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**Major Geoffrey St. Germaine**

## **NATO and NORAD Deterrence by Denial: Implications for the Royal Canadian Air Force**

**JCSP 47**

### **Exercise Solo Flight**

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## **NATO AND NORAD DETERRENCE BY DENIAL: IMPLICATIONS FOR THE ROYAL CANADIAN AIR FORCE**

### **INTRODUCTION**

The return of major power competition over the past decade has required the North American Aerospace Defence Command (NORAD) and North Atlantic Treaty Organization (NATO) to rethink their approaches to deterrence. As Russia and China field new technologies and continue to pursue strategies below the threshold of war, including hybrid warfare and gray-zone conflict, the retaliatory posture of deterrence by punishment, conceived during the Cold War, no longer offers a credible deterrence. A shift to a deterrence by denial strategy offers both NORAD and NATO a better way to deter major power aggression.

This change has implications for the Royal Canadian Air Force (RCAF). Deterrence by denial requires the ability to do two things: to detect an attack; and to defend against that attack. The RCAF must employ an array of capabilities from across the intelligence, surveillance and reconnaissance (ISR), air mobility, air attack and control of the air capability space. While NORAD and NATO have unique requirements, many RCAF capabilities apply to both. A successful NORAD deterrence by denial strategy builds NATO's deterrence credibility by preventing the threat of attack on North America from deterring or compelling NATO's actions. Denial of attack on North America permits North American forces to deploy overseas, which has been critical to success in NATO operations over the past 30 years.

A shortfall in recruiting, exacerbated by the COVID-19 pandemic, has caused the Canadian Armed Forces (CAF) to be short 10 000 personnel.<sup>1</sup> The RCAF is short more than 1500 personnel, nearly 11% of its force, and the situation will worsen until at least 2023/24 with

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<sup>1</sup> Ashley Burke, "Canadian military reports sagging recruitment as NATO ramps up deployment in eastern Europe," *CBC News*, March 23, 2022. <https://www.cbc.ca/news/politics/canadian-armed-forces-staff-shortfall-1.6395131>

shortages forecast to last into the next decade.<sup>2</sup> This will limit the RCAF's operational output and constrain force development.

NORAD and NATO are shifting to deterrence by denial strategies. Russian aggression in Europe, particularly the 2022 invasion of Ukraine, has caused the Canadian government to reprioritize NORAD modernization and other defence efforts to counter Russian aggression and increase Canadian, NORAD and NATO security. Continued personnel shortages will force the CAF to carefully consider where to apply its personnel resources over the next decade to best meet the Canadian government's defence requirements. As Canadian contributions to NORAD can bolster both NORAD and NATO deterrence by denial strategies, the RCAF must focus its efforts on maintaining and building capabilities that enhance the credibility of NORAD deterrence and denies Russian coercive options in North America.

## **DETERRENCE THEORY**

Deterrence theory was born from post-World War 2 competition between the United States (US) and the Soviet Union in the late 1950s and early 1960s.<sup>3</sup> In the 60 years since, deterrence theory has evolved further to explain complex situations beyond the US-Soviet nuclear dyad including conventional deterrence.<sup>4</sup> A state's deterrence strategies can be categorized into the following: nuclear punishment; nuclear denial; conventional punishment; and conventional denial.<sup>5</sup> Within this paper, deterrence by denial and deterrence by punishment

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<sup>2</sup> Canada, Department of National Defence, "RCAF Reconstitution Placemat," Last modified November 15, 2021.

<sup>3</sup> Glenn Snyder, *Deterrence and Defense: Toward a Theory of National Security* (Princeton, US: Princeton University Press, 1961), 5-10. <https://web-s-ebscohost-com.cfc.idm.oclc.org/ehost/detail/detail?vid=0&sid=2a4d35ff-b801-43e0-8947-11a2a675e469%40redis&bdata=JnNpdGU9ZW9vc3QtbGl2ZS5zY29wZT1zaXRl#db=nlebk&AN=1078537>

<sup>4</sup> Jan Ludvik, *Nuclear Asymmetry and Deterrence: Theory, Policy and History* (Abingdon, UK: Routledge, 2017), 6, <https://ebookcentral.proquest.com/lib/cfvlibrary-ebooks/detail.action?docID=4741330>.

<sup>5</sup> Ibid, 18.

will be discussed with the former taken to mean conventional deterrence and the latter to mean conventional retaliation. Nuclear deterrence is outside of the context of this writing.

