SHIELDING NORTH AMERICA

Canada's Role in NORAD Modernization

Edited by Nancy Teeple and Ryan Dean

NAADSN Engage Series

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NORTH AMERICAN AEROSPACE DEFENSE COMMAND

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Acronyms

ABM	anti-ballistic missile
ADIZ	Air Defence Identification Zone
ALCM	air-launched cruise missile
AOPS	Arctic Offshore Patrol Ships
ASAT	anti-satellite weapon
ASW	anti-submarine warfare
AWACS	Airborne Warning and Control System
BMD	Ballistic Missile Defence
BMEWS	Ballistic Missile Early Warning System
CADIZ	Canadian Air Defence Identification Zone
C2	command and control
C3	command, control, communications
CCG	Canadian Coast Guard
CJOC	Canadian Joint Operations Command
CM	cruise missile
DEW	Distant Early Warning
EvoNAD	Evolution of North American Defence
FOL	Forward Operating Location
GAC	Global Affairs Canada
GBI	Ground-Based Interceptors
GIUK	Greenland-Iceland-United Kingdom (Gap)
GLCM	ground-launched cruise missile
GMD / GBMD	Ground-Based Missile Defence
GoC	Government of Canada
HGV	hypersonic glide vehicle
IAMD	Integrated Air and Missile Defence
ICBM	intercontinental ballistic missile
ISR	Intelligence Surveillance Reconnaissance
ITWAA	Integrated Tactical Warning and Attack Assessment
JADC2	Joint All-Doman Command and Control

LRA	long-range aviation
MAD	Mutually Assured Destruction
MARCOM	Maritime Command
MARV	Maneuverable Re-entry Vehicle
MD	Missile Defence
MDA	Maritime Domain Awareness
MIRV	Multiple Independently Targetable Re-entry Vehicle
MW	Maritime Warning
NACD	Nuclear Arms Control and Disarmament
NATO	North Atlantic Treaty Organization
NMD	National Missile Defence
NORAD	North American Aerospace Defense Command
NWP	Northwest Passage
NWS	North Warning System
PJBD	Permanent Joint Board on Defence
RCN	Royal Canadian Navy
SAR	search and rescue
SDI	Strategic Defense Initiative
SHIELD	Strategic Homeland Integrated Ecosystem for Layered Defence
SLBM	submarine-launched ballistic missile
SLCM	submarine-launched cruise missile
SM	standard missile
START	Strategic Arms Reduction Treaty
STRATCOM	Strategic Command
THAAD	Terminal High Altitude Area Defense
TOR	Theatre of Responsibility
UCP	Unified Command Plan
USNORTHCOM	US Northern Command
WMD	weapon of mass destruction

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This book would not have been possible without the funding provided by the Department of National Defence (DND)'s Mobilizing Insights in Defence and Security (MINDS) program, through the North American and Arctic Defence and Security Network (NAADSN). NAADSN Network Lead Dr. P. Whitney Lackenbauer was indispensable throughout the process, providing the patient mentorship necessary to bring this edited volume to fruition. Network Coordinator and Director of the Center for Arctic Security and Resilience at the University of Alaska, Fairbanks, Troy Bouffard shared insights and offered valuable feedback and support. Post-Graduate Fellow Corah Hodgson provided premier copy-editing. Lastly, Network Manager Dr. Shannon Nash kept us organized and on task.

Foreword

Among the declared missions of the North American and Arctic Defence and Security Network (NAADSN) is the advancement of research and critical investigations of NORAD's "current and future roles in light of renewed strategic competition, emerging technologies, and shifting US defence priorities." This timely collection of informative and analytical essays is a major contribution to that effort.

NORAD modernization is destined to become the focus of an enlivened public debate in the lead-up to Ottawa's impending decisions on a set of once-in-a-generation procurement initiatives and consequential changes to Canada's defence relations with the United States – all with profound implications for how Canada navigates its way in a world of strategic realignment. Added to that, unprecedented changes to the Arctic environment and the inevitable growth in access to and activity within the region are also driving new requirements for local and regional situation awareness in the interests of public safety, law enforcement, sovereignty protection operations, and the constructive management of state-to-state relations across the region.

The rethinking of Canada's role in support of North American defence and Arctic stability promises to be an extended process not wanting for controversy and contention, and there will be many occasions, therefore, to be grateful for the information and insights of this *Shielding North America* volume. Indeed, NAADSN's core mandate to support defence policy debate includes, by definition, acknowledgement of the presence and importance of contending views – some of which are represented in this volume, and others of which will be stimulated by it.

Also on welcome display in *Shielding North America* is another key dimension of NAADSN's work, namely, the promotion of "leading-edge research with students, emerging scholars, and Northern stakeholders/rightsholders that tests core assumptions and prompts policy innovation." The term "emerging scholars" seems not to apply to the editors of this volume, given their already impressive records of publications, but Nancy Teeple and Ryan Dean most certainly represent the new generation of scholars and analysts that NAADSN actively encourages. Besides their editing work, their contributions to this collection join the work of eminent scholars like Jim Fergusson, whose persistent and celebrated scholarly attention to Canadian defence policy makes him an essential presence in any examination of NORAD, past, present, or future. Together, these "emerging" and "seasoned" scholars in effect bookend a compelling mix of

practitioner and academic voices. NAADSN lead Whitney Lackenbauer and co-leads Andrea Charron and Stéphane Roussel all contribute essays, and beyond that they also steer the network in its work to deepen scholarship and the interested public's understanding of contemporary defence and security.

While a strength of this volume is its sharp focus on North American *defence*, it is important to note that Canadian security writ large, as is acknowledged in *Strong, Secure, and Engaged,* relies on more than defence. It ultimately "requires coordinated action across the whole-of-government – military capabilities working hand in hand with diplomacy and development." *SSE* also affirms the place of "arms control, disarmament and non-proliferation" in "contributing to more secure, stable and predictable international relations." While diplomacy, disarmament, and development are not the subject of this volume, they will inevitably be part of the NORAD modernization debate. Related questions of spending priorities are broached in these essays, with the recognition that defence spending levels are not determined strictly on the basis of need, but on the basis of need compared with all the other needs relevant to safety and security – a familiar list that includes pandemic responses and prevention, climate change, infrastructure and more.

These and many more vexing questions are what make open and informed debate so essential, and what make this volume so important. It needs to be widely read, learned from, and challenged.

Ernie Regehr
February 2021

Preface

The modernization of North American defence is joining a cluttered Canadian defence agenda. The purchase of new warships for the navy and fighters for the air force is stretching the defence budget at a time when the COVID-19 pandemic is hurting government revenues and necessitating new economic stimulus spending. Since 9/11, the military's focus has been elsewhere, from its mission in the Afghanistan conflict, to humanitarian intervention in Libya, training the Peshmerga in Iraq, and its role in leading a NATO battlegroup in Latvia. The last NORAD modernization in 2006 extended Canada's commitment to the command in perpetuity and expanded its mission to include maritime warning. The 2016 Evolution of North American Defence (EvoNAD) study[1] explored potential changes to NORAD in light of new threats to the continent, but political scientists Andrea Charron and Jim Fergusson noted that the Canadians were not paying attention.[2]

2017's *Strong Secure Engaged* (*SSE*) lists NORAD among Canada's "core alliances,"[3] vital to the white paper's strategic vision of securing North America through providing deterrence to threats posed by "potential adversaries" to continental security.[4] *SSE* acknowledges that strategic deterrence is the primary value NORAD provides for Canada and is cognizant that this value diminishes as the technology supporting the binational command becomes increasingly obsolete.[5] However, timelines and costing of NORAD modernization are not presented in *SSE*.[6] The defence white paper simply states that ongoing studies were examining NORAD modernization.[7] This lack of clarity has led to the colloquialism in Canadian security circles that NORAD modernization is the "unwritten and unfunded chapter" missing from *SSE*.

Four years after the publication of *SSE*, the NORAD chapter has yet to be written. During this time, the Department of National Defence (DND)'s Mobilizing Insights in Defence and Security (MINDS)[8] program – designed to invest in and expand defence engagement – posed a series of Policy Challenges regarding NORAD modernization:

- What are the emerging threats against Canada and North America and the associated gaps in continental defence?
- What capabilities and infrastructure are required to respond to these threats? What is the best use of Canadian resources and assets to fill identified gaps? How can Canada best contribute, cooperate and coordinate within NORAD to address them?

- What changes to Canadian policy or practice may be required to strengthen the defence of Canada and North America?[9]

An important step towards answering these questions and filling in the missing *SSE* chapter was taken in the summer and fall of 2020. The Conference of Defence Associations (CDA) Institute organized a series of webinars that provided structured consultation between officials from the Canadian and US governments, industries, and academia to explore politically feasible, cost-effective options for NORAD modernization. Discussion was directed at utilizing current systems supporting NORAD, in conjunction with upgraded and new capabilities to create an innovative, integrated network to seamlessly address gaps in the current domain awareness, defeat, and command and control architecture. During these webinars, NORAD officials articulated certain program requirements that will guide its modernization regardless of the specific choices Canada and the United States make on how to proceed. These reports also outline the limits of what Canadian industry can provide, and highlight areas where Canada is well suited to contribute to NORAD modernization.[10]

Shielding North America was inspired by these webinars to attempt another step towards NORAD modernization. Within the volume, various leading thinkers grapple with the defence of Canada and the role of NORAD. As this volume was finalized, an agreement was reached between President Biden and Prime Minister Trudeau to expand cooperation on continental and Arctic defence, including the modernization of NORAD.[11] The focus of this book is to provide readers with pertinent background knowledge exploring Canada's role as a binational defence partner and the challenges it faces in modernizing continental defence. How can NORAD evolve with new responsibilities and capabilities to detect, deter, and defeat new threats to North America?

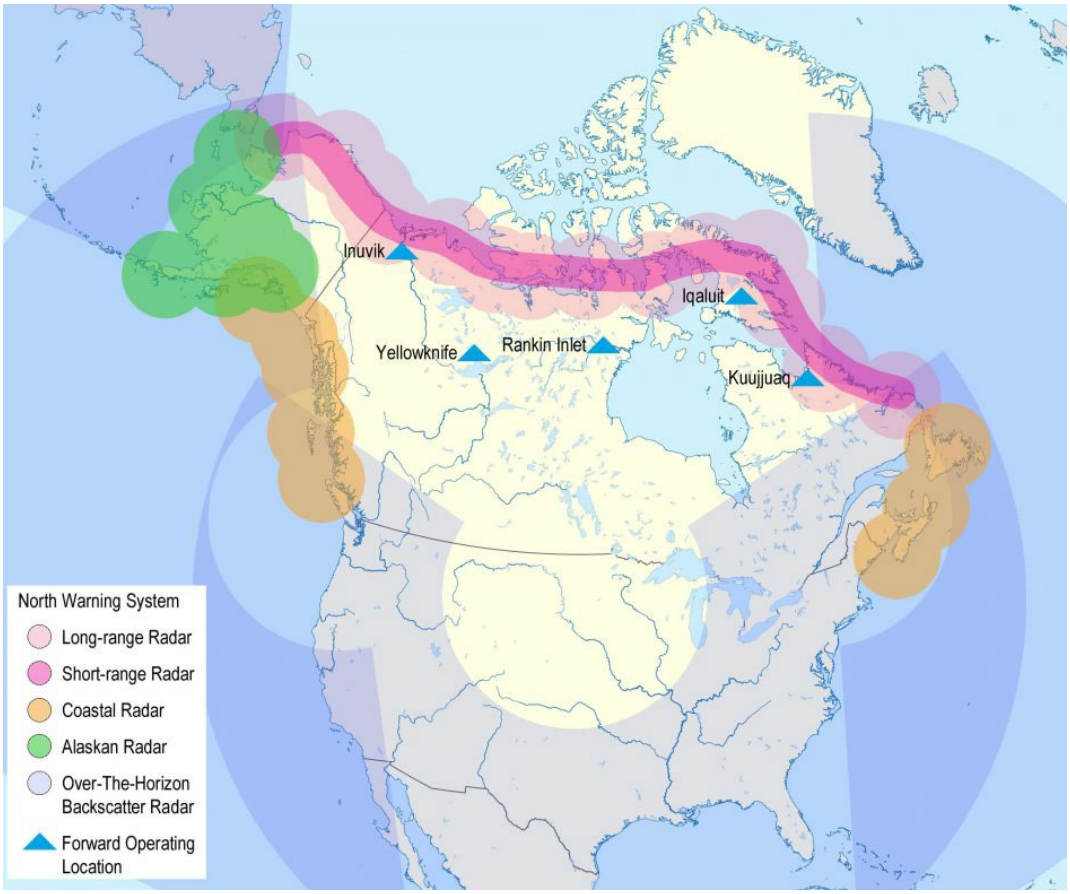
Nancy Teeple
Ryan Dean
February 2021

Notes

[1] NORAD, USNORTHCOM, CJOC, and Canadian and American departments of defence. Andrea Charron and James Fergusson, "Beyond NORAD and Modernization to North American Defence Evolution," Canadian Global Affairs Institute (May 2017), 4.
[2] Charron and Fergusson, "Beyond NORAD," 1.

[3] Canada, *Strong, Secure, Engaged: Canada's Defence Policy* (Ottawa: Department of National Defence, 2017), 7, 17.
[4] *Strong, Secure, Engaged*, 14.
[5] *Strong, Secure, Engaged*, 50.
[6] *Strong, Secure, Engaged*, 43.
[7] *Strong, Secure, Engaged*, 79.
[8] Canada, "Mobilizing Insights in Defence and Security (MINDS)," Department of National Defence, https://www.canada.ca/en/department-national-defence/programs/minds.html.
[9] Canada, "MINDS Policy Challenges 2021-22," Department of National Defence, https://www.canada.ca/en/department-national-defence/programs/minds/defence-policy-challenges.html.
[10] See Ryan Dean and Nancy Teeple, "NORAD Modernization: Report One: Awareness & Sensors,"; "NORAD Modernization: Report Two: Defeat Capabilities"; and "NORAD Modernization: Report Three: JADC2/JADO," CDA Institute. Available as NAADSN *Activity Reports* at https://www.naadsn.ca/research/.
[11] Office of the Prime Minister of Canada, "Roadmap for a Renewed U.S.-Canada Partnership," 23 February 2021, https://pm.gc.ca/en/news/statements/2021/02/23/roadmap-renewed-us-canada-partnership.

The intended radar coverage of the North Warning System and other NORAD radar systems, circa 1987.



Source: Perrin Beatty, *Challenge and Commitment - A Defence Policy for Canada* (Ottawa: Department of National Defence, 1987), 57.

Introduction

The Missing Chapter of *Strong, Secure, Engaged*

Ryan Dean, MA and Nancy Teeple, PhD

In February 2019, former Commander of the North American Aerospace Defense Command (NORAD) and US Northern Command (USNORTHCOM) General Terrence O'Shaughnessy alerted the American and Canadian defence communities that our nations are "at risk in ways we haven't seen in decades." He argued that we need to move forward on upgrading the aging continental defences with the rise of threats from adversaries like Russia. Two years later, Canada continues to contend with feasible options to "Secure North America" with its U.S. ally.

This volume explores Canada's role in the modernization of North American defence within an evolving integrated all-domain concept that addresses current gaps in awareness between domains (i.e., sensors), data collection, fusion, and access. Ultimately, NORAD aims to renew the credibility of its deterrent capability to defend North America. It involves the integration of the aerospace, cyberspace, land, and maritime domains, with command and control (C2) to close the gaps and seams that adversaries can exploit with new missile technology, unmanned systems, and even undetectable underwater vehicles. Information is a key domain in this initiative. Increasing the sources of information collection through expanding the sensor system and reducing the stove-piping of information collection, analysis, and sharing, can drastically reduce the time for effective decision-making to respond to threats in their earliest phases. The ability to respond to threats across various domains broadens the available deter and defeat options, better protecting North America.

As a binational command, the evolution of NORAD's roles and missions with the modernization of North American defence will have implications for Canada. The architecture for North American defence will require Canadian territory as part of the infrastructure to accommodate integrated land-air-maritime-space-based sensors, airfields, and other forward operating locations. NORAD modernization may involve revising and expanding its mission beyond

aerospace warning and control, and maritime warning, in order to maintain a credible deterrent against emerging threats. Canadian investment in NORAD modernization involves fiscal, political, and strategic considerations.

Innovating NORAD Modernization

During the fall 2020 webinars organized by the Conference of Defence Associations (CDA) Institute, NORAD representatives communicated to industry that the modern threats they are facing require an all-domain awareness capability (sensors) and a suite of defeat mechanisms (interceptors), linked through the creation of Joint All-Domain Command and Control (JADC2) capability. JADC2 is the major element of NORAD modernization, but more importantly represents a requirement for the entire American military and its global commitments beyond the continental defence concerns of Canada. Developed by the United States Air Force (USAF), JADC2 aims to establish "decision-making superiority" for authorities by utilizing artificial intelligence (AI) to provide more time and options to effectively counter the actions of great power adversaries and deter them from mounting outright threats to the international system.

The AI enabling JADC2 will link the sensors providing all-domain awareness with various defeat mechanisms and make the Strategic Homeland Integrated Ecosystem for Layered Defense (SHIELD) concept possible. The function of JADC2 is to take data from sensors placed "from sub-surface to on orbit" and fuse all of it into a comprehensive picture that identifies threats at the extreme edge of awareness, not waiting for the threat to travel through layers of sensors and aggregated reporting to identify it as such. When a threat must be countered, SHIELD aims to develop advanced defeat mechanisms that provide an active defence to intercept threats at the earliest stages of launch or target the launch platforms prior to launch (i.e., "to the left"). The goal is to "flip the cost-curve" against the threats seen today so that a $3-10 million interceptor missile is not sent against a $300,000 threat.[1]

US military officials presented to Canadian industry that the JADC2 capability made possible by machine-enabled insights (AI writ large) should overcome three major challenges. The first involves sorting through the sheer volume of data generated from multiple sources for authoritative data using machine-enabled insights for pattern and anomaly detection, applying predictive analysis and deep learning. Machine-enabled insights free up human actors from data processing roles – being "in the loop" – for decision-making based off the data – being "on the loop." Deep learning – machine learning at a broad level – is then applied to examine an adversary's battlespace and identify patterns of

behaviour that are associated with certain activities, generating operational alerts for decision-makers when something is afoot.

The second challenge addresses the cloud-based data architecture through which all the data is ingested and infused. This requires an AI capability to develop hypothetical scenarios, discerning an adversary's most likely and most dangerous courses of action for presentation to decision-makers. This assessment capability can also be used for allied contingency planning to inform decision-makers' force posture to best counter adversarial actions observed in real time. The third challenge is creating an all-domain common operating picture by displaying data from all sorts of feeds – from threats to friendly readiness data – and presenting it in a user-defined display for commanders. The goal is to be able to use this data around the world, enabling global integration with allies. AI-enabled processes will allow the United States and its allies to make faster and better decisions on a foundation of clearer data than their adversaries, thus achieving "decision-making superiority." AI will not be making the decisions; rather, human beings will ultimately make decisions from a position of information dominance.[2]

Decision-making superiority is the essence of developing JADC2, allowing NORAD to achieve its goal of renewed deterrence through creating a deterrence by denial capability – the ability to prevent an adversary from achieving its objective. But officials were adamant that JADC2 needed to be supported by layering defences along the approaches to North America to truly create a denial capability that can deter great powers from threatening North America.

American industry representatives involved in designing NORAD modernization argued that the command had two distinct layered defence needs supporting JADC2: sensor redundancy in its all-domain awareness capability, and a "shoot-assess-shoot" shot doctrine governing its defeat mechanisms.[3] Additional layers of sensors offer enhanced resiliency to the all-domain awareness capability requirement for NORAD. Instead of a few well-placed shots by an adversary resulting in complete sensor failure, layered redundancy can absorb damage over time, leading to the "graceful degradation" of NORAD's all-domain awareness capability. NORAD can presently achieve at least three layers of sensors: space-based sensors, sensors on aircraft, and terminal sensing by dedicated systems. The benefits of layered sensors are that they allow NORAD to be more conservative with its kinetic interceptors, but more sensors place greater processing demands on JADC2, officials cautioned. As JADC2 capability improves, additional layers of sensors could be added to NORAD.

NORAD officials communicated to industry that the multi-layered sensor system must be able to detect, identify, and track all types of missiles ranging

from ballistic to cruise missiles and new hypersonic glide vehicles. This multi-mission tracking capability is important given the issues raised by Teeple in her chapter. Can Canadian officials pick and choose the mission profiles of the sensors they may contribute to NORAD modernization? Furthermore, NORAD officials stated that the proposed multi-layered sensor system must be based around the existing ballistic missile defence (BMD) warning capability, with the additional layering of sensors seamlessly closing the current gaps that make NORAD vulnerable to developing threats such as hypersonic glide vehicles. This raises the notion of political risk associated with BMD, as presented by Massie, Boucher, and Roussel. Will possible Canadian contributions to its traditional preference of domain awareness be as politically benign as these scholars suggest?

Regardless of Canadian decisions on contributing to all-domain awareness, NORAD officials were clear that closing the gaps in coverage that currently exist requires a combination of multi-spectral sensor capabilities (a combination of radar, infra-red, radio frequency, acoustics, etc.) with long-range detection to engage threats as early as possible. Officials preferred that the extent of domain awareness would allow for a threat to be identified and tracked from its 'birth' or launch. This detection range means that some sensors will be based in space, though the orbits of these sensors and their balance with terrestrial- and maritime-based sensors have yet to be decided. The placement of these sensors raises concerns around BMD, as posited by Charron and Fergusson. Will the increasing militarization of space, indicated by the new generation of space-based sensors, upset the international strategic balance? How could this fear play with Canadian domestic audiences? Does technological change necessitate a global awareness capability for continental defence, or is this modernization aspiration an example of the asymmetries between American and Canadian defence requirements, as recognized by Charron?

NORAD officials hope that the new sensors could adapt what they do and where they do it to handle a high volume of threats from great powers. They recommend that sensors should be software-defined and open architecture for quick adaptability and upgradability. This would facilitate C2 networking without requiring a hardware update, increasing the lifespan of the renewed sensor system, and keeping down future costs. NORAD wants sensors that are modular and scalable. This means adapting sensors developed for other parts of the world for use with NORAD, making the renewed system quick to install, cheap, and easily upgradable.[4]

Officials involved in renewal presented NORAD's second layered defence requirement as the organization of its defeat mechanisms around a "shoot-assess-shoot" shot doctrine.[5] The benefit of "shoot-assess-shoot" is that it

mathematically allows for the least number of interceptors to achieve a "kill" (not including "left of launch" targeting). The disadvantage of this shot doctrine is that it requires longer-range initial intercepts to provide enough battlespace for assessment, tracking, and follow-on shot opportunities. Current JADC2 technology being advocated for NORAD aims to accomplish this through "engage on remote," making the most of the defeat mechanisms that the command already possesses. For example, layered sensors can inform a fighter to shoot its missiles early at a target, beyond that aircraft's radar coverage, so that the missile's maximum range is the point of interception, thereby achieving greater effectiveness. "Engage on remote" could represent a paradigm shift in thinking, in which "kill chains" could be forged on the fly rather than pre-planned, leading to the combination of "any sensor, best shooter." How does Canada currently fit into this paradigm? How *could* Canada fit into defeat mechanisms in the future?

As Massie, Boucher, and Roussel note, Canada already contributes to NORAD's defeat mechanisms through the weapon systems of its fighter aircraft and warships (these platforms also represent sensor contributions to NORAD's all-domain awareness capability). This capability will be enhanced with the acquisition of Canada's new generation of fighter aircraft and warships, obtained through procurement independent of NORAD modernization plans.[6] Webinar presentations by Canadian industry suggest that while Canada lacks the capability to develop specific kinetic defeat mechanisms, it is well suited to developing non-kinetic defeat options. Officials acknowledged that non-kinetic defeat options will become increasingly important and should work in tandem with kinetic options, presenting enough uncertainty to an adversary to deter their first attack. The technology to integrate kinetics and non-kinetics does not yet exist, but if detection, identification, and tracking improve, non-kinetics can be used to save interceptors. Used in a shoot-assess-shoot shot doctrine, officials posited, non-kinetics become magazine extenders. Non-kinetics will allow for NORAD to flip the cost curve back in its favour across all defence missions, from BMD to cruise missiles. The technology might develop to allow NORAD to smartly choose whether to commit a kinetic at all, relying solely on non-kinetic solutions to achieve a "kill." Will non-kinetic defeat options, as explored further by Teeple, be a politically viable contribution? Or could these mechanisms be perceived by Canadians as offensive in nature and associated with BMD, as Massie, Boucher, and Roussel warn?[7]

NORAD officials posit that both layered sensor redundancy and layered shot doctrine are required to deal with great power threats to North America. Smaller states simply do not have the volume of fire to overwhelm NORAD, even if the

command did not have both layered defence aspects. This calls into question the extent of deterrence by denial and how much of this capability is required for NORAD to deter threats – even great power threats – to North America writ large.[8] Could an overly comprehensive defence actually jeopardize the global strategic balance? Various chapters in Ernie Regehr's *Deterrence, Arms Control, and Cooperative Security* interrogate this issue directly, pointing out that NORAD has never been able to provide a perfect comprehensive defence – a deterrence by denial capability – even during the height of the Cold War. The binational command was effective due to its reliance on deterrence by punishment: its early warning capabilities prevented a surprise attack on America's nuclear arsenal, and the cold calculus of Mutually Assured Destruction (MAD) – mutual *vulnerability* – delivered by American strategic weapons deterred Soviet aggression.[9] Modernization efforts to generate a comprehensive defence will likely be similarly doomed to fail, Regehr argues, confusing Canadians about the nature of a renewed NORAD and upsetting the strategic balance of MAD.[10] Given that a comprehensive defence capability would engage great power aerospace threats – from enhanced BMD to atmosphere-skipping hypersonic vehicles – as noted by Charron and Fergusson in their contribution, will Canadians link NORAD modernization to the larger American defence movement towards space control concepts? Would this ensure a renewed effort by great powers to further develop their aerospace capabilities?

The webinars between NORAD and Canadian industry made clear that NORAD renewal was not just about issues of domestic politics and international stability. Modernization offered participation opportunities for Canada's defence and high technology industries, while potentially generating valuable communications infrastructure across remote parts of the country, particularly the Arctic. These opportunities surround the common theme across the webinars: that the collection, processing, and dissemination of data is crucial to NORAD modernization.

Industry experts at the webinars indicated that Canada's contribution could be based around the transportation of data – the communication infrastructure – from sensors, to JADC2, to defeat mechanisms, underpinning modernization. Access to NORAD data, these representatives argued, will give Canadian companies a competitive advantage in future commercial endeavours, but also generate issues of intellectual property rights that will need to be addressed at the policy level. Additional policy questions surrounding Canadian industry's participation in NORAD modernization included the possibility of private/public partnerships to facilitate their full involvement.

Experts acknowledged that Canadian industry faces the challenge of American security classification processes – a sort of non-tariff barrier to active participation in NORAD modernization. As NORAD officials warned, the more data is shared, and the more players are involved in creating and maintaining data for NORAD, the higher the risk to data integrity. How can Canadian companies receive the appropriate classifications in a timely process that allows for their participation whilst preserving the protections that these classifications offer? All webinar participants were clear in their call for the Canadian government to engage as soon as possible with American authorities to facilitate enhanced data and technology sharing between industry players in a less burdensome fashion.

The webinars also highlighted the development of the all-domain awareness capability as another area of NORAD modernization where Canadian industry can expect to make significant contributions. Canadian industry representatives argue that all-domain awareness, and creating its supporting communications infrastructure, presents an excellent opportunity to bring Canada's diverse advanced technology industry – a non-traditional defence player – into the NORAD modernization process. Larger Canadian technology companies, specializing in networking and telecommunications, are well suited to contribute to the communications infrastructure and networking that will securely move vast amounts of data around the world and process it using AI. Many smaller and medium-size firms work in quantum computing, data analytics, and AI technologies that will enable all-domain awareness through the manufacture of sensors and the efficient and secure transportation of data to and from JADC2.

NORAD officials insisted that covering Canadian territory with sensors is necessary for all-domain awareness. This includes covering the Arctic, the most challenging of the command's environments for renewal, with sensors to detect threats from multiple adversaries posed to pass through the Arctic.[11] The sensors needed to address these threats will be placed into "a resource constrained space," characterized by vast distances with little existing infrastructure to support them. These remote sensors will have to be able to reliably cope with the Arctic's harsh climate and severe weather. Space-based sensors layered above the Arctic present an additional challenge for all-domain awareness capability, due to the constraints of polar orbits.[12]

Webinar presentations also highlighted NORAD modernization as an infrastructure project as well as a defence requirement. Sensor data could be used for civilian applications, such as improved weather information or even predictive analysis. Similarly, civilians could be granted access to new communications infrastructure, allowing remote communities to join the digital economy. Communities in the North would particularly benefit from this infrastructure,

especially from the connectivity granted by the new space-based assets feeding sensor data to JADC2. Could access to data and communications change the perceptions of Canadians on NORAD modernization?

NORAD officials also emphasized the options of sharing NORAD data through the US military's larger JADC2 global system with additional allies, such as NATO and the "Five Eyes" intelligence community. All of these allies have valuable data to contribute to JADC2's global all-domain picture. It was noted by presenters that NATO's involvement in the sharing of data is critical from NORAD's perspective, in that it would address deficits in all-domain awareness across the North Atlantic, a critical avenue of approach to North America. However, this sharing of data conflates the traditional role of the binational command with that of NATO, a confusion that once befuddled Prime Minister Diefenbaker and frustrated Canada's overall defence policy at NORAD's inception. While *SSE* makes clear that both alliances provide strategic deterrence to Canada, they are premised on the notions of Canada's "home" and "away" games. Will this geographic distinction between continental and international defence perspectives break down with technological advancement and the sharing of data and defence responsibilities, as Lackenbauer suggests? However, and with whomever data and infrastructure is shared, officials were adamant that these decisions must be made before technical solutions to enable this sharing can be designed and implemented.

Offensive and Defensive Deterrence

The issue of whether Canada adopts an offensive and/or defensive role in the modernized architecture rests with perceptions of how Canada views itself as a military actor and how it wants to be viewed by other nations. Offence and defence are perceptual because a capability deployed to enhance defence may be perceived by an adversary as offensive, even if not intended by the state deploying that capability – the classic "security dilemma."[13] This creates a challenge to strategic stability because a nation disadvantaged by that capability will seek to offset it to avoid being asymmetrically vulnerable. The debate in Canada regarding strategic stability may be driven by concerns that enhanced domain awareness and defeat capability, facilitated through "information dominance" and defeat mechanisms, may embolden the adversary to more aggressive strategic behaviour. In addition, "offence and defence" perceptions have implications for strategic messaging. As suggested, what the US defence planners describe as "defensive" may be perceived by adversaries as offensive, particularly capabilities contributing to deterrence by denial. Canadians may also view certain "defensive" capabilities as offensive if they are perceived to introduce strategic

instability, influencing the nation's role in North American defence. With the evolution of North American defence through the SHIELD concept, a more "balanced approach" to deterrence is required, because "deterrence by punishment is insufficient to deter the full range of attack options available to Beijing and the Kremlin."[14] SHIELD calls for investment in defeat capabilities to support deterrence by denial, driven by the logic that in order to deter, one must be able to possess the ability to defeat.[15] "Left of launch" defeat capabilities may be perceived as offensive because they can be used as first-strike weapons. This perception may be shared by many Canadians.

Denial may also include hardening systems through resiliency and redundancy to mitigate the effects of an attack. An adversary's cost-benefit calculation would deter aggressive action, as it would not achieve the intended effect. The importance of the redundancy and resiliency of systems was touched on earlier. *SSE* states that "deterrence has traditionally focused on conventional and nuclear capabilities, but the concept is also increasingly relevant to the space and cyber domains."[16] There remains a gap in how resilience is to be achieved, suggesting that the cyber and space domains pose a challenge for hardening against threats. There must be more discussion about resilience of systems that are vulnerable to infiltration, exploitation, and outright destruction (particularly the threat of counterspace capabilities). A uniquely Canadian approach to the denial role could include enhancing resiliency to protect critical assets in the space and cyber domains that contribute to a modernized network of sensors and data functions, respectively. Space-based systems are particularly vulnerable to anti-satellite and counter-space capabilities, deployed from the terrestrial or cyber domain, electromagnetic spectrum, or space-based assets (i.e., offensive payloads on satellites). The integration of systems and sharing of data through JADC2 addressed in this document also highlight vulnerabilities that could be exploited by adversaries. Seams and gaps between and within systems need to be addressed as old and new capabilities are brought online as part of SHIELD. Resilience is essential to deterring the adversary from corrupting information, and disrupting and disabling systems designed to gather, assess, and relay information for real-time action.

Defensive non-kinetic options may include alternatives involving dialogue and signalling, rather than direct disabling and disruptive actions. As a senior defence planner recently described, non-kinetic "left of launch" options could find a positive reception in Canada. These include diplomatic engagement, information operations, and the application of military pressure on an adversary on a different flank. A "different flank" was unspecified, but is interpreted to suggest applying pressure in an alternative domain or geopolitical space where

the adversary is vulnerable, which would likely create the incentive to reconsider a launch. These options allow for non-escalatory or less-escalatory actions to engage the adversary and de-escalate a crisis before it goes kinetic.[17] Among Canada's many tools, diplomacy is a strength and adds value to the nation's role in using dialogue and other soft-power capabilities to reduce the likelihood of enemy aggression. This speaks to Canada's middle power status and tradition as an "honest broker" in world affairs.

