American NORAD officials are always sensitive to what the political traffic will bear. This sensitivity is the product of several factors. First, even though officers posted to NORAD come to acquire a distinct North American perspective over time, they do not entirely shed their national identities. Having been initially trained, worked, educated and promoted within a national environment, one which the majority will return to following their NORAD posting, they are acutely aware that despite the binational agreement, two different states are involved. Second, the foreign policy establishments of Global Affairs Canada (GAC) and the U.S. State Department each provide a political advisor (POLAD) to the senior commanders to ensure national interests are considered and protected.

Finally, NORAD is embedded beneath three decision-making bodies: the Tri-Command consisting of CJOC-NORAD-USNORTHCOM; the Military Cooperation Committee, and the Permanent Joint Board on Defense (PJBD). The former two are military in composition and leadership, whereas the PJBD is dominated by the civil-political world. **Whether this decision-making architecture, with its PJBD/MCC core established decades ago, remains functional is another important question in the future that needs close scrutiny.**

NORAD has benefitted from the lack of political attention to date and so long as both states generally agree on the nature of the threats North America faces, and concomitant

---

*Defence, 1954-2009: Déjà vu all over again.* Vancouver: University of British Columbia Press. 2010. p. 154.

responses and preparations, then political oblivion is easily managed. There is, however, the great risk that too little attention will lead to NORAD's marginalization especially in terms of resource commitments. There is a great unevenness in terms of the consequences of this marginalization; arguably, Canada needs NORAD far more than does the U.S. which means that, at a minimum, the Canadian government needs to understand NORAD better than it does at present and certainly GAC needs to rediscover NORAD; it is not sufficient to leave the defence of Canadian issues within NORAD to the POLAD and Deputy-Commander.

## Chapter 7: Summary of Findings

### Geopolitical Strategic Considerations

A new era dominated by Great Power, but now termed near-peer, competition and rivalry is evident with concomitant regional inter-state territorial conflicts. This requires a refocus (or rediscovery) of nuclear deterrence and strategy under new conditions

For the time being, the U.S. will remain the dominant global, political-military power with global power projection capabilities but both Russia and China have the means to modernize and develop advanced military capabilities that challenge the U.S. and the West. India remains a country to watch.

The relatively simple and straightforward geopolitical/strategic environments of the Cold War, and post-Cold War eras are being replaced by a much more complicated and challenging environment of multiple peer competitors.

The potential, if not fear, of the escalation of a local/regional conflict between peers today to a major nuclear exchange will remain affecting decisions regarding the threat and use of force. Advanced, integrated surveillance, reconnaissance, targeting and strike complexes have revolutionized the world of strategic deterrence. Defences, particularly at the tactical and theatre level, serve to complicate calculations regarding deterrence requirements.

Natural disasters are growing in number and scope. What decades ago were relatively rare in terms of the employment of military force in support of civil authorities abroad and at home has increasingly become a regular phenomenon challenging the capacity of civil and military forces.

The new generation of long range Russian air launched cruise missiles (ALCMs), nuclear or conventional, is the immediate pressing concern for NORAD's ability to deter, detect and defend North America. The North Warning System (NWS) lacks the range to identify and track Russian long range aviation (bombers) prior to their ALCM launch points over the Arctic Ocean, and the capability to identify and track ALCMs in flight.

The opening of the Arctic due to global warming necessitates the development of surveillance, and reconnaissance capability integrated across air, land, sea, and space.

The NWS, which is a primary source of surveillance information for NORAD, cannot be looked at in isolation from North American requirements as a whole. Future technologies enabling cruise missiles to operate at even higher speeds and exploit sub-orbital space

also need to be considered in relation to the NWS and NORAD's capability to deter, detect and defend a wide range of threats from a 360° axis.

## **NORAD C<sup>2</sup>**

The NORAD CFACC idea is bold and it is a credit to the past and present NORAD Commanders, their Deputy-Commanders and all NORAD personnel that they consider not only the modernization of equipment and technology in defeating new threats, but also nonmaterial changes, such as changes to the C<sup>2</sup> structure. Below are some considerations that are also beyond modernization.

Successive NORAD commanders have been the driving force behind developing, exercising and implementing adjustments to NORAD C<sup>2</sup> structures and processes in light of new 'perils' and evolving threats in new domains. The Commander of NORAD needs strategic control of the battle plan and should not be distracted by tactical decisions. And yet it is unclear if the NORAD battle management tempo warrants a NORAD CFACC.