Studies on deterrence generally agree upon three factors that are required for a successful deterrence strategy: communication; capability; and credibility.<sup>6</sup> The deterrent threat must be communicated to the potential aggressor in a way that makes it clear what the defender wants to deter and what actions it will take if potential aggressor takes the unwanted action.<sup>7</sup> The potential aggressor must also perceive that the defender has both the capability and intent (credibility) to carry out the threatened action.<sup>8</sup> If the potential aggressor does not understand what the defender wants and/or doesn't believe that the defender can or will follow through on the threat, deterrence will fail.

## **CHARACTERISTICS OF A RUSSIAN ATTACK ON NATO**

The assessment of Russia by US and European security leaders is that Russia is interested in re-establishing hegemony in its near abroad, specifically in former Soviet territories.<sup>9</sup> While Russia has worked to modernize its military over the past two decades, the downturn in Russia's economy and the impact of international sanctions imposed on Russia since its annexation of Crimea have limited its capacity to wage a protracted war against NATO.<sup>10</sup> Therefore, the major threat that Russia presents to NATO is using localized military advantage to pursue a limited aims strategy in areas of former Soviet influence in the Baltics, Poland or Scandinavian countries, to seize territory and then defend these areas with strike, air and maritime defence and,

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<sup>6</sup> Michael J. Mazarr, *Understanding Deterrence* (Santa Monica, CA: RAND Corporation, 2018), 8, <https://www.rand.org/pubs/perspectives/PE295.html>

<sup>7</sup> Ibid, 9.

<sup>8</sup> Ibid.

<sup>9</sup> Elbridge Colby and Jonathan Solomon, "Facing Russia: Conventional Defence and Deterrence in Europe," *Survival: Global Politics and Strategy* 57, No. 6 (2016): 29, <https://doi.org/10.1080/00396338.2015.1116146>

<sup>10</sup> Ibid, 27.

if necessary, tactical nuclear weapons.<sup>11</sup> Threats of attack against NATO countries in Europe and North American with long-range conventional or nuclear weapons to deter a NATO response should be expected.<sup>12</sup>

## NORAD

NORAD has undergone considerable change since the collapse of the Soviet Union. In the years immediately following, Western defence budgets and NORAD funding plummeted.<sup>13</sup> Following the September 11, 2001 terrorist attacks, much of the West's attention shifted to counterinsurgency and capability development was focussed on asymmetric warfare.<sup>14</sup> The US's major power competitors, Russia and China, increased emphasis on developing long-range conventional precision-strike capabilities.<sup>15</sup> These weapons include air- and submarine-launched cruise missiles and hypersonic weapons and the supporting capabilities required to strike key strategic targets in North America to deter the deployment of forces overseas.<sup>16</sup> Both Russia and China have watched Western military operations and recognize that the overseas deployment of overwhelming US force has been critical to success.<sup>17</sup> The US and Canada have recognized that they have fallen behind in NORAD's ability to deter attacks on North America and that NORAD must be able to deter strikes on North America.<sup>18</sup>

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<sup>11</sup> Colby and Solomon, "Facing Russia," 22-24, 31.

<sup>12</sup> Yaroslav Lukov, "Ukraine war: Putin warns against foreign intervention," *BBC News*, April 27, 2022, <https://www.bbc.com/news/world-europe-61252320>

<sup>13</sup> Lee Carson and Brian Mersereau, "Canada Needs to Make NORAD Modernization a Priority," *Centre for International Governance and Innovation*, March 28, 2021, <https://www.cigionline.org/articles/canada-needs-to-make-norad-modernization-a-priority/>

<sup>14</sup> Terrence J. O'Shaughnessy and Peter M. Fesler, "Hardening the Shield: A Credible Deterrent and Capable Defense for North America," *The Canada Institute*, September 2020, 2, [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](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)

<sup>15</sup> *Ibid.*, 3.

<sup>16</sup> *Ibid.*

<sup>17</sup> *Ibid.*

<sup>18</sup> *Ibid.*, 14.

Deterrence efforts in North American are complicated by both bilateral and binational relationships between the US and Canada, implemented through NORAD, US Northern Command (USNORTHCOM) and the Canadian Joint Operations Command (CJOC).<sup>19</sup> NORAD holds responsibility for aerospace warning, aerospace control and maritime warning while other defensive functions are the responsibility of USNORTHCOM and CJOC. While the implications of a North American deterrence by denial strategy to the RCAF may be divided between NORAD and CJOC, in the interest of clarity and brevity, this paper will not make the distinction.

NORAD seeks all-domain awareness through sensor fusion from many sources including military radars, air traffic control radars, space-based surveillance, warships and military aircraft.<sup>20</sup> A number these sources that require modernization. With an ideal detection system, NORAD could detect long range bomber aircraft taking off from their bases overseas and missile launches as they occur to maximize its response time.