Strong, Secure, Engaged makes clear that Canada values the deterrence of potential threats to North America provided by NORAD. For this deterrent to persist into the future, the modernization of the binational command is vital. While *SSE* signals that Canada favours focusing its renewal effort on developing an all-domain awareness capability for NORAD – its traditional early warning role – the white paper also states that the country is open to change. Much of this change centres on NORAD developing its deterrence by denial capability, which could include defeat mechanisms perceived to be offensive in nature by some Canadians. The following chapters contextualize present discussions about the future of NORAD, and inform decisions about Canada's potential contributions to the modernization of the command. This volume highlights current and future gaps that may exist in the defence of North America that a modernized NORAD could address. Common across the contributed works is the call to action: that Canada has pressing decisions on NORAD that must be made soon if it is to "get a piece of the action."

Plan for the Book

In this volume historian, P. Whitney Lackenbauer sets the stage with a historical reflection on 'defence against help'. Developed by political scientist Nils Ørvik in the early 1970s, the 'defence against help' thesis posits that small states must establish and maintain military credibility in the eyes of larger states to avoid their unwanted defence 'help'.[18] This rationale explains Canada's continental defence relationship with the United States throughout the Second World War and into the Cold War, when Canadian territory was essential to American national defence. Lackenbauer argues that technological progress is changing this equation. The development of space-based operations lessens American security dependence on Canadian geography, while the rise of the information or 'cyber' domain makes Canada increasingly dependent on the United States for its own security. Far from being a sovereignty threat, the United States offers opportunities for Canada's political and military benefit. Lackenbauer suggests that Canada must continue to maintain military

credibility, not to 'defend against help' from its larger ally, but to 'stay in the game' and get a 'piece of the action'.

Political scientists Andrea Charron and Jim Fergusson narrow the focus of the volume to NORAD. How does history inform the institution of today? The authors warn that Canada risks falling 'out of the game' of military credibility and not getting a 'piece of the action' to advance its own security agenda. Nowhere is this risk more evident than in relation to the Arctic and BMD. New NORAD infrastructure will appear in the Canadian Arctic, reviving the old Canadian narrative that American defence trumps Canadian sovereignty concerns there,[19] especially regarding the dispute over the legal status of the Northwest Passage. Similarly, American defence movement towards the control of space resurrects the spectre of BMD and Canadian fears that such systems will jeopardize the global strategic balance. Charron and Fergusson conclude that old political narratives continue to constrain the bilateral defence cooperation of today.

What do changing threats mean for NORAD? Former NORAD Commander General Terrence O'Shaughnessy and Brigadier General Peter Fesler offer an analysis of the threats and one of the potential pathways forward for NORAD modernization. China and Russia have developed the capability to conduct long-range, conventional, precision strikes, utilizing an effective suite of weaponry, from cheap drones to advanced hypersonic glide vehicles. Such developing global-strike capabilities increasingly expose North America to risk. The generals argue that NORAD modernization should contribute to redeveloping America's deterrence by denial – its SHIELD – to check the global-strike capability of its strategic competitors. SHIELD is a major revision of NORAD's historic role of preserving America's deterrence by punishment[20] via its SWORD. The authors present a vision of how SHIELD can re-establish balance in support of continental security for the foreseeable future.

In "Responding to *Hardening the SHIELD*," Andrea Charron anticipates the Canadian debate surrounding O'Shaughnessy and Fesler's proposal. Ultimately, a radical revision of NORAD might be too much, too soon for Canada to handle, whilst the focus on the narrow defence concern of great power competition diverts attention from broader security issues like climate change and asymmetric threats.[21] Apparent throughout Charron's analysis are the differing strategic cultures, resources, and scale of responsibilities facing the binational partners of NORAD. Contentious plans that cut across these differences, such as NORAD adopting offensive capabilities, decisions over access to data, or even the protection provided by BMD interceptors in the event of attack, could bedevil modernization efforts.

Can past controversy over Canada and BMD inform current decision-making on the issue? Political scientists Justin Massie, Jean-Christophe Boucher, and Stéphane Roussel offer a foreign policy analysis of NORAD modernization, arguing that the increasing threat posed by great power competition is only half of the equation. Analyzing a suite of timely statistical data, the authors posit that an increasingly permissive domestic environment, enabled by the minority Liberal government having viable options for a bipartisan consensus in Parliament and a public supportive of defence spending, should allow a window of opportunity for Canada to invest in the modernization of NORAD. However, history has shown that the less "offensive" modernization capabilities are perceived, the less domestic opposition should be expected.

Making distinctions between offensive and defensive systems could become increasingly difficult with the advancements in technology driving NORAD modernization. Nancy Teeple investigates the realities of missile defence currently confronting Canada, and how traditional Canadian policies and capabilities might adapt with technology to meet the needs of NORAD renewal. Could Canada meaningfully contribute to defeat mechanisms designed around missile defence in a politically acceptable way? Teeple predicts that Canada's thinking will shift, arguing that the increasing integration of domains and capabilities inherent in NORAD renewal will offer various policy options not previously available for Canada to pursue, ranging from actively deploying interceptor missiles to taking an offensive non-kinetic role. Canadian pragmatism in joining missile defence options will increase its defence credibility with its American ally, better ensuring that Canada "stays in the game."

Notes

[1] Ryan Dean and Nancy Teeple, "NORAD Modernization: Report Three: JADC2/JADO," CDA Institute, https://cdainstitute.ca/norad-modernization-report-three-jadc2-jado/.

[2] Dean and Teeple, "JADC2/JADO."

[3] See Nancy Teeple and Ryan Dean, "NORAD Modernization: Report Two: Defeat Capabilities," CDA Institute, https://cdainstitute.ca/norad-modernization-report-two-defeat-capabilities/.

[4] Ryan Dean and Nancy Teeple, "NORAD Modernization: Report One: Awareness & Sensors," CDA Institute, https://cdainstitute.ca/norad-modernization-report-one-awareness-sensors/.

[5] This doctrine involves firing an initial shot at an incoming missile, then assessing whether it killed the missile before firing a second shot to ensure the missile is defeated.
[6] See *Strong, Secure, Engaged*.
[7] Teeple and Dean, "Defeat Capabilities."
[8] See P. Whitney Lackenbauer and Ryan Dean, "We Cannot *Deter* What We Cannot *Detect*," *NAADSN Quick Impact*, 25 May 2020, https://www.naadsn.ca/wp-content/uploads/2020/05/20-may-25-PWL-RD-We-Cannot-Deter-What-We-Cannot-Detect-final.pdf.
[9] Traditional deterrence or "deterrence by punishment." The consequences of an aggressive action causing a retaliatory nuclear strike against the instigator's economic and population centres (i.e., cities) strongly disincentivizes a first strike.
[10] Ernie Regehr, *Deterrence, Arms Control, and Cooperative Security* (Peterborough: NAADSN *Engaged Series*, 2020) at https://www.naadsn.ca/wp-content/uploads/2020/06/Regehr-Deterrence_ArmsControl_CooperativeSecurity-NAADSN-jun20.pdf.
[11] For more on the threats passing through the Arctic and how they align with the notion of Arctic security, see P. Whitney Lackenbauer, "Threats In, To, and Through the Canadian Arctic: A Framework for Analysis," *NAADSN Ideas Series*, 11 June 2020, https://www.naadsn.ca/events/threats-in-to-and-through-the-canadian-arctic-a-framework-for-analysis/.
[12] Dean and Teeple, "Awareness & Sensors."
[13] For the original analysis of the security dilemma, see John Herz, "Idealist Internationalism and the Security Dilemma," *World Politics* 2:2 (1950): 171–201.
[14] O'Shaughnessy and Fesler, "Hardening the Shield," 8.
[15] O'Shaughnessy and Fesler, "Hardening the Shield," 8, 12.
[16] *SSE*, 50.
[17] "NORAD Modernization: Enabling Forward Operations," Event hosted by the Royal United Services Institute of Nova Scotia and USNORTHCOM Command Magazine "The Watch," 17 February 2021 (webinar).
[18] Nils Ørvik, "Defence against help-a strategy for small states?" *Survival* 15:5 (1973): 228-231 and "Canadian security and 'defence against help'," *Survival* 26:1 (1984): 26-31.
[19] See the works by Shelagh Grant for the best articulation of this narrative, particularly *Sovereignty or Security?: Government Policy in the Canadian North, 1936-1950* (Vancouver: UBC Press, 1988) and *Polar imperative: A history of Arctic sovereignty in North America* (Vancouver: D & M Publishers, 2011).
[20] For an excellent history of NORAD and its purposes, see Joseph T. Jockel, *No boundaries upstairs: Canada, the United States, and the origins of North American air defence, 1945-1958* (Vancouver: UBC Press, 1987).

[21] For more on the debate between narrow strategic studies and broad security studies, see Keith Krause and Michael C. Williams, "Broadening the agenda of security studies: Politics and methods," *Mershon International Studies Review* 40:2 (1996): 229-254.

1 'Defence Against Help': Revisiting a Primary Justification for Canadian Participation in Continental Defence with the United States[1]

P. Whitney Lackenbauer

Nils Ørvik first identified the concept of 'defence against help' as a security "strategy for small states" in the early 1970s. To avoid unwanted "help" from large neighbours, he posited, smaller countries had to establish and maintain military credibility:

> even a very small force might be fully credible, provided its objectives are within the limits of its capabilities. One credible objective for small states would be, while not attempting military resistance against a large neighbour, to persuade him that they are strong enough to defend themselves against any of the large neighbour's potential enemies. This could help to avoid the actual military presence of the great neighbour on one's territory for reasons of military 'help' and assistance.[2]

Geostrategic interdependence meant that the larger power actually posed a sovereignty and security threat to the smaller neighbour, because it would take whatever actions it deemed necessary to protect its own interests by "helping its neighbour," with or without the smaller state's consent. Therefore, acting out of its own self-interest, the small state should adopt a broad national defence policy to diminish the likelihood of unsolicited military assistance on or over its territory and adjacent waters. Ørvik's initial concept was devised based upon the Scandinavian example of non-aligned states (most notably the Soviet-Finnish case), but he suggested that the concept might have applicability in the Canadian case.

In its classic incarnation, the concept of 'defence against help' thus represents a trilateral equation, consisting of an external threat (or threatening context), a smaller state (the security of which is inextricably linked to the perceived security of a larger neighbour), and the neighbouring larger power itself. The equation incorporates how the threat relates to the larger state, and how the smaller state

plays (or does not play) an intermediary role in the threat relationship between the threatening context and the larger state. The smaller state's policy decisions are determined by how and what the larger state perceives as threats; whether the smaller state's territory, airspace, or maritime zones can play a potential role in offsetting or meeting the threat; and whether the smaller state can feasibly provide adequate defences and sustain military credibility to ensure that the larger power does not infringe on its sovereignty in meeting perceived security threats. Although two powers may share common basic values and definitions of the threat, the normative assumption is that it is always in the smaller power's national interest to be a sovereign state. Therefore, the smaller state's national sovereignty concerns can confound the interdependent nature of the security relationship between neighbouring powers in the face of an external threat.

In a 1981 paper framing how 'defence against help' represented one of the fundamental tenets in post-Second World war Canadian foreign policy, Donald Barry articulated that:

> One of the most frequently debated questions in Canadian defence policy vis-à-vis the U.S. is the extent to which the military actually serves Canada's national security interests. Because Canada's physical safety is guaranteed by the U.S., which it does so voluntarily out of concern for its own security, and the huge disparity in the capabilities of the two countries, many observers have concluded that Canada attempts to sustain a credible military posture and participates in North American defence for non-security reasons [particularly diplomatic credit]… Indeed some commentators have taken the extreme view that since Canada's security is assured it ought to take a "free ride," to abandon its participation in North American defence and redirect its military and diplomatic priorities elsewhere.[3]

He cautioned, however, that these interpretations of the American security guarantee were fundamentally flawed. A conceptual framework for Canadian policy had to recognize the interdependent nature of North American security, whereby the United States' safety was dependent on Canadian territory and airspace. Following this logic, he reasoned that "Canada cannot, consistent with its own national security interests, ignore the requirements of U.S. security nor can it easily isolate itself from the consequences of American strategic policy decisions." Therefore, in response to this 'security dilemma,' Canadian defence policy aimed to establish military credibility to both deter possible external threats and to maximize its security interests vis-à-vis the United States.[4]

Canada's alignment to the United States did not detract from the value of the concept to its decision-making; it bolstered it. A smaller state can invoke the strategy of 'defence against help' in two ways: unilaterally (with or without coordination with the larger state), or conjointly with the larger state. Barry identified that this logic partly explained Canada's decision to conclude formalized, bilateral defence arrangements with the United States. Policymakers in Ottawa paid considerable attention to perceived American encroachments on its sovereignty in the name of security, and thus devised conscious policies to mitigate possible demands from the U.S. while also accruing additional benefits from the bilateral defence association. Through conjoint initiatives, Canadian officials established ground rules for American security activities on Canadian territory. Although Barry demonstrated that the Canada consistently employed 'defence against help' in its security policy vis-à-vis the United States since the 1930s, he also suggested that the effectiveness of the strategy in protecting Canada's interests was inconclusive.[5]

In a *Canadian Defence Quarterly* article that same year, Nils Ørvik felt confident enough in his theory (and its effectiveness) to boldly proclaim that 'defence against help' constituted "the basic issue in Canadian national security." He lamented Canada's tendency to pragmatically pursue short-term defence policy objectives, rooted in specific issues like the choice of certain weapons systems, rather than focusing on the development of a long-term, cohesive military purpose. In his view, 'defence against help' offered "a more explicitly expressed rationale for our defence policy, an agreed framework of principles and basic assumptions which may guide us in the more detailed what-where-and-how decisions." Given the helpful, but ominous, role which the United States played in Canada's national security due to strategic interdependence, Ørvik thought that the concept justified a stronger Canadian Armed Forces better prepared "to defend our part of the continent, [and to lessen] the probability of unrequested American help."[6]

Does 'defence against help' continue to represent a workable, basic decision-making strategy for Canada to ensure continental defence in the 21st century? Building upon observations that I initially drew in a 2000 working paper, I maintain that the concept no longer represents an attractive or viable justification for core Canadian strategic decision-making. Rather than conceptualizing United States continental defence priorities as a threat to Canada's sovereignty (as it is conventionally defined in military and diplomatic circles) owing to potential territorial encroachment to protect the American heartland, cost-benefit analysis of Canadian options should focus on the benefits that Canada derives from its bilateral and binational defence partnership. Instead (and in contrast to some recent commentators), I suggest that the driving strategic

consideration since the late 1980s has been less about 'defence against help' than about the need for Canada to contribute meaningfully to bilateral defence in order to 'stay in the game' and secure 'a piece of the action.' Current proclamations that the North American "homeland is no longer a sanctuary" suggest, on a superficial level at least, similar continental defence imperatives to those which justified the 'defence against help' concept during the Cold War. While this may invite commentators to resurrect the concept as a strategic justification for costly Canadian investments in continental defence programs (or an argument for why Canada should opt-out), I contend that this would be out of step with current and future realities facing Canada in a North American context. In a recent book chapter, Andrea Charron and James Fergusson conclude that 'defence against help' was never applied in Canada's case and continues to represent the "wrong theory for the wrong country at the wrong time."[7] I contend that it was not always an inappropriate concept to drive Canadian thinking and may have represented a relevant and attractive concept in the early Cold War – but times change, and so must strategic justifications.

The Right Theory at a Certain Time? From the Second World War through the Cold War

From the Second World War through the Cold War, the impetus for Canadian decisions to actively participate in continental defence programs came not only from external security threats (primarily the Soviet Union), but also from a sovereignty-security paradox vis-à-vis continental security and the United States. Canada formulated defence policies that were consistent with the need to counter the dangers posed by hostile enemies to North American security, but also to ensure that Canadian sovereignty was not jeopardized by American military activities and installations on Canadian soil. Although the perceived intensity and magnitude of external threats varied over time, as did the perceived need to offset potentially threatening American influence, the idea of 'defence against help' formed the basis of rational Canadian calculations to participate, or not to participate, in continental defence schemes.

Several considerations must be stressed. Canadian sovereignty was perceived to be the terrestrial, maritime, or air spatial integrity of the nation-state. Security was embodied in external threats to the nation-state, framed in realist terms. Therefore, the following assessment uses these terms as predominantly understood during policy development and in media and academic circles during the Cold War. This particular conceptualization of interests shaped the concomitant bilateral security discourse.

The "modern" Canadian-American defence relationship traces its origins to 1938 and U.S. President Franklin Roosevelt's security pledge to Canada. With

war looming on the horizon, Roosevelt publicly promised American "help" if Canada was ever attacked. Not only did it draw Canada into the American security embrace, but explicitly revealed the shared geostrategic significance of the northern continental approaches to both countries. Prime Minister William Lyon Mackenzie King recognized American security needs, offering a reciprocal pledge that Canada would take adequate steps to ensure that an enemy could not use the country as a military corridor to the United States. In contrast to the American guarantee, however, Canada did not offer a guarantee to defence outside of its own borders. The bilateral security relationship, predicated on the idea that America would intercede on Canadian soil in the event of an incursion, and that Canada would bear responsibility for defending its own territory, took on its basic form for the next half-century. However, this earliest Canadian expression of 'defence against help' was rooted in promises of unilateral security action rather than a conjoint policy.

The Second World War saw the first application of Canadian 'defence against help' policy in practice. The influx of large numbers of American troops on Canadian soil during the war highlighted the King Government's need to take a more active role in Canadian defence to offset perceived encroachments on Canadian sovereignty. Massive American infrastructure development in the Canadian Northwest to build an air-staging route to Alaska, the Alaska Highway, and the Canol oil project, drew the first serious Canadian attention to the bilateral security-sovereignty balance and heightened political and public sensitivities to perceived *de facto* sovereignty infringements. Concurrently, the prime minister recognized that the intrinsic security concerns of the United States in the region (the lifeline between the continental United States and Alaska) had to be met. Therefore, an acceptable solution to Northern defence had to be conjoint rather than unilateral, given fiscal realities, manpower shortages, and the exigencies of war. Acting through the newly-formed Permanent Joint Board of Defence (PJBD), the King Government's policy response was a series of agreements to bolster Canadian involvement in defence projects on its own soil, through shared funding, increased Canadian personnel in the North, and postwar ownership arrangements that ensured Canadian *de jure* and *de facto* terrestrial sovereignty. Although the anxious and pragmatic King was leery of American intentions in the Canadian Northwest, he began to chart a cautious course in continental defence policy based on cooperation.[8]

The early postwar relationship was structured around American security and Canadian sovereignty and security concerns. The cooling of Soviet-American relations meant that North America's northern front took on ever increasing geostrategic importance as the shortest distance between the two superpowers. American strategists worried that there were "no boundaries upstairs" and began

to pester Canadian officials for greater commitments to the northern extremities of the continent. Although a land-based continental invasion was improbable, the likelihood of an airborne, transpolar attack by Soviet bombers preoccupied strategic thinking. Canada acknowledged and even shared American security concerns, but it also required assurance that the United States would not undermine Canadian sovereignty in helping to secure the northern flank. Accordingly, the King Government again adopted policies that ensured an adequate Canadian presence and level of involvement in defence projects in the North – a clear case of defence against help.[9] At Canada's insistence, guarantees of Canadian sovereignty accompanied tightening bilateral defence ties. For example, the agreement to construct the Distant Early Warning (DEW) line in May 1955 contained the first explicit acknowledgement of Canadian *de jure* terrestrial sovereignty in the Far North, and stressed Canada's contribution of land to continental defence.[10] By actively participating in continental defence on and over Canadian soil, along lines determined by American (and joint) strategic interests, Canada asserted her sovereignty and ensured that the burgeoning superpower to the south would not be obliged to take matters into its own hands.

Although Canadian contributions to North American defence were not commensurate to those of the United States, the government did enough to establish the perception - militarily, politically, and publicly - that it was a credible ally that was taking responsibility for its own sovereignty and security protection. The binational North American Air Defense Command (NORAD) agreement represented the most enduring policy manifestation of 'defence against help,' guaranteeing that both parties would work binationally to meet the Soviet airborne threat under a joint command and a single air defence plan, and enshrining senior Canadian involvement in direct decision-making relating to home defence commitments. The institutional structure meant that a Canadian became deputy commander of NORAD, and therefore established that Canada would have a say in what was going on over and on its territory. Such an arrangement did necessitate additional personnel and materiel, but the main Canadian contribution was land required for forward installations built mainly at American expense.[11] Air space defence operations in northern Canada could no longer be construed as unilaterally American - rather, any United States activities would be done *with* Canada as embodied in the bilateral agreement. By working in tandem, activities could no longer be considered a threat to sovereignty. "Help" was thus made less identifiably "American" and "Canadian" at a time when defences blended the territories almost into one for defence purposes and could have generated serious Canadian sovereignty concerns once again.[12] Deterrence strategies met with complete Canadian approval; after all, a mass build-up of nuclear weapons and the threat of massive retaliation to deter

any Soviet attack represented the antithesis to strategies based on terrestrial-based defences.

Historian Richard Goette's important work on sovereignty and command in the Canada-U.S. air defence relationship from 1940-57 explains how Canadian participation in continental defence efforts "enabled Canada to protect its sovereignty from American intervention." Senior defence officials perceived a risk if Canada tried to "free ride" off the Americans in peacetime. "If nothing is done until war comes," Air Commodore W.I. Clements noted in 1954, Canadians "might find things moving with great rapidity and the Americans might, on the excuse of national survival, suddenly take over everything overnight and if New York, etc., were being hydrogen bombed Canada's complaints about national sovereignty might not be heard above the other noises." Instead, Goette observed that, by working in partnership with the U.S., the RCAF had a "seat at the console," and Canadian airmen secured "a piece of the action" in continental air defence operations "while simultaneously safeguarding Canadian sovereignty." Furthermore, the arrangement protected Canada and its citizens from a Soviet attack. The cooperation ultimately institutionalized in NORAD allowed Canada to retain command of its military forces – thus passing what Goette identifies as the "acid test" of sovereignty.[13]

NORAD's mandate was defensive, and its original primary roles were surveillance and warning of bomber attack. The emergence of intercontinental ballistic missiles, and the purported "missile gap" of the 1960s, rendered the early warning systems erected across the North a hollow security promise. The capacity to detect a bomber attack did not translate into security against new strategic delivery systems. Henceforth, NORAD's mandate expanded to include aerospace warning of an incoming ballistic missile attack. Missile and satellite technology posed a new issue in continental security, shifting discussions that had previously centred on terrestrial, maritime, and air space into the realm of outer space. Nevertheless, an assessment of the discourse and policies from the 1960s to the 1980s does not indicate a discernable shift in Canadian strategic thought. When deciding whether (or how) to participate in new bilateral initiatives, the government still focused on the *consequences* of participation in joint defence projects with the United States for Canadian sovereignty, not the *opportunities* that the relationship presented.

The space domain is a case in point. In 1962, Canada became the third country in the world to orbit a satellite, largely due to military-directed programs since the Second World War, but in the ensuing decades Canadian space efforts became increasingly sporadic, civilian, commercial, and internationalised in orientation. The Americans made space research a national priority for government spending and recognized new security implications. By contrast,

Canada undertook no major national satellite projects (apart from communications) during the 1970s, "renounced the development of an indigenous launch capability," and refused any military effort to explore policy and technological areas where commercial benefits were not immediately identifiable.[14] Consequently, Canada abandoned its initial, leading-edge position in space strategy and capability.[15] As long as Canada's strategic outlook was reactive instead of proactive, and the need to defend against infringements on earth-based sovereignty preoccupied policymakers, the space domain remained a remote priority. Hence, Canada's decision to confine activities to "highly selective, mostly ground-based niches" is comprehensible. Although Canada was increasingly dependent on the satellite assets of the United States (and the United Nations),[16] this was not perceived to jeopardize Canadian sovereignty in the realist sense.

As Fergusson has shown in his definitive historical analysis,[17] Canada played a somewhat ambiguous role in continental missile defence from the onset. The 1968 NORAD renewal included a clause precluding any Canadian involvement in Ballistic Missile Defence (BMD),[18] which neutralized the argument that Canada would need to be directly involved for geostrategic and sovereignty reasons. Instead, Canada remained indirectly involved through terrestrially-based installations on its soil.[19] The 1971 White Paper on Defence noted that U.S. anti-ballistic missiles (ABM) interceptions outside of the atmosphere would not fall under Canadian jurisdiction, and thus did not pose a direct sovereignty threat. In the case of nuclear war the United States would do what it needed to protect its cities, and Canadian sovereignty would not factor into its calculus.[20] There was no point trying to 'defend against help' in this scenario. Encouraging diplomatic solutions to avoid nuclear war, through arms reduction talks rather than active military measures to counter the Soviet threat, seemed more appealing. In this period of relative calm, Canadian worries about unrequested American encroachments on the land and in the air largely abated.

The 1980s brought both renewed U.S.-Soviet tensions, and eventually the end of the Cold War itself. In 1981, NORAD was renamed North American *Aerospace* Defence Command, reflecting the new emphasis on defence and warning against missiles (including the new threat posed by cruise missiles) and the growing influence of space technology in defence and exploration. By the mid-1980s, BMD again captured North American headlines. The Reagan administration's Strategic Defense Initiative (SDI, colloquially known as "Star Wars"), announced in 1983, was predicated on perceptions that the Soviets had an advantageous "first-strike" capability that threatened U.S. strategic forces. The U.S. focused on designing a comprehensive, high-tech, "total defence" umbrella to thwart a full-scale Soviet ICBM attack.[21] As a research and development

program (even if based on fabricated data), SDI complied with the 1972 ABM Treaty; had it gone into testing and deployment phases, it would likely have violated it. It was only ten years, two presidents, and thirty billion dollars later, that the SDI project was officially cancelled.[22]

The Mulroney Government officially announced on 8 September 1985 that Canada would not officially participate in SDI - a decision heavily influenced by Canadian nationalist voices and after much study and public discussion.[23] Part of the concern was that SDI would entangle Canada "in a more elaborate continental defence arrangement." Defence officials worried that Canada could be increasingly left out of American technological "ventures that should be of interest to [the Canadian military]."[24] The Canadian media concentrated on management of the East-West rivalry more than bilateral security issues, and the government (prior to its September policy decision) portrayed SDI as a "prudent programme" that would "benefit the Canadian defence production industry and, hence, the Canadian economy."[25] Clearly, the debate on Canadian participation focused less on issues of sovereignty than on research and development contracts and technology transfer.

Nevertheless, the rational calculation of sovereignty concerns was indeed present, and 'defence against help' arguments emerged once again in some academic and media coverage. "If a truly effective ballistic missile defence could be deployed, a likely Soviet reaction would be a massive augmentation of its strategic bomber and long-range cruise missile forces, which in turn would require additional offsetting improvements to the North American air defence system," Ron Purver noted. "The cost of rejuvenated North American air defences, and of Canada's proportional share in them, would be very high; if Canada neglected to take up its share it would be faced with all the possible encroachments on its sovereignty from south of the border that continued membership in NORAD was at least partly designed to avoid or minimize."[26] A study at York University suggested that Canada should support SDI because "whatever follows offers at least some prospect of influence, however modest, with American decision makers that otherwise might not be possible at all. If Canada has no formal involvement with any future incarnations of the SDI programme, it will have to either surrender vast portions of its sovereignty or protect them at enormous cost."[27] The notion that components of the envisioned SDI system could require installations on Canadian territory also generated issues that theoretically implored Canada to get involved in (or get "dragged into") Star Wars should the Americans need to base anti-missile technology in the Canadian North.[28] "As Canada cannot avoid being drawn under the US umbrella of defence," Paul Rohrlich argued, "it might be logical to partake in the planning and implementation of the new security system."[29] In the end, the Canadian

Government decided that Canadian sovereignty was not in jeopardy. Therefore, a decision-making model based on 'defence against help' lent credence to official non-participation in SDI.

Canadian participation in the North American Air Defense Modernization (NAADM) plan, agreed to by both countries in 1985, involved the modernization of the DEW Line terrestrially-based radar stations across the Canadian Arctic into the North Warning System (NWS).[30] Because this defence infrastructure was located on Canadian soil, it had an intrinsic security *and* sovereignty dimension and was therefore marketable to the public as something the required Canadian participation. In short, the northern radar project was perfectly compatible with the logic of 'defence against help' - Canada needed to participate in continental defence initiatives that necessitated a geographical footprint within its borders. By contrast, the 1986 NORAD renewal negotiations included parliamentary hearings recommending a military space program to concentrate on early warning, surveillance, and communication tasks necessary to the protection of national security. The program was scuttled in 1989. Collective consciousness did not posit space as a national domain. The public unpopularity of SDI, coupled with a lack of identifiable national and thus political benefits, contributed to its demise.[31]

The rapid fall of the Soviet Union and the promise of an American-led new world order prompted a re-evaluation of security assumptions in the Western World. Voices within the United States, bolstered by the confidence of "winning" the Cold War, began to preach about an expected "peace dividend" in a new era of liberal peace. In Canada, the Mulroney Conservatives' "Cold Warrior" policy platforms of the 1980s seemed to hold little public appeal in an era of fiscal retrenchment and no obvious existential external threats to Canada. There was little political marketability in advocating defence against anyone, let alone the commitment of precious resources to defend against the almost unthinkable possibility of American encroachments on Canadian sovereignty in the name of continental defence. "SNORAD"[32] all but went into hibernation with no obvious strategic threats to North America. Nevertheless, during the debate over the 1996 NORAD renewal agreement, critic Douglas Ross contended that Canada had no option but to sign up to the arrangement "because of the rapidly declining ability of the Canadian military to project force or even exert control over Canadian territory and airspace." He lamented that policy-makers in Ottawa had to renew NORAD on whatever terms the Americans offered because "only capability can inspire serious consultation and cooperation on vital issues."[33] Canada, he suggested, had no capability, and thus no leverage.

When I initially wrote this paper in 2000, I asked where we should situate the concept of 'defence against help' in contemporary debates about Canada's

strategic policy and direction. Was the idea still employed, and if so for what purposes? Did Canadians still feel compelled to take on resource-intensive security responsibilities in partnership with the United States to preserve Canadian sovereignty from American "help," or had the emphasis and justification shifted? I focused on two cases studies: the Canadian debate over potential participation in continental Ballistic Missile Defence (and more specifically the American National Missile Defense program); and the attendant issue of space-based military systems. I observed that the evolution of the BMD issue had moved away from a defence policy-making posture predicated on the United States as a potential security threat to Canada, towards one that places a premium on assessing the costs and opportunity costs of non-participation such as the potential ramifications on the NORAD agreement. Similarly, I noted that arguments in favour of a more activist Canadian space and satellite surveillance policy were rooted in ideas that Canada was missing out on "the action," not any threat to its sovereignty.[34]

At the turn of the millennium, the US Joint Chiefs of Staff considered NORAD a logical organization to control a BMD system, given its existing surveillance and warning role for protecting North American air and aerospace and its close organizational relationship with U.S. Space Command.[35] "In a world of proliferating ballistic missile capabilities, subject to the agreement and tasking of the governments of the *U.S. and Canada* [emphasis mine], NORAD may be the logical organization to have command and control of a ground based North American limited ballistic missile defense system," USSPACECOM promoted.[36] Canada's 1994 White Paper had recognized the threat posed by the proliferation of weapons of mass destruction and associated delivery systems to both Canada and her "friends and allies," indicating that Canada was not opposed to an expansion of NORAD's missile warning function so long as the "missile defence posture … enhances global stability and is consistent with existing arms control agreements." It renewed NORAD in 1996 with provision for the traditional activities of "the surveillance and control of North American airspace; the collection, processing and dissemination of missile warning information within North America; and the examination of ballistic missile defence options focused on research and building on Canada's existing capabilities in communications and surveillance."[37] No one mentioned the need to participate in BMD to prevent American encroachments on Canadian sovereignty. When senior American military and political leaders quietly pushed for Canadian participation in BMD, they sold a vision of "extend[ing] the umbrella of this system to all of North America"[38] – but, from the onset, explained that U.S. did not require the use of Canadian territory or airspace to deploy a National Missile Defence (NMD) system.[39]

A decision-making model based on 'defence against help' might suggest that, since Canadian sovereignty and security was not threatened in the realist sense, there was no national security imperative (vis-à-vis the United States) to participate in BMD or NMD. Analysis of newspaper and journal articles suggested that the discourse has made a discernable shift away from 'defence against help' to the *opportunity* costs of non-participation.[40] Indeed, some Canadian officials and journalists argued that Canada opting out of participation in the NMD system would mean that the U.S. might not defend them against attack – the very antithesis of 'defence against help' – and might threaten the future viability of NORAD.[41] I observed similar logic at play with respect to space. Being left out of the American security embrace was a fundamentally different worry – and one more attuned to the realities of the twenty-first century.