Concerns that the new NORAD CFACC will not be resource or personnel neutral requiring a new senior Canadian position as well as the mismatch of position ranks which could see MGen (or BGen) giving air tasking orders to Lt. Gen which is, militarily-speaking, awkward.

NORAD CFACC idea and position has been practised in exercise like Exercise Vigilant Shield. Continued testing for long-term, political and other ramifications of such a position is encouraged.

The most often heard comments about the NORAD CFACC idea were the concerns that either this was a solution to a USNORTHCOM problem (i.e. it is too busy focused on DSCA and its other mandates) and/or that the move to Tyndall Airforce base would marginalize NORAD. For example: USNORTHCOM, being a U.S. combatant command attracts more visibility from Washington than does NORAD. With reduced attention being afforded to NORAD in the U.S. and given the demands placed on USNORTHCOM, there is concern NORAD will not be given the attention it deserves.

We also heard and were as well under the impression that a NORAD CFACC in Tyndall (the heart of CONR) could leave the *perception* that CANR and ANR are sectors of CONR similar to the U.S. Eastern Air Defense Sector (EADS) and Western Air Defence Sector (WADS) – See Appendix C - and that NORAD would simply be swallowed by the pace and tempo of USNORTHCOM missions – especially the growing DSCA role. These are deep-held and *persistent perceptions* similar to the many concerns expressed when NORAD maritime warning was first rolled out. NORAD will need to dedicate considerable time and resources to be the champions, cheerleaders, educators and

toughest critics of this concept. Consideration must also been given to how the NORAD CFACC will affect/plug into the tricommand structure.

To avoid a 'single point of failure' a backup or redundant CFACC is recommended and of course the "pipes and processes" limitations of having a CFACC pushing and pulling ATOs will need to be addressed.

### **Arctic Modernization**

Climate change and the shrinking of the multi-year Arctic Ocean ice cap, however, portends a change for the importance of the Arctic in the defence of North America and CANUS defence cooperation brining into stark relief the need for more capabilities. This need for more capabilities coupled with increased shipping will pose a challenge for both Canada and the U.S. given the few number of naval and CCG vessels, which can operate in the Arctic only in the summer(ish).

Greater attention will need to be paid to concerns of indigenous peoples. Neither state, for example, seems to budget enough for environmental cleanup.

In 2007, Russia resumed out-of-area (OOA) patrols via LRA, with every indication from President Putin that these patrols would continue 'from now on'. NORAD interceptor fighters resumed activity in 2007.

The costs of building large infrastructure in the Arctic remains highly prohibitive, and also needs to take into account the impact of the melting permafrost and the challenges this poses to all infrastructure

The NWS will have to be augmented by a range of other systems, including a greater commitment of airborne, such as U.S. AWACs, maritime and space-based assets. Specifically, the future NWS requires a significant 'look-down' capability to ensure that NORAD meets its mission to deter, detect and defend, and these capabilities will need to be integrated into a 'systems of systems' solution. The ALCM threat will necessitate that the Canadian CF-18 replacement possesses more advanced acuity (akin to look-down-shoot down capability but far more advanced) vital both for deterrence and defence purposes.

While some form of NORAD solution to aid SAR in the Arctic may be premature for now, not least of all for political reasons, both the U.S. via USNORTHCOM and Canada via CJOC provide direct support to civilian agencies, and examining possible enhanced cooperation especially relative to resource constraints and the expanse of the North America Arctic, is an imperative. This also extends into the maritime dimension. Future CANUS Arctic cooperation, however, is constrained by Canada's misplaced fixation of Arctic sovereignty concerns, which, implicitly at least, portrays the U.S. as the threat not least of all as a function of different positions on the legal status of the NWP.

## **Maritime Control/Air Control**

The North Atlantic and the sea lines of communication (SLOC) to NATO Europe are returning to prominence.

Tactical cooperation between the RCN and USN, as well as select NATO navies, is well developed. However, operational and strategic level cooperation is not, partially a function of the absence of a command structure à la SACLANT during the Cold War, and with it a regional division of responsibility in the North Atlantic.

