

Commentary



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North American defence modernization in an age of uncertainty

James Fergusson

First formally identified as a priority in the 2017 defence white paper, *Strong, Secure and Engaged*, and three years after NORAD modernization was identified in Prime Minister Justin Trudeau's mandate letter to Defence Minister Harjit Sajjan, the Trudeau government has finally earmarked funds for North American defence modernization. In the 2021 federal budget, the government did commit by defence standards, a paltry \$252 million to "lay the groundwork for North American Aerospace Defence Command (NORAD) modernization and sustain existing continental and Arctic defence capabilities" (Canada 2021). Yet no spending details were provided.

Subsequently, in January 2022, the government awarded a \$592 million contract for in-service support of the North Warning System (NWS).¹ In the recent 2022 budget, \$6.1 billion over five years was added to the defence budget (Canada 2022b), although the amount committed to NORAD modernization was left unspecified. In June, Defence Minister Anand announced \$4.9 billion over six years, and \$40 billion over 20 years for modernization with some additional details.² A month later on July 21, the Department of National Defence (DND) provided further details on its fact sheet, though this still lacked specificity.

The announcement and subsequent July DND fact sheet raise two areas for evaluation. The first concerns the funding commitments relative to the reality of defence spending in Canada and infrastructure construction in the Canadian Arctic. The second relates to the underlying policy implications, which have not been acknowledged or presented. To understand both, it is first useful to examine briefly the temporal delay between the need to modernize NORAD and the funding commitment.

Although formally identified as a priority in the 2017 defence white paper, North American defence modernization – or more specifically for Canada, the need to upgrade the NWS and related support infrastructure – dates back roughly to 2011. Not only was the NWS reaching the end of its life cycle (estimated at 2025), but the threat environment had dramatically changed. Russia emerged as an adversary due to its 2014 military intervention in Ukraine.³ Russia also developed and deployed long-range, air-launched cruise missiles and subsequently hypersonic vehicles,⁴ which rendered the NWS obsolete. Simply, the NWS lacked the capability to identify and track these new threats, thus rendering NORAD's aerospace warning and control mission problematic. North America will continue to remain vulnerable for some period to come, even with the 2022 funding commitment.

The roughly 10-year delay may be attributed to technical and political considerations. Technically, to confront the new threat environment, and thus ensure an effective North American deterrent posture, a more complicated and integrated multi-domain (air, land, sea, and space) warning system is required – one that stands in contrast to the NWS, which is single domain, land-based radar system that stretches across the Canadian Arctic and down the coast of Labrador. Not only do the land-based radars need to be more powerful and capable to reach far over-the-horizon to track cruise and hypersonic missiles in flight, but it also needs to be augmented by space (a future unspecified Canadian investment), air and potentially maritime-based capabilities, and linked into NORAD command, control and communications.⁵

Simply, the new system requires the development of a new architecture and the development and acquisition of new technologies, and these take a significant amount of time prior to making investment decisions. Relatedly, these developments cannot be taken in isolation from the United States, especially given the US's commitment to fund 60 percent of NORAD modernization infrastructure in Canada and its role as the primary source for new technologies. Negotiating and reaching an agreement takes time.

Politically, several interrelated considerations have been at play since 2011. A consensus must emerge on the threat and its priority, and this has long been difficult in Canada because of the priority generally assigned to overseas commitments and capability requirements where both National Defence and the Canadian government perceive the defence of North America and Canada as beginning “over there.”⁶ North America, NORAD and the Arctic NWS in particular are a politically sensitive domestic issue because of long-

standing Canadian sovereignty concerns relative to the United States. As such, North American defence cooperation is always liable to the general state of relations between Canada and the United States, which is one of the reasons why Ottawa has preferred NORAD to operate beneath the political radar in Canada.

In this regard, highly negative Canadian attitudes towards the Trump presidency arguably made forward movement politically risky and, as such, one might interpret the 2017 commitment *sans* detail and money as a political “trial balloon.” Regardless, the election of US President Biden in 2020 changed the political climate overnight. In addition, the Russian invasion of Ukraine eliminated any potential domestic political opposition to NORAD modernization, which one might have expected with charges of “militarizing” the Arctic and “kowtowing” to the Americans.



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Similar and additional technical and political considerations are also important in evaluating the government’s NORAD modernization funding commitment, especially to spend \$4.9 billion over the next six years. It implies first of all that agreement has been reached with the United States on at least the basic architecture or the first stage of a 20-year sequential process.⁷ One might suggest that the first stage is focused primarily on the acquisition and deployment of the two new land-based, over-the-horizon radar systems (one to cover the Arctic approaches to Canada and the other over the North Pole), which is a relatively mature technology.⁸ Even so, as noted above, the government has committed funds to extend the life of the obsolete NWS, which indicates that the replacement radars may take much longer than six years to complete.