In 2000, I observed that justifying investments in Canada-U.S. defence projects as an imperative to counter the "threat" of the United States encroaching on Canada's sovereignty had less salience in contemporary debates than their perceived value as an opportunity to derive national military, economic, technological benefit and enhanced security. This conceptual shift represented a transition to a predominantly "piece of the action" mindset. Canada no longer could count on having a "seat at the table"[42] by virtue of its geostrategic location. Lieutenant General (ret'd) Charles Belzile explained to a Calgary audience in 2000 that Canada must "ante up" like everyone else if it wants to accrue the benefits from bilateral security arrangements.[43]

Recent critiques of Defence against Help

Has 'defence against help' lost its utility to predict Canadian involvement in continental defence and security arrangements with the United States? Three recent studies reappraising the concept arrive at different conclusions about its continued relevance to understand the logic behind Canada-U.S. security relations after 9/11. Furthermore, in critically analyzing how the concept may have been misinterpreted or misapplied, they invite further reflection on its applicability. Because none of these studies cited my 2000 paper, I have analyzed them to see if (and, if so, how) they consider the 'seat at the table' or 'piece of the action' ideas that I suggested were supplanting 'defence against help' arguments in the late 1980s and 1990s.

Donald Barry and Duane Bratt tried to resurrect 'defence against help' as an explanation for Canada-U.S. security relations in 2008. After tracing the general history of how Canada had applied the concept (which closely resembled Barry's 1981 paper and what I wrote in 2000) and situating it in more general international relations theory, they suggest that 'defence against help' had gained new relevance in the post-9/11 war on terrorism. When the U.S. focused its

attention on border security, "Ottawa was forced to broaden the application of its defense against help strategy beyond the traditional calculation of external threats *against* North America to include terrorist threats *within* North America." They cite Public Safety minister Anne McLellan's 2003 statement that "We refuse to be a weak link or a haven from which terrorists can attack others."[44] In short, Canada could not be a source from which (and not just through which) security threats penetrated the United States. This seemed to meet the spirit of Ørvik's original concept, particularly in light of broadening and deepening definitions of "security"[45] and the increasingly porous distinction between defence and security during the War on Terror.

When they move beyond border security, however, Barry and Bratt's reformulation of 'defence against help' loses it conceptual focus and utility. To show how the concept informed Canada's decision to decline participation in the U.S. BMD program in 2005, they cite U.S. Ambassador Paul Cellucci's comment questioning "why Canada would in effect give up its sovereignty, its seat at the table, to decide what to do about a missile that might be headed toward Canada." Barry and Bratt then note that supporters of Canada's decision "pointed out that interceptions would take place in the atmosphere outside Canadian territory or airspace."[46] In this context, sovereignty means something quite different from what Ørvik had intended. Examples of 'defence against help' rationales are strikingly absent from their conclusions, which instead point to how Canada opted out of U.S. continental defence projects, did not invoke it for "offshore situations" (an idea which has no obvious resonance with Ørvik's original concept), and sought security collaboration with the U.S. to derive "certain benefits," particularly "access to senior U.S. national security officials, significant influence in a joint decision-making mechanism, and access to the largest and most sophisticated intelligence-gathering system in the world." In short, they ultimately compress the 'seat at the table' and 'defence against help' justifications as one in the same – thus negating the analytical value of 'defence against help' as a distinct concept. Ending with Canada's access to training experience with the U.S. and "economic spin-offs" as benefits of bilateral and binational defence cooperation further undermines their suggestion that 'defence against help' remains the core pretext for collaboration.

Two years later, Philippe Lagassé offered a refreshing appraisal of how Canadian scholars have employed the concept. Returning to Ørvik's original theory, he observed that the concept had been intended as a prescriptive strategy designed to bolster Canadian investments in defence and to more clearly articulate national interests and priorities. "Ørvik did not think that Canada followed a defence-against-help approach to continental security," Lagassé perceptively noted. "Quite the contrary; when Ørvik wrote about Canada and

defence against help, he was telling Canadian governments what they ought to do in matters of continental defence, not evaluating what they were already doing."[47] Nevertheless, the concept proved useful as a descriptive framework to understand the logic behind Canada's approaches to managing continental security-sovereignty dilemmas that it faced from the late 1930s to the end of the Cold War. Proponents of Canadian involvement in BMD "echoed some of Ørvik's contentions" when they suggested that "defend[ing] the continent against ballistic missiles without Canadian input … would undermine Canadian sovereignty," but "few analysts suggested that Canada needed to build its own missile defences, share a proportionate burden of the system's costs, or even offer to locate interceptors on Canadian soil." Instead, most arguments noted that Canadian territory and treasure was not in play, and that the U.S. only sought Canadian political support and NORAD involvement. Ultimately, the sovereignty argument had little traction, and the decision to opt out of the program seemed to suggest that Canada believed it could enjoy a "free ride" without bearing the political costs of participating in a U.S.-led project that could be perceived to undermine the global strategic balance.[48]

After 9-11, Lagassé noted a proliferation of references to 'defence against help,' but "the concept only faintly resembled what Ørvik had meant." Antiterrorism, homeland security, and homeland defence measures were reflected in bilateral "smart border" and "safe third country" accords, as well as NORAD's expanded mandate, but did not amount to a "continental security perimeter." Nevertheless, Canada sent a clear signal to its neighbour: "Washington need not worry – Canada was serious about North American security and concrete, credible measures to guard the two countries' interdependent security…. While some commentators saw this as evidence of Canadian subservience, others saw it as Canada's latest pursuit of defence against help."[49] He concluded that 'defence against help' still held some appeal to describe the history of Canada-U.S. security relations, but analysts seldom presented it as a prescriptive strategy:

> Today, Canadian defence against help is as much about passing legislation, improving police and intelligence capabilities, and tracking shipments and money as it is about antisubmarine warfare, aerospace defence, and military aid of the civil power. As a result, when analyzing whether Canada is pursuing a defence-against-help strategy, today's scholars must pay as much attention to Canada's refugee policies as they do to Canadian defence spending. When they do so, they discover that defence against help explains Canada's behaviour quite well. Moreover, even when gazes are turned squarely on Canada's continental defence efforts, the country appears to be attaining its defence-against-help

> objectives. This implies that descriptive uses of Ørvik's catchphrase are likely to remain more appealing than his prescriptive admonitions.[50]

Most recently, Andrea Charron and James Fergusson – Canada's leading academic experts on continental defence – have published a chapter arguing that 'defence against help' is, and has always been, an inappropriate theoretical framework to understand Canada's defence relations with the US. They suggest that "there has never been a scenario in which the United States have provided help which the Canadian government has rejected"[51] – a blanket statement with which historians will quibble[52] and which invites the rebuttal that this might be precisely because Canada effectively defended against such help historically. Furthermore, the conceptual underpinnings do not require that Canadians see no national security threat from would-be adversaries and only a threat from the U.S., which the authors intimate.[53] Their general argument is predicated on faith (which I share) that the U.S. will not do anything within Canadian territory without Canadian government permission, and that the binational relationship institutionalized in NORAD is an expression of Canadian sovereignty and leaves Canada in control of its airspace. Instead of defending against help, they argue convincingly that "Canada's defence decisions are not motivated to avoid unwanted help" but to "borrow help." According to this argument, Canada has adopted a strategy of "borrowed power" that ensures sovereign control over its territory while "expropriating or borrowing US airpower and investment capital to meet its national defence needs over time."[54]

The quiet assumption that the U.S. will inherently defend Canada puts the latter in a precarious position. By "borrowing power" from their American neighbours rather than spending more on national defence, Charron and Fergusson observe that "the issue today is exactly the reverse of defence help" in which Canada's insufficient defence capabilities pose a risk to the United States. Although this logic, and their description of Canada as a "weak link," seems to resonate with Ørvik's theory more than they acknowledge, they point to perceptions of "easy riding" or doing defence "Walmart style"[55] as highly problematic. Pointing to the future, they highlight several issues that could complicate or undermine NORAD's place in Canada-U.S. relations, including an emerging strategic threat environment where hyperspace weapons transcend any delineation of the air and space domains. Furthermore, NORAD modernization – and particularly the future of the NWS terrestrial-based radars strung along Canadian coasts – has the potential to resurrect Ørvik's thesis if the U.S. demands more from Canada than the latter is prepared to invest.[56]

"The Homeland is Not a Sanctuary": Present and Future Implications

In April 2019, NORAD commander General Terrence J. O'Shaughnessy proclaimed "the homeland is not a sanctuary" – a declaration reiterating that year's *National Defense Strategy*. "We are facing increased global disorder, characterized by decline in the long-standing rules-based international order – creating a security environment more complex and volatile than any we have experienced in recent memory," he described. "Inter-state strategic competition, not terrorism, is now the primary concern in U.S. national security."[57] The 2018 *National Defense Strategy* had offered similar logic, describing "the re-emergence of long-term, strategic competition by … revisionist powers" as "the central challenge to U.S. prosperity and security. It is increasingly clear that China and Russia want to shape a world consistent with their authoritarian model – gaining veto authority over other nations' economic, diplomatic, and security decisions."[58] In turn, senior officials have linked this competition to emergent threats to North America. US Assistant Secretary of Defense Kenneth Rapuano insists that "we must anticipate multi-dimensional attacks on land, in the air, at sea, in space and in cyberspace, targeted not just against our military forces, but against our critical infrastructure and our population…Indeed, our way of life at home and abroad."[59]

Geography and geopolitics would seem to implicate Canada in these assessments. "Geostrategically, the security of the North American continent is indivisible," Ørvik argued. "It makes neither military nor economic or political sense to argue that Canada and the United States could or should be seen as two separate defence units."[60] While post-Cold War optimism may have diluted the perceived importance of this interdependence, it returned after 9/11 and has ever greater salience with the recent pivot towards strategic competition between the United States, China, and Russia. Or does it? NORAD officials insist that "distance and oceans' no longer protect North America, with new technologies and hybrid or grey zones tactics negating previous benefits afforded by physical geography.[61] While some aspects of geography remain significant and enduring variables,[62] the logic of an emerging strategic environment where the *geo-* in geostrategy is less salient to continental defence renders 'defence against help' less of a "basic security issue."

Significant policy changes in the US suggest other risks to Canada. The Trump administration's "America First foreign policy,"[63] coupled with its "one war" strategy aimed at "preparing to win a single major war against a formidable competitor,"[64] may represent significant departures from previous worldviews. Furthermore, US expectations of its allies, support for NATO, and willingness to intervene in "minor" global conflicts seem to have shifted. President Trump's

foreword to the 2017 *National Security Strategy* suggested that "unfair burden-sharing with our allies and inadequate investment in our own defense had invited danger from those who wish us harm."[65] He has vowed to end American defence support to "free riders," particularly NATO allies who are not carrying their weight, and has targeted Canada for spending only 1.27% of its GDP on defence (well below the 2% NATO guideline).[66] Will US "isolationism" leave Canada to fend for itself in this brave, new, Trumpian world? Does "America First" portend the end of the stable and predictable defence relationship between Canada and the United States since the Second World War? If the United States is increasingly less dependent upon Canadian territory and airspace for surveillance and other defensive activities (a trend since the 1980s), should Canada worry about the prospect of too little, rather than too much, help from its superpower ally?

While a small cluster of experts writing on continental defence and NORAD lament Canadians' ignorance of new threats and growing capability deficits to detect, defeat, and deter them, official statements suggest intentions to elevate the issue on the political agenda. In 2016, a House of Commons Standing Committee on National Defence report emphasized the importance of inter-operability with the U.S. in defending North America and recommended "that the Government of Canada consider a plan to replace and upgrade the North Warning System by extending the infrastructure's operational life cycle, adapting new technology, and expanding the system to cover Canada's Arctic Archipelago."[67] The overall tenor highlights the need for material investments to defend against strategic military threats to North America, not US threats to sovereignty. Similarly, Canada's 2017 defence policy, *Strong, Secure, Engaged* (*SSE*), highlights how trends in the global threat environment are "undermin[ing] the traditional security once provided by Canada's geography. Defending Canada and Canadian interests…demands robust domestic defence." This might suggest unilateral action, but the second pillar of *SSE* emphasizes "secure in North America." The document promises that "Canada takes its responsibility to defend against threats to the continent seriously" and "will expand Canada's capacity to meet NORAD commitments." In particular, the policy commits to "modernize NORAD to meet existing challenges and evolving threats to North America, taking into account the full range of threats."[68]

While *SSE* is "the most rigorously costed Canadian defence policy ever developed,"[69] it does not include NORAD modernization and renewal in its funded commitments. "In the case of the NWS, the estimated cost is in the billions of dollars of spending," Charron and Fergusson note. "While there is lots of attention to and discussion of the projects, there is next to no discussion around the costs or plans to pay for them."[70] NORAD has developed a classified

Homeland Defense Design that will guide modernization, which includes a layered sensing system for awareness across multiple domains, a new system for joint multi-domain command and control, and lastly "new defeat mechanisms for advanced threats, including cruise missiles, ballistic missiles, hypersonic weapons, and small unmanned aerial systems."[71] While efforts to replace the NWS are progressing, NORAD's deputy director of strategy reported in January 2020 that it is taking "longer than any of us would like."[72]

How will the Canadian government build political and public support for this costly endeavour with the United States? NORAD's public release of information about Russian 'Blackjack' bomber flights in the Arctic represent a form of strategic domestic messaging intended to justify continental defence modernization,[73] with larger discussions and public consultations expected soon. Along these lines, O'Shaughnessy observed in February 2020 that:

> this is not the first time that a peer competitor has elected to hold our homeland at risk. Early in NORAD's history, when nuclear-armed Soviet bombers first presented an existential threat to the United States and Canada, our nations faced down that daunting challenge by establishing the Distant Early Warning line of radars and the Semi-Automatic Ground Environment (SAGE) command and control system in less than three years. That stunning achievement demonstrated the power of shared resolve and innovation by our great nations and had an immediate deterrent effect. We hear echoes of that era in today's strategic environment, and while the challenges before us are significant, history makes clear that innovation and resolve will allow us to bolster our strategic advantage.[74]

Will we hear echoes of 'defence against help' as well, given the salience of that line of thought in the mid-1950s?

Findings and Analysis

Michael Dawson, the Canadian Political Advisor to the Commander of NORAD from 2010-14, wrote in late 2019:

> Whether the Canadian government likes it or not, NORAD must adapt to a renewed emphasis on early warning and attack assessments. To date, Canada has, somewhat inexplicably, continued to refuse to participate with the U.S. in continental missile defence. It has also dithered at length over the procurement

> of badly needed new fighter jets that are key to enhancing North American security under NORAD. As the North Warning System (NWS) approaches obsolescence, a decision on its replacement must soon be made by the two governments.
>
> The U.S. is watching Canada's commitment closely. The alliance will not survive merely on the nostalgia for its Cold War record. Canada will be expected to do its part for NORAD in the current context, or the U.S. will do whatever it takes to ensure its own defence, regardless of Canada's sovereignty. There may soon come a moment where Canada has no choice but to step up on continental missile defence and equipping its forces. Otherwise it may risk the end of an alliance that has not only protected North America, but has *defended Canada against U.S. help*. (emphasis added)[75]

In suggesting that, "throughout its 60-year existence, NORAD has been Canada's 'defence against help,'" Dawson unabashedly invokes the idea that "NORAD is just as much about protecting Canada from the United States" as it is about defending against other adversaries.

It is telling that *Strong, Secure, Engaged* avoids such exhortations – perhaps because it does not attempt to specifically define what NORAD modernization will look like or how much Canadians will have to pay for it. The threats that it identifies are those of hostile actors who might seek to threaten Canada and Canadian interests across the military mission spectrum; and not the United States, which is appropriately cast as our core ally. This runs counter to the fear that Dawson seeks to invoke when emphasizing the potential threat that the US poses as a superpower determined "to defend its own soil at all costs" – or, conversely, the fear that Canada runs the risk of the U.S. *not* coming to our defence if we do not partner with them. These narratives of 'defence against help' or 'defence to ensure help' may detract from more substantive debate about the relative benefits that Canada secures in having a 'seat at the table' or might accrue through investments in capabilities with mutual benefits to our primary security partner.

I anticipate that 'defence against help' will arise in discussions about NORAD modernization, if only as a hangover from a Cold War mindset and fears associated with an unpredictable commander-in-chief in Washington. The idea that geography does not matter as much as it used to may hold true for some external threats and strategic delivery systems, but it certainly has mattered – and will continue to matter – when it comes to *SSE* commitments to expand Canada's military presence in the Arctic. Historically, Canadian commentators

have invoked 'defence against help' most frequently and stridently with respect to continental defence investments in this region. Given the stable Canada-U.S. partnership embodied in NORAD and consistent official references to the two countries as "premier partners" in the Arctic,[76] constructing the U.S. as a potential sovereignty threat to justify Canadian investments is unlikely to have significant resonance with policymakers. Instead, calls for 'defence against help' might come from Inuit and other Northern Canadians, if for some reason the U.S. *and Canadian* governments proceed with modernizing existing or building new defence infrastructure without involving them – an unlikely scenario given the commitments to policy co-development and co-implementation in Canada's recent Arctic and Northern Policy Framework.

Recent developments, assessed against Ørvik's original concept and recent articles, appear to confirm my earlier assessment that the concept of 'defence against help' no longer offers a viable, primary justification for Canadian strategic decision-making on continental defence imperatives. This changed reality may pose a problem for politicians in a democracy who need to "sell" the public on defence policies that contribute to security according to identifiable national interests. During the Cold War, successive Canadian governments conditioned voters to think of continental defence according to both external threats and a need to participate in joint endeavours lest their sovereignty be eroded by U.S. assistance. Canada did emerge from the Cold War with its territory and air space intact – in this respect, the strategy of 'defence against help' achieved its historic objectives. The danger is that a strategic justification can survive beyond its useful life, and when no longer applicable can work against national interests. The close Canada-U.S. defence and security relationship remains vital to core Canadian interests, but 'defence against help' should no longer serve as a conceptual metric to assess the potential costs of non-participation in continental defence initiatives.

In 1996, Joseph Jockel and Joel Sokolsky declared that "the Cold War Canada-U.S. defence relationship, just like the 50-year struggle that necessitated and sustained it, is over."[77] The return of great power competition does not portend a return to the Cold War, despite familiar references to Russian and Chinese authoritarian ideology in the US defense strategy. Instead, new interpretive frameworks are needed to respond effectively to an evolving strategic environment – and to explain why Canadians must invest in essential, and expensive, capabilities to defend North America as a shared homeland. I concluded my paper in 2000 with the assertion that a fundamental characteristic of 'defence against help' remains intact: the need for Canadian military *credibility*. A shift in emphasis towards space-based operations lessens Canada's once inherent leverage in continental defence decision-making. In an age when

access to and control of information is critical to domestic protection and international operations, Canada is more, not less, reliant on its chief ally. Accordingly, 'defence against help' can no longer prescribe a high-level conceptual solution to current debates about specific continental defence policy direction. New realities require a refocused relationship that no longer sees the United States as a potential sovereignty and security threat, but a vital means of accruing definite political and military benefits. Mutual cooperation and benefit, not wariness and fear, should drive the policy agenda of the future. As Lagassé suggests, the concept of 'defence against help' may retain analytical value to describe some aspects of Canadian strategy, particularly historically, but it has outlived its helpfulness as a prescriptive strategy or defence policy catchphrase to guide continental defence investments in the twenty-first century.

Notes

[1] This chapter was originally produced as a working paper (2020) funded by the Defence & Strategic Foresight Group. A revised version appeared in the *Journal of Military and Strategic Studies* 20:2 (2021): 62-89.
[2] Nils Ørvik, "Defence Against Help – A Strategy for Small States?," *Survival* 15:5 (1973), 228.
[3] Donald Barry, "The United States in Canadian Security Policy: Defence Against Help" (paper prepared for the annual meeting of the Western Social Science Association, San Diego, 23-25 April 1981), 1.
[4] Barry, "The United States in Canadian Security Policy," 1-2. For an updated version of his ideas, see Barry and Duane Bratt. "Defense Against Help: Explaining Canada-US Security Relations." *American Review of Canadian Studies* 38:1 (2008): 63-89.
[5] Barry, "The United States in Canadian Security Policy," 3, 20-21.
[6] Nils Ørvik, "The Basic Issue in Canadian National Security," 8-15. Ørvik saw no contradiction between defending against help and helping to defend others, so long as both were based upon long-term national interests.
[7] Andrea Charron and James Fergusson, "Canada and defence against help: the wrong theory for the wrong country at the wrong time," in *Canadian Defence Policy in Theory and Practice*, ed. Thomas Juneau et al (Cham: Palgrave, 2020), 99-115.
[8] See Shelagh Grant, *Sovereignty or Security? Government Policy in the Canadian North, 1936-1950* (Vancouver: UBC Press, 1988).
[9] David Bercuson, "Continental Defense and Arctic Sovereignty, 1945-50: Solving the Canadian Dilemma," in *The Cold War and Defense* eds. Keith Neilson and Ronald Haycock (New York: Praeger, 1990), 155; Joseph Jockel, *No Boundaries*

Upstairs: Canada, the US and the Origins of North American Air Defence (Vancouver: UBC Press, 1987).

[10] Canada, Treaty Series 1955, No. 8, "Establishment of a distant early warning system," 5 May 1955.

[11] On the creation of NORAD, see Jockel, *No Boundaries Upstairs*, chapter 5, 91-117. See also Joel Sokolsky and Joseph Jockel, eds., *Fifty Years of Canada-United States Defense Cooperation* (Lampeter: Edwin Mellen, 1992).

[12] For an early articulation of this in the missile age, see R.J. Sutherland, "Canada's Long Term Strategic Situation," *International Journal* 17:3 (1962): 199–201.

[13] Goette, *Sovereignty and Command*, 5, 10. Contrast with Michael Byers, "Canadian Armed Forces under United States Command," *International Journal* 58:1 (2002-03): 89-114.

[14] John Kirton, "A Renewed Opportunity: The Role of Space in Canada's Security Policy," in *Canada's International Security Policy* eds. David B. Dewitt and David Leyton-Brown (Scarborough: Prentice-Hall, 1995), 111-17.

[15] Andrew B. Godefroy, "Space and National Security: Canada's Sporadic Strategy, 1985-1999," *Proceedings of the First Graduate Student Symposium* (Ottawa: Conference of Defence Associations Institute, 1999); and Godefroy, *Defence and Discovery: Canada's Military Space Program, 1945-74* (Vancouver: UBC Press, 2011).

[16] Kirton, "A Renewed Opportunity," 115. It would be wrong to suggest that 'defence against help' was the only, or even the single most important, consideration in Canada's decision to not development a military space program. There existed a widespread perception that any potential militarization of space automatically included the endorsement of a weaponization of space, and thus was anathema to Canadian societal values. See Godefroy, *Defence and Discovery*.

[17] James Fergusson, *Canada and Ballistic Missile Defence, 1954-2009* (Vancouver: UBC Press, 2011).

[18] Joel Sokolsky, "The Bilateral Defence Relationship with the United States," in *Canada's International Security Policy*, 178-79.

[19] Although the surveillance systems (Ballistic Missile Early Warning System, or BMEWS) deployed to warn of an ICBM attack were not located on Canadian soil, communications passed through Canada to NORAD headquarters in Colorado. Furthermore, the Canadian Forces' Baker-Nunn camera facilities at Cold Lake and St. Margaret's, New Brunswick, constituted part of the U.S. Space Detection and Tracking System (SPADATS). Department of National Defence, *Defence in the 70s*, 26.

[20] DND, *Defence in the 70s*, 26-7.

[21] SDI consisted of six major subsystems: space-based and ground-based interceptors, a ground-based sensor, two space-based sensors, and a battle management system. Donald Baucum, "Ballistic Missile Defense: A Brief History," [http://www.acq.osd.mil/bmdo/bmdolink/html/origins.html]. On Canadian policy

options in the early 1980s, see Brian MacDonald, ed., *Canada's Strategies for Space: A Paradox of Opportunity* (Toronto: Canadian Institute for Strategic Studies, 1983).
[22] On SDI, see P.M. Boffey, et al., *Claiming the Heavens: Complete Guide to the Star Wars Debate* (New York: Times Books, 1988).
[23] The announcement did not stop Canadian companies from participating in SDI.
[24] Sokolsky, "The Bilateral Defence Relationship," in Dewitt and Brown, 179.
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[49] Lagassé, "Nils Ørvik's 'Defence against Help,'" 471-72.
[50] Lagassé, "Nils Ørvik's 'Defence against Help,'" 474.
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2 NORAD: Beyond Modernization[1]

Andrea Charron and Jim Fergusson

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.

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…"[2] 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 (C2) 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.

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.[3] At best, for Ottawa, small, marginal steps are the most the political traffic will bear, which is understood in NORAD circles.

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, C2, 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.

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 and Shore Patrol Vessels (AOPS) with first year ice capabilities,[4] 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 offshore resource extraction transits. Canada's Northwest Passage (NWP) is likely to see more tourist-related shipping and destinational 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 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[5] 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.[6]

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.[7] 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 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.

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 Russian 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 1987 Intermediate Nuclear Forces (INF) Treaty.[8] 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.

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 reaching their

Figure 2-1: Pre-2018 CADIZ Orientation[9]

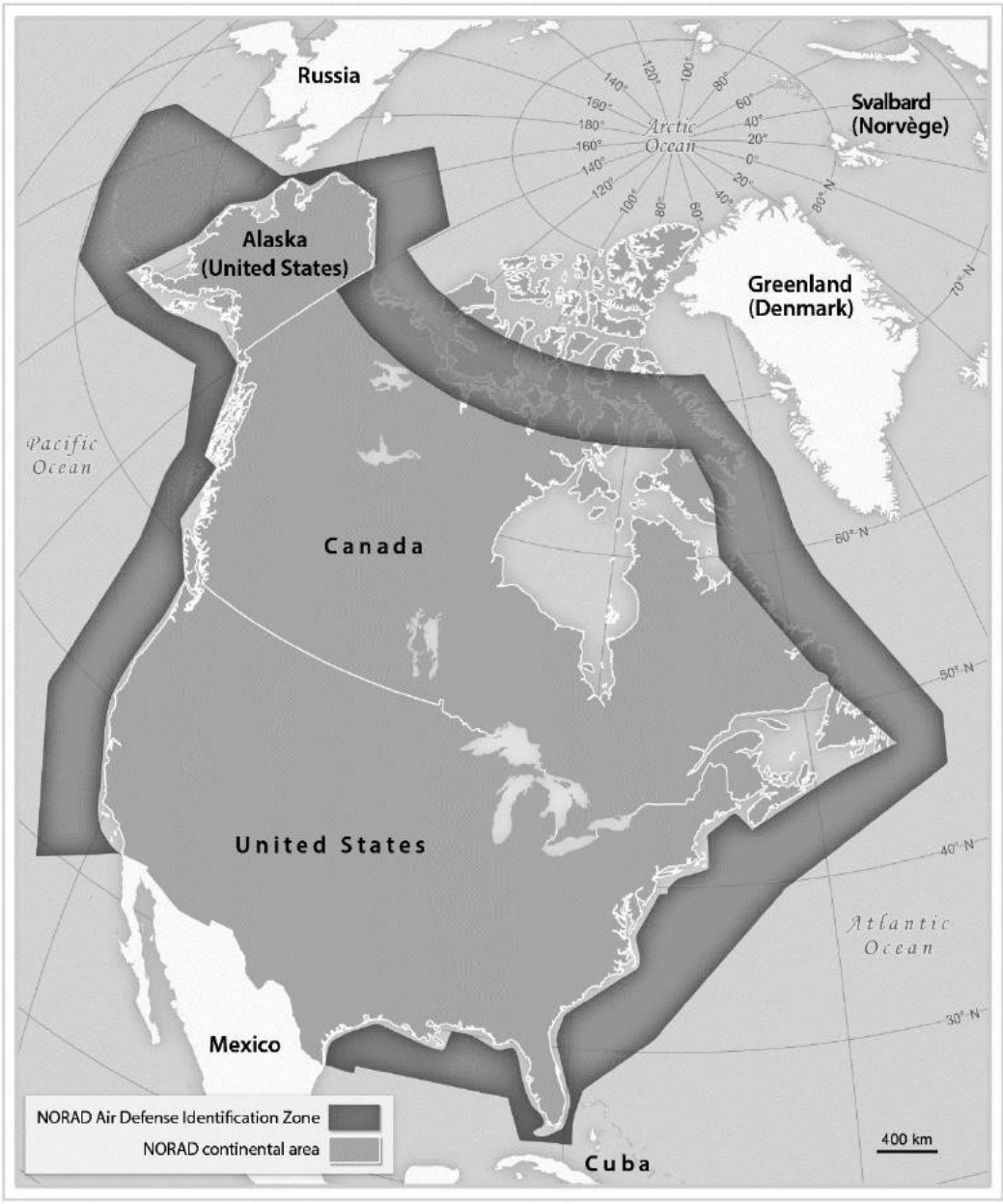


Figure 2-2: CADIZ as of 24 May 2018[10]

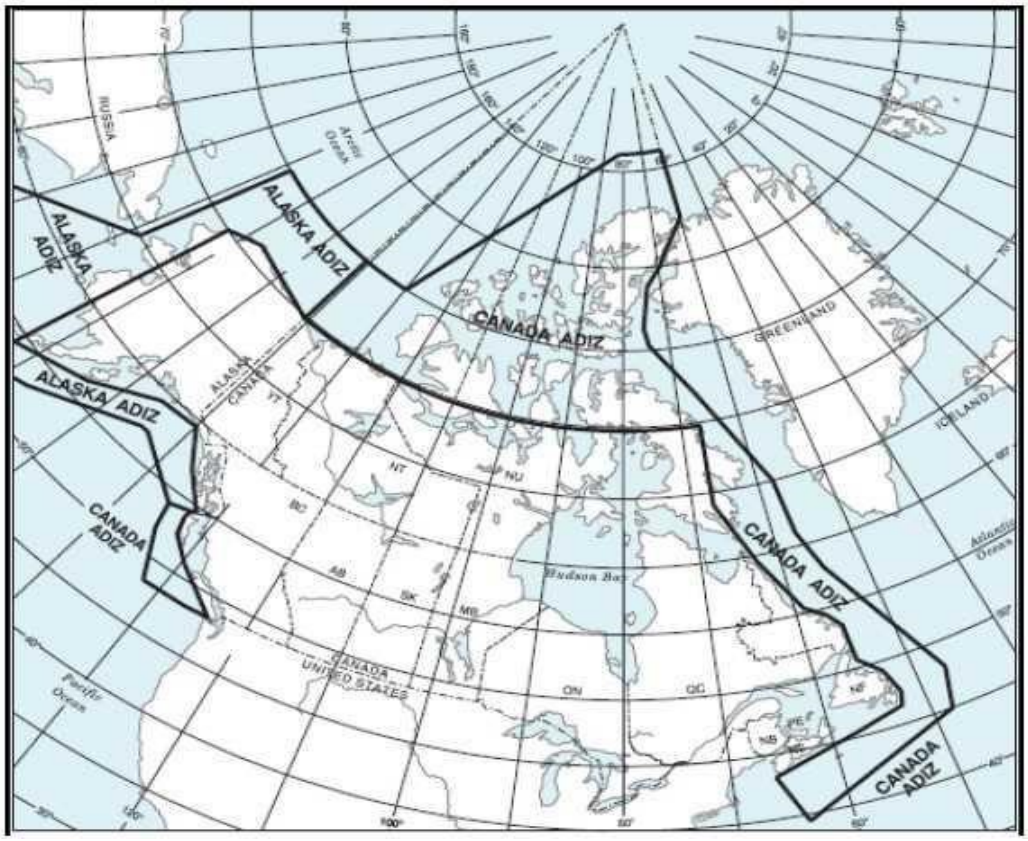
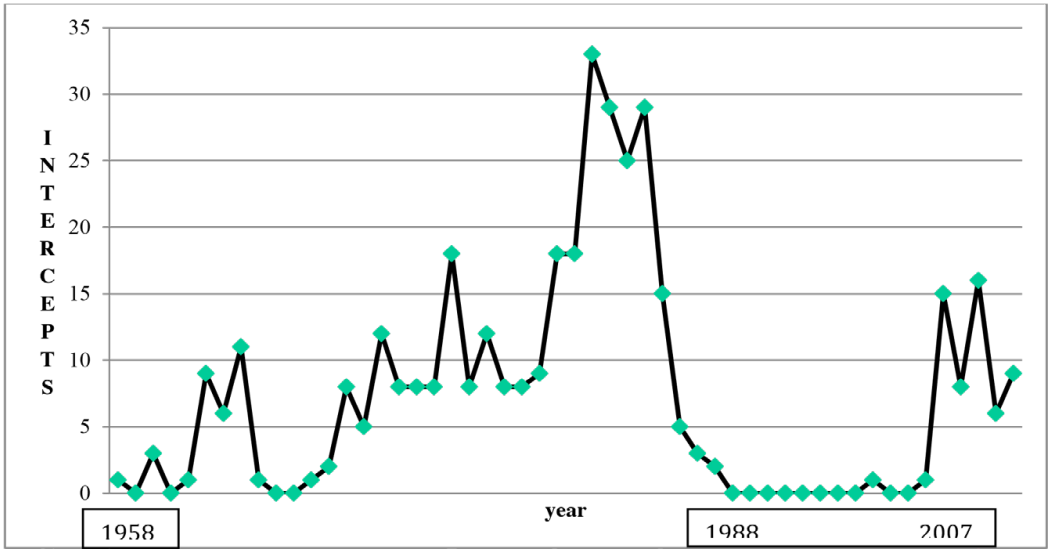


Figure 2-3: Intercepts of Soviet/Russian Aircraft by NORAD



Source: Rob Huebert, University of Calgary.

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.[11]

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.[12] 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?