Developing protocols for the transfer of naval air defence assets to NORAD, and exercising these protocols in future Vigilant Shield exercises is essential. This does not mean, however, that either the RCN or USN/USFFC must dedicate standing naval assets to NORAD on a permanent basis. Rather, both need to create ‘virtual’ air defence task forces, which would serve the basis for future exercises, and provide a foundation for the effective air defence of North America during times of crisis.

The navies on both sides of the border are adamant that bilateral maritime control works best for the defence of North American. Similar to the need for the NORAD Commander to think “up and out”, continued bilateral cooperation may work for tactical and operational-level missions but not for strategic big picture planning and exercising. If bilateral maritime control is to keep pace of future threats, more strategic-level exercises testing, especially the various seams between commands, is recommended.

## **From Air to Aerospace**

Canada-US military space cooperation is likely to remain bilateral, reflecting the interests of both parties.

Many defence experts lamented the status quo vis-à-vis Canada’s non participation in the U.S. Ground-based Midcourse defense mission, and this issue needs to be carefully re-evaluated, not least of all in relation to the emergence of hypersonic weapons, which portend the blurring of the air and space domains.

## **Political Considerations**

NORAD operates largely beneath the political radar. Politically, there is also little value for either government to concentrate upon North American defence.

Arguably for Canada, the most important force at play that could affect NORAD and the relationship is significant changes to the US Unified Command Plan (UCP). The centrality of NORAD, in conjunction with its partner, USNORTHCOM, is the primary driver of current and future North American defence cooperation.

Given the single-minded focus of Global Affairs Canada and to a lesser extent, the U.S. state department, to trade negotiations nothing will happen re: changes to NORAD if it requires any political attention most notably a change to the NORAD agreement. Indeed the U.S. has only recently appointed the Chair of the Permanent Joint Board of Defense, which, in theory, is “directing” NORAD via EvoNAD to consider such bold moves. The binational agreement will not be opened given the current President and Prime Minister in power.

The terms of reference might allow for the NORAD CFACC concept to be exercised, but to be operationalized permanently, is an open question. It may be stretching TOR beyond its limits.

Looming in the background, perhaps uniquely in Canada, is the ballistic missile defence debate which clouds and complicates any discussions about NORAD. The mood in Canada is especially prickly with camps on both sides of the BMD debate. (Witness for example, the media frenzy caused by the then NORAD Deputy-Commander’s testimony to NDDN in the Fall of 2017 regarding the facts concerning NORAD vs. USNORTHCOM’s responsibilities vis-à-vis a ballistic missile attack on North America). Add the F35 debate and the level of misinformation about NORAD has no bounds. It would be unwise for any changes to be proposed for the NORAD Agreement given the current level of misinformation. NORAD needs, for example, a Canadian NORAD summer school and needs to secure clearances for certain academics to be able to understand and critique the full scope of NORAD challenges. There are very few defence scientists studying NORAD (the majority seem to be Canadians) and even fewer students to assume la relève when current experts like Jim Fergusson, JJ Jockel and Joel Sokolsky retire within the next 10 years. The Canadian POLAD, NORAD and CJOC Commanders cannot be the only champions of NORAD. And on the U.S. side, we suspect political interest in NORAD, especially at the Pentagon or U.S. State Department is far less. NORAD is often quickly referenced as the gold star standard of Canada-US relations with little appreciation for the history, evolution and precipitous changes that made need to be made in the future.

### **Other Considerations**

NORAD planners need to consider what might happen should the U.S. or Canadian command systems change in the future. Might Greenland be an important addition to NORAD? And in the (far off) future perhaps Mexico. Mexico, while having liaisons in USNORTHCOM, might consider a NORAD rep in the future, but for now, the timing is not right and Canada would likely argue against such an expansion of membership.

## Bibliography

*9/11 Commission Report*. 2004. New York: WW Norton and Company Inc.

Agreement Between the Government of the United States of America and the Government of Canada on the North American Aerospace Defence Command. Article I, Para I, & Article III. 28 April 2006. Found at <http://www.state.gov/documents/organization/69727.pdf>

Allarie, Nic. "Shelf Life Extended: The Longevity and Continued Relevance of the Binational North American Aerospace Defense Command", MA Thesis (Winnipeg, MB: University of Manitoba, 2016).