Of course, building new radar lines or any other NORAD-related Arctic infrastructure is no easy task, with a short construction season, limited maritime transportation capacity and the large distances involved.⁹ Alongside this reality, six years is a very short time in the historically lengthy Canadian procurement process with an average closer to 15 years. Assuming that the internal specification of requirements process has been completed for the unspecified first six-year stage, requests for proposals or bids have to be issued, companies need to construct their bids taking into account buy Canadian provisions in terms of industrial and technological benefits, as well as the government’s commitment to significant Indigenous participation. Next,

the bids must be evaluated, contracts issued and finally the acquisition and deployment undertaken.¹⁰ Where this all stands today is unknown publicly.

In other words, the likelihood that DND can spend \$4.9 billion over six years appears very low. Certainly, the government can streamline the process by invoking national security and undertaking non-competitive, off-the-shelf buys. However, this is highly unlikely given the Trudeau government's decision to pursue a competition for the CF-18 replacement project, and the defence minister's statement in Trenton about "the economic benefits that Canadians are going to see through tens of thousands of jobs adding billions to our GDP per year" (CPAC 2022).

If then DND is unable to spend \$4.9 billion over six years, what then happens to the unspent portion? In the past, National Defence has returned unspent money to the central agencies, never to be seen again. There is no National Defence savings account. Of course, conceived as simply part of the \$40 billion 20-year NORAD funding commitment, the unspent amount may not be affected, but this remains to be seen.

Beyond six years, 20 years is a very long time in the political, economic and technological world. Committed to NORAD modernization in agreement with the United States, neither this government nor a future one is likely to renege in the future. Nonetheless, between now and 2042, at least five federal elections will occur, and the degree to which future governments remain committed is unpredictable. Nor is the current international environment set in stone. No one can predict the state of western relations with Russia as the future unfolds, not to mention relations with China. No one can predict whether the apparent political and public consensus on defence and NORAD modernization will hold. No one can realistically predict the state of the economy over the next year or so, never mind 20 years. And National Defence will not be immune from government fiscal retrenchment or demands to re-direct funds during an economic downturn to other more politically salient economic and social pressures.

Alongside these factors, if history is our guide, the actual final costs of NORAD modernization are likely to exceed significantly \$40 billion, especially given the unpredictable costs of acquiring new advanced technologies for the NORAD mission suite as they emerge over the next 20 years. The Royal Canadian Navy's Future Combat Ship is a case in point with numerous cost overruns and time extensions. Of course, with the United States committed to modernization (and nominally to 60 percent of the costs), there is no turning back. Even so, the US Department of Defense is also not immune to future political and economic forces at play, and there is no indication of its specific funding responsibilities.

In the context of the American commitment, the DND fact sheet provides some limited guidance. Specifically, a significant amount of the money allocated across the four baskets seems to sit outside the gambit of the US funding

agreement, such as the research and development elements and Arctic force sustainment. Neither are necessarily NORAD infrastructure *per se*. Of course, neither DND nor the government has released any detailed information about the US funding envelope, such that the real amount of the government's commitment to NORAD infrastructure modernization is not publicly available and may not be known yet.

Understandably, this detailed information is classified, as much for political reasons as for national security. However, at another level, this is problematic. As deterrence by denial is the central underlying strategic rationale for NORAD modernization, demonstrated capabilities and their communication to existing and potential adversaries are important. Furthermore, with modern space-based capabilities, nothing can be truly hidden. In other words, not least of all relative to the transparency and accountability mantra of the government and the magnitude of investment, the government and DND need to be more forthcoming on NORAD modernization. This, in turn, is linked to the unspoken parameters or limits of NORAD modernization in government thinking about Canada's role in the defence of North America.



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As best that can be discerned from DND's announcements, NORAD modernization is primarily limited to the Arctic approaches and dominated by the NWS replacement, now labelled the Northern Approaches Surveillance System (NASS), supporting infrastructure (forward operating locations) and associated command, control and communication infrastructure. At Trenton, the Chief of the Defence Staff (CDS), in reply to a media question, stated, "for Canada, we are focused upon 10 to 2 o'clock that is why it is so important we are integrated with the US as they cover the other avenues of approaches" (CPAC 2022). Apparently, at least for now, the east and west coasts of Canada (9 to 10, and 2 to 3 o'clock) are solely an American responsibility. What this, in turn, entails in terms of surveillance infrastructure relative to Canadian territory is unspecified.