Figure 2-4: Russian Long Range Aviation Flight Paths

Figure 2-5: Estimated Russian Air-Launched Cruise Missile and Sea-Launched Cruise Missile Ranges

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. Alone, however, it 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.[13] This reduces the burden on the Canadian budget. But, Canada's new defence policy, *Strong, Secure, 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 nonstarters today. Moreover, the government will have to consider 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 long and involved. This all has to be completed by roughly 2025, when the current NWS reaches the end of its lifespan, 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, regarding the threat environment, it is important to recognize that Russian LRA flights have remained within international airspace, suggesting that the flights are 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)[14] 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.[15] 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 has 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.[16] 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

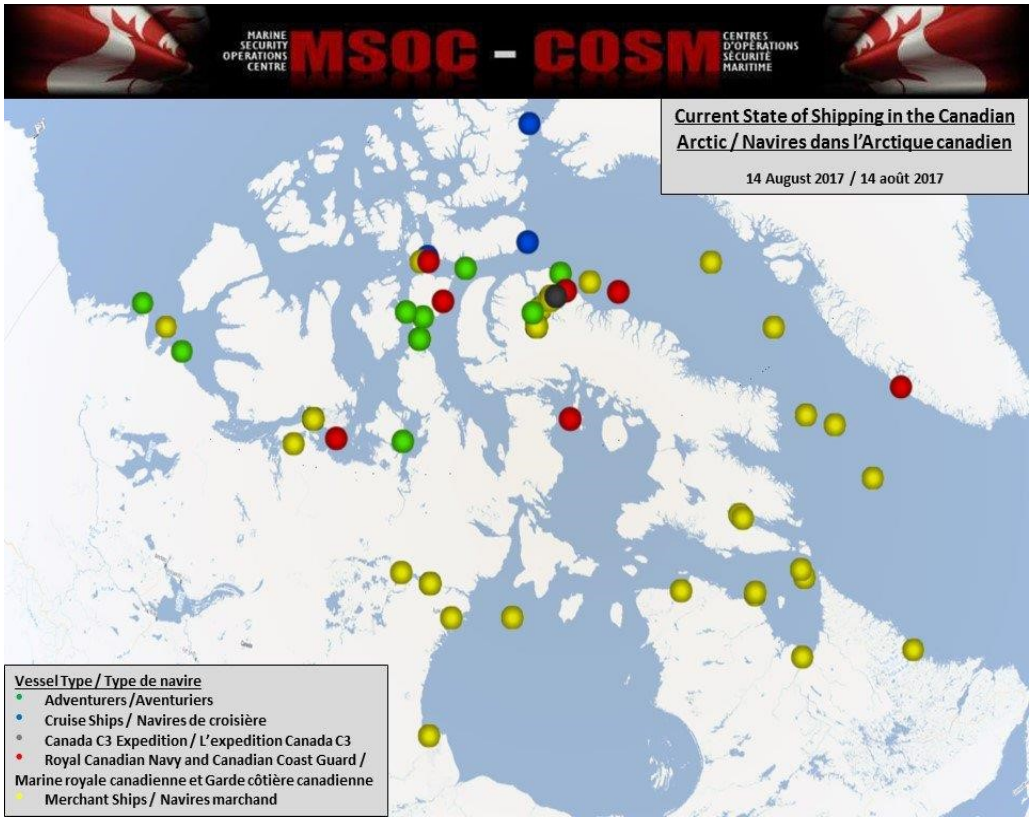
zero. Second, aerial SAR in Canada is an RCAF mission,[17] but its primary SAR assets are largely located in the south. While it is likely that some of the new generation of RCAF SAR aircraft will be deployed to the Arctic, probably at Yellowknife, the home of CAF Joint Task Force North, the expanse 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-freer for longer periods *in the summer,* poses two implications for CANUS defence cooperation and NORAD.[18] 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 (RCN) acquisition of Arctic and Offshore Patrol Vessels (AOPS).

For now, however, there have been only modest increases to traffic in the Canadian and U.S. Arctic, mainly due to longer "shoulder seasons".[19] 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.[20]

According to NORDREG[21] data for 1990 to 2012, annual vessel count trends are 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.[22] As well, the new mandatory Polar Code,

Figure 2-6: Canadian Arctic Shipping Picture 14 August 2017



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.[23] The lack of any port facilities in Canada's Arctic also limits vessel activity.[24] 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.

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"[25] 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.

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.[26]

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).[27] 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 intendant 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, 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[28] 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." [29] 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.

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.[30]

With the North Atlantic returning to the defence agenda, several priorities emerge, that naturally raise issues for the CANUS relationship. The 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.

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.[31] 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,[32] there was no need to resurrect these arrangements. The maritime terrorist threat to the east coast of North America 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 2nd 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 NATO, the central objective is to secure the SLOC in the case of war in Europe, even if its location would be far to the east of the Cold War inter-German border. The requirement to ensure the movement of personnel and resources from North America to reinforce

standing forces is vital, especially for Norway in particular, which borders Russia.[33]

USNORTHCOM, in contrast, is responsible for maritime threats (surface and subsurface) 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 US regional commands, including EUCOM. NORAD is responsible for air-breathing threats emanating from surface and sub-surface platforms – SLCMs.

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 Archangelsk.

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^3) 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^2 to ensure proper coordination between maritime and land-based air defence.[34] 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 warning system components into Greenland and Iceland which would directly engage two NATO allies.[35]

The logic of centralizing North American air defence under NORAD C^2 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.[36] 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)[37] 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.

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*.[38] 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^2 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.[39] 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^2 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^2 seams, alongside the C^2 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^2 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 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.

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.[40] 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.[41] The control mission is strictly an air one. Continental ballistic missile defence (BMD) is a US only mission.[42] 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.[43] 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.

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.[44] 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 50th Space Wing, located at Schriever Air Force Base,[45] 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 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.[46] 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.[47] 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^2 would not be assigned to NORAD, and the US would not assign any formal priority to the defence of Canadian cities.[48] 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^2 to NORAD for the mid-course phase element, currently under USNORTHCOM.[49] 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 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, 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."[50] 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.[51] 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.[52] 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 and track the ballistic missile launch side of the hyperglide threat.[53] The 'system 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 hyperglide 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 hyperglide warheads merge into a weapon system capable of maneuvering across the air-suborbital space divide, and launchable from a diverse range of platforms.

In addition, much also depends upon the maneuverability of current hyperglide technologies as manoeuver 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 reconsideration 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, if 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 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.[54] Nonetheless, NORAD provides the only C^2 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.[55] 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.[56] In this case, air, ground and maritime based interceptors are outside 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, 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 nonstarter.[57] 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, 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.[58]

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.[59] 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.[60] It is also likely that the space component of USSTRATCOM would transfer to the new space command and force.

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.[61] 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 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 remains an essential requirement, in

the view of many defence experts, to tackle the BMD issue. The launch of *Strong, Secure, Engaged* (*SSE*) without considering BMD is clearly a missed opportunity.

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.[62] Since its indefinite extension in 2006, these peaks of political attention have largely disappeared.[63] 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 *SSE* 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.[64]

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".[65] 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.

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 even though 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.[66] To be clear, the connection of defence to 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.[67]

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."[68] 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.

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 multidimensional 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, 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.[69] At a minimum, the profile and status of NORAD needs to be 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 way 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–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.

Notes

[1] Selections from original work *NORAD: Beyond Modernization* published at the Centre for Defence and Security Studies, University of Manitoba, 31 January 2019. Published with assistance from Joseph Jockel, PhD (St. Lawrence University), Joel Sokolsky, PhD (Royal Military College of Canada), and Chris Sands, PhD (Johns Hopkins' School for Advanced International Studies' Center for Canadian Studies). Funding for the original work was provided by the Canadian Department of National Defence, through a Targeted Engagement Grant from the Defence Engagement Program.

[2] Nic Allarie, "Shelf Life Extended: The Longevity and Continued Relevance of the Binational North American Aerospace Defense Command," MA Thesis (Winnipeg, MB: University of Manitoba, 2016), p. 60.

[3] To be clear, NORAD has the role to warn of ballistic missiles incoming to North America. USNORTHCOM has the role to defeat these missiles.

[4] See "Arctic and Offshore Patrol Ship Project," Royal Canadian Navy, 10 August 2020, 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 "Ice Navigation in Canadian Waters," Canadian Coast Guard, 26 July 2019, https://www.ccg-gcc.gc.ca/publications/icebreaking-deglacage/ice-navigation-glaces/page03-eng.html. Canada's first AOPS was launched on 15 September 2018 and was officially named the *HMCS Harry DeWolf* on 5 October 2018.

[5] 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.

[6] 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).

[7] For example, when the US F-15 fleet was grounded due to an accident, Canadian CF-18s were moved to ANR.

[8] 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 policymakers 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.

[9] Source: From Lasserre, Frédéric and Pierre-Louis Têtu, "Russian Air Patrols in the Arctic: Are Long-Range Bomber Patrols a Challenge to Canadian Security and Sovereignty?" *Arctic Yearbook* (2016): 304-327.

[10] Kelsey Lindsey, "Canada expands its air defense identification zone to cover Arctic archipelago," *ArcticToday*, 29 May 2018, https://www.arctictoday.com/canada-expands-air-defense-identification-zone-cover-arctic-archipelago/.

[11] These could include the U.S. base at Thule, in Greenland, and the Canadian Alert base on the northeastern tip of Ellesmere Island.

[12] 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.

[13] 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. 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)."

[14] 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, 5. https://docs.house.gov/meetings/AS/AS29/20170525/106038/HHRG-115-AS29-Wstate-RandR20170525.pdf.

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

[16] 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.

[17] 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.

[18] Elisabeth Rosenthal, "Race Is On as Ice Melt Reveals Arctic Treasures," *International New York Times*, 18 September 2012.

[19] The weeks before and after peak shipping season in the summer months.

[20] 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 Ma*il, 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]."

[21] 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 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.

[22] See Pizzolato et al., "Changing Sea Ice," Table 2.

[23] The company is looking to purchase ice strengthened hulls for future voyages.

[24] 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.

[25] US Coast Guard, "Arctic Strategy," May 2013, 7, http://www.uscg.mil/seniorleadership/DOCS/CG_Arctic_Strategy.pdf.

[26] 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.

[27] 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_201 5.pdf.

[28] General Jacoby was Commander of NORAD and USNORTHCOM from 2011-2014.

[29] Department of National Defence, *Strong, Secure, Engaged: Canada's Defence Policy* (Ottawa: Government of Canada, 2017), 61.

[30] SNMG1and 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.
[31] During a large portion of the Cold War, Canada committed to providing reinforcements to the northern flank (Norway).
[32] 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.
[33] The most recent study is John Andreas Olsen, ed., *NATO and the North Atlantic*. Whitehall Paper #87 (London: Royal United Services Institute, 2017).
[34] 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.
[35] 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.
[36] "Acquire ground-based air defence systems and associated munitions capable of protecting all land-based force elements from enemy airborne weapons." GoC, *Strong, Secure, Engaged*, 16.
[37] "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.
[38] Naval air defence, especially for the USN, is concentrated on the requirement to protect carriers within its carrier task forces, rather than national territory.
[39] 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.
[40] 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.

[41] Beneath the Command Centre, a separate air warning and ballistic missile warning centres existed.
[42] 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).
[43] 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.
[44] 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.
[45] Named after General Bernard Schriever, father of the USAF space and missile program.
[46] 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 Cheryl Pellerin, "Stratcom, DoD Sign Space Operations Agreement with Allies," DoD News (23 September 2014). https://www.defense.gov/News/Article/Article/603303/ stratcom-dod-sign-space-operations-agreementwith-allies/.
[47] 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.
[48] 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^2. In addition to C^2, 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: Déjà vu all over again* (Vancouver: University of British Columbia Press, 2010).

[49] Assigning C^2 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.
[50] GoC, *Strong, Secure, Engaged*, 90.
[51] 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: Government of Canada, 2018), https://www.canada.ca/content/ dam/dnd-mdn/documents/reports/2018/defence-investment-planeng.pdf.
[52] 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.
[53] BMEWS refers to ground-based radars, which are cued by the US Defense Support Program (DSP) of infrared satellites in geostationary and polar orbit.
[54] 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 Fergusson, *Déjà vu.*
[55] 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.
[56] This directly reflected the prohibition on the placing on orbit of weapons of mass destruction in space found in Article IV of the 1967 Outer Space Treaty. United Nations, *United Nations Treaties and Principles on Outer Space* (New York: 2002), 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.

[57] 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 changed to look elsewhere.

[58] GoC, *Strong, Secure and Engaged,* 56.

[59] 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, 29 June 2017, http://spacenews.com/mda-restarts-satelliteservice-business-with-ses-as-first-customer/http://spacenews.com/mda-restarts-satellite-service-businesswith-ses-as-first-customer/.

[60] Valerie Insinna, "Pentagon presents recommendations on Space Force to Trump," *Defense News* (23 October 2018). https://www.defensenews.com/space/2018/10/23/pentagon-presents-recommendations-on-spaceforce-to-trump/.

[61] 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.

[62] 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.

[63] In agreeing to an indefinite extension, the agreement is open to review upon request of either party, can be terminated given six months' notice.

[64] NDDN 2017, House of Commons Standing Committee on National Defence, "Canada's Abilities to Defend Itself and Our Allies in the Event of an Attack by North Korea on the North American Continent," 42nd Parliament, 1st Session (December 3, 2015 - September 11, 2019). https://www.ourcommons.ca/Committees/en/NDDN/StudyActivity?studyActivityId=9637426.

[65] NDDN 2017.

[66] Allison Dunfield, "'Promises Made, Promises Broken'," *Globe and Mail*, 7 March 2005, https://www.theglobeandmail.com/news/national/promises-made-promises-broken/article1115162/. David Burney, "Managing Canada-US Relations," in Eds., Andrew F. Cooper and Dane Rowlands, *Canada Among Nations 2005: Splitting Images* (McGill-Queen's University Press, 2005), 47-62. 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.

[67] 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.

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

[69] 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. Fergusson, *Déjà vu, 154.*

3 Hardening the Shield: A Credible Deterrent & Capable Defense for North America[1]

Terrence J. O'Shaughnessy and Peter M. Fesler

The brief respite from great power conflict in the late 20th and early 21st centuries is over, and the Homeland is no longer a sanctuary. The *National Defense Strategy* (*NDS*) concisely articulates a shift in the security environment, away from one dominated by the threat of violent extremism, toward one in which peer adversaries, possessing the capability to generate catastrophic effects globally, are the paramount concern for the United States. These adversaries have developed the capability and intend to hold critical sites in the United States and Canada at risk with conventional strikes. Recognizing this, the NDS specifically makes direct defense of the Homeland against a peer the number one priority for the Department of Defense. Canada's national defense policy articulated in *Strong, Secure, Engaged* provides similar guidance.

In response to the changing security environment and guidance from national leaders, the men and women of U.S. Northern Command and the North American Aerospace Defense Command (NORAD) are enhancing their ability to defend against a peer threat. The two commands act as North America's shield, deterring attack, and defending the populations and critical infrastructure of the United States and Canada. Improving defensive capabilities in the face of a growing threat, while accounting for fiscal realities has required the two commands to fundamentally rethink the way they think about defense. Effective Homeland defense against a peer will not be achieved simply by a return to Cold War postures and plans, nor will it be achieved with current post 9/11 counter-terrorism forces. Homeland defense requires a fundamentally new approach and steps are being taken today toward making that approach a reality.

We cannot expect to have the same success defending our homelands against a peer competitor, using the same resources, organization, and focus that we applied to defending against violent extremist organizations that have no ability to hold the homeland at risk.

The Changing Security Environment

Despite the clear shift in the global security environment, there are those that hold to the defense concepts of a bygone era. This is understandable. For more than 30 years since the collapse of the Soviet Union, war for America has been dominated by counter-insurgency and counter-terrorism conflicts. Defense planners have been focused on the difficult challenges associated with defeating insurgencies in largely ungoverned spaces in an effort to prevent terrorist groups from building a base of operations from which to launch the next 9/11 style attack. The American way of war became defined by battles in places with familiar names like, Mogadishu, Korengal, Tora Bora, Fallujah, and Ramadi.

Out of necessity, and due to a lack of a peer, or even near peer military threat, funding for major high-end acquisition programs was shifted to the sustainment of current operations in the war against violent extremism. Gradually, almost imperceptibly, America's Cold War and Desert Storm winning conventional military was transformed into a lethal and effective counterinsurgency force. Like the generations before them, military professionals today (the authors of this paper included) are shaped by their own experiences, and in these experiences the Homeland was, with few exceptions, a secure base from which to launch operations in conflicts on the other side of an ocean.

How Has the Security Environment Changed?

While U.S. and Allied forces fought, learned, and won on the battlefield, America's old adversaries also learned. They deliberately designed strategies and acquired systems intended to circumvent the military strength of the West. Today, the oceans that were formerly the moats that defended the arsenal of democracy have become a means of approach, the Arctic is no longer an icy fortress wall protecting the northern flank, and the skies in which American airmen operated with impunity for the last three decades have become contested and the preferred domain for adversary kinetic attacks on the Homeland. At the same time the American military was abandoning training for large-scale warfare and retooling for counter-insurgency, her enemies were preparing for a force-on-force fight with the United States, and in doing so they discovered a weakness.

If the traditional American way of war is the deployment of overwhelming force to a fight overseas, then the way to defeat the United States military in the next war, in the minds of her adversaries, is to prevent deployment in the first place. Either through the threat of attacks on economic targets designed to constrain options, or direct strikes on mobilizing forces, the deployment of the American military must be stopped before it starts. The economic engine and

carefully orchestrated multi-modal logistical movements that enable the world's preeminent military are now a target.

Growing Adversary Capability

Such a strategy requires new weapons; weapons with sufficient reach to allow for their delivery without directly facing the still very dangerous American military, bypassing its fielded forces completely. This is a significant departure from the past, where great effort was made to keep regional conflicts just that, regional. In this approach, driven by the recognition that building a force sufficient to prevail on the battlefields of Europe or the Western Pacific would be cost prohibitive, the new generation of weapons would be specifically designed for horizontal escalation to strikes against largely unhardened targets in North America.

Most importantly, these weapons would need to be conventional. Both China and Russia have long been able to range any target in North America with nuclear payloads, but the threat of immediate and devastating retaliation by the nuclear triad of United States Strategic Command limited their utility in hemming in the American military. Using nuclear weapons against targets in North America in an attempt to alter the outcome of a regional conflict would be suicidal, and so they set out on a deliberate path of conventional long-range weapons development.

China's approach has been, as would be expected for the Middle Kingdom, patient. In a methodical and steady manner that is difficult for the West to comprehend, Beijing has developed the economic and technological backbone necessary to challenge the United States and its allies. Its weapons of choice: economic coercion and control, and cyber intrusion. Beijing's recent flexing of its economic muscles, and its conduct of a sophisticated and systemic approach to industrial espionage are well documented. Further, the growing indications that Chinese cyber actors have moved beyond data exfiltration to planting leave behind capabilities for future conflict, has earned the close attention of the operators and planners at United States Cyber Command.

Beijing has not limited itself, however, to the development of non-kinetic weapons. Over the past decade, the Chinese People's Liberation Army, or PLA, has fielded a wide array of new systems including solid fueled road mobile ICBMs, hypersonic glide vehicles, quieter submarines, and air refueling capability, the latter of which will likely place targets in the western United States and Canada within range of air launched cruise missiles by the mid-2020s. These systems have dramatically increased to ability of Chinese forces to project power beyond a range needed for defense.

The opaque nature of the Chinese Communist Party makes it difficult to determine Beijing's intent, but Chinese military leaders have not been shy in stating that they believe they must be prepared for war with the United States. Much of Beijing's weapons development is designed to prevent the United States military from deploying into the Western Pacific in a crisis, and military leaders in the PLA frequently speak of a strategy designed to deny access to the theater through attacks at range. If their words are to be believed, cyber and long-range precision strikes on key locations in the United States will be part of this strategy.

To an even greater degree, Russia has invested in the capability to strike targets in North America while remaining below the nuclear threshold. Russian nuclear forces have long possessed the capability to strike targets in North America. More recently, however, the Kremlin has dedicated significant resources toward the creation of a long-range precision conventional strike capability. The development, acquisition, and deployment of stealthy air and sea-launched cruise missiles, and the modernization of the aircraft and submarines that deliver them, has given Russian military planners their first true conventional capability to strike the Continental United States.

Russian political and military leaders have repeatedly made it clear in public statements that they intend to attack targets in the United States in the event of a conflict elsewhere. Unlike China, there is nothing opaque about the Kremlin's position, and the logic behind the strategy is sound. Russia enjoys a favorable balance of forces in the European Theater at steady state. Russian forces can mass more quickly on their frontier than their NATO foes, but once the West mobilizes, the balance irreversibly shifts in favor of the United States and its allies.

To counter this inevitable shift, a key component of the Kremlin's strategy is the prevention, or at least delay of NATO, and specifically, American military mobilization and deployment into the European Theater. That mobilization funnels through a limited number of air and seaport facilities and installations in the Continental United States, and these are the sites that Russia's new generation of weapons appear designed to strike.

Russia has also ramped up training for these attacks, with repeated submarine deployments to the Western Atlantic and long-range aviation sorties into the Arctic approaches to North America. Russian activity is no longer limited to the predictable strategic messaging patrols of the mid-2000s, intended to visibly convey the Kremlin's displeasure with Washington and demonstrate relevance in the wake of its Cold War defeat. Tupolev bombers and ultra-quiet, nuclear-powered submarines now frequently conduct mission rehearsals for strikes on the United States and Canada in areas that are outside of the North American Aerospace Defense Command's radar coverage, and in a manner designed to defeat U.S. Northern Command's maritime Homeland defense forces. Armed

with their new generation of long-range weapons, these submarine and bomber crews quietly maneuver to positions where they can hold virtually every point in North America at risk. This is not messaging. The Kremlin's stealthy operations are designed specifically to remain undetected, and what good is a strategic message if it is not received.

Adversary Logic of Horizontal Escalation and Their Balanced Approach

The strategies developed by Russia and China are not without precedent, rather they are the natural progression of military strategic thinking, and their technology development is simply following a very predictable path, one that the United States walked decades ago. Since the late 1980s, American air and naval forces have possessed the capability to conduct long-range, conventional, precision strikes. Every conflict in which the United States has participated since the end of the Cold War has featured live television coverage of the near simultaneous impacts of dozens of land attack cruise missiles launched from U.S. Air Force and Navy platforms more than one thousand miles away.

Bombers of U.S. Strategic Command regularly prowl the skies in the approaches to both China and Russia, and no other country in the world comes close to the American Navy's command of the seas. The United States military's dominance in the air and at sea provides control of the global commons and largely unfettered access to launch locations within range of virtually every point on the globe. Long-range precision strike is a key component of any American military campaign, and consistent with airpower doctrine, planners consider adversary logistical hubs as lucrative targets. America's adversaries have watched and learned.

To counter what it perceives will be the opening salvos of war with the United States, Beijing has gradually expanded its defenses in an attempt to deny access to the Western Pacific. China's well documented anti-access and area-denial efforts include the fielding of missiles specifically designed to kill the American carriers, and large quantities of cruise and ballistic missiles intended to hammer U.S. forces deployed to regional bases. Beijing has also invested in increasingly sophisticated and dense air defense systems designed to blunt strikes by American aircraft and long range-cruise missiles.

From their increasingly secure territory, Beijing has sought to develop the offensive kinetic and non-kinetic capability to strike American forces at ranges as far away as North America. China's bombers are operating at ever greater ranges, now holding targets in Alaska at risk, and its submarines roam well beyond the confines of the second island chain, creeping ever closer to North America. This balanced approach to offense and defense is designed to deter and if necessary,

defeat U.S. forces that they perceive will attempt to intervene in Beijing's sphere of influence.

Similarly, the Kremlin has sought to deny American airpower the ability to conduct long-range strikes against key infrastructure by fielding the most modern and capable integrated air defense system in the world. Featuring over fifty battalions of the latest SA-10, 20, 21, and 23 missile systems, which the Kremlin claims have counter-stealth capabilities, Russian air defenders believe they are well equipped to defend against the West's long-range strikes.

Russia's enhanced defense is coupled with an ever-increasing capability to strike at range, impeding U.S. force flow and destroying critical infrastructure well outside of the European theater. Conventional attacks on targets deep in the United States and Canada are now firmly entrenched as a necessary component of any war winning strategy in a conflict with the West. The Kremlin has chosen this strategy because it has few other options, and because the United States has given it an opening. This is not supposition. The Kremlin has openly communicated its intent.

Over the past two decades, Russia has set out on a deliberate path to circumvent the West's military superiority. Turning a strategy into doctrine, and doctrine into reality, the Kremlin has modernized its entire air defense network and fielded long-range conventional cruise missiles in sufficient numbers to make the threat of strikes on North America feasible. Some have suggested that these new long-range weapons are intended for regional conflicts. They could, in fact, be used within the confines of the European continent, but it is improbable that the Kremlin would procure weapons with four to five times the range needed for their intended purpose. It is also unlikely that they would pair these weapons with bombers specifically designed for round trip intercontinental flight if their intended targets could be reached by far more numerous and lower cost shorter range aircraft or ground-launched systems.

Russian planners are not stopping with new weapons. Their fleet of bombers is well into a decade-long modernization program, and plans have been drawn for the development of an entirely new generation of long-range aircraft. In the maritime domain, recent media reports out of the Kremlin highlighted the laying of the keels of additional Severodvinsk class guided missile submarines, similar to the one that now challenges maritime forces on both sides of the Atlantic. Over the next decade the Russian Navy's fleet of these highly capable submarines will increase nearly tenfold.

Military Focus Out of Balance

In stark contrast to the balanced approaches of both China and Russia, the United States has adopted a purely offensive approach that relies on the ability of the American military to mobilize and mass forces at a time and place of its choosing. Very little attention has been focused on defending the Homeland because the basic assumption in the American strategy is that "we will fight the enemy over there so that we don't have to fight them here." That philosophy was reinforced by the nearly three decades of the fight against violent extremism and insurgencies, and in that context, it was a reasonable assumption.

This approach is no longer sufficient in light of the threat now posed by Russia and China. Implicit in the current American strategy is the assumption that Washington will be allowed to fight the purely overseas fight that it desires, but Beijing and the Kremlin do not intend to contain conflict at the regional level. In fact to the contrary, they plan to take the fight to North America so that they don't have to fight in Europe or the Western Pacific, or at least to ensure that any fight will be against one with reduced participation by the United States military.

This is not the first time that the pendulum has swung too far in the direction of the offense. In the early days of the Cold War, Washington recognized a similar imbalance, and set out to reorient the Department of Defense. In fact, it was this realization that was responsible for the creation of the North American Aerospace Defense Command in the waning days of the 1950s.

The history of the American military provides multiple examples of imbalance and rebalance, and in each, there was an accompanying hesitation. Stasis is easier than change. The whole of an organization is typically designed for the world as it was and not as it is, but change must and does occur. It occurs either by choice, or out of necessity in crisis, and when it is the latter, that change is often too late to avoid unnecessary losses. From Bull Run, to the skies over North Vietnam, to the 21st century wars in Iraq and Afghanistan, history provides numerous examples of the results of slow recognition and adaptation to changes in the character of war.

Deterrence Out of Balance

Deterrence is the act of discouraging an action or event through instilling doubt or fear of the consequences. Both during and after the Cold War, when the primary threat to the homeland from China and Russia was nuclear, our nuclear forces provided an effective and credible deterrent. Because our forces were postured to ensure a survivable retaliatory capability, no nuclear strike on

the United States could prevent a nuclear response, and the consequences of such a response were unpredictable and potentially devastating. In the terms of deterrence theory, this is deterrence by punishment. The credibility of any deterrent threat depends on capability and will. In the context of a nuclear attack, the United States undoubtedly had (and still has) the capability to deliver a devastating response, and it would be dangerous to question Washington's will.

The promise of devastating retaliation in response to a nuclear first strike is credible. The threat of a nuclear retaliation as a response to a limited, precise conventional strike is less so. Washington would be challenged to find a way to make an adversary believe that in response to a small-scale conventional strike, kinetic or otherwise, it would unleash its nuclear arsenal, and the threat of conventional retaliation against Russia or China would not promise the level of damage necessary to deter. Sole reliance on deterrence by punishment is insufficient to deter the full range of attack options available to Beijing and the Kremlin. A more balanced approach to deterrence is required.

That approach requires both the promise of punishment and the capacity to resist an adversary attack. The ability to punish exists, but making an adversary believe that a sufficiently capable defense exists may alter his cost-benefit calculus by creating the impression that an attacking force would incur significant loss or have insufficient impact, therefore making launching an attack an undesirable option. If an adversary does not fear punishment and does not believe defense is possible, there is no disincentive. Lack of a defense invites attack, and conversely, the ability to defend and resist deters it. In the words of General George Washington, "To be prepared for war is one of the most effectual means of preserving peace," and in this case preparedness comes in the form of the ability to defend the Homeland as part of a balanced strategy.

Restoring Balance and Hardening the Shield

Where the ability to project power, backstopped by U.S. Strategic Command's nuclear force, represents America's sword, the defensive capability provided by U.S. Northern Command and its bi-national partner the NORAD are America's shield. Significant effort has been placed on sharpening the sword. The nuclear enterprise is undergoing a complete, decade-long modernization, and the services are recovering from nearly 20 years of war against violent extremists and retooling for future conflict against peer adversaries. The same cannot be said for the shield.

The shield served well through the Cold War and continues to protect America and Canada from attack by terrorists, but with one notable exception, its last major upgrade occurred in the mid-1980s, and like any tools of war, it

needs attention. The bias toward the offense that has rightfully characterized American military planning in the post 9/11 environment has resulted in a lack of focus on defending the Homeland. The shield, while still intact, is showing its age, and it is the recognition by America's adversaries of the imbalance between offensive and defense capabilities that has led them to consider expanding any future regional conflict to the North American continent.

There is also imbalance within the shield. The sole significant defense modernization effort over the past two decades is the ballistic missile defense system. Comprised of unique sensors and ground based interceptors, this system is designed to shoot down nuclear tipped missiles launched by a rogue nation, namely North Korea. This ballistic missile defense enterprise has enjoyed significant investment over the past decade at billions of dollars per year, and this investment is ensuring that the system remains capable of defending against an increasingly sophisticated North Korean ICBM force. In comparison, the defensive systems designed to defend against the range of threats presented by peer competitors have seen almost no upgrade or investment, and in some cases even the funding for sustainment of the old equipment has been cut. In order to be prepared for war, balance must be restored, and the shield must be hardened.

America's current shield is comprised of multiple single-purpose systems. Scanning the skies for approaching bomber aircraft is NORAD's early warning radars. Always at the ready guarding against rogue nation nuclear missile attack stands Northern Command's ballistic missile defense enterprise. At sea, an ever-present array of sensors and platforms listen for the faint sounds of approaching adversary submarines. Although these systems remain capable, the shield's components were each designed to counter a particular threat or weapon and operate completely independent of each other. The radars used by NORAD to warn of Russian or Chinese ballistic missile attack, for example, are not integrated with those used by Northern Command to engage missiles launched by North Korea. Even if the ballistic missile defense architecture were to detect a launch from China, it would not directly share that information with NORAD's missile warning systems. The watch standers in the consolidated NORAD and Northern Command headquarters are forced to verbally pass information displayed on independent systems.

The stove-piped character of the shield stands in stark contrast to the offensive capabilities that America's adversaries are fielding. The weapons available to Beijing and the Kremlin are diverse and designed to complicate defense by simultaneous strikes across multiple domains and through multiple means. They seek to exploit the seams between the existing defensive system, and they are increasingly difficult to detect. To defend against these emerging threats, improvements to the shield are needed, but simply upgrading or replacing each

of the shield's aging single-threat systems would be costly and likely ineffective, as this approach would fail to close the seams.

A more holistic modernization effort is needed. Designed to achieve deterrence of adversaries by denial of their objectives, and defend the Homelands should that deterrence fail, Northern Command and NORAD have collectively developed a modernization strategy for defense referred to as the Strategic Homeland Integrated Ecosystem for Layered Defense, or SHIELD. SHIELD is not a system, or even a system of systems, it is an ecosystem. It is a fundamentally new approach to defending North America. SHIELD takes advantage of the data provided by traditional and non-traditional sources to provide a layered ability to detect any threat approaching the continent, from the sea floor to on orbit, in what NORAD and Northern Command refer to as "all domain awareness." It pools this data and fuses it into a common operational picture. Then, using the latest advances in machine learning and data analysis, it scans the data for patterns that are not visible to human eyes, helping decision-makers understand adversary potential courses of action before they are executed. With an understanding of likely enemy actions, it will assist in the development of a response, weighing the risk and reward, looking several moves into the future, and allowing for decision superiority. Finally, the SHIELD will employ an array of new and already fielded defeat mechanisms designed specifically for Homeland defense, preserving more of the force for the forward fight.

Domain Awareness: Anticipating the Attack

Successful defense first requires the ability to detect, track, and identify threats as they approach. To accomplish this, SHIELD does not simply call for the replacement of radars, or the acquisition of a better undersea acoustic sensor. In fact, a key characteristic of SHIELD is its use of a combination of both existing and new equipment and technologies. Some current sensors will be retained and are already part of the SHIELD, as they still provide useful data. Others will be abandoned, and funds currently used for their sustainment will be repurposed. In some cases, new equipment will be required, but with all of these sensors, their use will be significantly changed from past efforts. No longer will a sensor provide information in a unique format to a specially designed platform. Instead each will provide data to a central library accessible, and more importantly useable by all, as capturing and making sense of the data is the heart of the SHIELD.