Barnes, Major Pux. "The JFACC and the CAOC-centric RCAF: Considerations for the Employment of Air Power in Joint Operations" RCAF Journal Vol 3(3). (Summer 2014). Available at <http://www.rcaf-arc.forces.gc.ca/en/cf-aerospace-warfare-centre/elibrary/journal/2014-vol3-iss3-04-the-jfacc-and-the-caoc-centric-rcaf.page>

Burney, Derek 2005. "Canada Among Nations 2005: Splitting Images" Ottawa, Carleton [https://books.google.ca/books?id=QvMpwqMLRwC&pg=PA53&lpg=PA53&dq=2005+%2B+Canada+%2B+US+ballistic+missile+defence+%2B+mad+cow+disease&source=bl&ots=fspsQo9jV\\_&sig=2XzkyRJpaiM1V1Q5wKEHUpVco8&hl=en&sa=X&ved=2ahUKEwjv1rG\\_q6TdAhWmwcQH9Y9XC1wQ6AEwBXoECAEQAO#v=onepage&q=2005%20%2B%20Canada%20%2B%20US%20ballistic%20missile%20defence%20%2B%20mad%20cow%20disease&f=false](https://books.google.ca/books?id=QvMpwqMLRwC&pg=PA53&lpg=PA53&dq=2005+%2B+Canada+%2B+US+ballistic+missile+defence+%2B+mad+cow+disease&source=bl&ots=fspsQo9jV_&sig=2XzkyRJpaiM1V1Q5wKEHUpVco8&hl=en&sa=X&ved=2ahUKEwjv1rG_q6TdAhWmwcQH9Y9XC1wQ6AEwBXoECAEQAO#v=onepage&q=2005%20%2B%20Canada%20%2B%20US%20ballistic%20missile%20defence%20%2B%20mad%20cow%20disease&f=false)

Canadian Forces Air Doctrine Note 14/01: Royal Canadian Air Force Air Task Force Commander Definitions, Roles and Responsibilities found at <http://www.rcaf-arc.forces.gc.ca/en/cf-aerospace-warfare-centre/doctrine-adn-14-01.page>

Charron, Andrea and Troy Bouffard, "A Tale of Two Russias?" *Vanguard* (August/September 2018). See <https://vanguardcanada.com/2018/08/21/aug-sep-issue-our-changing-north/>

Charron, Andrea and Jim Fergusson, "NORAD In Perpetuity" (2014). Available at [http://umanitoba.ca/centres/cdss/media/0\\_NORAD\\_in\\_Perpetuity\\_final\\_report\\_March\\_2014.pdf](http://umanitoba.ca/centres/cdss/media/0_NORAD_in_Perpetuity_final_report_March_2014.pdf)

Charron, Andrea and James Fergusson. 2018. "Arctic Sovereignty: Preoccupation vs Homeland Governance and Defence" *CGAI* (September). [https://www.cgai.ca/arctic\\_sovereignty\\_preoccupation\\_vs\\_homeland\\_governance\\_and\\_defence](https://www.cgai.ca/arctic_sovereignty_preoccupation_vs_homeland_governance_and_defence)

Charron, Andrea Jim Fergusson and Nic Allarie, "'Left of Bang': NORAD's Maritime Warning Mission and North American Domain Awareness" (2015). Available at

[https://umanitoba.ca/centres/cdss/media/0\\_NORAD\\_Maritime\\_Warning\\_Mission\\_Final\\_Report\\_8\\_Oct\\_2015.pdf](https://umanitoba.ca/centres/cdss/media/0_NORAD_Maritime_Warning_Mission_Final_Report_8_Oct_2015.pdf)

Department of Defense. *Ballistic Missile Defense Review Report*. Washington D.C. February 2019.

[https://dod.defense.gov/Portals/1/features/defenseReviews/BMDR/BMDR\\_as\\_of\\_26JAN\\_10\\_0630\\_for\\_web.pdf](https://dod.defense.gov/Portals/1/features/defenseReviews/BMDR/BMDR_as_of_26JAN_10_0630_for_web.pdf)

Dunfield, Alison. 2005. Updated in 2018. “Promises Made, Promises Broken”, *Globe and Mail*. (7 March) <https://www.theglobeandmail.com/news/national/promises-made-promises-broken/article1115162/>

Fergusson, James. 2010. *Canada and Ballistic Missile Defence 1054-2009: Déjà vu all over again*. Vancouver: University of British Columbia Press.