The North Warning System (NWS), a ground-based early-warning radar system located in Northern Canada and Alaska, is obsolete.<sup>21</sup> It is ineffective for the detection and identification of long-range air- and sea-launched cruise missiles, or modern, low-observable piloted or remotely-piloted aircraft.<sup>22</sup> The best approach to replace the NWS is to fuse sensor data from ground-, air-, maritime- and space-based sensors.<sup>23</sup> Individual system components can be added, removed or upgraded, creating a system that can more readily keep pace with changing technologies. The RCAF must prioritize the operationalization of ground-, air- and space-based

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<sup>19</sup> Andrea Charron and James Fergusson, "North America's Imperative: Strengthening Deterrence by Denial," *Strategic Studies Quarterly* 15, iss. 4 (Winter 2021): 45, <https://www-proquest-com.cfc.idm.oclc.org/docview/2616545726?pq-origsite=summon>

<sup>20</sup> O'Shaugnessy and Fesler, "Hardening the Shield," 10.

<sup>21</sup> Charron and Fergusson, "North America's Imperative," 49.

<sup>22</sup> Ibid.

<sup>23</sup> Ibid.

capabilities to replace the NWS and expand the area of surveillance out to the launch ranges for air- and submarine-launched cruise missiles.

A system of long-range, ground-based radars will provide persistent detection capability for cruise missiles and aircraft. Over-the-horizon radar (OTHR) has increased detection ability and range with a limited infrastructure footprint, requiring only four ground stations in Canada, rather than the 50 that comprise the NWS.<sup>24</sup>

To augment ground-based radars, surveillance satellites provide persistent surveillance over large areas using a variety of payloads to sense across the electromagnetic spectrum. The decreasing cost of space access make surveillance satellites a highly desirable capability to enhance NORAD's detection capability. This capability must allow the detection of missile launches and potentially the launch platform itself, though this is an exceptionally challenging task for submarine-launched cruise missiles. As the service responsible for the CAF's use of space, the RCAF must pursue improved space-based surveillance and detection capabilities.

Aircraft can be moved to different locations to augment detection in specific areas, and can be tasked on operations other than those supporting NORAD's mandate. The chief disadvantage is that they are impermanent and fragile, requiring time to reach the location from which they can conduct surveillance operations in the area of interest and robust support infrastructure, both of which pose challenges in the sparsely populated Arctic. Unmanned systems also require appropriate communications support, including satellite communications.

An RCAF fighter capability with increasing range is required to counter Russian long-range bombers than can launch cruise missiles to strike North American targets from further

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<sup>24</sup> Canada, Department of National Defence, "Backgrounder – North Warning System In-Service Support," Updated January 31, 2022. <https://www.canada.ca/en/departement-national-defence/news/2022/01/backgrounder--north-warning-system-in-service-support.html>



away. NORAD must demonstrate that it can intercept these aircraft before they can reach the launch range of their weapons and must continue to intercept Russian aircraft that approach the Canadian and US air defence identification zones (ADIZ), something happening more frequently since they restarted in 2007.<sup>25</sup> The CF-18 replacement will allow the RCAF to have more fighter aircraft available for this mission. The great distances involved and a lack of suitable airfields in the sparsely populated Canadian north limit fighter aircraft range and require air-to-air refueling aircraft to extend their range. The RCAF has two CC-150T Polaris capable of air-to-air refueling and must replace this capability as this aircraft reaches the end of its service life.<sup>26</sup> An airborne early warning and control (AEW&C) is also required to support fighter operations in the Arctic. Canada has leveraged USAF E-3 Sentry AEW&C in the past, but the US has indicated that relying on this in the future is not guaranteed as the aging fleet has seen reduced serviceability rates as the USAF moves to replace it with the E-7 Wedgetail platform.<sup>27</sup> Canada must explore an organic Canadian capability to fill this role.