In practice, SHIELD will pull in data from a layered sensing grid ranging from current and future on orbit systems, to new long-range sensors currently being sited in several locations in the United States. Combined, these sensors will allow for the detection of threats well before they can reach launch locations for

targets in North America. In some cases, sensors will be able to see adversary platforms before they even leave their own territory. Sensors will detect, characterize, and track advanced cruise missiles (and the aircraft, ships and submarines that carry them), ballistic missiles, hypersonic weapons, and small unmanned aerial systems at their maximum ranges. This will be accomplished through a global sensing grid that includes a robust and resilient layer of space-based systems. The depth, discrimination, and sustained custody available only using on orbit systems will create the time and space needed to respond when faced with weapons designed specifically to compress the time available to decision-makers.

This long-range surveillance is the first step in defense, as it will allow for the posturing of forces at the right place and time, and provide warning to key commands, like U.S. Strategic Command and Canada's Joint Operations Command, and non-defense agencies, such as the U.S. Department of Homeland Security. The data from these systems will be combined with that provided by short-range sensors, including terrestrial radars operated by Navigation Canada and its American counterpart, the Federal Aviation Administration. Additional sensors, originally designed for vastly different purposes, are today being used in new and creative ways, and already contribute data to the SHIELD. This data, and that provided by future sensors, will be fused to provide high fidelity tracking of threats as they approach the North American continent, allowing NORAD and Northern Command operators to determine the precise point of attack and execute the defense.

Effective defense must begin with domain awareness. This is not to suggest that NORAD and Northern Command are blind today. In fact, the SHIELD is already being improved. Over the past two years incremental steps have been made to repurpose existing systems and harness the data they provide, but in order to keep up with adversaries that are determined to find and exploit weakness, greater investment is needed.

Joint All-Domain Command and Control: Raising the Shield

Simply detecting and displaying an approaching threat does not constitute a defense. Joint all-domain command and control (JADC2) is command and control for the digital age – the architecture needed to produce faster and better decisions for our warfighters from the tactical edge to the combatant commander – decision superiority. What makes this different from previous command and control constructs is that it is built on a data-rich foundation that employs the power of modern computing to enhance decision-making. This new capability moves beyond the limitations of human capacities to produce computer-enabled

insights that can identify anomalous events, anticipate what will happen next, and generate options with associated repercussions and risks.

To conduct command of control of the joint forces assigned to the defense of North America today, the men and women of the two commands process information from multiple sources and displays to build a mental picture of adversary and friendly activities. They then relay instructions via an array of single service systems. Information passed to aircraft defending against cruise missile attack, for example, are relayed through unique Air Force systems, while critical information needed to defeat an approaching submarine is passed through a U.S. Navy command and control system. Should that submarine make it through the maritime defenses and launch its payload of land attack cruise missiles, Homeland defense forces would be required to orchestrate the combined defense through two independent and incompatible systems.

The SHIELD will tie these independent systems together into a networked command and control system capable of directing the joint force in all domains, on the land, in the air, on orbit, and at sea. Initially it will not replace each of the Services' existing systems. Rather, it will act as a Rosetta stone capable of interpreting and relaying data from one system to another, and as with SHIELD's approach to the sensors needed for domain awareness, it will also use a combination of new and old. This capability is already being operationally tested in a Northern Command and NORAD initiative known as "Pathfinder." Today, Pathfinder is processing more sensor data than the current command and control system used for air defense of North America. Perhaps more importantly, because of the quantum leap in processing power that has been achieved since the fielding of the current system, and the approach used in SHIELD, Pathfinder is identifying information buried in the data, giving new life to old sensors.

In a recent demonstration, the Pathfinder system was tied to Federal Aviation Administration radars, and without any modification to the radars themselves, consistently demonstrated an ability to effectively detect and track very small unmanned aircraft, previously thought to beyond the capability of the system. Through this approach, the opportunities for the enhancement of domain awareness are virtually unlimited, and it does not take a leap of logic to see how this same process may lead to an enhanced capability to track a range of threats designed to evade detection. Similar experiments are being conducted with the full range of sensors currently in use.

JADC2 is about increasing both the breadth and depth of the data analysis. This data-driven approach provides highly granular understanding to move decision-making from reactive to anticipatory and proactive. Decision-makers will have more sophisticated insight into complex problems and make decisions with much clearer understanding of the ramifications on future operations.

Modern processing power will be used in conjunction with machine learning, data analytics, and eventually artificial intelligence to look at the vast pool of data available and recognize patterns that are invisible to human analysts. This data, already available today, holds the key to anticipating an adversary's moves before they are executed. By looking at vast quantities of historical data and trends over time, patterns of behavior will be established, making deviations from the norm standout, allowing leaders at all levels to effectively see into the future. Armed with this data, decisions will be made at a pace necessary to achieve advantage; the speed of relevance in modern warfare.

SHIELD will also use data analytics to aid in the development of friendly courses of action. Again, by recognizing minute and inter-related trends in logistics, readiness, supply, and even weather, SHIELD will allow for the refinement of plans and an understanding of future cost, benefit, and risk in ways that are not even conceivable using current systems. The combination of advanced understanding of future adversary actions and the development of informed responses will provide the decision superiority necessary for victory on the modern battlefield. As Sun Tzu prescribed, "*Know yourself, know your enemy, and in a hundred battles you will not know defeat."*

This is not the stuff of science fiction or a glossy brochure that promises future capability never to be achieved. Sensor data is being coupled with data analytics by Northern Command today to great advantage. The SHIELD approach of importing data from multiple distributed traditional and non-traditional sources, and analyzing it for patterns and trends, has allowed Northern Command, in its defense support to civil authorities' role, to anticipate COVID19 outbreaks before they occur. This enabled the command to make informed decisions and position medical equipment and personnel before local medical experts even realized the disease was spreading. Computer-aided decision superiority is becoming reality.

Defeat Mechanisms: Blunting the Attack

Domain awareness and the analysis of data is the core of the SHIELD, but seeing, understanding, and out thinking an enemy although necessary, is not sufficient to deter or defend. Attackers must ultimately be defeated. To engage and defeat approaching threats, Northern Command and NORAD currently rely on equipment designed for offensive actions in other theaters. Stealthy fighter aircraft designed to fly deep into highly defended enemy territory can certainly engage and defeat an approaching bomber or cruise missile over the vast expanses of the Arctic, but the costly capabilities necessary for the attack are not needed for defense over the high north of Canada. Similarly, a surface-to-air

missile system designed to move with and protect advancing Army units against air and missile attack is over-designed for the defense of a stationary port. Although effective, repurposing these systems for defensive actions is inefficient and costly, and their use in a defense role precludes their use in battlefields overseas. Homeland defense is—and must continue to be—complementary to and not in competition with other regional operations.

The forces used by NORAD for air defense today are exactly the same forces needed by Indo Pacific Command to deter and defeat Chinese aggression in the Western Pacific. Similarly, NORAD and the European Command wrestle over a limited number of critical assets as they contemplate the war, they may both fight against Russia. SHIELD provides a unique solution to these shortfalls; one that circumvents the current zero-sum game approach to the global allocation of forces. It calls for the development and fielding of purpose-built, low cost, persistent systems designed to defend key areas in North America against conventional threats available to Russian and Chinese military planners. The use of this approach reduces the need for forces freeing them up for conflict elsewhere and reduces the overall demand for costly offensive forces.

These purpose-built defeat mechanisms fall into two categories. The first is the lower cost applications of existing technologies. This category includes the use of missile systems divorced from their costly launch platforms, such as the Navy's standard family of missiles fired from fixed land-based locations without the associated Aegis weapon system that normally accompanies them. SHIELD leverages the research and development already complete to allow for low cost fielding of these systems in short order. The second category is the use of new technologies designed to invert the cost curve, as today the missiles used in the defense often cost more than those used by the attacker. These new technologies include directed energy and high-power microwave weapons with unlimited magazines and high rates of fire. The incremental approach within SHIELD allows for the fielding of current technologies while future capabilities mature and are tested.

How Much Defense is Enough?

Another feature of the SHIELD is its approach to defense and deterrence with respect to sufficiency. Many have suggested to the authors of this paper that the defense of the Homeland is simply too expensive, as it is impossible to defend everything within fiscal limitations. "We can't defend every school in North America" one defense leader remarked. There is merit to these claims, as certainly the defense of everything in North America against all possible threats is unaffordable, but there is also a flaw in this logic. Defense has never implied the

protection of everything against all, and it does not in the Homeland defense application.

Clearly it would unaffordable, and perhaps illogical, to attempt to defend everything of value. Not everything of value, however, is targetable within the limitation of threat systems, and not everything of value is likely to achieve enemy objectives if destroyed; therefore, not everything of value is likely to be targeted. The destruction of a bridge or a power plant in the Midwest would certainly be a loss and would undoubtedly have an impact locally, but its loss would be unlikely to create an economic or logistical impact sufficient to alter the course of a conflict in Europe or the Western Pacific. Enemy planners would almost certainly avoid wasting valuable weapons on targets that would do little to advance their objectives. On the contrary, there are assets that if lost could have significant effect on America's ability to wage war, and these are the likely targets.

The list of the most critical assets in North America is finite and manageable. There are very few conventionally targetable assets that are so vital that threat of their destruction would constrain the range of options available to decision-makers, and even fewer that if lost would generate war losing effects. For obvious reasons, they are not listed in this paper, but it would be foolish to assume that adversaries do not already understand vital infrastructure and key nodes. In fact, it is likely an understanding of these vulnerabilities that has led America's adversaries to consider expanding conflict to the North American continent. SHIELD reduces and complicates an adversary's ability to target these most critical sites by maintaining a permanent and standing capability to defend them.

The defensive systems within SHIELD will cover concentrations of critical assets taking away the ability of an adversary to easily generate economic effects that would constrain policy-makers' response options, or impact power projection into the Western Pacific or European theaters. With this backstop of defense in place, some of the assets that are currently tethered to these key sites will then be pushed forward to meet adversary launch platforms at greater range and destroy them before they release their payloads. In a balanced approach, the remaining assets would be freed up to aid in the theater effort.

Engaging the archer instead of the arrow is a key component of the SHIELD approach to defense, as it is the most effective way to invert the cost curve and gain efficiencies. Shooting down twelve cruise missiles, for example, even with a perfect interceptor still takes twelve shots, but shooting down the bomber with that same interceptor will only take one, and if done at range, will preclude the need to engage each cruise missile after launch. Possessing the capability to defeat the launch platform, whether in the air or below the surface of the sea, is also the most effective way to deter. An adversary may be willing to lose cruise missiles in

an attack, but the loss of the bombers or submarines that launch them, results in a long-term reduction in capacity, and may give adversary commanders pause.

The SHIELD and the Sword: Balance Restored

The protection of key sites and the ability to hold an attacking force at risk presents a capable defense, and it is a sufficiently capable defense that will ultimately create credible deterrence—deterrence by denial of an enemy's ability to achieve its objectives. This is the goal of SHIELD, and in a global context an ability to defend at home and simultaneously prevail in a forward fight may dissuade an adversary from even contemplating war.

The innovative approach that is being taken at Northern Command and NORAD is making the defense of the Homelands and deterrence by denial a reality. It is already beginning to shift the balance that has led to the consideration of escalatory strategies in Beijing and the Kremlin. Through the incremental development and maintenance of a strong SHIELD, neither will achieve an ability to strike at will. Their actions will be anticipated, and their forces will be detected before they even leave the security of their own bases. They will be met at ranges that preclude employment of their weapons, and they will fail to achieve their objectives.

The defense of the Homeland, while an absolute necessity, cannot drive the creation of new organizations, nor can it require a larger defense budget. The reality of the current economic climate precludes such proposals. An understanding of the fiscal environment is designed into SHIELD from the start and recognizing the very real budget limitations challenging the Department of Defense, SHIELD takes a prioritized and incremental approach to defense. Its operational concepts are designed to complement the offense, as opposed to competing for limited resources and reducing capability to fight overseas.

Defense cannot replace offense or deployed operations in military prioritization. The Nation must not simply turn to isolationism and fall back behind the moats and walls of fortress America. The United States and its allies have a key role to play in maintaining the international order, and to withdraw would likely have catastrophic results around the globe. Both the American *National Defense Strategy*, and its Canadian contemporary, *Strong, Secure, Engaged*, recognize the need for a secure base of operations and prioritize direct defense of North America as a necessary condition for continued international engagement. SHIELD is designed to ensure that the American military and its Canadian counterpart have a secure Homeland from which to deploy.

The security environment has undergone a tectonic shift over the past decade. The world once dominated by concern over, and singularly focused on, the threat

posed by violent extremism has evaporated. In its place is a new and more dangerous environment in which peer adversaries are jockeying for advantage and seeking to exploit weaknesses. The weapons they have fielded are designed specifically to take advantage of the seams that have emerged in the West's capability to defend. Foremost, in the minds of leaders in Beijing and the Kremlin, is the increasing vulnerability of the Homeland, and both are actively working across all domains, from cyber and space to maritime and air, to find ways to disrupt deployments before they even leave the North American continent.

The "away game" strategy that has dominated American military thinking since the end of the Cold War is no longer sufficient. Adversaries do not intend to allow the American military to fight the war it wants to and deploy unmolested into a theater of conflict. America must, therefore, be prepared to fight the war that is coming, a war that is fought across command boundaries and on both sides of the oceans. Reliance solely on the away fight is a flawed approach, and balance between the offense and defense must be restored.

The United States military has been in this position before, and through deliberate investment has repeatedly found a way to build a force sufficient to both defend at home and project power overseas. When confronted with the threat of Soviet nuclear bombers in the mid-1950s, the National Security Council recognized a similar imbalance. Within less than a decade, radars were fielded, Arctic bases were built, an entirely new bi-national command was established, and balance was restored.

U.S. Northern Command and the North American Aerospace Defense Command are actively working to once again restore that balance. Within today's fiscal realities and without degrading the ability for the United States, Canada, and their allies to prevail in war across the oceans, the two commands have developed a fundamentally new approach to defense. This concept, known as the Strategic Homeland Integrated Ecosystem for Layered Defense, or SHIELD, is becoming a reality today. The continued deliberate and prioritized fielding of the systems integral to this approach will create a defense, sufficiently capable to deter adversary attack, enabling continued engagement overseas, and ensuring the security of the American and Canadian populations well into the future.

Notes

[1] Originally published by the Canada Institute, Wilson Center for International Scholars, Washington, September 2020, https://www.wilsoncenter.org/publication/hardening-shield-credible-deterrent-capable-defense-north-america.

4 Responding to "Hardening the SHIELD: A Credible Deterrent and Capable Defense for North America"[1]

Andrea Charron

Successive NORAD commanders have had, as their first job, a review of NORAD's missions and capabilities considering current threats. And I am conscious on the anniversary of 9/11 to note the efforts of NORAD on that day – no organization thinks about 9/11 more than they do and reminders of the day are located outside of and throughout the joint NORAD and USNORTHCOM headquarters at Peterson Air Force Base. NORAD's greatest strength has been the ability to reinvent itself considering changing geopolitics. The changes have been more evolution than revolution, but still, they have mattered, and Canada has been onboard. From adopting a drug interdiction assistance role in the 1990s, to pivoting to counter terrorism and a look inside North America as opposed to just the approaches after 9/11, to the adoption of a maritime warning mission in 2006, NORAD continues to change.

"Hardening the Shield" (chapter 3 in this volume) pulls together the hints provided in many of Gen. O'Shaughnessy's testimonies to Congress and the Senate during his tenure. It builds on the thinking of his predecessors and what has been a series of studies from NORAD NEXT to the latest Evolution of North American Defence (EvoNAD) on how to outthink and outpace threats to North America. This latest "thinking" about the defence of North America suggests a revolution in how one conceives of not only NORAD's role, but crucially USNORTHCOM's role with implications for other combatant commands as well. This revolution is prompted by the twin challenges of great power competition and a Unified Command Plan (UCP) designed for another era. The Bottom Line Up Front of this paper is a call for a new North American defence architecture that is both an integral cog in the US deterrence machinery and can "actively" – i.e. offensively if necessary – defend the homeland so that the US military can maintain its superiority and freedom to manoeuvre. This revolution is dependent on many factors coming together (and ideally not during a pandemic when economic budgets are stretched thinly). Bold thinking is to be applauded. Inevitably, however, bold thinking also raises questions, especially for

Canada and for NORAD because this revolution first might be more than the Canadian public and government can digest right now. Second, may still leave North America vulnerable because the focus on great power competition (and back to symmetric threat challenges) shifts attention away from persistent threats like climate change (which accounts for a significant % of CJOC and USNORTHCOM missions), and asymmetric threats to North America.

Canada, it must be recognized, is the biggest cheerleader of NORAD for many reasons including because it provides the CAF with privileged insight into US strategic thinking regarding decisions made vis—a-vis North American defence. In addition to extra training and command opportunities for the CAF, NORAD has been vital to providing some of the key infrastructure like the NWS, which is essential for the military and civilian agencies as well. And, while Canada "owns" these assets, the U.S. has contributed the lion's share of the funds because NORAD is bi-national. Bi-national means that Canada and the US are not just operating in parallel (that would be bilateral), Canada and the US operate jointly with one focus – North America's defence. Canada embraces NORAD because it has been to date, a defensive command. NORAD operates in and from home, not away. What is being suggested in this paper is that NORAD will no longer be an exclusively defensive command but also an offensive command – this is what engaging the "archers" (the launch platforms) rather than the 'arrows' can infer. The question becomes what if the archers are outside of USNORTHCOM's Area of Responsibility? NORAD does not, in theory, have geographic limitations on its warning missions given its global area of operations. Will NORAD pass the warning to another combatant command? Not only does Canada not possess capabilities for such a function, but this implies a fundamental re-structuring of the US UCP.

Of course, offense and defence are two sides of a coin and one might suggest this is semantics only, but language does matter. Canada is reluctant to use the term "adversary" (it is only referenced 3 times in *SSE* whereas climate change is referenced 10 times). Russia is referenced as problematic in Eastern Europe and in a NATO context and China "is a rising economic power with an increasing ability to project influence globally. "(*SSE*, 50). Rather than referring to "kill chains", Canada references "defeat" capabilities. Where the U.S. refers to homeland defence, Canada refers to defending Canada and North America and Canada calls the Arctic an indigenous homeland rather than a fortress. These differences in language point to a different outlook as to how we perceive threats to Canada and how best to defend Canada and North America. Canada, for example, does not send troops overseas to defend Canada except with the support of allies and importantly the US. For the US, until recently and referenced in the

paper, the defence of the US is the away game. This concerted attention to North America is new and necessary, but still very uneven between the US and Canada both in terms of perceived threats and abilities to respond.

Data, and lots of it, is the key ingredient to much of the SHIELD concept. Intelligence from all domains and from around the world including from new sensors, space-based assets, and intelligence from civilian agencies and allies will improve the fidelity of information and decision-making by producing a better, more detailed common operational picture. Certainly, after 9/11, NORAD's direct access to feeds from the Federal Aviation Administration (and importantly FAA personnel on the watch floor) has been invaluable. But the AI and cloud-based analysis that will be required will be a) very expensive at a time when both economies are in a recession; b) assume timely and coordinated procurement processes; and c) will reside within the US exclusively. I cannot imagine the United States allowing allies to be the final say on the filters applied or to 'own' the COP which means the age-old problem of sharing secret data with the United States needs to be solved.

Now to the focus on great power competition. Russia is the acute threat in a North American context (because of its capabilities, especially in the Arctic) but China is the chronic threat in all other contexts and the most anticipated peer competitor to the U.S. The United States has signaled, in many recent documents, that it feels more vulnerable, though most of the attacks by Russia and China against the US have been conducted covertly and via social media/cyberattacks and espionage. Nevertheless, a threat in Eastern Europe can no longer be seen as an isolated threat to only the immediate surrounding region. We forget that it was not until after 9/11 that there was a dedicated combatant command for North America. Before, there was U.S. Joint Forces Command (JFCOM), with responsibility for land and maritime defense of the continental states and provider of military assistance to civil authorities, and the North American Aerospace Defense Command (NORAD) for aerospace defense. In essence, when you looked at the UCP map prior to 9/11, all parts of the world had a commander-in-chief dedicated to focusing on the threats to that region, but that was not the case for North America. That had to change and USNORTHCOM was the solution. Given the regional focus of the geographic combatant commands, each has a different threat posture and focus. Consider the concerns of USSOUTHCOM vs. EUCOM (for example). INDOPACOM is the behemoth and it and EUCOM vie for the title of most strategic command in the world. (Current US doctrine, I suggest, favours the Pacific, notwithstanding the recent pivot to the Arctic).

This paper suggests USNORTHCOM and NORAD become the crucial command within the UCP. On the one hand, this makes sense – of course a military's first obligation is to defend home. But 70+ years of US military doctrine has discounted, overlooked and marginalized defence of the homeland. All 8 USNORTHCOM commanders have had to advocate for attention to be paid to USNORTHCOM and to remind the chain of command it does more than defence support for civil authorities (as vital as that is). For SHIELD to come to fruition, it will need the buy in of all of the geographic and functional combatant commands.

Second, the assumption throughout the document is that China and Russia are intent on keeping U.S. forces from deploying because of their ability to hit North American targets from far away. It also assumes war will require large numbers of soldiers and assets to respond, rather than a "come as you are" conflict perhaps in other domains that don't require the mobilization of troops. The technologies that Russia and China have are lethal and in the case of hypersonic glide vehicles – currently undefendable. There are other states of concern, but Russia and China both have the capabilities to severely disrupt the West and China, especially, is seeking to change the word order in its favour. Accordingly, North America needs both deterrence and defence – the former has been the main role of NORAD for 62-plus years. It is the defence part on which the authors suggest we need to think far beyond North America and in all domains – something my colleague Jim Fergusson and I have been arguing for many years. And while USNORTHCOM has all domains represented within its command, NORAD does not nor do there seem to be appetite among the other services (land, maritime etc.) to be part of NORAD if the rejection of maritime control is any indication. All domain command and control also suggest a rethink of the Western trend toward organizing along domain specific component commanders. What is more, an important part of defence for the United States is the capability to defeat a ballistic missile attack. Canada has supported being a part of the warning side but not the defeat side. This could change but could also require a reopening of the NORAD agreement which historically has been challenging and is why Canada pushed for the agreement to be signed in perpetuity.

Let's suppose that Canada does say yes to missile defence. I wonder if this guarantees that NORAD would acquire command and control of continental BMD, and through NORAD, would Canada have input over what targets to defend or sacrifice? Is it guaranteed such an invitation to join would be extended by the United States? Generally, a sword is wielded by one person. And if space-

based assets can substitute for land and sea-based assets, then Canada's territory may not feature in the US defeat mechanism calculus.

Finally, there is much emphasis in the paper on receiving information "at the speed of relevancy" to make fast and better decisions. After all, seconds literally do count in some scenarios. On many occasions, however, disaster has been obverted because a soldier or analyst doubted what a computer screen was telling him/her or questioned the data blinking on their screen. What if NORAD wanted to exploit or surveil or probe a target rather than defeat it? The AI assisted processes that girds SHIELD is needed but how it is configured, with what observe-orient-decide-act (OODA) loop parameters, and filters will be crucial. It is important that NORAD and USNORTHCOM do not become linear in thinking or response options. Further, Canada will find it difficult to keep up the predictive analysis and joint all-domain command and control plans being recommended not because the Canadian Armed Forces aren't capable, but because it can barely manage what is expected of it now - 50% of CAF missions respond to domestic events such as floods and fire. Will the governments see financial sense in investing in computer assisted defence (notwithstanding concerns about them being hacked or compromised or rendered redundant) against great power competition, which so far has done more damage with a few bots on twitter, than on flood, fire, and other support to overwhelmed national authorities?

Nineteen years to the day when the U.S. was attacked from within North America by suicide bombers, the response was very costly wars conducted "away" to deal with terrorism at its source as well as the impetus finally to pay for badly needed feeds of civilian air space information into the NORAD HQ. NORAD adapted, created Op NOBLE EAGLE, and focused attention within North America. Post-9/11, NORAD and USNORTHCOM focused almost exclusively on Sunni-based terrorism. It has not disappeared and the challenges of COVID-19 mean that all forms of terrorism have the perfect grounds in which to thrive. Too close a focus on great power competition may leave North America vulnerable to other threats – especially non-state-based actors and what is rapidly taxing governments around the world, including CJOC and USNORTHCOM, responding to the effects of climate change at home.

NORAD was and remains a bold idea. After WWII, it was the air forces that recognized the air space above North America as indivisible and requiring joint defence, and this recognition has been deeply embedded in the defence thinking of both countries at the political and military levels. I think we all agree that the need to modernize NORAD, and that the CANUS defence relationship for North America is vitally important. The authors provide a useful and insightful

starting point from which to move forward with detailed discussions between Canada and the US, and the means to do so already exists – the PJBD and its Military Cooperation Committee are the obvious places to create the basis for moving forward, as it was in WWII and since.

Notes

[1] Originally published as a NAADSN *Quick Impact* on 11 September 2020, https://www.naadsn.ca/wp-content/uploads/2020/09/20-Sept_Charron_Responding-to-the-Hardening-the-SHIELD_Quick-Impact.pdf.

5 Back to the Future? Missile Defence as a Political Landmine in Canada

Justin Massie, Jean-Christophe Boucher, and Stéphane Roussel

Unbeknownst to the vast majority of Canadians, Canada is currently engaged in a process of modernizing the North American Aerospace Defense Command's (NORAD) capabilities, in collaboration with the United States, to better deter, detect, track, and enable the defeat of airborne threats to North America. While such a project will require significant investments by the Canadian government, as well as deliberation on the role Canada wishes to play in the future of aerospace defence on the continent, NORAD's modernization is currently under the radar of most Canadians.

One of the reasons is that the Canadian government has so far avoided taking a position on the two most politically sensitive aspects of NORAD modernization: its significant financial costs and its links with missile defence. First, the North Warning System (NWS) is nearing the end of its useful life, but the billions of dollars needed to modernize its radar chain are not accounted for in Canada's defence policy.[1] Yet, it is a key pillar of the NORAD renewal. As U.S. General Terrence O'Shaughnessy, former commander of NORAD, has repeatedly warned, new nuclear-armed cruise missiles and hypersonic missiles go undetected by the NWS.[2] The modernization of NORAD will thus require a multi-layered sensor system, integrating air, space, naval, and submarine capabilities.[3]

Second, upgrading NORAD entails a discussion about the role Canada wishes to play in missile defence. To date, the Trudeau government has simply emphasized that "Canada's policy with respect to participation in ballistic missile defence has not changed," while acknowledging its intention "to engage the United States to look broadly at emerging threats and perils to North America, across all domains, as part of NORAD modernization."[4] The Minister of National Defence's 2019 mandate letter, for its part, states the need to "develop

better surveillance (including by renewing the North Warning System), defence and rapid-response capabilities in the North and in the maritime and air approaches to Canada."[5]

The U.S. Arctic defence strategy, on the other hand, is more explicit. It states that the U.S.-Canada binational study on renewing the NWS is part of a broader effort aimed at modernizing "missile and cruise missile defense systems … critical to maintaining a layered approach to domain awareness through multi-domain sensors that include terrestrial radars and space-based capabilities," in light of the "threats posed by Russia's advanced cruise missile and hypersonic glide vehicle capabilities."[6] Furthermore, the 2019 U.S. missile defence review states that Canada and the United States are pursuing a three-phase modernization plan. The first two phases, currently underway, include incorporating advanced sensors and expanding surveillance capabilities around the National Capital Region. Phase three, for its part, "will incorporate emerging technology and explore new options to expand surveillance and tracking of cruise missiles for the rest of North America." The review further states that the United States is pursuing a "comprehensive approach to missile defense" that "integrates offensive and defensive capabilities for deterrence," including the "space-basing of interceptors" and the neutralization of "offensive missile threats prior to launch."[7]

While it may have been wise to dodge these sensitive issues during a U.S. presidency as irascible as Donald Trump's, Canada's participation in the modernization of NORAD's capabilities is expected to receive increasing public attention. Indeed, during their first phone call, Prime Minister Trudeau and President Biden "agreed to expand co-operation on continental defence and in the Arctic, including the need to modernize NORAD."[8] With the election of a new Conservative leader in favour of Canadian participation in the U.S. ballistic missile defence (BMD) system, the Canadian debate could occur as soon as the next federal election.[9] In this context, it is necessary to anticipate the reaction of Canadian public opinion to the modernization of NORAD in order to assess the political acceptability of this project. Simply put, what is the domestic appetite for the modernization of NORAD?

This is a difficult question to answer. There is a frustrating but familiar shortage of available data on Canadian foreign and defence policy. Indeed, there have been no surveys conducted on the issue of NORAD since 2017. Additionally, the issue of continental defence has been largely absent from the public eye in the past few years. Thus, we need to turn to past debates on missile defence and the most recent survey data on defence spending to consider the likely reaction of public opinion to the financial and political implications of NORAD modernization. We first begin by analyzing the public perception of

BMD in the 2000s. In general, data from past debates have indicated that Canadians do not support a participation in offensive capabilities, but are willing to contribute to early warning, defensive capabilities. We then assess the latest polling data pertaining to military expenditures and find that, despite the current economic insecurities caused by the COVID-19 pandemic, there is a certain public appetite for increasing the defence budget if a bipartisan consensus holds. We argue that Canadians are likely to support the modernization of NORAD so far as it remains in the business of detection rather than interception. This, however, is premised on the absence of mobilized domestic political opposition and continued public support for increased defence spending. Thus, we conclude that there is a window of opportunity for Canada to invest in the modernization of NORAD through its defensive capabilities.

Domestic Opposition to BMD

On 24 February 2005, Prime Minister Paul Martin announced that Canada would not participate in the U.S.-led ballistic missile defence system. The decision surprised many, since Defence Minister John McCallum and the Prime Minister himself had signalled their predisposition towards Canadian involvement.[10] The Martin government had entered into formal negotiations on an agreement with the U.S., and it was reported that it had decided to join in missile defence but was waiting after the next federal election, which Martin called in May 2004, to make a formal announcement.[11] In the meantime, the issue was shelved because it was perceived as "a political liability."[12] Participation, however, was reconsidered following the results of the election, which led to a minority Liberal government.[13] The Martin government merely agreed to contribute to NORAD's early warning mission supporting missile defence.

Two main culprits have been accused of causing this reversal: U.S. President George W. Bush and Quebecers. During a bilateral meeting with Paul Martin in November 2004, the U.S. President publicly called for Canada's involvement in missile defence, despite Canadian efforts to keep the issue private. This significantly complicated the political calculus of Prime Minister Martin. If he were to agree to Canadian involvement in missile defence, he would be criticized for bowing to the request of a very unpopular U.S. president, following the invasion of Iraq.[14] As political columnist Jeffery Simpson put it, "Mr. Bush slid a knife into Mr. Martin's ribs."[15]

The Martin government also had domestic political reasons to "stand up" to the United States by saying "no" to missile defence. Having won a narrow victory in June 2004, Martin faced the prospect of losing the support of Quebecers, who strongly opposed Canadian participation in BMD, and whose support was key

to Martin's electoral success.[16] Most importantly, Martin faced considerable opposition within his own party. The Quebec wing of the Liberal Party adopted in December 2004 a resolution calling for the government to decline the U.S. invitation. Defence Minister Bill Graham acknowledged that he "lost the argument" in Cabinet. "I supported one side of the argument, and it was not accepted by the majority of cabinet and the Prime Minister."[17] In short, public opinion thwarted Canadian involvement in missile defence, whether through anti-American or anti-BMD attitudes, in combination with the minority government's dependency on electoral support in Quebec.

In a poll conducted in July 2001 – that is, prior to 9/11, the invasion of Iraq, and the domestic debate on BMD – a majority (58%) of Canadians already opposed the idea of Canadian involvement. There was slightly greater opposition found in Ontario (61%) and British Columbia (60%) than in Quebec (59%). To be fair, though, the question asked by Ipsos-Reid was disturbingly biased: it referenced opponents to BMD claiming that "it could lead to another arms race."[18] As such, all we can infer from this poll is the widespread opposition to military initiatives that may drive an arms race.

In March 2004, before Martin's turnaround on the issue, Ipsos-Reid conducted another poll, this time asking Canadians whether their country "should actively support the Bush administration's missile defence system even if it may require dedicating military spending to the program or allowing US missile launchers in Canada."[19] Again, an overwhelming majority (69%) opposed this, in slightly greater opposition in British Columbia (77%) than in Quebec (74%), Ontario (67%), or Alberta (57%). This suggests that participation in the more "offensive" dimension of missile defence, i.e., striking targets, is not palatable to most Canadians.

What about missile detection? In November 2004, Ipsos ran a poll asking whether "Canada should join the US missile defense program that would protect all of North America from potential missile attacks?"[20] To this more neutral question, a much smaller majority (52%) of Canadians expressed opposition, with greater resistance found in Quebec (60%) and British Columbia (55%) than in Ontario (split 49% against, to 46% in favour) and Alberta (53% in favour). Therefore, the minority Martin government faced a split opinion before settling on the thorny issue, with significant resistance in Quebec and beyond. It is unclear, however, the extent to which such opposition rested on the (erroneous) perception that participation would entail installing ground-based weapons in Canada to shoot down ballistic missiles headed for North America.