This also includes the northeastern approaches, which raises the issue of Greenland/Denmark and its place in North American defence. Historically, Greenland has never been seen in Canadian thinking as part of North American defence. Today, however, given potential long-range cruise (air or sea-launched) and hypersonic missile launch points and flight paths down the east coast of Greenland, surveillance coverage needs to be extended and inte-

grated into NORAD. Leaving this to bilateral agreements between the United States and Greenland/Denmark is not necessarily an optimal solution for Canada (and this may also extend to Iceland).¹¹

The alternative is a NATO solution, but this raises broader issues about a major role for NATO in the Arctic, which until recently has been firmly opposed by Canadian governments and reflects currently quiet beliefs that the Arctic should be an isolated theatre of cooperation among the Arctic states, including Russia. Indeed, Canada vetoed the inclusion of an Arctic statement at the 2009 NATO summit in Reykjavik and the 2022 NATO strategy refers to the high North – meaning the strategic Greenland-Iceland-United Kingdom (GIUK North Atlantic gap – not the Arctic.

Granted that Canada/NORAD's relationship with Greenland/Denmark is as much a foreign policy issue as a defence one, arguably funding announcements are not the place for policy announcements *per se*. Nonetheless, NORAD modernization is much more than simply about funding infrastructure. This extends further into the implications of the threat environment for the current NORAD mission suite. Although the NASS appears conceptualized as only the Canadian ground portion of an all-domain surveillance system, notwithstanding the generic Canadian commitment to a space-based system, domain integration extends beyond simply surveillance or the passive component of the North American deterrence posture into interception capabilities or active defence. In other words, both need to be integrated together. As such, whether NORAD can simply remain within the aerospace domain emerges as an important question.

Dating back to the American proposal following 9/11 to expand the NORAD missions suite into an all-domain North American Defence Command, it is important to recognize that multi-domain surveillance integration suggests the need for multi-domain interception integration, except perhaps for the politically sensitive land domain. Indicative today is the previous NORAD Commander's emphasis on obtaining Joint All Domain Command and Control (JADC2). Although the current Commander, US General Glen VanHerck, has dropped it from the current NORAD lexicon, it remains in play in the United States military generally and is implicitly embedded in his objective to ensure that NORAD has all-domain awareness, information dominance, and decision superiority for deterrence, defence and warfighting (NORAD and USNORTHCOM Public Affairs 2021).

More specifically, naval air defence assets historically have been transferred under NORAD command as necessary.¹² However, given the importance of forward deployed naval assets to deal with the ocean approaches and the compressed decision-making timeline with modern technology, this appears as a non-optimal solution. Adding a maritime control mission in the context of NORAD's existing maritime warning mission (added in 2006) is an obvious solution. This also raises (in the somewhat distant future) the issue of space capabilities in the equation.

Relatedly, the current NORAD command and control structure dating back to its origins and consisting of three regional command centres (Alaska, Canada, and US Continental Headquarters) is already under consideration. Although the concept of a Combined Forces Air Component Command, experimented in NORAD exercises after 2015, appears to have been dropped, it is clear that a new command and control structure and process are in the offing. Its implications for the regional commands, and thus Canada, remain to be seen. Besides this development, Canada Regional Headquarters in Winnipeg will require a significant influx of capital for its expansion and technological modernization.

The surveillance and control relationship also raises several other issues for Canada. Although unclear, the new NASS will likely be located across the Canadian High Arctic. Consideration also needs to be given to developing a radar network at the lower latitudes. If cruise and hypersonic missiles pass over the Arctic line, there exists no significant capability to track them, as internal civilian radars integrated into NORAD after 9/11 lack the capacity. Of course, these radars could be located in the northern continental United States, but no information has been provided.



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This, in turn, raises the government's funding commitment to the active defence or interception side of the deterrence equation. For now, the government is committed only to acquire new short-, medium- and long-range air-to-air missiles for the new F-35 interceptor fleet (a requirement for NORAD and overseas missions). It has also committed to a new air-to-air refuelling fleet to extend the range of the F-35, allowing it to intercept bombers and other aircraft (archers in NORAD parlance) capable of standoff air-launched missiles. Even so, the probability of intercepting the archers is difficult to estimate and depends upon the ratio of bombers (as well as submarines) and missiles to interceptors. The likelihood that all the archers and the missiles (arrows) will be defeated is below 100 percent. No defence is perfect. Besides, striking at the archers close to, if not in, Russian territory implies NORAD acquiring a pre-emptive strike capability, which will likely prove problematic for the Canadian government, which perceives NORAD as a defensive, reactive institution, not an offensive one.

Regardless, NORAD is in the missile defence world, and this raises the issue of whether Canada needs to invest in ground-based point defences (surface-to-

air missiles) to protect high-valued targets. Such targets are twofold: Canadian cities and industrial centres, and military bases. In terms of the latter, this includes the NASS itself and Arctic forward operating locations. Such defences, however, raise the thorny issue of ballistic missile defence, which the defence minister at Trenton stated there was no policy change, but the government would continue to track the issue.

