



NORAD: Renewal of the North Warning System by Canada – or Not?

Jeff G. Gilmour

Introduction

The 2021/2022 budget of the federal government announced that “Canada takes seriously its responsibility to defend against threats to North America, including as a member of the North American Aerospace Defence Command (NORAD)... Building on commitments in Canada’s defence policy, “Strong, Secure, Engaged,” the Prime Minister and the President of the United States recently agreed to modernize NORAD and expand cooperation on continental defence and in the Arctic to keep people in both countries safe.” The budget then proposed \$163.4 million over five years and a further \$88.8 million “to sustain” the existing continental and Arctic defence capability.”¹

Based on these budget numbers, it is not clear what they are supposed to address. The funding seems to reflect a short-term investment by this country as opposed to committing funding levels required for more comprehensive and sustained programs necessary to respond to current and future threat scenarios. As well, although a NORAD upgrade and the issue of Arctic defence could be considered as two separate issues, recent military posturing, and the introduction of new hypersonic technologies by Russia in the Arctic, have served to link the two issues as demonstrated in this paper.

The purpose of this paper is to: (1) examine how recent Russian activity in its Arctic regions presents an incremental threat to the continental security of North America; (2) briefly discuss China as a potentially significant actor in the Arctic; (3) discuss the need to upgrade existing NORAD warning systems to counter the incremental threat posed by Russian and Chinese

activity; and (4) consider the possible policy or program options the government of Canada has in terms of its traditional role and obligations as a NORAD partner.

NORAD Background

NORAD is a pact that Canada signed in 1957 with the United States during the Cold War. It is a combined organization of the two countries that provides aerospace warning and control, air sovereignty and protection for North America.² Aerospace *warning* includes the detection, validation and warning of attack against North America whether by aircraft, missiles or space vehicles. Aerospace *control* includes ensuring that air sovereignty and air defence of the airspace over both countries is maintained. In May 2006 a maritime warning element was added to the agreement to include maritime approaches, maritime areas and internal waterways.

To accomplish the aerospace control mission, NORAD relies on a network of satellites, airborne radar and fighter bases located in northern Canada and Alaska. The first ground-based radar system was the Distant Early Warning (DEW) Line in which stations were built starting in the 1950s across northern Canada to counter the threat of Soviet bombers. As the threat changed to the possibility of missiles entering North American airspace, the North Warning System (NWS) was initiated in 1985 by building a series of radar installations across sites in the High Arctic to increase the time to react to incoming missiles from across the Arctic Ocean.

It should be clear that NORAD was designed to warn against threats that originated externally and not to monitor internal threats. Before we discuss the options relating to the renewal of NORAD, it is important to consider the possible external threats to North America, particularly via or in the Arctic.

Russian Military Build-up in the Arctic

Intercontinental ballistic missiles (ICBMs) launched from the central Soviet Union/Russia remain a threat to the security of North America and have been the primary focus of NORAD efforts over the years. This has become an issue of increasing importance as the risk of state-on-state conflict is receiving greater attention from a planning and priorities perspective. The Soviet Union collapsed in 1991, and the main actor arising from the dust was a diminished but still powerful Russia. In 1992 a NORAD strategy review concluded that Russia still had the capability to launch an array of missiles against the North American continent.³ Western security planners have directed increasing focus on recent efforts by Russia to upgrade its Arctic military presence by refurbishing and modernizing Soviet-era bases and airfields. The Kremlin established an Arctic command in 2014 to reorganize its offensive and defensive military assets, including 14 new military airfields and 16 deep-water ports that either have been built or restored in the country's far North.⁴

Publicly, the Russian leadership has suggested comprehensive military investments in its Arctic regions are being undertaken in a desire to protect its Arctic-based second-strike nuclear capability and to protect its interests in a region that is becoming increasingly accessible and economically vital. However, as noted in a recent release from the Center for Strategic and International Studies (CSIS), "the uptick in Russian military activities and exercises in the western Arctic, as well as the testing of new hypersonic missile capabilities in the White Sea,

suggest that Russia's posture may not be strictly defensive."⁵ Indeed, deployments, exercises, missile tests, air operations and naval patrols occur regularly.