Two *post hoc* surveys examined in greater detail the reasons underlying Canadians' opinions about missile defence. A Compass poll conducted in February 2005 found that more Canadians (54%) opposed involvement in

missile defence than in 2001 (47%), including a majority among Bloc (72%), NDP (65%), and Liberal (59%) voters, in contrast with the majority of Conservatives (57%) who supported Canadian participation. More importantly, the survey found that "majority opposition to missile defence is not firm and could be readily reversed."[21] Indeed, a majority expressed support for the idea that Canada "should help defend against missiles just as we have done in the case of bombers and terrorists," that it "cannot be a strong, independent country if we leave our defence to our neighbour," and that Canada "has enemies and does need to defend its cities." As for opposition to missile defence, the only reason that received majority support (58%) was the impression of insufficient public discussion of the matter to justify Canadian participation. The survey thus concluded that "achieving majority support for missile defence is not an immense challenge for any federal government desirous of persuading Canadians to accept missile defence," with the notorious exception of Quebec, where opposition was found too deeply rooted to be upturned.

In March 2005, a detailed Decima survey found that a majority (57%) of Canadians supported the Martin government's decision.[22] The most common reason reported to support the decision was a lack of confidence in President Bush's defence strategy (34%), followed by the perceptions that the U.S. did not treat Canada fairly on trade issues (21%), that BMD was not proven to work and could be a costly failure (21%), and finally that Canada should not be taking part in the weaponization of space (19%). In other words, among the variety of reasons expressed by Canadians, disagreement with U.S. defence and trade policies accounted for a majority (55%) of the opposition to missile defence, followed by the reliability of the system and, lastly, by the fear of a space arms race.

Support for Martin's decision was expressed throughout the country, including in Quebec (63%), Ontario (56%), and Alberta (50%). Political affiliation counted more, with Conservative voters expressing greater disagreement (49%) than agreement (35%) with Martin's "no," in sharp contrast to Liberal (64%), Bloc Québécois (72%), and NDP (71%) voters' views that Martin had made the right decision. Therefore, opposition to Canadian participation rested more on political views than regions of residence. Furthermore, as Pierre Martin observed, "it is not clear whether missile defence would actually have made much difference in Quebec in the 2004 election had the prime minister swiftly decided on the issue upon assuming power in December 2003."[23]

Indeed, there was little political mobilization of public opinion on missile defence. Only the Bloc Québécois (BQ) made opposition to BMD a key feature of its electoral platform.[24] It suggested that participation in the "missile shield"

was a "folly" that would undermine international peace and security and spur an arms race in space.[25] In contrast, the Conservative Party remained ambiguous on the issue. Although they helped the Liberals defeat a BQ motion demanding that the government oppose missile defence in February 2004,[26] the Harper Conservatives neither argued for nor against missile defence participation in the House of Commons. Their 2004 election platform did not mention the matter of missile defence, and their 2005 Policy Declaration vaguely supported "Canada's participation in negotiation of a North American Missile Defence System on the clear understanding that any agreement must serve Canada's interest."[27] This ambiguity, according to journalist John Ibbitson, resulted from a split between the Red Tory and Reform factions within the newly united Conservative Party.[28]

The absence of political mobilization may have resulted in lower levels of public support for Canadian participation in BMD. Indeed, public opinion is significantly shaped by elite cues. Had the public been more exposed to arguments favouring a cost-free participation involving no missiles on Canadian soil, perhaps greater support would have followed. The newspaper coverage of the debate was fragmented, including in Quebec, where editorials in *La Presse* favoured Canadian involvement and those in *Le Devoir* opposed it.[29] Yet, while several arguments were put forward against participation, the most common one related to a cost-benefit calculus. There was a prevalent perception that Canadian involvement in missile defence would represent a waste of resources and money, either because it would be prohibitively costly to Canada, or because BMD was unreliable.[30]

The issue faded soon after Martin's decision due to a lack of political interest. BMD remained relatively ignored during the Harper years. This is surprising as there was a window of opportunity for the Canadian government to engage more fully in missile defence. First, Conservative voters have been shown to have been the most supportive of a Canadian contribution to BMD throughout the 2000s, especially in Alberta. Furthermore, Stephen Harper's electoral base in Quebec was relatively thin. Second, the Conservatives formed a majority government from 2011 to 2015, giving the electoral runway to put in place a Canadian-U.S. partnership on BMD. Third, the Conservative government was dealing with Barack Obama, one of the most beloved US presidents, hence mitigating domestic anti-Americanism. Despite such a potentially malleable public opinion, Prime Minister Harper decided not to reconsider Martin's decision to opt out. While he recognized "changes occurring in the world," he declared that his government judged "that Canadians did not need the security of participation in the anti-ballistic missile defence system."[31] The Harper government thus chose

not to build on the momentum provided by a bipartisan Senate report suggesting Canada should reverse course.[32]

While BMD was abundantly discussed in Parliament during the majority Harper government, it only briefly regained media attention in 2017.[33] This followed a series of North Korean missile and nuclear tests, including ICBMs capable of reaching North America, leading President Trump to threaten "fire and fury" against North Korea. This situation clearly affected Canadian threat perceptions. In the only poll conducted on BMD since 2005, an October 2017 survey found a 19-point increase (from 36% in 2016 to 55%) in Canadian concern about a potential nuclear war.[34] A strong majority (60%) of Canadians disagreed that tensions between the United States and North Korea were not Canada's problem, and Canadians were split on whether joining BMD would make Canada safer (40%) or not (42%). Nevertheless, fewer than a third of Canadians (29%) said their country should join the U.S. missile defence system, with 44% believing it should stay out. As such, opposition to Canadian involvement in BMD dropped eight percentage points from the last comparable poll in November 2004, below the majority threshold. Strikingly, the amount of uncertainty about the issue rose from a mere 4% in November 2004 to more than 27% in October 2017. This trend shows that opposition to BMD can be assuaged.

Furthermore, the 2017 Angus Reid poll indicated that opinions were correlated more with political affiliation than regions, with majority support (53%) for Canadian participation among Conservative voters, majority opposition among Liberal (53%) and NDP (54%) electors, and a plurality of Bloc (44%) voters. Interestingly, the strongest opposition was expressed in the Atlantic provinces (52% against, 24% in favour), and the weakest in Quebec (38% against, 31% in favour), with Ontario in the middle (47% against, 27% in favour). In other words, even in Quebec, opposition to BMD is reversible. The Trudeau government, for its part, has thus far stuck to Canada's non-involvement policy, although the ongoing discussions with the United States over NORAD modernization may compel the Canadian government to revisit the issue.

Implications for Modernizing NORAD

The current Canada-U.S. discussions over NORAD modernization are likely to include the thorny issue of missile defence. Indeed, American military officials are favouring the development of multi-purpose, multi-layered, and all-domain radars and sensors to replace the aging land-based NWS.[35] This means integrating land, air, maritime, and space assets into a global framework designed

to track and defeat aircrafts, maritime vessels, and cruise and ballistic missiles. Replacing the NWS with such fused surveillance capabilities may force Canada to increase its participation in the early warning dimension of missile defence, through land, air, maritime, and/or space assets. USNORTHCOM is furthermore looking into focusing more on defeating launch platforms than missiles, which could eventually alter NORAD's role to a more offensive posture.

How should the Canadian government handle the modernization of NORAD? Despite an increasingly hostile international environment, new adversarial military capabilities, more proven BMD capabilities, and a more cordial U.S. administration under President Biden, domestic political considerations are expected to shape Canadian decisions regarding the NWS and NORAD. Although scarce, the polls surveyed above suggest a relatively permissive domestic environment. However, three conditions are expected to shape the public appetite for an increased Canadian military contribution to NORAD: the level of elite consensus, the nature of the military capabilities involved, and the costs shouldered by Canadian taxpayers.

First, as discussed above, the level of public opposition is a function of political mobilization. Achieving a transpartisan consensus would considerably limit the electoral impact of adopting unpopular policies. Such consensus, however, may be impossible to reach. We can infer from the Trudeau government's reluctance to discuss the matter that the Liberal party is divided over the issue and/or fearful of the public reception.[36] When it was revealed that the U.S. policy is not to intervene in the event of a ballistic missile attack on Canada, National Defence Minister Harjit Sajjan merely stated: "[o]ur current policy has not changed, but as I stated, when we look at NORAD modernizations, we'll be looking at all perils of threats."[37] Few details have emerged about the state of the discussions about NORAD modernization, and no timeline has been disclosed publicly.[38] As of January 2021, the Canadian government is officially still in the examination phase, and timelines for the modernization of NORAD have yet to be determined.[39]

Whatever the Liberals decide, the Conservatives are likely to push for greater Canadian involvement in continental defence, including through missile defence. As foreign affairs critic, Erin O'Toole made repeated calls for Canada to take part in BMD and become "a full partner in the defence of North America."[40] As leader of the Conservative Party, O'Toole has so far maintained that position.[41] In contrast, opposition is expected from the NDP, while the BQ has yet to state its position on the matter. New Democrats have clearly rejected any proposal to join a missile defence system that claim is both expensive and ineffective. "It's cheaper to develop new weapons than to develop that kind of defensive system," claimed Hélène Laverdière, the NDP's foreign affairs critic.

"And that kind of defensive system only leads countries like North Korea but also countries like China and Russia, who may feel concerned, to upgrade their systems and it leads to escalation."[42] From the little attention paid since 2005 to the issue of NORAD modernization, we can thus expect a similar political landscape as the one faced by Prime Minister Paul Martin. The Liberals have the capacity to build a bipartisan consensus with the Conservatives in favour of joining BMD via the renewal of the NWS, or alternatively with the NDP (and perhaps the BQ) by limiting Canada's participation in the modernization of NORAD.

This leads us to the second condition for the political acceptability of increased Canadian contributions to continental defence: the nature of the capabilities involved. Simply put, the less "offensive" the required capabilities are perceived, the less domestic opposition is to be expected. Any investments in capabilities that are perceived to permit first strikes, or lead to an arms race or to the weaponization of space, are likely to generate political and public opposition. This, of course, includes the interception capabilities associated with missile defence, but it excludes those involved with surveillance and the detection of potential threats. As such, there should be less resistance to Canada investing in a multi-layered system of aerospace and maritime radars and sensors as part of maintaining all-domain awareness, but the acquisition of long-range strike capabilities would likely generate domestic pushback.[43] Indeed, the increased space-based surveillance capabilities and the investments in all-domain awareness technologies for the High North have so far attracted little public attention, let alone opposition. Interestingly, two new capabilities that Canada plans to acquire, namely armed drones and naval strike missiles on Canada's future warships (possible variants of the Tomahawk cruise missile), have not attracted much attention thus far. These could be viewed as enhancing Canada's surveillance and anti-access/area-denial deterrent in the Arctic, but could also be framed as providing the ability to conduct offensive operations abroad. More sensitive is the replacement of Canada's fighter fleet, and the possibility of replacing the *Victoria*-class submarines, which are currently expected to remain in service until 2035.[44] That said, the BQ and the NDP have so far put greater emphasis on the need to generate local jobs than on the military capabilities of Canada's planned acquisitions.

A third condition shaping the domestic receptivity to the NORAD upgrading resides in its price tag. The refurbishment of NWS radar sites across Canada has not been budgeted and cannot be sustained with the current defence budget. As DND Deputy Minister Jody Thomas declared, "whatever funding we're envisioning for NORAD modernization is new money."[45] While DND has declined to provide cost estimates, renewing the NWS is expected to cost over

$10 billion, with Canada responsible for 40% of the costs.[46] If Ottawa agreed to pay over $4 billion to modernize the NWS, the newly refurbished radars could be integrated into BMD's all-domain early warning system. At a minimum, this would prolong NORAD's current involvement in BMD through the Integrated Tactical Warning and Attack Assessment (ITWAA). Canada's investment in the modernization of NORAD could also be used as leverage to seek participation in the intercept planning process, to ensure some Canadian input into operational planning decisions. By offering a concrete contribution to BMD, Canada could seek to secure some degree of protection assurance from incoming missile threats aimed at Canadian territory, which is currently not covered by the US BMD system.[47] While far from guaranteed – the U.S. did not agree to Canadian input in 2004[48] – bearing significant costs for BMD through multi-purpose sensors and radars in the Canadian Arctic would grant Canada some bargaining power.[49]

To what extent are Canadians inclined to increase Canada's defence budget? Assessing support for public expenditures (such as military spending) is always fraught with methodological difficulties.[50] Serious studies examining perceptions toward public spending assume that support for expenditure tracks the ebbs and flows of military budgets.[51] As defence spending increases, individuals are less likely to support further budget increases while, inversely, as budgets are cut, public support for more spending increases.

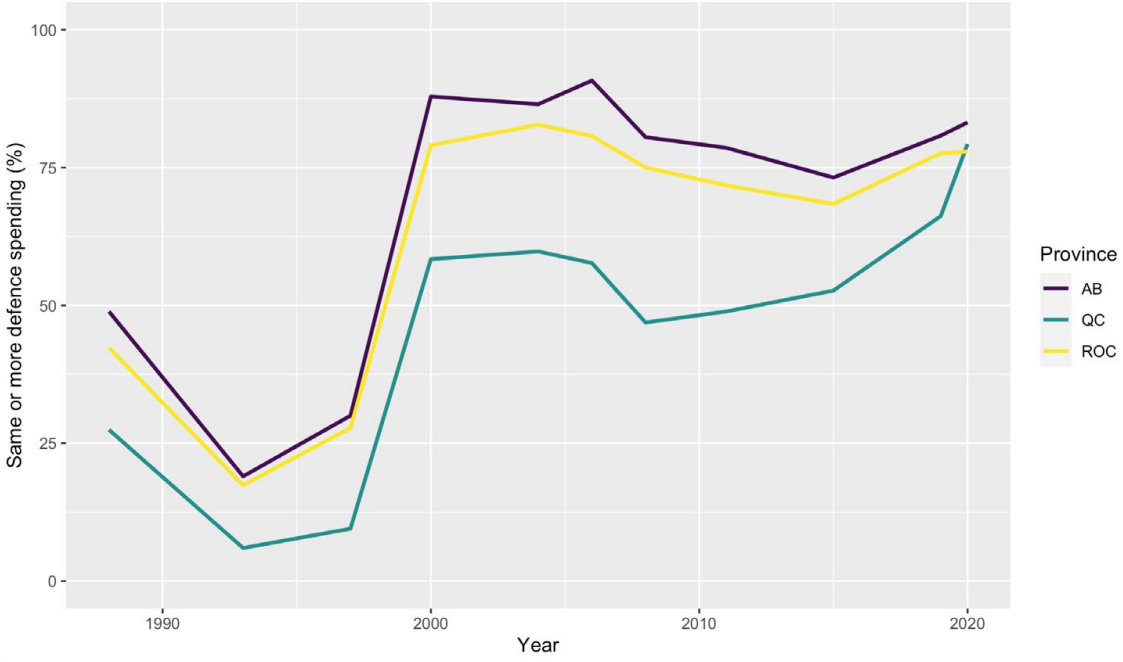
Figure 1 below presents the evolution of Canadian support for defence spending between 1988 and 2021 on the question of whether respondents thought the government should spend much more, more, the same as now, less, or much less. The data was collected from the *Canadian Election Study*, and more recent surveys aggregates the number of respondents who thought that the government should spend the same or more on national defence.[52] As we can see, support for military spending increased markedly at the turn of the millennium. By far, Alberta has been the province most supportive (≈ 82% since 2000), while Quebecers were the least supportive of military spending (≈ 58% since 2000). The rest of Canada (excluding both Quebec and Alberta) also strongly expressed support for Canada to increase or maintain its defence budget (≈ 77% since 2000). Overall, that opinion is very stable in both the rest of Canada and Alberta, with only ≈ 5% standard deviation. In Quebec, however, we see much more variation (standard deviation is ≈ 10%) and a steady rise of support for the same or more defence spending since 2008. In 2020, Quebec is as supportive as other provinces, with the least support found in British Columbia. Figure 1 thus shows a significant openness towards greater investments in national defence.

Nevertheless, the steady support for military spending presented here should be interpreted with some reservations. It is difficult to establish clearly with these surveys what causes an increase in public support for military spending. Only

more sophisticated survey instruments, such as experiments, would allow us to make more definitive assertions. However, from the literature, we can surmise some preliminary conclusions. First, international determinants of the public perceptions of military expenditures suggest that support should remain strong. On the one hand, the steady rise of support for military spending seems to be correlated with the increasingly worsening situation abroad, with Russia in Europe and China globally both challenging the existing international order. As the threat perception increases, we should expect Canadians to gradually become more open toward defence spending. On the other hand, since the mid-2010s, Canada's allies have been keen on arguing that defence spending should increase – the infamous 2% NATO target – to meet new and expanding security challenges.

Second, the domestic support for more defence spending, as reported in Figure 5-1, requires some caveats. All polls show that support for increased defence spending is highly partisan, with Conservative-leaning voters believing (≈ 63%) that we should increase military budgets to meet the NATO 2% benchmark. In comparison, Liberal (≈ 36%), Bloc Québécois (≈27%), and NDP-leaning voters (≈ 26%) were much less enthusiastic.[53] This offers political runway for the Liberal government of Justin Trudeau to find some bipartisan support from the Conservative party, even under the conditions of a minority government and a looming election. Nonetheless, existing research (and to some extent current survey data) suggests that support for military spending is influ-

Figure 5-1: Evolution of public support for defence spending (1988-2021)



enced by gender, with female respondents generally less favourable to such spending. From the standpoint of the Trudeau government, any conversation around the allocation of public treasure – balanced between social and military expenditures – should account for the gendered dimension that is not favourable to increased defence spending.

On the economic front, things appear less favourable. The COVID-19 pandemic has increased overall government debt and dragged Canada into a recession. Furthermore, although recent polls have shown that most (64%) Canadians agree that the government should be spending "whatever is required to rebuild and stimulate the economy and support those who need help," much of the focus of this recovery is on building a more stable economic base in Canada, health care, and income support and employment insurance.[54] Faced with diminishing revenues, a sizable deficit and mounting debt-to-GDP, and the necessity to invest in an economic recovery post-COVID, the Government of Canada seems to be poised to favour social spending over military spending. In this respect, inevitable budgetary cuts in the coming years suggest a tough environment for increasing Canadian military expenditures beyond what was planned in *SSE*. Nevertheless, Canada is already investing in new warships, new fighters, and a Ground-Based Air Defence system that can all, if properly equipped, contribute to a defeat capability. Even if there is no new funding for NORAD modernization, these projects will all make a meaningful contribution.

Conclusion

A review of the circumstances that may have influenced the decision of Paul Martin's government with respect to BMD reveals some of the difficulties Ottawa may face in such a process: a divided public opinion, but one in which the opposition is particularly vocal and concentrated in certain electoral regions important to the governing party (in this case, Quebec, which is historically more suspicious of major defence-related projects); real or continuing uncertainty about the potentially destabilizing strategic effects and effectiveness of the proposed system; the attitude of public opinion towards the American leadership and its policies; the lack of consensus within the party in power and among the parties in the House of Commons; and the costs associated with the implementation of the project, which may in turn fuel the mistrust of part of the public opinion and the political elite. These factors are exacerbated by the fact that the government is a minority government and therefore likely to be facing an election in the near future. This review therefore suggests that the decision may be strongly influenced by domestic political considerations.

The situation of the Justin Trudeau government with respect to the NWS modernization project is, in some respects, reminiscent of the Martin government's confrontation with Washington's expectations of BMD, insofar as it is a minority government. Moreover, programs to mitigate the impacts of the COVID-19 pandemic are putting a great deal of pressure on the federal government's financial resources, making it vulnerable to cost arguments.

However, there is likely a window of opportunity for Canada to join missile defence if the government sees fit. The public's attitude towards a project of this nature (complex and far removed from the daily lives of citizens) is usually stimulated by other factors, sometimes only remotely related to the substance of the project. For example, the public opposition observed in 2004 and 2005 had been fuelled by the unpopularity of the Bush Jr. administration and its policies, particularly regarding international security. The idea that BMD was to be a system that worked primarily to the benefit of the United States, at the expense of strategic stability and even for aggressive purposes, was more likely to spread. Conversely, the defeat of Donald J. Trump, as unpopular in Canada as Bush Jr. was, particularly among Liberal voters, probably neutralizes one of the factors that might have convinced some public and political opinion to oppose a project perceived as leading to a closer association with the United States. The absence of such factors stimulating opposition to U.S. policies, coupled with the lack of any public debate on NORAD or missile defence since the mid-2000s – and the fact that this is not so much a matter of creating a new institution as of "modernizing" one that is generally well perceived by Canadians – probably helps to preserve the window of opportunity for a decision in favour of the project. Moreover, China's aggressive attitude, particularly towards Canada, may create a sense of vulnerability and a need to strengthen the security of the country and the continent, both in public opinion and in the political class.

The impact of the two elements that were problematic for the Martin government, namely the ways in which the project's purpose and costs will be presented, is still unknown. However, the unequivocal support shown by Canadians, including Quebecers since 2015, for the growth of the defence budget provides the government with some room to manoeuvre. If the window of opportunity described here does exist, it remains to be seen whether the government will use it. Probably the greatest risk to Canada's eventual participation in BMD is the absence of a decision.

Notes

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[17] Graham Fraser, "Defence Minister Admits he 'Lost War' in Cabinet," *Toronto Star*, 5 March 2005, A14.
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6 The Future of Canadian Participation in Missile Defence[1]

Nancy Teeple

Missile defensce in Canada is a controversial issue, due to Canadians' commitment to the elusive concept of strategic stability, which missile defence is believed to undermine. In addition, Canadian domestic opinion regarding Canadian-American relations is often challenged by the fear that Canadian foreign and defence policy would become so aligned with the US that Canada would lose its independence. Canadians' sensitivity to procurement costs challenges the acquisition of any new defence capability, which often becomes a matter of national debate. However, future uncertainties concerning the security and defence of North America, in light of the resurgence of great power competition, rogue state nuclear actors, and the rise of destabilizing technologies entangling the nuclear and conventional domains, require a revisit to the question of Canada's participation in missile defence in the years to come.

Canada is an active military player in the world; its geography and middle power status require that it partners with strong nations through bi- and multilateral alliances and defence partnerships in order to secure its safety, and in turn contribute to these alliances to reinforce trust and reciprocity. This is observed in NATO, NORAD, and the Five Eyes. As part of its contribution to North American defence, the time is long overdue for Canada to contribute substantively to US missile defence. The current threat context is distinguished from previous ones defined during the Cold War, post-Cold War, and post-9/11 security environments. The threats are variable, from multiple domains, and deployed by new and old actors.

This chapter explores how Canada's defence policy, strategy, and capabilities will adapt with the evolution of the Canada-US bilateral North American defence relationship. This adaptation will likely see Canada participating in missile defence in response to emerging threats in the international security environment, through the modernization of Canada's capabilities in multiple domains and the increasing integration of North American defence architecture with the US. Canada's preference for a passive, defence-dominant role in the binational relationship in NORAD and other bilateral agreements may shift to

incremental support to, and involvement in, missile defence and evolve from non-kinetic passive defence activities to offensive roles in new domains such as the cyber domain.

This chapter investigates 1) how Canada might adapt to emerging developments in missile technologies by joining missile defence; and 2) what options it might consider in terms of political palatability, cost-benefits, the modernization of current capabilities, and the development of new ones. Building upon the works of well-established experts, this chapter considers the changing concept of missile defence with advances in delivery technology – such as advanced cruise missiles, hypersonic vehicles, stealth aircraft, and new maritime platforms – designed to evade missile defence systems. This chapter begins with an exploration of the missile defence issue within the Canadian politico-strategic context, particularly the domestic issues regarding an independent Canadian foreign and defence policy, and Canada's commitment to arms control, non-proliferation, and disarmament. This discussion is followed by an examination of Canada's evolving role in the changing North American strategic landscape, which addresses the inconsistency of Canada's support for Aegis sea and land ballistic missile defence in Europe relative to its unwillingness to participate in North American missile defence. An evaluation of international developments in missile delivery technologies that challenge current early-warning and missile defence systems considers new concepts for passive and active defences. Finally, options for Canada within the evolving integration of multi-domain systems to enhance early warning and response. The options will be assessed within the politico-strategic context concerning domestic public opinion on the effect of missile defence on strategic stability, the costs of participation, and a uniquely Canadian contribution that satisfies North American defence requirements without compromising its partnership or national values.

The Canadian Domestic Political Context: Nuclear Weapons and Missile Defence

Since the beginning of the Cold War, Canada chose not to possess its own nuclear arsenal, and through successive governments, it hosted and then later rejected stationing US nuclear weapons in Canadian territory, and struggled with the decision of whether to join US missile defence programs. This section presents a brief consideration of the domestic issues within the Canadian politico-strategic context that pose challenges to Canada's participation in missile defence from the Cold War to the present. Domestic issues range from concerns about an independent Canadian foreign and defence policy, a two-track

contradictory policy on nuclear weapons, to Canada's commitment to strategic stability through promoting arms control, non-proliferation, and disarmament (NACD).

Canada has an ambivalent relationship with nuclear weapons and missile defence. Since the Cold War, Canada has maintained a commitment to strategic stability through arms control, nuclear non-proliferation, and disarmament. This includes anti-ballistic missile (ABM) systems, which undermine the logic of mutually assured destruction by threatening the other state's ability to retaliate with a nuclear strike. The mutual vulnerability created by the mutual threat of annihilation, or otherwise unacceptable damage to cities, disincentivizes the use of nuclear weapons, and thus creates an equilibrium of strategic stability. Such strategic defences cause instability by incentivizing states to create capabilities to evade missile defence through some asymmetric capability, a pre-emptive or preventive first strike. The ABM Treaty of 1972 (revised in 1974) imposed limitations on missile defence sites to allow for mutual vulnerability, while also ensuring the survival of leadership depending on whether the state chose to protect a capital city or a missile site.[2]

Canada's Policy Incoherence

From the Cold War to the present, Canada followed divergent policies on the role of nuclear weapons in national security, continental security, and European defence. During the Cold War, the Departments of National Defence and External Affairs were at odds on the value of nuclear weapons. Philippe Lagassé identifies the dissonance in Canada's two-track policy of promoting strategic stability through NACD alongside maintaining its alliance obligations, which divided the Departments of National Defence and Foreign Affairs. On the one hand, Canada "tacitly endorsed and facilitated the United States' offensively oriented nuclear strategies," while (to support strategic stability and arms control) discouraging "offensive nuclear doctrines and the arms races they have tended to fuel." Lagassé argues that this contradictory two-track policy served Canadian national interests. The defence of North America required "maintaining a credible nuclear weapons posture," in spite of the emphasis on the "futility of nuclear war and arms races."[3] Notably, Lagassé affirms that the technological development of Ballistic Missile Defence (BMD) threatens to "expose the contradiction and force Ottawa to give precedence to strategic defence over strategic stability, or vice-versa."[4] He states that:

> The belief that BMD was destabilizing meant that Canadian participation in the system was inimical with Ottawa's declared support of strategic stability. Yet declining a role in BMD called

> into question Canada's commitment to the strategic defence and the logic of transmitting tactical warning and attack assessment data to NORAD. Simply put, BMD was forcing an intersection, and possible collision, of Ottawa's two-track approach to nuclear politics.[5]

Complimentary to Lagassé's two-track model is Erika Simpson's[6] argument that Canadian policymakers held two divergent views on nuclear weapons during the Cold War: 1) Defenders who focused on the Soviet threat and believed that Canada's security as guaranteed by the U.S. and NATO's nuclear deterrence, was suitable and reliable; and 2) Critics who argued that the Soviet threat was exaggerated and that Canada was trapped into war by its allies, and who doubted NATO's deterrence doctrine.[7] Like Lagassé and Simpson, Duane Bratt identifies the "schizophrenic" nuclear policy of Canada, in which Canada deployed nuclear weapons in Canada[8] and supported the US deployment of nuclear weapons in European NATO states,[9] while actively promoting nuclear non-proliferation internationally: "Canada will continue its long tradition of nuclear cooperation with the United States – even as it strides the international stage as a leading proponent of nuclear disarmament." Bratt affirms that Canada's security is dependent on its relationship with the US and that nuclear weapons are critical in American defence doctrine, and reminds us that Canada "remains firmly under the protection of the American nuclear umbrella." Bratt also suggests that Canada will "in the end" support U.S. missile defence, which will either be financial or entail allowing the U.S. to use Canadian territorial airspace.[10]

Fergusson argues that Canada pursued a doctrine of separation in order to keep missile defence off the public agenda, due to the link to US strategic nuclear forces and its implicit link to space weaponization. Keeping BMD "at a distance" was Canada's preference, "even if it has meant that the defence of Canadian territory and population centres would be left to the discretion of Canada's southern ally."[11] The doctrine of separation involved treating nuclear weapons, missile defence, and military space as separate "policy baskets," but all are linked in Canadian policy through NORAD. This approach is intended to keep strategic missile defence separate from Canadian progress on bilateral cooperation on the military uses of space. Fergusson argues that this separation is unlikely to continue if Canada moves forward to consider reversing its policy on missile defence, placing the issue on the public agenda.[12] Fergusson argues that in Canada's pragmatism there is no need to change its approach, but the issue of military space vis-à-vis its relationship to US Strategic Command (STRATCOM) will likely be part of the public debate when missile defence resurfaces on the agenda.[13]

The role of public opinion was particularly influential in the decisions of the previous Diefenbaker, Pearson, and Trudeau governments to either station nuclear weapons in, or remove them from Canada. Varying degrees of public opinion had an impact on the Canadian government's decision not to participate in missile defence since the ABM debates in the 1960s. Collins states that the variables involved in these decisions included anti-Americanism, the influence of Quebec politics, and fears of space weaponization.[14] Canada declined an ABM role in 1967, Mulroney turned down formal government support of the Strategic Defense Initiative (SDI) in 1985, Paul Martin dithered and declined in 2004/05, Harper/Baird considered BMD and rejected participation in 2012,[15] a 2014 Senate recommendation considering a role for Canada was ignored,[16] in 2015 Trudeau indicated that BMD was off the table for Canada, and in 2017 Trudeau reiterated that the Liberal long-standing opposition to missile defence would not change "any time soon."[17] However, Trudeau's responses appear to merely push the issue down the road rather than closing the door on the matter.[18]

The manipulation of public opinion on the dangers of Canadian participation in missile defence includes playing on Canadian fears about giving up sovereignty to the US, prohibitive costs, the effectiveness of interception technology, diplomatic consequences, and questions of whether Canada faces a threat. Debate among scholars on these issues is gradually narrowing, as evident in the 2018 Macdonald-Laurier Institute (MLI) report on a survey of experts about whether Canada should participate in Ballistic Missile Defence (BMD).[19] The report indicates that the majority of Canadian defence and security scholars, and missile defence experts argue that Canadian involvement in BMD would not worsen Canada's diplomatic relations, with some arguing that it would better align Canadian foreign and defence policies with the NATO BMD program. Technical and operational limitations should not dissuade Canadian involvement, but rather limited BMD gives Canada access to a system under a "great power guarantor."[20] One might also argue that a limited system would enhance strategic stability through preserving some vulnerability. The financial cost is certainly a concern, given that the US has not provided a figure for Canada to consider its participation, and Canada is reluctant to consider participation without first seeing the price tag. For instance, McDonough argues that cost, rather than logically inconsistent criticisms about the effectiveness of BMD, is the "only element of uncertainty" about Canadian participation. The cost would also be affected by how Canada participates, whether through hosting radars or interceptors, or some other support. This is what McDonough describes as a "known unknown," namely, "what the United States may require from Canada to secure both participation in missile defence and involvement in the

interception process in North America.[21] Canadians are already sensitive to the costs of procuring new defence equipment and capabilities that they think are unnecessary, and uninformed and politicized opinions often have an impact when procurement becomes an item of national debate.