Someday, perhaps, the government will explain its allergy to ballistic missile defence. Regardless, NORAD, as a function of the long-range missile threat, is now in the missile defence business, even if not ballistic missiles *per se*. More importantly, it remains to be seen whether Canada can remain outside of ballistic missile defence with the United States, and limit its missile defence to cruise and hypersonics, on two grounds. First, as recognized by the CDS in Trenton, the United States is moving rapidly forward in integrating air and missile defence. Second, whether air-, naval- or ground-launched interceptors against hypersonic missiles, the capability also has nascent anti-satellite capabilities, which is also troublesome relative to Canadian policy on military space.

All of these policy implications, conveniently ignored in the NORAD modernization announcements, suggest a major transformation of NORAD is on the horizon. In some ways, they are reminiscent of the policy implications of initial Canadian-American air defence cooperation in the 1950s, which led to the creation of NORAD itself as a function of military requirements. In other words, NORAD modernization is much more than new infrastructure. It is about a much broader and deeper NORAD and thus an expanded and new continental defence relationship.

If the past is a guide, this will take place with little, if any, Canadian public debate about a “new” NORAD, as the government seeks to avoid the sensitive and feared issue of Canadian sovereignty relative to the United States. Perhaps it would be better if the government and DND go beyond simple funding announcements, as important as they are, to the lay the groundwork for a well-informed public debate. If not, a future government may well face a defence-driven *fait accompli* with a domestic political firestorm likely to follow, albeit likely short-lived, as the Diefenbaker government did in 1958 following the signing of the NORAD agreement.

Certainly, NORAD and DND officials are well aware of the implications of NORAD modernization beyond new infrastructure, as may be the government in previously announcing a defence review. Unfortunately, like the relative paucity of information and timelines in the funding announcements, both have been silent about the nature and scope of the review. Regardless, time is pressing, and for the foreseeable future North America and Canada will remain vulnerable to the threat posed by the new military technologies, which can affect how both Canada and the United States respond to future international crises overseas.

Finally, there also remains the “wild card” in NORAD modernization – the pace of technological advancement. The funding announcements indicate a “one and done” mentality, even if it will take 20 years, consistent with the past in which, for example, NORAD modernization in the 1980s with the NWS was done over the next three decades. Technological advancements with an unpredictable future indicate that NORAD modernization will never truly be “one and done,” but a never ending process that requires consistent and continued attention and funding.

In effect, the funding commitments are an important first step. Beyond that, the government needs to be more forthcoming to ensure a mature, well-informed debate on North American defence and NORAD. No longer can government and DND simply ignore North America for long stretches of time. The world has changed, and with it the significance of North American defence. Funding is just the tip of the iceberg.

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Endnotes

- 1 The seven-year contract, formerly held by Raytheon Canada, was awarded to the Inuit-owned Nasittuq. See Canada 2022a.
- 2 In the National Defence fact sheet released a month later, the \$40 billion was reported as \$38.6 billion on an accrual basis. See Canada 2022c.

- 3 In response to overthrow of the pro-Russian government in Kyiv, Russia annexed Crimea and provided military support to the two separatist movements in Eastern Ukraine. The West, including Canada, responded by condemning the Russian actions, and they began to provide military support to Ukraine.
- 4 There are two types of hypersonic vehicles that can be launched by ballistic missiles as well as air and sea platforms: unpowered glide vehicles and scramjet powered vehicles. Both are highly manoeuvrable outside and inside the atmosphere, primarily designed to defeat missile defences, and fly at altitudes of between 50 and 80 kilometres, far above air-breathing planes but below orbital levels.
- 5 Of note, the new Arctic Offshore Patrol Ships (AOPS), with their first-year ice capability, do not possess a radar capable to contributing to the air warning and defence mission of NORAD. The Future Combat Ship, equipped with a variant of the Lockheed Martin Long Range Discrimination Radar, probably does have such a radar, but the vessel is not ice capable.
- 6 This has been reversed by a Canadian government on two occasions: Pierre Trudeau (1971) and Stephen Harper (2011) white papers, but neither translated into a significant, long-term shifts in defence priorities.
- 7 Whether this implies that the United States is committed to spending roughly \$6 billion over the same time frame is unknown.
- 8 In terms of new radar technology, the ability to penetrates through the Aurora Borealis has long been a radar challenge. In 2018, Raytheon Canada received a contract in 2018 to develop and test an over-the-horizon radar capable of dealing with this problem in the high Arctic. The results of the tests are unknown. See Raytheon Company 2018.
- 9 With regard to transportation capacity, Arctic communities depend upon maritime re-supply during the shipping season, and thus new capacity will be required as well.
- 10 Compounding the process, DND and other involved government departments have constrained personnel resources, not least due to other major procurement projects stemming from the 2017 defence white paper and 2018 Defence Investment Plan.
- 11 Of note, Denmark now has a liaison officer informally posted to NORAD Headquarters.
- 12 On 9/11, an American aircraft carrier off New York was transferred under NORAD command.

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