Filipov, David “Space, nuclear security, polar bears: Russia and the U.S. still have some shared concerns” *Washington Post* (25 August 2017)

<https://www.arcticnow.com/politics-policy/2017/08/25/space-nuclear-security-polar-bears-russia-and-the-u-s-still-have-some-shared-concerns/>

Goette, Richard. 2018. *Sovereignty and Command in Canada-US Continental Air Defence, 1940-1957*. Vancouver: UBC Press.

Government of Canada. *Strong, Secure and Engaged: Canada’s Defence Policy*. 2017.

Government of Canada, *Canada First Defence Strategy* (Ottawa, 2008). See [http://www.forces.gc.ca/assets/FORCES\\_Internet/docs/en/about/CFDS-SDCD-eng.pdf](http://www.forces.gc.ca/assets/FORCES_Internet/docs/en/about/CFDS-SDCD-eng.pdf).

House of Commons Standing Committee on National Defence (NDDN) 2017 “Canada’s Abilities to Defend Itself and our Allies in the Event of an Attack by North Korea on the North American Continent” . (2nd Parliament, 1st Session (December 3, 2015 - Present) Found at

<http://www.ourcommons.ca/Committees/en/NDDN/StudyActivity?studyActivityId=9637426>

Insinna, Valerie. “Pentagon presents recommendations on Space Force to Trump”. *Defense News*. October 23, 2018. <https://www.defensenews.com/space/2018/10/23/pentagon-presents-recommendations-on-space-force-to-trump/>

Jockel, Joseph. 2007. *Canada in NORAD 1957-2007: A History*. Montreal and Kingston: McGill-Queen’s University Press.

*Joint Statement from President Donald J. Trump and Prime Minister Justin Trudeau*. Washington D.C. February 13, 2017. <http://pm.gc.ca/eng/news/2017/02/13/joint-statement-president-donald-j-trump-and-prime-minister-justin-trudeau>

Lasserre, Frédéric and Pierre-Louis Têtu. “Russian Air Patrols in the Arctic: Are Long-Range Bomber Patrols a Challenge to Canadian Security and Sovereignty?” in *Arctic Yearbook*. 2016: 304-327.

Library of Parliament “Lumber I to IV: History of the Canada-U.S. Softwood Lumber Dispute”. (19 September 2005).

<https://lop.parl.ca/content/lop/ResearchPublications/tips/tip134-e.htm>

National Commission on Terrorist Attacks upon the United States. *The 9/11 Commission Report. Executive Summary*. (Washington, DC :National Commission on Terrorist Attacks upon the United States, 2004).

National Security Presidential Directive and Homeland Security Presidential Directive NSPD-66 / HSPD-25 (January 9, 2009). Available at

<https://fas.org/irp/offdocs/nspd/nspd-66.htm>

NAV Canada “Notice of Change: Adjustment to the Canadian Air Identification Zone” found at, <http://www.navcanada.ca/EN/products-and-services/Service%20Project%20Announcements/SPA-2018-ADIZ-EN.pdf>

NORAD information package. *Read Ahead* (2015).

Olsen. John Andreas ed. 2017. *NATO and the North Atlantic*. Whitehall Paper #87. London: Royal United Services Institute.

Pizzolato, Larissa and Jackie Dawson “There’s more behind Arctic shipping than climate change” *Globe and Mail*, (3 February 2014).

Pizzolato, Larissa & Stephen E. L. Howell & Chris Derksen & Jackie Dawson & Luke Copland, “Changing sea ice conditions and marine transportation activity in Canadian Arctic waters between 1990 and 2012”, *Climatic Change*, (December 2013).

General Robin Rand, “Fiscal Year 2018 Priorities for Nuclear Forces and Atomic Energy Defense Activities: Presentation to the House Armed Services Committee” (25 May 2017). Found at: <https://docs.house.gov/meetings/AS/AS29/20170525/106038/HHRG-115-AS29-Wstate-RandR-20170525.pdf>

Rosenthal, Elisabeth “Race Is On as Ice Melt Reveals Arctic Treasures”, *International New York Times*, (18 September 2012).

Skies Magazine 2016. “22 Wing Hosts Air Defence Exercises”, *Skies Magazine* (7 September) <https://www.skiesmag.com/news/22-wing-hosts-u-s-army-air-defence-exercise/>

*Treaty Between the United States of America and the Union of Soviet Socialist Republics on the Elimination of Their Intermediate-Range and Shorter-Range Missiles* came into force in 1988.