Criticisms about the effectiveness of Ground-Based Midcourse Defense (GMD) Ground Based-Interceptors (GBIs), in addition to the other systems – Patriot, Aegis, THAAD (Terminal High Altitude Area Defense) – were refuted by responses in the MLI report that recent testing demonstrates the increasing success of interception. Collins states that arguments that the system is "technologically infeasible and ineffective" are unfounded given the GMD system's proven capability to "deploy sophisticated countermeasures, decoys, and other advanced technologies," such as multiple independently re-targetable vehicles (MIRVs), hypersonic speeds, and maneuverable glider technology.[22]

The MLI survey results demonstrate that the Canadian epistemic community is becoming more receptive to a Canadian role in missile defence, suggesting the time is ripe for an open and informed public debate addressing the realities of the emerging North American threat and Canadian position, geographically and geopolitically. Benefits to Canada involve either its increased integration into the defence architecture of North America, providing it with access to information on strategic planning and space, or achieving limited decision-making authority.[23]

Canadian domestic opinion regarding Canadian-American relations is often challenged by the fear that Canadian foreign and defence policy would become so aligned with the U.S. that Canada would lose its independence. A debate among scholars regarding this decision concerns "defence against help" with respect to Canadian sovereignty and security concerns that the United States would take action to protect its national security interests by "helping" Canada defend North America. This concern otherwise motivated Canada, as a smaller power relative to its great power neighbour, to establish credible measures, in the form of military capabilities in cooperation with the US, to defend against external threats emanating from Canadian territory bordering on the Arctic[24] – the avenue of Soviet aerial threats to the continent. The concept of "defence against help" has often been used to justify Canadian defence decisions to participate or not participate in nuclear sharing or strategic defence (missile defence), fearing "United States continental defence priorities as a threat to Canadian sovereignty … owing to potential territorial encroachment to protect the American heartland." Although "defence against help" provided a useful descriptive framework to understand Canada's approach to managing "continental security-sovereignty dilemmas" from the 1930s to the end of the

Cold War, P. Whitney Lackenbauer correctly affirms that the "defence against help" concept is unhelpful as a decision-making strategy for Canada in the 21st century continental defence context. Rather, a rational analysis of the benefits to Canada from its bilateral and binational defence partnership should guide defence policy and investment in essential capabilities in response to evolving threats to the shared homeland.[25]

Lackenbauer's argument that Canada should calculate the benefits of its security and defence partnership with the US finds support in the shift in the Canadian government's[26] activism in nuclear arms control and disarmament from the late 1990s to a quieter, almost silent, approach to NACD in the past decade. This shift, or retreat, in NACD activism correlates with the increasingly uncertain international security context characterized by a return to great power competition, with threats emerging from new domains, and by the development of destabilizing weapons systems. A likely explanation is that Canada is increasingly aligning its national security interests with those of the United States – its powerful ally and partner in NORAD, NATO, and the Five Eyes, among other bilateral defence cooperative agreements – within this uncertain and unpredictable global and continental security environment. As the Western liberal order is increasingly under threat by revisionist states, Canada is becoming more pragmatic in its appreciation of the growing threat and the benefits of its relationship with the United States, through greater investment in continental defence. This alignment may also reflect the increasing consistency between Canada's Global Affairs and Department of National Defence on nuclear issues, potentially impacting future decisions on missile defence participation. The evolution of North American defence opens the door for increasing participation in strategic defence via emerging integrated domains.

Revisiting Canada's Role in North American Strategic Defence in a Changing Landscape

The global strategic landscape has progressively changed since 9/11, demonstrating that North America was not immune to threats and actors originating abroad. The US withdrew from the ABM Treaty in 2002 in response to the growing threat of rogue nations or terrorists using weapons of mass destruction (WMD) against the US and its allies. This step included the US' modernization of the nuclear triad, which entailed expanding national missile defence with active and passive defences, responsive infrastructure, command and control (C2) and intelligence planning, and the entanglement of nuclear and non-nuclear strike capabilities of the sea (SLBMs), air (bombers), and land delivery platforms (ICBMs). The New Triad "offers a portfolio of capabilities

and the flexibility required to address a spectrum of contingencies."[27] Russia and China responded to the US withdrawal from the ABM Treaty with nuclear modernizations of their own. Rogue states such as North Korea and Iran pursued nuclear weapons technology and ballistic missile delivery technology. North Korea became a nuclear weapon state in 2006,[28] while Iran continues to develop its nuclear and ballistic missile program.

The GMD program developed out of the 1999 National Missile Defense Act's policy to "deploy as soon as is technologically possible an effective National Missile Defense system capable of defending the territory of the United States against limited ballistic missile attack (whether accidental, unauthorized, or deliberate)."[29] In the post-9/11 and post-ABM context, and within the guidelines of the 2002 Ballistic Missile Defense Review (BMDR) and 2002 National Security Presidential Directive-23 (NSPD-23), the Bush II administration proceeded with developing this system of interceptors and radars[30] to protect the US homeland from WMD terrorism and rogue states with nuclear ambitions. The architecture and concepts continued to evolve from the Bush to the Obama administration, and following.[31]

In 2010, US/NATO began the first of a series of phases to deploy ballistic missile defence in Europe,[32] through the European Phased Adaptive Approach (EPAA) centred on Aegis sea- and land-based missile defence system deploying SM-3 midcourse interceptors. The Active Layered Theatre BMD system capability is intended to protect deployed NATO forces from short-, medium-, and intermediate-range ballistic missiles launched from Iran. The system is evolving with upgrades to the SM-3 and integration with land- and sea-based sensors.[33] The US also cooperates with allies in the Pacific theatre to deploy Aegis systems with Japan, South Korea, and Australia.[34] Since the 2010 Lisbon Summit, Canada has committed its support to ballistic missile defence in Europe and the Pacific theatre, but not in the continental US.[35] Canadian critics fear that Canada's participation will undermine arms control and encourage destabilizing nuclear arms races by provoking Russia into developing offensive delivery systems. Canada has avoided bilateral engagement with the US on BMD, preserving the status quo; while Russia and China proceeded to develop longer-range conventional and nuclear offensive strike systems, and North Korea continues advancing its ICBM technology to strike targets on the west coast of North America.

The North American strategic context is evolving in unpredictable ways as the international security environment becomes more uncertain. In addition to the evolving threat of terrorism and rogue states that emerged in the post-9/11 context, the US and its allies are now seeing a return to great power competition

with Russia and China. The trajectory of destabilizing events began with Russia's annexation of Crimea in 2014, its support to separatists in Eastern Ukraine, and its 2015 assistance to the Syrian Assad Regime against anti-Assad rebels in the region. The increasing deterioration of relations between the West and Russia corresponds with NATO's support to allies in Eastern Europe with its enhanced forward presence to counter Russian aggression.

The rise of revisionist states includes China's expansion in the South China Sea, its increasingly aggressive behaviour against Western allies in the Asia Pacific, and its anti-access/area-denial strategy to push US assets out of the region. Russia is also deploying denial assets in Eastern Europe, the Eastern Mediterranean, and its Arctic territory. Russia and China's strategic behaviours are both regional and global. Of particular concern for Canada and the US is the development of long-range strike capabilities against North America. Russia poses the greatest threat with its hybrid methods of aggression below the threshold of conflict (including disinformation), offensive cyber operations, and advances in nuclear weapon delivery technology. At its Arctic bases, Russia's land, sea, and air platforms are being modernized with hypersonic vehicles and advanced cruise missile technology that can threaten North America from a standoff position. China maintains a minimum deterrence posture with a No First Strike policy, but as its warhead numbers grow, in conjunction with the modernization of its capabilities, including the conventional and nuclear entanglement of C2, this posture could change from defensive to offensive. Strategic cooperation between Russia and China intended to "reinforce strategic stability" may include Russia's assistance with China's modernization of its nuclear and conventional forces.[36]

Rogue nations are increasingly posing a threat to North America. As North Korea appears to achieve increasingly long-range ICBM capability to strike North America, the issue becomes a real concern for Canada. Its west coast could become a soft target for North Korea to demonstrate its resolve and capabilities to the US or to coerce it from interference in the Korean Peninsula. Iran poses a challenge to North America's east coast since the US withdrew from the Joint Comprehensive Plan of Action (JCPOA, i.e., the "Iran Nuclear Deal"). This development loosens the constraints on Iran's nuclear weapon and ballistic missile delivery program, which involves achieving short-, medium-, intermediate-, and long-range missile capabilities. If Iran develops the capability to strike the east coast of the US with a nuclear weapon, Canada will also be at risk. The ending of bilateral arms control agreements like the INF Treaty, New START, and multilateral treaties, such as Open Skies and the JCPOA, contributes to an atmosphere of nuclear competition between the US/NATO and its adversaries, as observed in capabilities designed to defeat missile defence

systems. What is global is now regional – North America is facing unprecedented evolving threats against the continent.

Evolving North American Security and Defence

NORAD expert Andrea Charron describes the unprecedented transformation as comprising a shifting geostrategic and geopolitical landscape, in conjunction with the emergence of new weapons systems in her evaluation of the evolution of North American defence.[37] The former NORAD and USNORTHCOM Commander, General Terrence O'Shaughnessy, states that "[w]e face a more competitive and dangerous international security environment today than we have in generations. And like yesterday, our security environment is marked by the re-emergence of Great Power competition with an evolving balance of power." O'Shaughnessy identifies threats to North America as Russian aircraft and surface ship incursions into the Arctic, Russia's development of hypersonic missiles tipped with both conventional and nuclear warheads, and subsurface nuclear torpedoes. He identifies the most geographically vulnerable area as the Canadian Arctic, where Russian forces are active. Vulnerable targets include the North American economy, in which communications networks, dams, pipelines, power grids, and roads can be attacked. The General states that NORAD is evaluating new ways to counter North American threats.[38] More recently, the General affirms that Canada and the US have lost their military advantage over Russia in the Arctic, as Russia has been expanding its capabilities in the region, improving its air, maritime, and land platforms for delivering strategic weapons, like advanced cruise missiles. He states that "in order to reclaim our strategic advantage in the high North, it is critical that we improve our ability to detect and track surface vessels and aircraft in our Arctic approaches and establish more reliable secure communications … in the higher latitudes" through a network of space-based and underwater sensors linked with traditional radar systems.[39] In order to improve the ability to monitor activities in the North, the General promotes the Joint All-Domain C2 (JADC2) concept through NORAD and USNORTHCOM – a joint capability necessary for homeland defence, and which provides domain awareness in real time to sense incoming ballistic missiles and new hypersonic glide vehicles and cruise missiles. This program intends to link sensors with shooters and use predictive analysis to advise decision-makers facing complex decisions on the consequences or outcomes "at the speed of relevance."[40]

General O'Shaughnessy's recommended responses to the growing threat are part of Canadian and American efforts to close the gap in capabilities to detect, deter, and defend against new threats to North America. Charron and Fergusson

address the challenges of the modernization and evolution of North American defence,[41] which have implications for Canada's future participation in missile defence. Explored within the framework of the Evolution of North American Defence (EvoNAD), the binational Canada-US NORAD command evaluates the long-term implications of strategic developments.[42] Charron states that "[a]t EvoNAD's core is the examination of immediate and future threats to North America and the utility of current defence structures and capabilities to meet them."[43] This process requires a re-evaluation of the requirements to counter threats emerging in multiple domains, in conjunction with revisions to Canada-US defence cooperation. The defence of the US involves the defence and security of Canada due to its geographical location at the top of the North American continent, bordering the Arctic from which aerial, ballistic, and maritime threats may arrive via the Arctic, Pacific, and Atlantic Oceans. Charron predicts greater Canada-US cooperation in the current and evolving context and suggests that "the functional demands of this new threat environment could lead to NORAD's ultimate transformation into an integrated, multi-domain and dimensional North American Defense Command solution."[44] Canada's defence policy outlined in the 2017 White Paper *Strong, Secure, Engaged* (*SSE*) does not discuss missile defence, but it does address new threats and challenges in the North American and Arctic context; the importance of the binational command, NORAD, and its need to evolve with the threat; and the necessity of upgrading the North Warning System.[45] However, *SSE* is silent on allocating funds to some of these initiatives. Fergusson notes that the Canadian public is "largely uninformed and disinterested" about NORAD modernization and the North Warning System, while the Trudeau government remains silent on the issue.[46]

The North Warning System (NWS) comprises a network of long- and short-range radars in the High North to detect and provide early warning of air and missile incursions into North America. This system is integral to Canada-US defence cooperation on North American security as it is directly related to the evolution of North American defence in light of emerging technological advances by adversaries.[47] Built in the 1980s, the NWS was a response to the air-launched cruise missiles (ALCMs) that emerged in the 1970s.[48] The NWS is incapable of managing the modern threats posed by ALCMs today. Charron highlights the gaps in which the NWS cannot identify and track Russian long-range bombers before reaching North American airspace, when they arrive at their ALCM launch points over the Arctic Ocean or further distances, and the radars cannot track ALCMs in flight due to their low radar profile signature and terrain flight paths.[49] A limited number of US air warning and control system (AWACS) platforms to detect ALCMs and sea-launched cruise missiles (SLCMs) from a

distance from North American coasts are available, but Canada still has no ground-based air defence to intercept missiles.[50] Fergusson adds ground-launched cruise missiles (GLCMs) to the problem mix, suggesting that a long-range GLCM threat against North America may be possible if Russia deploys them in the Arctic.[51] Thus, Charron asserts that the next-generation NWS will need to identify and track air-breathing threats and maritime threats. It requires ground-, sea-, and space-based sensors, and needs to move further North and down the North American east and west coastlines. A "new NWS will entail integrated land, air, sea and space systems into a single system-of-systems construct."[52] Charron suggests that with new capabilities being developed by Russia, namely next-generation long-range ALCMs and SLCMs, in addition to hypersonic delivery vehicles, the conditions are set for the "merger of air and missile defence, and the air and outer space domains."[53]

New Capabilities and New Deterrence Concepts

Missile Delivery Technological Challenges to Current Early Warning and Missile Defence Systems

The *2019 Missile Defense Review* (MDR) outlines the new direction for America's missile defence strategy in response to innovations in offensive weapons systems, including new domains, that threaten the US homeland.[54] In describing the new challenges that leave gaps in the missile defence capabilities to track, target, and destroy missiles, the MDR also outlines improvements in the missile defence systems of adversaries. One might consider whether a missile defence gap is emerging within the strategic competition, particularly considering the increasing denial capabilities being pursued by Russia and China.

The 2019 MDR is consistent with the policy, strategy, and capabilities outlined in the 2017 *National Security Strategy* (NSS), 2018 *Nuclear Posture Review* (NPR), and 2018 *National Defense Strategy* (NDS). These documents outline the emerging strategic challenges and requirements for new concepts and capabilities, including expanding the nuclear arsenal and missile defences to respond. Both General O'Shaughnessy and the MDR describe the need for a layered integrated system to manage all missile threats, not just ballistic missiles, but hypersonic glide vehicles (HGVs), advanced cruise missiles (CMs), ISR (intelligence, surveillance, reconnaissance) gaps, and other challenges.[55] In a statement at the Center for Security and International Studies (CSIS) in 2019, O'Shaughnessy indicated that existing and planned BMD is capable of meeting the threat from North Korea, but it was never designed for the large Russian and Chinese stockpile of missiles capable of flying at various ranges.[56] The evolution and expansion of missile defence reflects the shift in nuclear posture from the

former administration. However, as early as 2015, the *National Security Strategy* described increasing concern for a potential catastrophic attack on the US homeland or critical infrastructure. The 2018 NPR is distinguished from the previous NPR, as a "return to pragmatism" in an "uncertain future security environment." This pragmatism justifies expanding and diversifying the nuclear arsenal; in addition to a shift from a mission limited to defending against ballistic missiles (BMD), to defending against new missile threats posed by hypersonic vehicles and advanced cruise missiles, and possibly detecting and intercepting unmanned underwater vehicles. This shift invites broader missile defence concepts.

In considering new deterrence concepts, O'Shaughnessy argues that the question of deterrence has changed in dealing with Moscow and Beijing. When the adversary has hypersonic, cruise missiles, and cyber capability, he asks whether there are new definitions of "cost imposition" on them to deter attack. He suggested that the US response does not have to be kinetic, but could be a cyber response to deter an aggressor.[57] One might suggest that the original purpose of BMD, namely to reduce or eliminate the coercive and deterrent value of weapons[58] – i.e., deterrence by denial – remains the central concept. Determining the methods through which to achieve this purpose against multiple weapons in multiple domains is the challenge, including conventional, unconventional, kinetic, and non-kinetic means; in addition to the requisite ISR capabilities in all domains.

New Offensive Weapons Systems

The conditions under which the US withdrew from bi- and multilateral arms control (ABM, JCPOA, INF, Open Skies) provide a strong indicator of future cooperation, including potentially allowing New START to end in 2026 without negotiating a new treaty to replace it.[59] As the US and Russia lose confidence in arms control, we are seeing the removal of the constraints on destabilizing technologies, in conjunction with the emergence of new systems not addressed by arms control. Under these conditions, Russia is developing capabilities intended to bypass early warning and missile defence. Russia's cooperation with China on new systems also has implications for North American security. In developing technologies to offset American conventional and nuclear advantages, Russia and China attempt to restore parity by having capabilities that can defeat missile defence. Notably, CSIS reports that "[f]oreign missile threats have continued to evolve in number, range, sophistication, and survivability." They are longer-range, more accurate, and diverse. The multifaceted threats that could overcome the current defence systems of the US and its allies include "advanced cyber intrusions, electronic warfare, and hypersonic boost glide vehicles."[60]

The Threat from Russia

> *Efforts to contain Russia have failed … nobody wanted to listen to us. Listen now.* – President Vladimir Putin, 2018[61]

The most pressing missile threat to North America is Russia. At the 1 May 2018, State of the Union Speech in Moscow, Russian President Vladimir Putin unveiled new high-tech nuclear weapons in response to Western anti-missile systems that could erode Russia's nuclear deterrent: underwater drones, intercontinental missiles, and hypersonic weapons designed to evade missile defences. Putin argues that Russia's growing military might will ensure strategic stability in the world.[62] Pointing to the US withdrawal from the ABM Treaty, Putin blames the West, particularly those who "seek unilateral advantage against Russia," for creating conditions that require Russia to develop advanced strategic weapons. Putin's statements provide a glimpse into Russian intentions to secure its ability to threaten the West asymmetrically with new weapons systems, which could be used as coercive tools so that Russia can continue to expand its sphere of influence. In defending Russia's position, Putin identifies the US nuclear strategy as threatening to lower the nuclear threshold, so that any use of nuclear weapons against Russia would result in an "immediate response." Russian advances in nuclear delivery systems pose the greatest threat to North America,[63] as do North Korean ballistic missile and nuclear programs. Russia-China cooperation[64] – "Our comprehensive strategic partnership with the People's Republic of China" – may involve Russian assistance to Chinese advancements in their nuclear forces, reinforcing the threat of this new strategic peer competitor.

Russia is the only nuclear peer competitor to the United States, although China is quickly becoming a competitor by rapidly modernizing its comparatively smaller arsenal. Russia's modernization of its large and diverse arsenal includes a number of technological offsets for which current US missile defence and early warning are not equipped, namely the Avangard hypersonic glide vehicle, a new heavy ICBM (Sarmat) with MIRVs, the new Bulava SLBMs with MIRVs deployed on Borei-class ballistic missile submarines (SSBNs), the Kinzhal high precision air-launched ballistic missiles (deployed on Tu-22M3M, MiG-31k interceptors, and planned for the next-generation Sukhoi-57 stealth fighter), the Kh-101/Kh-102 Raduga conventional and nuclear-capable long-range standoff ALCM (deployed on Tu-160, Tu-95MS16, Tu-22M3/5, and Su-27IB (Su-32) strategic bombers),[65] the Kalibr land-attack cruise missiles, the Poseidon autonomous underwater vehicle,[66] and the (failed) Burevestnik hypersonic cruise missile. Hypersonic capabilities are particularly problematic for missile defence. HGVs travel at immense speeds (above Mach 5), as do ICBM

re-entry vehicles; however, HGVs are incredibly maneuverable, which makes them difficult to track and intercept because they can change direction quickly and without predictability. Advanced cruise missiles also pose a significant challenge to missile defence due to their low-altitude path and maneuverability – they cannot be detected by ground-based radars until they close in on their targets.[67] The Poseidon unmanned underwater torpedo can use stealth to detonate a nuclear warhead against a coastal city. Russia's advantage in longer-range standoff weapons is that it can launch these systems from outside North American air- and maritime-space. Many platforms can threaten North America from Russia's Arctic territory. The INF Treaty-violating ground-launched cruise missile – the Novatar 9M729 (SSC-8) – can threaten NATO allies in Europe.[68]

As a revisionist state with global ambitions, China is modernizing its arsenal, which is currently a small minimum deterrent force with a "No First Use" doctrine. Like Russia, China is enhancing its SLCMs, ALCMs, and hypersonic capabilities, and developing new ballistic missile systems with MIRVs, maneuverable re-entry vehicles (MARVs), decoys, and jamming devices.[69] Its strategic forces' modernization includes upgrading its road-mobile ICBM numbers with MIRVs and shifting to solid-fuel rockets. With these developments, China is attempting to asymmetrically offset US strategic advantages by pursuing capabilities to assure retaliation against the US.[70] China is deploying anti-aircraft/aerial-denial (A2/AD) systems including a "wide range of mobile air and missile defence capabilities" to deny the US the capability and freedom of action to protect allies in Asia. These include regional ballistic missile strike capabilities at medium- and intermediate-ranges, in addition to anti-satellite capabilities that can threaten US space-based assets.[71] China's qualitative and quantitative modernization indicates a shift from minimum deterrence to an offensive posture. China's regional and longer-range delivery systems are not the only threat to the US and its allies; its Arctic ambitions[72] and cooperation with Russia create new challenges for North American defence and countering China in the polar region.

North Korea is rapidly advancing its ballistic missile program, including intercontinental range capabilities in the Pacific region. In addition to explicitly threatening the US with nuclear weapon use, it has increased testing of its ballistic missiles signalling to the US and regional allies its intention to use its capability for "coercive nuclear pre-emptive threats," and potentially "employ nuclear weapons in the event of conflict in Asia."[73] North Korea's ICBM ambitions could threaten the US homeland, and by proxy, Canada's west coast. Political rhetoric and missile tests put the issue on the Canadian radar, and the question of Canada's participation in missile defence was briefly mentioned in the Canadian

media. Participation would benefit Canada, protecting it from a missile that could accidentally strike Canadian territory by missing its US target, or a deliberate "soft targeting" of Canada to coerce the US into a confrontation.[74] The 2019 MDR indicates that North Korea's investment in extensive missile testing has "neared the time" when it could credibly threaten the US homeland.

Iran seeks to expand its regional influence and status through its nuclear and ballistic missile program. Iran's nuclear program inspired US and NATO plans to deploy the BMD system in Europe. Its success in achieving "improved accuracy, range, and lethality" can threaten US forces and allies in the Middle East, Eastern Europe, and South Asia;[75] and its longer-range developments may pose a challenge to the east coast of North America.[76] The latter development led the Obama administration to consider whether to install a GBI site in the northeast of the US. In Canada, this included discussion among defence officials and analysts as to whether Canada would install an X-Band radar site in Goose Bay, Labrador, to detect an incoming missile from the Middle East.[77]

New Concepts: Active and Passive Defences, and Attack Operations Should Deterrence Fail

As a distinct feature of missile defence, deterrence by denial is evolving with the threat and the modernization of the Triad. The denial mission of missile defence can range from partial to comprehensive defence – the former by deploying limited systems to protect a launch site, C2 site, or major (capital) city; and the latter to defend an entire nation (or continent) from all types of missile threats. Missile defence employs advanced technology with hit-to-kill vehicles guided by advanced sensor systems and a "look-shoot-look" doctrine. The missile defence architecture is improving with warhead tracking, target discrimination (one of the most difficult BMD tasks), and computer processing to increase its effectiveness. However, as the system improves, adversaries seek to develop less costly countermeasures and decoys to overcome the system.[78]

The Four Roles of Missile Defence

The 2019 MDR outlines the four roles or missions of missile defence: deterrence, active defence, passive defence, and attack operations. These are presented below with assessments of their offensive and defensive roles, kinetic and non-kinetic capabilities, and their capacity to ensure that adversaries cannot threaten the US with long-, medium-, or short-range ballistic missiles or cruise missiles.

Role 1: Deterrence

Deterrence is a concept based on the rational calculation of the costs versus benefits of taking an action, and disincentivizing an actor to take a certain action

by imposing consequences that far outweigh the benefits of taking the action. Mutually assured destruction[79] embodies this concept between nuclear competitors that use their nuclear forces to mutually threaten countervalue targets – economic and population centres and C2. This is deterrence by punishment, using the threat of retaliation to prevent an action. The mid-Cold War shift to counterforce – offensive strike options to disarm the adversary's nuclear platforms to prevent their launch – exemplifies deterrence by denial, which considers more credible options among a flexible spectrum of potential responses to nuclear threats. Missile defence provides the ultimate denial capability and thus is intended to disincentivize the adversary from attempting (or threatening) a strike because such action would be futile and would generate a counter-response. However, the point of missile defence is to provide options for denial if deterrence fails, which requires some combination of the three other functions: active defence, passive defence, and attack operations.[80]

Role 2: Active Defence

Active defence is the primary mission of missile defence capabilities – to intercept a missile in flight, at the mid-course or terminal phase. This is a right-of-launch denial role that can be perceived as offensive by the adversary (i.e., denying his ability to strike), or defensive by the state deploying the system for homeland defence or the defence of allies. The capability involves the kinetic interception of the missile via a hit-to-kill capability, although laser technology development is in progress to expand interception options.

Role 3: Passive defence

Passive Defence is described in the 2019 MDR as measures "intended to mitigate the effects of a missile attack" or "mitigate the potential effects of offensive missiles." The elements involved are hardening; dispersal; deception; redundancy; and the enhanced resilience and defence of bases, logistics, and other key facilities and functions.[81] This role for missile defence is defence dominant, reinforcing deterrence calculations in the mind of the enemy by providing the capability to survive a strike and retaliate with remaining capabilities. This defence-dominant role might offer the most receptive option for Canadian participation in missile defence beyond providing early warning/ISR.

Role 4: Attack Operations

Attack operations are described in the 2019 MDR as operations to destroy offensive missiles prior to launch. These operations are conceptualized as "left of launch" or "left of bang." This is what Charron and Fergusson refer to as intercepting the "archers" (platforms) rather than the "arrows" (missiles), pre-emptively.[82] Given the emergence of new domains of warfare, such as space and the cyber realm, attack operations can be carried out through kinetic or non-

kinetic means. Attack "left of launch" operations fall within pre-emption doctrine and are thus deterrence by denial systems that are by nature, offensive. They have the capability to disrupt, degrade, or destroy both first-strike and retaliatory nuclear platforms. Among the critics of missile defence, left of launch will be viewed as most problematic, potentially incentivizing adversaries to strike first before they lose their window of opportunity. Nevertheless, this capability also impacts the adversary's calculation of the costs of appearing to be preparing to launch a strike; rather than losing a missile by active defensive measure, entire platforms could be lost.

Left of Launch

Alternatives to active defence are being explored according to the 2019 MDR, promoted by STRATCOM and the Missile Defense Agency. The Director of Reserve Forces and Mobilization Assistant to the Commander of STRATCOM, Major-General Rick Evans, advocated for "integrated war-fighting solutions beyond an active defense."[83] Arguing that the US does not have the "money, capability, and capacity," the General indicated the importance of refocusing on passive defence, non-kinetic operations, tactical operations, and C4 network architectures: "missile defense is part of the holistic continuum of offensive and defensive war-fighting integration … It requires a global network of sensors, all-source intelligence, integrated fires — both left and right of launch — lethal and nonlethal and ballistic missile [C4] and intelligence. That is what is going to address today's and tomorrow's threats." The language of "left of launch" (i.e., left of bang) communicates an emphasis on denial, as adversaries themselves are seeking to "deny access in contested environments." In line with the MDR concept of an integrated approach to countering missile threats, Evans suggests that "there is more value potentially from pre-launch boost phase intercept, cyber and passive capabilities." Such capabilities include "hypersonic glide vehicles, boost-phase killers, improved sensors, better radars and kill vehicles, more capacity across the spectrum and … directed energy." Former Commander of Army Space and Missile Defense Command Lieutenant General James Dickinson stated that:

> For comprehensive missile defense, we need to strengthen and integrate other elements including defeating adversary missile systems left of launch or shortly after launch; layered approaches to include cyber, electromagnetic spectrum and possibly directed energy; and we also need to consider and remember that there is no silver bullet to defeating these threats.

Dickinson addressed the need for a space-based sensor layer as part of the "next generation space architecture to enable military operations."[84] As recently stated by O'Shaughnessy,[85] Dickenson also indicated that low earth orbit satellites will facilitate and provide advantages in communications and data transfer.

These new concepts and plans for technological innovation to carry out the four roles for missile defence (deterrence, active defence, passive defence, and attack operations) provides opportunities to explore options for Canada that span non-kinetic options, passive defences, and revised approaches to deterrence.

Options for Canada's Participation in Missile Defence

This section considers options for Canada within the evolving integration of multi-domain systems to enhance early warning and response. Exploring options considers Canada's operational role or involvement in the missile defence architecture. One of the challenges is whether Canada will participate in any offensive operations within the realm of active defence or attack operations that involve right or left of launch. As North American defence evolves and adapts – NORAD and the Tri-Command framework – Canada's contribution may span the defence to offense spectrum of options depending on the domain(s) involved. Early on, support for passive defence and providing enhanced ISR might best fit in with Canada's preferences, and these options might be considered along an incremental shift over time towards more active and offensive means. Canada may choose partial or full participation, but it remains to be seen what this would look like. Canada may also prefer a non-kinetic role, even in offensive operations, rather than a more active kinetic mission.

Canada's Current Role in Strategic Defence

The Canada-US continental defence relationship involves a series of formal and informal arrangements, namely NORAD, bilateral defence arrangements involving MOUs, and the Permanent Joint Board on Defence. Since 2006, NORAD's mission has involved aerospace warning and the control of air and space, airspace control (defence against air-breathing rather than aerospace threats, and maritime warning).[86] NORAD's limited role in missile defence is providing early warning and attack assessments. Although Canada is not a part of missile defence, it does cooperate in providing warning and characterizations of missile threats under its aerospace warning mission.[87] Canadians can warn the US about an impending attack, but they cannot participate in responsive decision-making or interception, which is NORTHCOM's mission. Canada is currently outside the protection of US GMD.[88] In a 2017 statement to a parliamentary committee, Lieutenant General Pierre St-Amand, Canadian

Deputy Commander of NORAD, warned that the US is under no obligation to defend Canada against an incoming missile: "We're being told . . . that the extant U.S. policy is not to defend Canada."[89] This situation could change in the context of evolving North American defence and security.

Several proposals for Canadian participation suggest expanding its existing roles in early warning, assessment, and data sharing. Other proposals include a more active interception role. Space and cyber domains offer unique opportunities for Canada to explore non-kinetic "left of launch" approaches to disabling systems electronically. New domains and advanced technological development offer Canada the option to participate in the research, development, and testing of kinetic and non-kinetic missile defence capabilities through Memoranda of Understanding (MOUs) with the US defence industry.[90] The following discusses contribution options in different domains, which Canada may choose to expand upon and pursue.

Cyber

Canada is slowly developing a cyber domain capability, although it remains behind its allies in this domain. Cyber could be an option for Canada to contribute to missile defence in a non-kinetic role to detect, disrupt, destroy, or deter adversaries' launch capabilities through offensive cyber-attacks. In 2018, Futter and Collins considered this option through the Bill C-59 framework, which expands the Communication Security Establishment's (CSE) mandate to allow for offensive cyber activities.[91] Although the CSE is administered under DND, it is likely that option would have to be a CAF-only role, which requires Canada to step up its Cyber Command to be capable. This role falls within the MDR's attack operations, which might have implications regarding acts of war, and may encounter resistance in the domestic Canadian context.