While Russia's strategic intentions in the region remain somewhat ambiguous, the CSIS report suggests there are some indicators of what its long-term objectives may be. One base that has received particular attention is Rogachevo Airbase in the Novaya Zemlya archipelago, where Russia has recently deployed MIG-31 BM interceptors, which are supersonic, long-range aircraft capable of destroying air and ground targets. It has also been determined that Russia has been testing new weapons in the Arctic, such as the Poseidon 2M39 Torpedo and the Tsirkon anti-ship hypersonic cruise missile.⁶ According to sources, "the 2M39 torpedo is a stealthy, nuclear-powered and autonomous long-range torpedo that can evade underwater detection under Arctic ice to deliver a thermonuclear warhead to North American coastal targets."⁷

The Pentagon sees hypersonic weaponry "as a potential game changer that could give it – or an opponent – the kind of edge that stealth aircraft or smart bombs did in decades past."⁸ Hypersonic missiles, or hypersonic glide vehicles (HGV) travel at speeds greater than Mach 5 or about 1.5 km per second. They are designed to sustain such speeds over long distances, manoeuvre as they do so and hit targets with pinpoint accuracy.⁹ HGVs combine the speed of a ballistic missile with the manoeuvrability and accuracy of a cruise missile. More importantly for NORAD operations, they can dodge ground-based radar by hiding behind the curvature of the Earth. Because they travel so quickly, and are manoeuvrable to evade defensive measures, these missiles would be extremely difficult to shoot down and they would arrive with little to no warning.

Another concern for the defence of North America is that Russia is now able to deploy the *Borei*-class (sometimes referred to as the *Dolgorvkiy*-class) ballistic missile submarines (SSBMs) in the Arctic Ocean. These submarines have replaced *Delta III*, *Delta IV* and *Typhoon*-classes. Six of these submarines are operational with four more under construction. K-535 *Yuriy Dologorvkiy* is the lead vessel of this class and was commissioned in January 2013. These nuclear submarines are 557 feet in length and can attain a speed of 33 knots when submerged. They currently carry 16 RSM-56 Bulva submarine-launched ballistic missiles (SLBMs) with up to G-10 multiple independently targetable reentry vehicle (MIRV) warheads.

There is no reason why these submarines, operating in the Arctic Ocean, could not be eventually armed with HGVs. Russia wants the world to know that from the Arctic to the Black Sea, it will call on greater fire power than its foes.¹⁰

China's Interest in the Arctic Ocean

In the past decade, China has expressed interest in the Arctic region, and has become an observer state in the Arctic Council. With the receding of sea-ice in the waters of the High Arctic, it is likely that China will continue to be very interested in the Arctic Ocean and Canada's Northwest Passage in the coming years. We have already seen illustrations of that interest. For example, in September 2017 *Xue Long (Snow Dragon)*, a Chinese icebreaker research ship, transited through Lancaster Sound to the Beaufort Sea with the stated goal of obtaining 'scientific information' and hydrographic surveys from the voyage. (It should be noted that China is interested in the Northern Sea Route through Russia's North as well.)

Combined with its clear interest in the Arctic, China has been rapidly increasing its naval capabilities. In 2020 the People's Liberation Army Navy (PLAN) was operating six Type 094

Jin-class SSBMs, with more being constructed.¹¹ These nuclear submarines are 442 feet in length and carry up to 12 JL-2 missiles, which are second generation intercontinental-range SLBMs with three to eight MIRVed nuclear warheads attached.¹² With a range of about 7,200 kilometres, these missiles provide China with its first viable sea-based nuclear deterrent. It is realistic to think that the PLAN could utilize these new submarines in the Arctic environment to avoid detection by NORAD and be closer to their assigned targets in North America. It is not difficult to foresee HGVs being part of the future armament of these submarines, which could be stationed throughout the Arctic with targets allocated across North America.

NORAD Renewal

Uncertainty regarding the strategic intentions behind Russia's recent initiatives in its Arctic region and China's unambiguous ambitions to be a player there have provoked concern about threats to the continental security of North America. The challenges posed by these two powers are made more complex by the presence of new technologies, including hypersonic glide vehicles, advanced cruise missiles and unmanned aerial systems that can evade current early warning detection, tracking and interception systems, whether based in traditional centrally-located launch sites, in the Arctic, or forward deployed in aircraft or submarines. The resulting gap in North American defence serves to undermine the credibility of Western deterrence strategies. The question is how NORAD will respond.