*United Nations Treaties and Principles on Outer Space.*  
<http://www.unoosa.org/pdf/publications/STSPACE11E.pdf>

United States Coast Guard, “Arctic Strategy” (May 2013). Available at  
[http://www.uscg.mil/seniorleadership/DOCS/CG\\_Arctic\\_Strategy.pdf](http://www.uscg.mil/seniorleadership/DOCS/CG_Arctic_Strategy.pdf)

*US Goldwater-Nichols Department of Defense Reorganization Act* of 1986.

## Appendix A: Acronymns and Definition

**9/11** = September 11, 2001.

**ADIZ** = Air Defense Identification Zone

**AI** = Artification Intelligence

**ALCM** = Air-launched cruise missiles

**ANR** = Alaskan NORAD Region

**AO** = Area of Operation

**AOR** = Area of responsibility

**ASW** = anti-submarine warfare

**ATO** = Air Tasking Order

**BAAD** = Bomber Assurance and Deterrence missions

**BMD** = Ballistic Missile Defense

**BMEWS** = Ballistic Missile Early Warning System

**C2** = Command and Control = the *exercise of authority and direction by a commander* over assigned, allocated and attached forces in the accomplishment of a mission. With C2, five functions are performed: 1) monitoring; 2) assessing; 3) planning; 4) directing and 5) coordinating. Note: implied is “execution of the plan.”

**CADIZ** = Canadian Air Defence Identification Zone

**CADS** = Canadian Air Defence Sector

**CAOC** = Combined Air Operations Centre

**CANR** = Canadian NORAD Region

**CDS** = Chief of the Defence Staff

**CFACC** = Combined Forces Air Component Commander

**CJOC** = Canadian Joint Operations Command (CJOC) i

**CMOC** = Cheyenne Mountain Operations Center

**Combined** = more than one country

**Command** = vested authority to direct, coordinate and control assigned forces

**CONR** = Continental (U.S.) NORAD Region

**Control** = mechanism used to exercise command over part of the activities of a subordinate command. Control needs to be delegated.

**COP** = Common Operating Picture

**DEN** = domestic events network

**DSCA** = defense support to civil authorities

**DSP** = Defense Support Program

**DSPACED** = Directorate of Space Development (DSPACED)  
**EvoNAD** = Evolution of North American Defense Study

**EADS** = Eastern Air Defense Sector

**FAA** = Federal Aviation Authority

**Force Generator** = the agency that prepares capabilities comprised of assets and personnel to achieve operational readiness. E.g. In Canada, the commander of 1 Canadian Air Division (1 CAD) is a force generator for the air component of the Canadian Armed Forces at the operational and tactical levels on behalf of the Commander of the RCAF. The Commander RCAF is the overall force generator for CAF Air Forces

**Force Employer** = the agency that assigns specific tasks and missions to a military capability. E.g. 1 CAD Commander is the force employer in her/his role as commander Canada NORAD Region (CANR)

**GIUK gap** = Greenland, Iceland, United Kingdom gap

**ICBM** = intercontinental ballistic missiles

**Joint** = more than one environment (e.g Air Force and Navy of same nation)

**LRA** = Long Range Aviation

**MARCOM** – allied maritime command

**MCC** = Military Cooperation Committee and Maritime Component Commander

**MDA** = maritime domain awareness'

**MW** = maritime warning

**N2C2** = NORAD-USNORTHCOM Command Center

**NATO** = North Atlantic Treaty Organization

**NN** = US Navy North

**NORAD** = North American Air Defence Command (1957 – 1981) then North American Aerospace Defense Command (1981 onward)

**NWS** = North Warning System

**OOA** = out-of-area

**POLAD** = Political Advisor

**PJBD** = Permanent Joint Board on Defense

**RCAF** = Royal Canadian Air Force

**RCN** = Royal Canadian Navy

**SACLANT** = Supreme Allied Command Atlantic

**SecDef** = U.S. Secretary of Defense

**SLBM** = submarine-launched ballistic missiles

**SLOC** = sea lines of communication

**Supported command** = a command that receives forces or other support from another command and has primary responsibility for all aspects of an assigned task. E.g. NORAD is a supported command for its aerospace warning and air control missions.