To counter the threat of submarine-launched cruise missiles to North America, the RCAF must provide aircraft to support anti-submarine warfare (ASW) tasks including long-range patrol aircraft (LRPA) and maritime helicopters (MHs) embarked in Royal Canadian Navy warships. NORAD does not have a mandate for maritime surveillance, unlike in the air domain where it has a mandate for aerospace control so the employment of LRPA or warships would be by CJOC.<sup>28</sup>

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<sup>25</sup> Frédéric Lasserre 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, 306, [https://arcticyearbook.com/images/yearbook/2016/Scholarly\\_Papers/11.Lasserre-and-Tetu.pdf](https://arcticyearbook.com/images/yearbook/2016/Scholarly_Papers/11.Lasserre-and-Tetu.pdf)

<sup>26</sup> Chris Thatcher, "Canada seeking qualified bidders for Polaris replacement," *Skies Magazine*, <https://skiesmag.com/news/canada-seeking-qualified-bidders-polaris-replacement/>

<sup>27</sup> "USAF to replace E-3 Sentry Aircraft with Boeing's E-7 Wedgetail," *Air Force Technology*, April 27, 2022, <https://www.airforce-technology.com/news/usaf-replace-e-3-sentry-boeing-e-7-wedgetail/>

<sup>28</sup> Andrea Charron, "NORAD's Maritime Warning Mission: The Most Overlooked, yet critically important mission for the foreseeable future," *Canadian Naval Review*, June 1, 2020, <https://www.navalreview.ca/2020/06/norads-maritime-warning-mission-the-most-overlooked-yet-critically-important-mission-for-the-foreseeable-future/>

Regardless, a deterrence by denial strategy must transcend the Canada/US binational NORAD framework into the bilateral and unilateral defence activities of both countries.

Ballistic missile defence (BMD) is a more controversial aspect of the defence of North America. In 2005, Canada ruled out participation in US missile defence efforts, concerned with the placement of weapons in space, despite the system using ground-based interceptors.<sup>29</sup> The US plan for NORAD modernization and the US Strategic Homeland Integrated Ecosystems for Layered Defence (SHIELD) will make it increasingly difficult for Canada to maintain its position on BMD, as increased NORAD sensor fusion will include those associated with BMD. The Canadian government has recently stated that it is re-examining whether it should join the US BMD program.<sup>30</sup> The implications of a policy change for the RCAF would likely be in the sensor domain.

## NATO

Following the end of the Cold War, NATO's focus shifted away from deterring Soviet expansion towards other purposes.<sup>31</sup> Crisis management, including conflict prevention, peace enforcement, peacekeeping and stabilization, and expeditionary capability became NATO's priority, highlighted by operations in Bosnia, Kosovo, Afghanistan and Libya between 1992 and 2014.<sup>32</sup> Resurgent Russian aggression, culminating in the annexation of Crimea from Ukraine, forced NATO to rethink its approach to Russia.<sup>33</sup> The Warsaw Summit in 2016 signaled a revival

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<sup>29</sup> Canada, Senate, Standing Senate Committee on National Defence and Security, Daniel Lang and Romeo A. Dallaire, *Canada and Ballistic Missile Defence: Responding to the evolving threat*, June 2014, 4-5. <https://sencanada.ca/content/sen/Committee/412/secd/rep/rep10jun14-e.pdf>

<sup>30</sup> Andy Blatchford, "Canada taking 'comprehensive look' at joining U.S. ballistic missile defence," *Politico*, May 10, 2022, <https://www.politico.com/news/2022/05/10/canada-eyeing-bold-and-aggressive-military-options-to-defend-continent-00031349>

<sup>31</sup> "A Short History of NATO," *NATO*, accessed May 6, 2022. [https://www.nato.int/cps/en/natohq/declassified\\_139339.htm](https://www.nato.int/cps/en/natohq/declassified_139339.htm)

<sup>32</sup> Kęstutis Paulauskas, "On Deterrence," *NATO Review*, August 5, 2016. <https://www.nato.int/docu/review/articles/2016/08/05/on-deterrence/index.html>

<sup>33</sup> *Ibid.*

of Cold War deterrence efforts and included establishing an enhanced forward presence in Estonia, Latvia, Lithuania and Poland.<sup>34</sup> Deterrence has returned to the forefront of NATO security thinking.<sup>35</sup>

NATO can employ either deterrence by denial or punishment, or a combination of the two to deter Russian aggression. Deterrence by punishment threatens to impose severe costs on an adversary if an attack occurs.<sup>36</sup> This means that NATO has to be willing to escalate the conflict to apply sufficiently heavy punishment on Russia, which presents a number of challenges. First, this threat may lack credibility if Russia perceives that NATO lacks capability or resolve.<sup>37</sup> Second, Russia may be willing to bear greater costs than NATO and will be likely to ignore threats of punishment if it perceives its stakes are significantly higher than NATO's.<sup>38</sup> Third, should Russia seize its objective quickly through a *fait accompli*, then it would require compellence to dislodge them, a much more difficult strategy to employ.<sup>39</sup> Finally, in a limited aims scenario, the advantage lies with the side that forces escalation onto the other side and for deterrence by punishment, NATO is required to escalate.<sup>40</sup>