Military leaders recognize the new threats from potential enemies utilizing weapons such as HGVs and updated cruise missiles launched from different platforms, including the Arctic Ocean. In response, two senior US military officers – General Terrence J. O'Shaughnessy (Commander of North American Aerospace Defense Command) and Brigadier General Peter Fesler (Deputy Director of Operations, Headquarters North American Aerospace Defense Command) – published an article in 2020 entitled “Hardening the Shield: A Credible Deterrent and Capable Defense for North America.” This article outlined a new strategy called the Strategic Homeland Integrated Ecosystem for Layered Defence (the ‘Shield’) to replace the NWS.¹³

The authors argue that “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.”¹⁴ The Shield concept envisions “a global sensing grid that can sniff out threats as they develop by drawing on data from ‘traditional and nontraditional sources,’ such as civilian air traffic control guides.”¹⁵ The authors claim that this system is comparatively inexpensive and is a high-tech system that:

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.¹⁶

The Shield concept is already being utilized by NORAD through an operational testing of a cloud-based data fusion system called Project Pathfinder.¹⁷ A demonstration linked Pathfinder to the existing radar installations and illustrated that the system could detect small, unmanned aircraft which the existing system was not able to do on its own.¹⁸ The US Air Force has signed off on the Pathfinder prototype and ordered a production model, signing an \$8 million contract.¹⁹

Options for the Government of Canada

Broadly speaking, and despite both a societal and political reticence to engage in most anything related to national security or defence, there remains sufficient policy support within the federal government for Canada to remain a relevant and contributing partner within the bilateral NORAD command construct. While there have been recent divergences in structure and policy (the creation of US Northern Command and Canada's unwillingness to participate in the US North American Ballistic Missile Defence incorporating ground-based interceptors respectively), it is acknowledged that NORAD represents a key element in Canada's defence relationship with the United States and provides Canada with the means to provide greater security to its territory than could be provided on its own.

There is also some recognition in certain circles of the need to upgrade existing North American warning systems against both current and emerging threats as described earlier. This is an outcome of the possibility or enhanced risk of state-on-state conflict.

On the assumption it is a political non-starter that Canada would be prepared to support the sort of offensive initiatives to destroy an enemy's missiles before they are launched as described in the United States 2019 Missile Defence Review, Canadian efforts will remain strictly defensive in nature. What are the possible policy or program options in this regard? Notwithstanding issues of politics and cost, the spotty record of recent governments regarding anything related to military procurement is a very real factor. The options seem to be as follows:

- Do nothing: The reality is the current government may be perfectly willing to let the United States do what it feels is necessary to protect the continent and foot the bill. This would be only the latest example of the Canadian government's continued and gradual erosion of defence-related sovereignty and defence cooperation with the United States. Any possibility for the Canadian government to remain relevant with its US continental partner would be seriously undermined as a result.
- Upgrade the current Northern Warning System: While it is clear the NWS would be challenged to detect and monitor the new offensive technologies discussed earlier, an upgraded NWS system could still provide some utility when it came to defending against traditional, land-based ICBM launches. The current NORAD agreement states that Canada is on the hook for 40% of the costs for the warning system. Estimates of the renewal costs range from \$11 billion to \$15 billion. In a post-covid economic environment, expenditures of this kind may be a tough sell around the Cabinet table, but in the interest of having to be seen as 'doing something,' this may be the most politically acceptable option.
- Invest in new missile defence technologies. One option is for Canada to become a technological partner in a layered system approach of which the Shield framework described earlier is an example. The need for integrated ground, air, space and sea-based sensors has been clearly demonstrated, and there would be benefits to be gained by Canada by

participating in the technological development of a system. It is unknown to what degree this option has been floated around the appropriate policy tables in Ottawa, or how much the government is willing to spend, what the role of the private sector would be in such an option, or how the US and Canadian roles and responsibilities would be developed and approved.

- One additional policy option that goes beyond technical solutions to the defence of North America is to revisit the possibility of Canada becoming a partner in the US ballistic missile defence system. This has been a point of discussion within policy and academic circles for some 16 years. However, it is likely that even the thought of revisiting this issue will generate significant pushback from a number of different communities in Canada. And until there is a sense of what sort of quid pro quo the US administration is prepared to put on the table in exchange for Canada signing on to the program, and short of any imminent threat to Canada by a foreign adversary in this regard, it would be hard for any Canadian government to defend a change in the status quo.