**Supported commander** = the commander who has the primary responsibility for all aspects of a task assigned by either the strategic or the operational level command. E.g. the Commander of NORAD

**Supporting command** = a command that provides forces or other support to another command. E.g. CJOC vis-à-vis NORAD

Note: subordinate commands/ commanders are not considered to be supporting the commands/ commanders to which they are subordinate.

**Supporting commander** = provides forces or capabilities to a supported commander. The supporting commander can perform this function regardless of rank in relation to the supported commander. E.g. the joint force air component commander (JFACC) major-

general (MGen) may be supporting a joint force commander (JFC) who may be of a lower rank.

**TOR** = terms of reference

**UCP** = Unified Command Plan

**Unity of Command** = A single, clearly identified commander must be appointed for each operation.

**USAF** = United States Air Force

**USCG** = U.S. Coast Guard (USCG)

**USNN** = United States Navy North

**USSF** = United States Space Force (proposed)

**USFFC** = US Fleet Forces Command

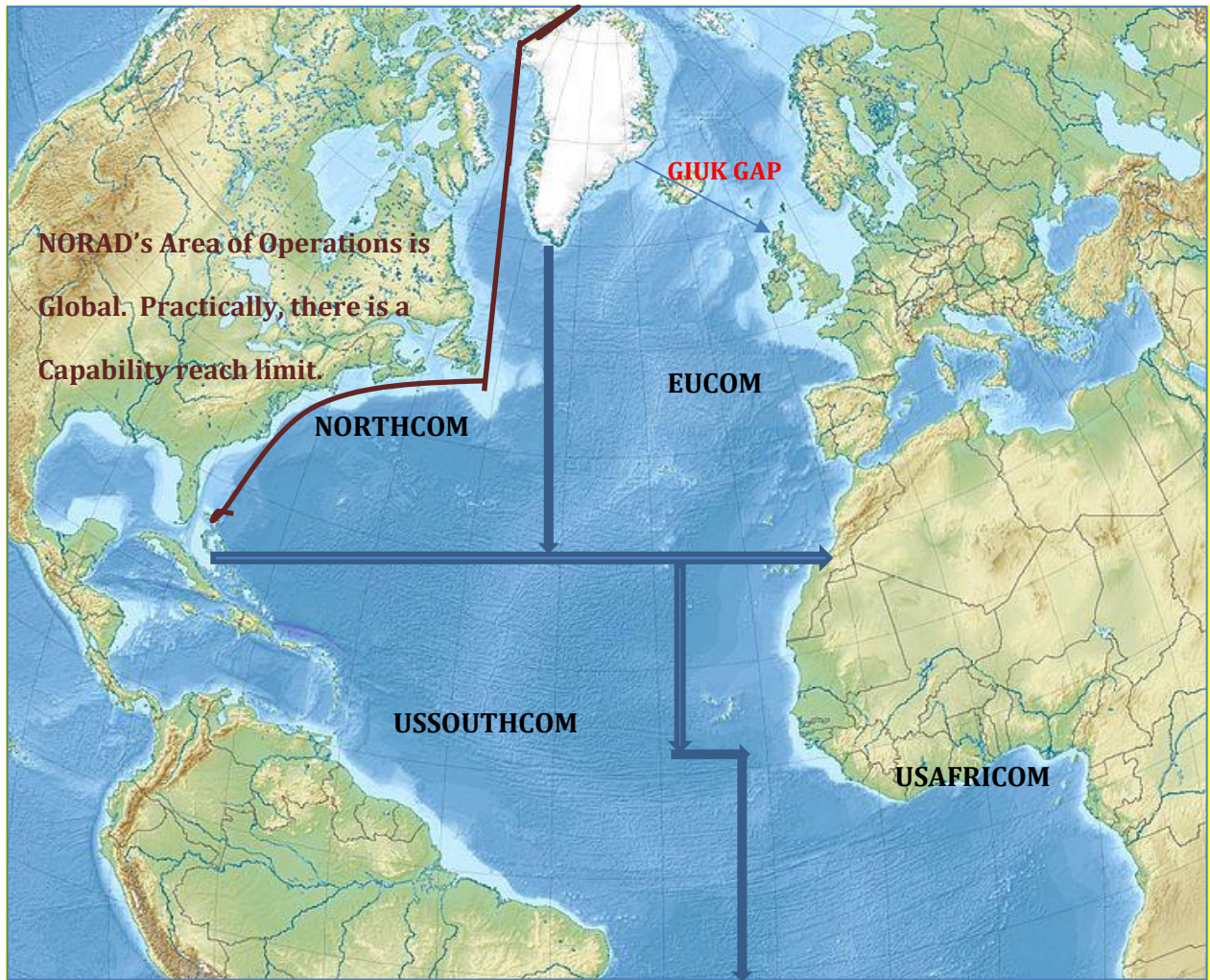
**USN** = United States Navy

**USSPACECOM** = United States Space Command

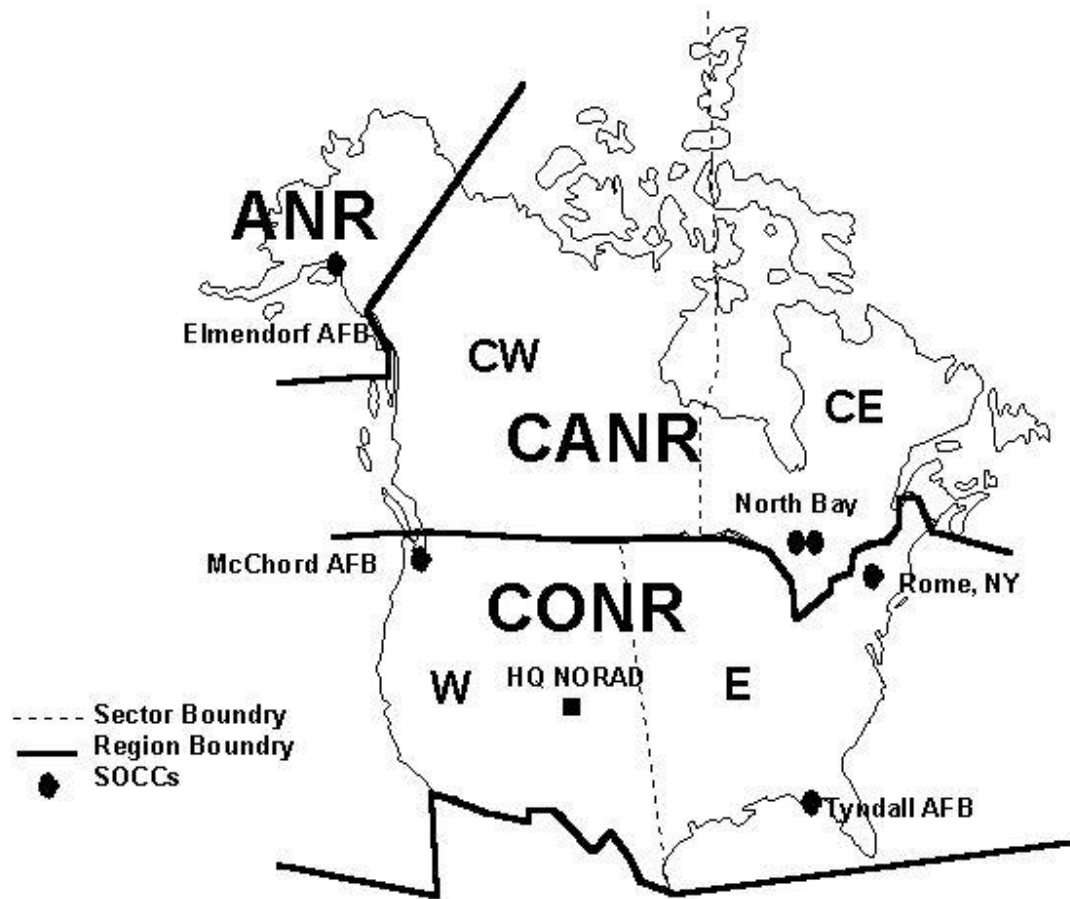
**USSC** = United States Space Command (proposed)

**WADS** = Western Air Defense Sector

## Appendix B: Approximate U.S. UCP AORs with NORAD's Aerospace Capabilities' Reach



## Appendix C: NORAD Regions



**ANR = Alaskan NORAD Region**

**CANR = Canadian NORAD Region**

**CONR = Continental (U.S.) NORAD Region**