Of Archers and Arrows: Canada in Cruise Missile Active Defence

Charron and Fergusson recognize the need to intercept launch platforms "archers" and not just focus on the "arrows." This approach implies intercepts close to Russia, which could shift NORAD's posture from defence to defence/offence, via a pre-emptive strategy. This shift would involve delegating new authorities to NORAD or under the Tri-Command relationship purview, which the authors argue would have C2 implications. Charron and Fergusson suggest that Canada might prefer to leave the archers to the US, and focus instead on the counter-cruise missile defence function of intercepting arrows (active defence) by air-, ground-, and sea-based capabilities in a binational military division of labour. Although there might be limited domestic support for Canada hosting an interceptor site, Fleming suggests that Canadian interceptors would

increase its relevance to the US.[92] Canadian interceptors could also provide another layer against missiles that make it through US GMD.[93] In order to fill the gap in the North, they suggest that Canada could allow US fighters to deploy to Northern forward operating locations (FOLs) for the archer mission. Although a politically contentious issue, they argue that this approach is covered by NATO Article V.[94] In addition, this approach would be consistent with supporting the US BMD system in Europe. Fergusson suggests that in light of the delay in the replacement of the CF-18 with anti-cruise missile capabilities (which also may not be sufficient), shorter-range, ground-based, anti-cruise missile defences (like a point defence system) might be necessary to defend limited geographical areas. He notes that *SSE* prioritizes ground-based air defences for investment for overseas, but also possibly for North America. He suggests, however, that Canadian homeland point defences are unlikely to be part of NWS modernization cost-sharing.[95]

The maritime threat is also relevant to defence against cruise missiles, particularly those launched from sea-based platforms. These SLCMs become air-breathing threats, which might require integrating air and maritime defence, linking the regional commands.[96] Currently maritime, defence cooperation occurs between the Royal Canadian Navy and the US Navy through MOUs.[97] McDonough considers the maritime option for Canada's participation in missile defence through the backdoor of NATO – a multilateral rather than bilateral option, to which Canada might be more receptive. This option involves a Canadian role in the sea-based Aegis BMD mission, and considers whether this role should involve long- or short-range missiles, and/or perhaps cruise missiles.[98]

Early Warning / ISR

Some analysts argue that Canada is already a "de facto" participant in a ballistic missile warning role through NORAD,[99] which supports missile defence, if indirectly. With the evolution of North American strategic concepts and defence, NORAD could expand its role into new areas, particularly all-domain awareness in the Arctic,[100] an important capability being promoted by General O'Shaughnessy.[101] One challenge is that NORAD is no longer the only early warning provider. The US has deployed other systems that provide missile defence warning, such as new fixed and mobile X-band radar assets that provide tracking and cueing capabilities, and sensors that feed information to ground- and sea-based systems not linked to NORAD and outside GMD.[102] However, there is a debate about whether these other systems make NORAD obsolete, or merely result in curtailing its aerospace role.[103] Charron and Fergusson maintain that NORAD is the obvious solution to the demands of the new threat environment. If it provides surveillance to more domains, it provides the

Commander with more information that takes "decisions further out in time and space." This role expands NORAD's missions while also distancing the Command from "the threat to bang continuum."[104]

New Radars and Sensors

Fergusson argues that participation begins with interception or a dedicated co-located radar not linked to NORAD or its early warning mission.[105] NORAD provides early warning to missile defence, which is the extent of its role in that program. Canada could deploy a radar in contribution to NORAD's early warning and thereby formal participate in missile defence, which would provide Canada with its desired access to US continental missile defence intelligence, systems information, and operational planning.[106] At the time, Fergusson stated that early warning is not missile defence, but that could change with a decision to establish a third site in the northeast of the US to counter Iranian developments in long-range ballistic missile technology in conjunction with successfully achieving a nuclear capability. This third site would require greater participation,[107] at the very least a Canadian radar site on its east coast – an X-band radar site in Goose Bay,[108] as proposed in 2005. Fleming suggests that Canada could station radar and sensor sites in its territory to "assist in the detection, discrimination, and tracking of missiles … as well as the determination of a successful interception." By virtue of its geography, Canada would provide a valued contribution in support of an interceptor site in the northeast US, in the event that Iran succeeds in advancing its ballistic missile and nuclear program to ICBM capability.[109]

Outer Space

Canada's space assets provide an opportunity for an expanded role in missile defence through enhancing space situational awareness. As part of the US Space Surveillance Network, Canada's Sapphire satellite indirectly provides data to both NORAD and the GMD system through Strategic Command.[110] Although Canada-US space cooperation has been managed bilaterally outside NORAD (although NORAD tracks inbound missiles and other objects in orbit),[111] a revisit to Canada's participation in missile defence would impact NORAD's role in keeping early warning separate from missile defence.[112] In addition to Sapphire, other Canadian space assets might provide an option to be integrated into a missile defence role, such as the polar RADARSAT-2 and RADARSAT Constellation, which could enhance all-domain awareness.[113] Fergusson suggests that "asymmetric" contribution in space would allow Canada to be involved in strategic defence in the hope that it would lead to NORAD obtaining a strategic defence C2/ballistic missile mission. This option allows Canada to contribute

asymmetrically, and "keep strategic defence at a distance," which is less problematic for domestic politics.[114] Fergusson mentions that it is uncertain how space security will unfold over the next decade, and since the publication of his article, the space domain has emerged as a significant strategic region, including the standing up of the US Space Force. Adversaries' developments of kinetic and non-kinetic anti-satellite weapons threaten satellites networked to ground systems through disruption, disabling, and possible destruction. The Canadian defence interest in accessing space implies possible future investments in non-kinetic defensive space capabilities, such as "satellite hardening, maneuverability, stealth, reconstitution alongside surveillance," rather than denial capabilities, which imply a role in space weaponization. Canada's interest in the peaceful uses of outer space would be maintained through this passive defence capability, leaving the more problematic offensive missions to the US.[115]

Conclusion

This chapter predicts that Canada's thinking on continental defence requirements will shift towards increasing support for missile defence, particularly in the post-INF context, as adversaries increase their ability to threaten North America with advanced missiles and other offensive systems. The evolution of North American defence, including its missile defence architecture with new deterrence concepts and capabilities, opens the door to a re-evaluation of Canada's participation. With the increasing integration of domains and capabilities in the evolution and modernization of the binational defence command, opportunities open for new Canadian roles in the continental defence architecture. A variety of options are available, with the potential to expand contribution from early warning, assessment, and data sharing, to actively deploying interceptors, or taking an offensive non-kinetic role. These options will depend on the receptivity in the domestic political context, sensitivity to cost, sovereignty, and the perception of supporting the US offensive nuclear posture. Canada's receptivity and role will also be influenced by the uncertainty created by the evolution of missile threats from adversaries. These include Canada possibly becoming a target for adversary coercion to demonstrate resolve to the US, testing its extended deterrence policy, and efforts to divide allies. The Canadian pragmatism in joining the US in North American missile defence provides benefits by increasing its credibility as a defence partner, strengthening the binational relationship, enhancing its leverage and influence in decision-making processes, and ensuring it prepared for the risks, threats, and challenges posed by an increasingly uncertain and unpredictable security environment.

Notes

[1] Prepared for the 2020 Homeland Defense Academic Symposium hosted by NORAD and USNORTHCOM (virtual event), 1-3 December 2020.
[2] The 1972 ABM Treaty permitted missile defence to protect two targets – one missile silo and one city. The 1974 Protocol imposed further limitations on systems so that only one site could be defended – a city or a silo. NTI, "Treaty on the Limitation of Anti-Ballistic Missile Systems (ABM Treaty)," Overview – Nuclear Threat Initiative, 26 October 2011, https://www.nti.org/learn/treaties-and-regimes/treaty-limitation-anti-ballistic-missile-systems-abm-treaty/.
[3] Philippe Lagassé, "Canada, Strategic Defence, and Strategic Stability: A Retrospect and Look Ahead," *International Journal* 63:4 (2008): 918-37.
[4] Lagassé, "Strategic Defence," 918.
[5] Lagassé notes that Washington was largely indifferent to Canada's participation in BMD, an aloofness which allowed Canada to decline a role in missile defence without affecting NORAD's air and tactical warning mission. Lagassé, "Strategic Defence," 923.
[6] Erika Simpson, *NATO and the Bomb: Canadian Defenders Confront Critics*, (Kingston & Montreal: McGill-Queen's, 2001), 224-225.
[7] Simpson, *NATO and the Bomb,* 224-225.
[8] "Canada deployed four nuclear weapons systems—the Bomarc surface-to-air missile, the CF-104 Starfighter nuclear bomber, the Honest John short-range battlefield rocket, and the Genie air-to-air unguided rocket." Duane Bratt, "Canada's Nuclear Schizophrenia," *Bulletin of the Atomic Scientists* 58:2 (March/April 2002): 47.
[9] During the 1950s and 1960s, West Germany, Italy, Turkey, the Netherlands, Greece, Belgium, and Greenland (Denmark) hosted U.S. nuclear weapons, and Britain and France stored U.S. nuclear warheads. Bratt, "Schizophrenia," 48. This relates directly to the contradiction between the articles of the multilateral 1968 Nuclear Non-Proliferation Treaty, which prohibits the proliferation of nuclear weapons beyond the established nuclear weapons states (NPT Treaty – articles I, II, and III). However, these weapons remain under US control, so whether they actually violate the NPT can be debated.
[10] Bratt, "Schizophrenia," 45, 48, 50.
[11] James Fergusson, "Off the Radar: Strategic Defence and Military Space," in *After Afghanistan: An International Security Agenda for Canadians*, eds., James Fergusson and Francis Furtado (Vancouver: UBC Press, 2016), 230.
[12] Fergusson, "Off the Radar," 230-231.
[13] Fergusson, "Off the Radar," 238-239.

[14] Jeffrey F. Collins, *Should Canada Participate in Ballistic Missile Defence: A Survey of the Experts*, Macdonald-Laurier Institute, July 2018, 9.
[15] Not lost is the policy inconsistency in the fact that the Harper government approved European NATO BMD at the Lisbon Summit in 2010. Collins, *Should Canada Participate,* 10.
[16] A bi-partisan Senate report. Parliament of Canada, "Canada and Ballistic Missile Defence: Responding to the Evolving Threat," Standing Senate Committee on National Security and Defence, June 2014.
[17] Bruce Campion-Smith, "Trudeau Weighs Calls to Join Ballistic Missile Defence," *Toronto Star*, 19 September 2017, https://www.thestar.com/news/canada/2017/09/19/trudeau-weighs-calls-to-join-ballistic-missile-defence.html.
[18] Lee Berthiaume, "Liberals Have Not Ruled out Joining U.S. on Ballistic Missile Defence: Sajjan," *Globe and Mail*, 4 October 2017, https://www.theglobeandmail.com/news/politics/liberals-have-not-ruled-out-joining-us-on-ballistic-missile-defence-sajjan/article36488585/.
[19] Collins, *Should Canada Participate*.
[20] Collins, *Should Canada Participate,* 19.
[21] David S. McDonough, "Canada, NORAD, and Missile Defence: Prospects for Canadian Participation in BMD," CDA Institute Vimy Paper, April 2016, 17.
[22] Collins, *Should Canada Participate,* 13-14.
[23] Collins, *Should Canada Participate,* 19.
[24] Nils Ørvik identifies the trilateral equation of external threat, smaller state, and larger neighbouring power as part of the defence against help decision calculation, assuming that the smaller power's national interest is to be a sovereign state. Nils Ørvik, "Defence Against Help – A Strategy for Small States?" *Survival: Global Politics and Strategy,* 15:5 (1973): 228-231.
[25] P. Whitney Lackenbauer, "'Defence Against Help': Revisiting a Primary Justification for Canadian Participation in Continental Defence with the United States" (Waterloo: Defence & Security Foresight Group briefing paper, May 2020), 2, 10, 14. Charron and Fergusson argue that "defence against help" is an inappropriate concept for understanding Canada-US relations, as Canada has never rejected an instance of US help,[25] suggesting no evidence to the contrary. In agreement with Charron and Fergusson, Lackenbauer affirms that "the U.S. will not do anything within Canadian territory without Canadian government permission." See also Philippe Lagassé, "Nils Ørvik's 'Defence against Help': The Descriptive Appeal of a Prescriptive Strategy," *International Journal* 65:2 (2010): 463-474.
[26] Primarily key actors in the Department of Foreign Affairs/Global Affairs Canada, in partnership with Canadian disarmament advocacy groups.
[27] Hans M. Kristensen, Robert S. Norris, and Ivan Oelrich, "From Counterforce to Minimal Deterrence: A New Nuclear Policy on the Path Toward Eliminating

Nuclear Weapons," *Federation of American Scientists* (April 2009): 15, https://fas.org/nuke/norris/nuc_10042901a.pdf.

[28] North Korea withdrew from the Nuclear Non-Proliferation Treaty (NPT) in January 2003 and began conducting nuclear tests in 2006. In July 2017, North Korea successfully tested an ICBM (Hwasong-14 and Hwasong-15). NTI, North Korea, *Nuclear Threat Initiative*, August 2019, https://www.nti.org/learn/countries/north-korea/.

[29] Thomas Karako and Ian Williams, "Missile Defense 2020: Next Steps for Defending the Homeland," *Center for Strategic and International Studies - Missile Threat*, April 2017, xiv-xv, http://missilethreat.csis.org/wp-content/uploads/2017/04/170406_Karako_MissileDefense2020_Web.pdf.

[30] The current GMD architecture includes 2 interceptor sites, supporting by 7 types of sensors as of 2016. By 2018, 44 GBI were in based in Alaska and California to counter North Korea and Iran. The GMD architecture has since been upgraded with new integrated systems such as sea-based X-band radar (SBX), upgraded early warning radars, SPY-1 radar on Aegis ships, and forward-based TPY-2 radars. Karako and Williams, "Missile Defense 2020," xiv-xv.

[31] In December 2016 Congress, passed a national defence authorization act to update policy in response to recent threats and the requirement for a more robust and layered system that is expanded to defend allies and deployed forces, and provide a hedge against unpredictable regimes. CSIS, Missile Threat, 2017, xviii.

[32] At the Lisbon Summit in 2010, the NATO-Russia Council discussed cooperating on territorial BMD and a joint ballistic missile threat assessment to prepare a future cooperative framework. NATO Review, "Missile Defence," updated 2015, https://www.nato.int/docu/review/Topics/EN/Missile-defence.htm.

[33] Details of the phases and upgrades to SM-3 interceptors available at Kingston Reif, "The European Phased Adaptive Approach at a Glance," Arms Control Association, January 2019, https://www.armscontrol.org/factsheets/Phased adaptiveapproach. Participating countries include:

- Turkey: host a BMD radar at Kürecik
- Germany: Command Centre at Ramstein Air Base
- US: deploy Aegis BMD ships in Romania: Aegis Ashore with SM-3 interceptors at Deveselu Air Base Poland: base SM-3 interceptors at Redzikowo military base Netherlands: upgrade four air-defence frigates with extended long-range BMD early-warning radars Spain: base four Aegis BMD ships in Rota.

[34] CRS for Congress, "Navy Aegis Ballistic Missile Defence (BMD) Program: Background and Issues for Congress," Congressional Research Service, RL33745, 21 June 2019, 7-8.

[35] Senate testimony of Frank Harvey highlights the inconsistency in Canada's policy on ballistic missile defence. At the NATO Lisbon Summit in November 2010, all

NATO members committed to "develop the capability to defend our populations and territories against ballistic missile attack as a core element of our collective defence … we've agreed to develop missile defense capability that is strong enough to cover all NATO European territory and populations, as well as the United States." This commitment was reinforced at the 2012 Chicago Summit. Harvey correctly states that, "[a]s a NATO member, there is no question any longer that Canada officially endorses the logic, strategic utility, and security imperatives underpinning BMD. In essence, the Government of Canada (GoC) now fully embraces the merits of multinational cooperation on missile defence as part of Canada's treaty obligations and alliance commitments … Why would any Canadian government support BMD to protect European, American and Asian allies, territories and populations yet continue to shy away from embracing the utility of bilateral negotiations with the US to protect Canada? This serious (and potentially dangerous) inconsistency demands some logical explanation … Ottawa should engage in high-level consultations with Washington on BMD architecture, *precisely because the government has already embraced the strategic imperatives tied to BMD*. Drawing imaginary distinctions between American, European and Asia security on the one hand, and Canadian security on the other, makes no sense." Canadian Global Affairs Institute, "Canada and Ballistic Missile Defence," Policy Update, March 2014, https://www.cgai.ca/canada_ballistic_missile_defence.

[36] Russian analysts describe the following factors in cooperation with China to strengthen strategic stability: "Strategic partnership between Russia and China, a high level of trust and the absence of a zero-sum game between them, as well as a low probability that their bilateral relations may degrade to rivalry in the foreseeable future. A possible increase in China's nuclear capabilities will not pose a military threat to Russia." Sergei Karaganov and Dmitry Suslov, "The New Ways of Understanding and Ways to Strengthen Multilateral Strategic Stability," Russia's National Research University's Higher School of Economics, Moscow (September 2019), 5, http://svop.ru/wp-content/uploads/2019/09/REPORT_Eng_1.pdf. This report explicitly cites the support of the Russian Foreign Ministry, State Duma, and Council on Foreign and Defence Policy. Among the additional factors increasing strategic stability from the Russian perspective are two that stand out in the context of this discussion: "The newest Russian weapons guarantee its ability to inflict unacceptable damage upon the U.S.," and "strengthening of asymmetrical deterrence amid waning transparency— ability of weak countries to deter militarily stronger states using the factor of uncertainty," 5.

[37] Andrea Charron, "From NORAD to NOR[A]D: The Future Evolution of North American Defence Co-operation," *CGAI Policy Paper*, May 2018, https://www.cgai.ca/from_norad_to_nor_a_d_the_future_evolution_of_north_american_defence_co_operation.

[38] Statements by NORAD Commander General Terrence J. O'Shaughnessy at the Ottawa Conference on Security and Defence in 2019. James Careless, "NORAD

Commander: North America is in Most Danger Since 'Height of Cold War'," *Canadian Defence Review*, 2 December 2019, http://www.canadiandefencereview.com/news?news/2624.

[39] Statements to the US Senate Committee on the Armed Forces. Lee Berthiaume, "NORAD Commander Says Canada, U.S. Have Lost Military Edge Over Russia in the Arctic," *Globe and Mail*, 13 February 2020, https://www.theglobeandmail.com/canada/article-norad-commander-says-canada-us-have-lost-military-edge-over-russia/.

[40] Aerospace Nation, "A Conversation with Gen O'Shaughnessy," *Mitchell Institute*, 4 May 2020, https://www.mitchellaerospacepower.org/aerospace-nation. See also General Terrence O'Shaughnessy and Brigadier General Peter Fesler, "Hardening the Shield: A Credible Deterrent & Capable Defense for North America," Canada Institute, Wilson Center, September 2020, https://www.wilsoncenter.org/sites/default/files/media/uploads/documents/Hardening%20the%20Shield_A%20Credible%20Deterrent%20%26%20Capable%20Defense%20for%20North%20America_EN.pdf.

[41] Importantly, Charron and Fergusson argue that the evolutionary changes to NORAD resulting from the new threat environment go beyond upgrading and modernizing aged infrastructure and equipment. Andrea Charron and James Fergusson, "The Evolution of North American Defence," *MacDonald-Laurier Institute*, 24 May 2017, https://www.macdonaldlaurier.ca/norad-and-the-evolution-of-north-american-defence-andrea-charron-and-james-fergusson-for-inside-policy/; and Charron, Andrea, and James Fergusson. "Beyond Modernization," in *North American Strategic Defence in the 21st Century: Security and Sovereignty in an Uncertain World*, eds., Christian Leuprecht, Joel J. Sokolsky, and Thomas Hughes (Cham, Switzerland: Springer, 2018), 141-148.

[42] Referencing the "Evolution of North American Defence" (EvoNAD) binational study of requirements in six domains – maritime, air, aerospace, land, outer space, and cyber. Charron, "From NORAD to NOR[A]D."

[43] Charron, "From NORAD to NOR[A]D."

[44] Although Charron acknowledges that this outcome is not certain and encounters barriers. Charron, "From NORAD to NOR[A]D."

[45] Department of National Defence, *Strong, Secure, Engaged: Canada's Defence Policy* (Ottawa: Government of Canada, 2017), 79-80.

[46] James Fergusson, "Missed Opportunities: Why Canada's North Warning System is Overdue for an Overhaul," Macdonald-Laurier Institute, January 2020, https://macdonaldlaurier.ca/files/pdf/20191219_NORAD_Fergusson_COMMENTARY_FWeb.pdf.

[47] Fergusson, "Missed Opportunities."

[48] Fergusson, "Missed Opportunities."

[49] Charron, "From NORAD to NOR[A]D."

[50] Charron, "From NORAD to NOR[A]D."

[51] Fergusson, "Missed Opportunities."
[52] Charron, "From NORAD to NOR[A]D."
[53] Charron, "From NORAD to NOR[A]D."
[54] US Department of Defense, *2019 Missile Defence Review* (Washington, D.C.: Office of the Secretary of Defense, 2019), https://www.defense.gov/Portals/1/Interactive/2018/11-2019-Missile-Defense-Review/The%202019%20MDR_Executive%20Summary.pdf.
[55] See O'Shaughnessy and Fesler, "Hardening the Shield."
[56] John Grady, "NORTHCOM Says U.S., Canada Must Maintain 'Clear-Eyed' View of Arctic Threats," *USNI News*, 23 July 2019, https://news.usni.org/2019/07/23/northcom-says-u-s-canada-must-maintain-clear-eyed-view-of-arctic-threats; and CSIS, "Homeland Defense and the Role of NORAD and USNORTHCOM: A Conversation with General Terrence O'Shaughnessy" [video], *CSIS Headquarters*, 22 July 2019, https://www.csis.org/events/homeland-defense-and-role-norad-and-usnorthcom-conversation-general-terrence-j-oshaughnessy.
[57] Grady, "NORTHCOM"; and CSIS, "Homeland Defense."
[58] David S. McDonough, "Canada, NORAD, and Missile Defence," *CDA Institute Vimy Paper* 31 (April 2016): 15.
[59] New START was extended for five years in February 2021 under the newly-elected Biden administration. Whether the U.S. and Russia will negotiate a new treaty within that time frame remains to be seen.
[60] Karako and Williams, "Missile Defense 2020," xvi, xix.
[61] On 1 March 2018, President Vladimir Putin's State of the Union speech was held at Manezh Central Exhibition Hall in Moscow. President of Russia – Kremlin, "Presidential Address to the Federal Assembly," Moscow, 1 March 2018, http://en.kremlin.ru/events/president/news/56957.
[62] Olga Tanas and Andrey Biryukov, "'Nobody Listened to Us. Listen Now': Putin Warns the U.S. with Nuclear Weapons Display," *Globe and Mail*, 1 March 2018, https://nationalpost.com/news/world/nobody-listened-to-us-listen-now-putin-warns-the-u-s-with-nuclear-weapons-display.
[63] Russia recently pressed the US to renegotiate New START before it expires, but it is clear that any agreement to extend or renew will require limitations on missile defence. Such constraints are now difficult to envision, with Russia's new strategic weapons platforms that directly threaten North America. Unless advanced cruise missiles, hypersonic vehicles, and other systems such as unmanned underwater vehicles are also constrained, it will be difficult to pursue this venue of enhancing strategic stability. This is a reality that Canada must consider in moving forward on the evolution of North American security and defence.
[64] Karaganov and Suslov, "New Ways of Understanding."

[65] Center for Strategic and International Studies, "Kh-101/Kh-102, Missile Threat – CSIS Missile Defense Project, October 2017, https://missilethreat.csis.org/missile/kh-101-kh-102/.
[66] CRS for Congress, "Russia's Nuclear Weapons: Doctrine, Forces, and Modernization," 5 August 2019.
[67] Putin claims that these new generation weapons' intense maneuvering – lateral and vertical – make them invulnerable to air or missile defence systems. Putin, "Presidential Address to the Federal Assembly."
[68] This concern relates to Russia's so-called "escalate to de-escalate" doctrine, in which "Russia would prevail in a conventional conflict against a superior military force (read: NATO) by detonating a tactical (low-yield) nuclear weapon in the battlefield, in order to force the US to move down the escalation ladder." This doctrine has been debated and refuted by analysts as an assumption made through a Western perspective following Russia's withdrawal from its No First Use pledge in the 1990s, and its exercises simulating using a tactical nuclear weapon on the battlefield. Non-Western analysts have argued that Russia's intention to lower the nuclear threshold in a conflict is "far from convincing." Olga Oliker states that "the combination of what states write, what they say, what they exercise, and what they build should provide a good sense of their actual policy." Olga Oliker, "Russia's Nuclear Doctrine: What We Know, What We Don't, and What That Means," CSIS, May 2016, 2, https://csis-prod.s3.amazonaws.com/s3fs-public/publication/160504_Oliker_RussiasNuclearDoctrine_Web.pdf; and Nancy Teeple, "Offensive Weapons and the Future of Arms Control," *Canadian Journal of European and Russian Studies* [Forthcoming].
[69] US Department of Defense, *2019 Missile Defence Review* (Washington, D.C.: Office of the Secretary of Defense, 2019), II, IV, VII, 6, 13, 19-21.
[70] McDonough, "Canada, NORAD, and Missile Defence," 14.
[71] *2019 MDR*, VI.
[72] China considers itself as a "near-Arctic state," pursuing the Polar Silk Road as part of its global Belt and Road Initiative.
[73] *2019 MDR,* II, V.
[74] It is suggested that Canada, without the protection of BMD, "may be subjected to nuclear blackmail or 'held hostage' with a threat of a strike or even actual attack." Eric Fleming, "Time to Tango: Embracing Canada's Participation in Ballistic Missile Defence," *Macdonald-Laurier Institute Commentary*, May 2017, 3.
[75] *2019 MDR*, V.
[76] The *MDR* indicates that Iran's Space Launch Vehicle (SLV) program establishes the technical foundation to shorten the timeline for Iran to achieve ICBM capability. *2019 MDR*, 3.
[77] David Pugliese, "Canada May Host Radar Site for US Missile Defence System," *Ottawa Citizen*, 28 June 2013; McDonough, "Canada, NORAD, and Missile

Defence," 10; and David S. McDonough, *Back to the Future: Debating Missile Defence in Canada … Again*, CDFAI, June 2013, 2.
[78] McDonough, "Canada, NORAD, and Missile Defence," 16.
[79] Thomas Schelling, *Arms and Influence* (Yale University Press, 1966), 24.
[80] *2019 MDR*.
[81] *2019 MDR*, 63-64.
[82] Charron and Fergusson, "Evolution of North American Defence."
[83] Statements at a symposium on Space and Missile Defence on August 6, 2019.
[84] Jen Judson, "Should the DoD Shift Focus Toward Passive Missile Defense?" *Defense News*, 6 August 2019, https://www.defensenews.com/digital-show-dailies/smd/2019/08/06/should-the-dod-shift-focus-toward-passive-missile-defense/. Note: this article seems to conflate "passive missile defence" with the concept otherwise described in the *2019 MDR* as "attack operations" – i.e., "left of launch."
[85] Aerospace Nation, "Conversation with Gen O'Shaughnessy."
[86] McDonough, "Canada, NORAD, and Missile Defence," 5.
[87] Charron and Fergusson, "Evolution of North American Defence," 146, ft. 11.
[88] McDonough, "Canada, NORAD, and Missile Defence," 17.
[89] Campion-Smith, "Trudeau Weighs Calls."
[90] Fleming, "Time to Tango," 5.
[91] Andrew Futter and Jeffrey Collins, "Deciding on a Canadian Approach to Missile Defence," Macdonald Laurier Institute, 20 August 2018, https://www.macdonaldlaurier.ca/deciding-canadian-approach-missile-defence/. Stephanie Carvin, "Zero D'Eh: Canada Takes a Bold Step Towards Offensive Cyber Operations," *Lawfare*, 27 April 2018, https://www.lawfareblog.com/zero-deh-canada-takes-bold-step-towards-offensive-cyber-operations.
[92] Fleming, "Time to Tango," 6.
[93] James Fergusson and David McDonough, "WMD Proliferation, Missile Defence and Outer Space: A Canadian Perspective," in *Canada's National Security in the Post-9/11 World: Strategy, Interests, and Threats*, eds., David McDonough (University of Toronto Press, 2012), 253-268.
[94] Charron and Fergusson, "Evolution of North American Defence." The authors suggest another option: that Canada could "agree to disagree," although this would re-create the "defence against help" that would strain Canada-US relations. Charron and Fergusson, "Beyond Modernization," 141-148.
[95] Fergusson, "Missed Opportunities."
[96] Charron and Fergusson, "Evolution of North American Defence."
[97] Charron and Fergusson, "Beyond Modernization," 146.
[98] McDonough, *Back to the Future*, 6.
[99] Senate Standing Committee on National Security and Defence, "Canada and Ballistic Missile Defence: Responding to the Evolving Threat," 1 June 2014,

https://sencanada.ca/content/sen/committee/412/secd/rms/01jun14/Report-e.htm; and Fleming, "Time to Tango," 3.
[100] McDonough, "Canada, NORAD, and Missile Defence," 6.
[101] See Sensors and JADC2 in O'Shaughnessy and Fesler, "Hardening the Shield."
[102] McDonough, "Canada, NORAD, and Missile Defence," 5.
[103] McDonough, "Canada, NORAD, and Missile Defence," 6.
[104] Charron and Fergusson, "Beyond Modernization," 147.
[105] James Fergusson, "The NORAD Conundrum: Canada, Missile Defence, and Military Space," *International Journal* 70:2 (2015): 206.
[106] Fergusson, "NORAD Conundrum," 206-207.
[107] Fergusson, "NORAD Conundrum," 209.
[108] McDonough, "Back to the Future," 5.
[109] Fleming, "Time to Tango," 5-6.
[110] McDonough, "Back to the Future," 5; and Fergusson, "NORAD Conundrum," 210-213.
[111] Charron and Fergusson, "Beyond Modernization," 141-148.
[112] Charron and Fergusson, "Evolution of North American Defence."
[113] McDonough, "Canada, NORAD, and Missile Defence," 11.
[114] Fergusson, "Off the Radar, 243-46; and Fergusson, "NORAD Conundrum," 196-214.
[115] Fergusson, "Off the Radar," 245-246.

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Contributors

Dr. Jean-Christophe Boucher is an Assistant Professor at the School of Public Policy and Department of Political Science at the University of Calgary. His is currently a director of research in civil-military relations at the Canadian Defence and Security Network funded by the Social Science and Humanities Research Council. He specializes in international relations, with an emphasis on Canadian foreign and defence policies, international security, and methodology.

Dr. Andrea Charron is the Director of the Centre for Defence and Security Studies and Associate Professor in Political Studies at the University of Manitoba. She has written extensively on Arctic security and continental defence issues, and regularly testifies on these subjects to parliamentary committees. She lectures frequently at Canadian Forces College and serves on DND's Defence Advisory Board.

Ryan Dean is a PhD Candidate in the Department of Political Science at the University of Calgary. His research focuses on Canadian Arctic polices, including issues of sovereignty, defence, and governance. He received his MA in Political Studies from Queen's University and his BA (Hons) in Political Science (International Relations) from Carleton University.

Dr. James Fergusson is the Deputy Director or the Centre for Defence and Security Studies, and Professor in the Department of Political Studies at the University of Manitoba. He teaches a range of courses in the areas of international relations, foreign and defence policy, and strategic studies. He has published numerous articles on strategic studies, non-proliferation and arms control, the defence industry, and Canadian foreign and defence policy.

Brigadier General Peter M. Fesler is the Deputy Director of Operations, Headquarters North American Aerospace Defense Command, Peterson Air Force Base, Colorado. As the Deputy Director, he is responsible for supporting the execution of aerospace warning, aerospace control and maritime warning for North America to include the Canadian, Alaskan and continental United States North American Aerospace Defense Command Regions within the bi-national command. He is a graduate of the School of Advanced Air and Space Studies and is a Distinguished Graduate of both the Naval Postgraduate School and National War College.

Dr. P. Whitney Lackenbauer is Canada Research Chair (Tier 1) in the Study of the Canadian North and a Professor in the School for the Study of Canada at Trent University, Ontario, Canada. He is network lead of the North American and Arctic Defence and Security Network (NAADSN), and served as Honorary Lieutenant Colonel of 1st Canadian Ranger Patrol Group from 2014-20. He has (co-)written or (co-)edited more than fifty books and more than one hundred academic articles and book chapters, many of which explore Arctic history, policy, sovereignty, and security issues.

Dr. Justin Massie is Associate Professor of political science at the Université de Québec à Montréal and Co-Director of the Network for Strategic Analysis. He was the 2019 Fulbright Visiting Research Chair in Canada-U.S. Relations at Johns Hopkins University's School of Advanced International Studies (SAIS) in Washington, DC. His research focuses on the global power transition, multinational military coalitions, and Canadian foreign and defence policy.

General (ret'd) Terrence J. O'Shaughnessy is the former Commander, United States Northern Command and North American Aerospace Defense Command. USNORTHCOM partners to conduct homeland defense, civil support, and security cooperation to defend and secure the United States and its interests. NORAD conducts aerospace warning, aerospace control and maritime warning in the defense of North America. He has commanded at the squadron, group, wing, Numbered Air Force and major command levels and is a command pilot with more than 3,000 hours in the F-16 Fighting Falcon, including 168 combat hours.

Dr. Stéphane Roussel is a full professor at the National School of Public Administration (ENAP). From 2002 to 2012, he was a professor at the Department of Political Science at the University of Quebec in Montreal (UQAM), where he held a Canada Research Chair in Canadian Foreign and Defense Policy, as Director of the Observatory for Policy and Security in the Arctic (OPSA) and Director of the Center for Foreign and Security Policy Studies (CEPES). His work focuses on Canadian security policy, particularly security relations with the United States and Europe.

Dr. Nancy Teeple is a postdoctoral fellow at the DND/MINDS funded North American and Arctic Defence and Security Network (NAADSN) and an adjunct assistant professor and research associate at the Department of Political Science

and Economics at the Royal Military College of Canada. Her research areas are nuclear strategy and deterrence, missile defence, arms control, and Arctic security. Nancy was awarded the 2019-2020 Fulbright Canada Research Chair in Peace and War Studies at Norwich University in Vermont where she explored the causal processes in the formulation of U.S. Arctic security and defence policy, within the context of the Canada-U.S. continental defence relationship.

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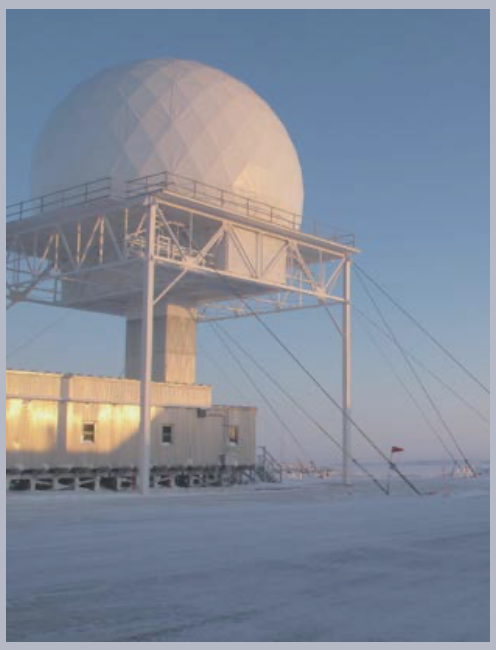
SHIELDING NORTH AMERICA

Canada's Role in NORAD Modernization

Edited by Nancy Teeple and Ryan Dean

Contributors: Jean-Christophe Boucher, Andrea Charron, Ryan Dean, James Fergusson, Peter M. Fesler, P. Whitney Lackenbauer, Justin Massie, Terrence J. O'Shaughnessy, Stéphane Roussel, Nancy Teeple.



The North American Aerospace Defense Command has stood as a bulwark of continental defence for over sixty years. However the binational command's increasing technological obsolesce risks being exploited by growing great power competition. What are these emerging threats to North America and the associated gaps in continental defence? What capabilities and infrastructure are required to respond to these threats? How can Canada best contribute to modernizing NORAD to detect, deter, and defeat these threats? This book aims to provide timely and relevant works by leading thinkers grappling with the defence of Canada and the role of NORAD within.

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