It is clear that the United States is awaiting a decision on this important issue by the Trudeau government. If Canada fails to make a decision soon, would the United States go it alone in building this new infrastructure? Time is of the essence for the Liberal government to make the next move.

Conclusions

Four decades ago, the North Warning System, consisting of a chain of radar stations built across the northern perimeter of North America, was primed to warn us of approaching Soviet bombers and missiles. But the system needs updating to reflect new threats and new technology.

Today with the latest technology, potential enemies can now attack North America with HGVs and advanced cruise missiles launched in Russia or by SSBMs located at remote sites in the Arctic Ocean. In remarks to a US Senate committee in February 2020, General O'Shaughnessy underscored the need to modernize the aging early warning system. He also noted that the United States and Canada have lost their longstanding military advantage.²⁰ A number of different technologies are being reviewed and discussed at NORAD to provide warning systems in response to new weapons systems that have materially reduced the time between launch and impact. This includes Shield and space-based warning systems. The United States is proceeding with its plans to modernize early warning. The question is what Canada will do.

Jeff G. Gilmour is a Research Associate with the Arctic Institute of North America (AINA) and a national board member of the Naval Association of Canada.

Notes

- ¹ Canada's Federal Budget, Ottawa, 20 April 2021.
- ² See J.L. Granatstein, "NORAD," in *The Canadian Encyclopedia*, 7 February 2006.
- ³ *Ibid.*, Canada and the US renew the Agreement every four years, or at the request of either country.
- ⁴ Marcus Kolga, "Winter is coming to Canada's North, Vladimir Putin will make sure of it," *Maclean's Magazine*, 26 May 2021.
- ⁵ Center for Strategic and International Studies, (CSIS), "Russian Troop Build-Up in Ukraine and Russia's Northern Fleet in the Arctic," 28 April 2021.
- ⁶ See, for example, Nick Paton Watson, "Satellite images show huge Russian military buildup in the Arctic," CNN, 5 April 2021, <https://www.cnn.com/2021/04/05/Europe/Russia-arctic-nato-military-intl-cmd/index.html>.
- ⁷ See Kolga, "Winter is coming to Canada's North."
- ⁸ Samantha Masunaga, "Hypersonic Drive," *Los Angeles Times*, 6 March 2018, p. A-8.
- ⁹ See "Hypersonic Missiles: Gliding Missiles that Fly Faster than Mach 5 Are Coming," *The Economist*, 6 April 2019, p. 67.
- ¹⁰ "The Next War," *The Economist*, 27 January 2018, p. 9.
- ¹¹ R. O'Rourke, "China Naval Modernization," Congressional Research Service, 21 May 2020.
- ¹² *Ibid.*
- ¹³ General Terrence J. O'Shaughnessy and Brigadier General Peter Fesler, "Hardening the Shield: A Credible Deterrent & Capable Defense for North America," Wilson Centre/Canada Institute, September 2020.
- ¹⁴ *Ibid.*, p. 9.
- ¹⁵ See James McCarten, "Past, Present Leaders of NORAD Back Data-Driven Defence Technology," Global News, 11 September 2020, p. 3.
- ¹⁶ O'Shaughnessy and Fesler, "Hardening the Shield," p. 9.
- ¹⁷ See Murray Brewster, "Plan to Plan to rebuild defence early-warning system means political, fiscal headaches for Trudeau government," CBC, 26 January 2021, p. 4, available at <https://www.cbc.ca/news/politics/norad-shield-defence-ballistic-missile-bmd-1.5887192>.
- ¹⁸ "NORAD and Defense Innovation Unit Create AI "Pathfinder" To Detect Threats," Defence TechConnect, 23 March 2021, available at <https://defensetechconnect.com/2021/03/23/norad-and-defense-innovation-unit-create-ai-pathfinder-to-detect-threats/>.
- ¹⁹ See Brewster, "Plan to Plan to rebuild defence early-warning system means political, fiscal headaches for Trudeau government," p. 4.
- ²⁰ Lee Berthiaume, "NORAD commander says Canada, US have lost military edge over Russia in the Arctic," *The Globe and Mail*, 13 February 2020.