Deterrence by denial, on the other hand, offers advantages to NATO. It does not rely on alliance resolve to act as forces are already in place. The response to a Russian attack would be defensive, which is more palatable to NATO members.<sup>41</sup> A deterrence by denial strategy requires

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<sup>34</sup> NATO, "Warsaw Summit Communiqué," press release, July 9, 2016, [https://www.nato.int/cps/en/natohq/official\\_texts\\_133169.htm](https://www.nato.int/cps/en/natohq/official_texts_133169.htm)

<sup>35</sup> "Deterrence and defence," NATO, Updated 28 Mar 22, [https://www.nato.int/cps/fr/natohq/topics\\_133127.htm?selectedLocale=en](https://www.nato.int/cps/fr/natohq/topics_133127.htm?selectedLocale=en)

<sup>36</sup> Robert M. Klein, Stefan Lundqvist, Ed Sumangil and Ulrica Pettersson, "Baltics Left of Bang: The Role of NATO with Partners in Denial-Based Deterrence," *Strategic Forum* Iss. 301 (November 2019): 3, <https://www.proquest.com/docview/2321876856?parentSessionId=LtAkT8IQrloIqFRN6pGtJGrykUviwvmvPj85NXmg4rQ%3D&pq-origsite=summon&accountid=9867>

<sup>37</sup> Ibid, 4.

<sup>38</sup> Ibid.

<sup>39</sup> Ibid, 5.

<sup>40</sup> Colby and Solomon, "Facing Russia," 31.

<sup>41</sup> Klein, Lundqvist, Sumangil and Pettersson, "Baltics Left of Bang," 6.

forces in place to defend against attacks in Europe and to defend North America from attack by air- and sea-launched cruise missiles and, potentially, hypersonic weapons. Additionally, the defence of Europe should include area denial by establishing A2/AD bubbles over areas most at risk of Russian aggression.<sup>42</sup>

Much like continental defence, expeditionary operations that Canada will undertake supporting NATO deterrence by denial measures in Europe require the ability to detect and defend. One of the main contrasts between NORAD and NATO contributions is that the contribution to NORAD more directly supports Canadian sovereignty and Canada must possess both detection and defence capabilities. This is not the case with NATO, where the deployment of RCAF capabilities is part of the larger alliance and must be tailored to suit both NATO's requirements and the capabilities Canada is able to contribute. Canada does not need to contribute to all NATO capabilities.

Russia has deployed significant coastal and air defence missiles throughout Europe, notably in the Baltic Sea and Black Sea Areas. While these have been termed anti-access/area denial (A2/AD), doctrinally, Russia does not employ its defences in this manner nor do they expect these systems to effectively deny NATO access to these areas.<sup>43</sup> Russian air defence employs defensive mass to force NATO to gain air superiority through attrition.<sup>44</sup> In the case of coastal defence cruise missiles, these are employed more similarly to an A2/AD capability, though they are employed as part of sea denial strategy that also involves guided missile corvettes and frigates and sea mines.<sup>45</sup> Air power has a key role in countering Russia's air and

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<sup>42</sup> Colby and Solomon, "Facing Russia," 5-7.

<sup>43</sup> Michael Kofman, "It's Time to Talk About A2/AD: Rethinking the Russian Military Challenge," *War on the Rocks*, September 5, 2019, <https://warontherocks.com/2019/09/its-time-to-talk-about-a2-ad-rethinking-the-russian-military-challenge/>

<sup>44</sup> Ibid.

<sup>45</sup> Ibid.

coastal defence emplacements. Countering these capabilities requires a layering of NATO capabilities including AEW&C, airborne electronic attack (AEA), suppression of enemy air defences (SEAD) and missile defence.<sup>46</sup> Further, new capabilities including the teaming of manned and unmanned combat aircraft will be important in permitting NATO aircraft to enter areas of higher risk using unmanned aircraft to probe and trigger responses from Russian defences, permitting follow on attacks through AEA or SEAD capabilities.

Extended deterrence in Europe requires consideration of permanent or semi-permanent basing of assets within Europe. For the RCAF, this could either be done through rotational deployments, as is the case for Operation Reassurance under NATO air policing, or through the permanent establishment of units in Europe as was done during the Cold War.<sup>47</sup>

## **RCAF RECONSTITUTION**

Personnel shortages, exceeding 10%, will challenge the RCAF to meet operational tasks and force development that will be asked of it over the next decade. The RCAF in the planning stages of its reconstitution strategy, which will likely be released in the near future. To maximize its contribution to NORAD and NATO deterrence by denial efforts to counter Russia, and with thought to the requirement to deter Chinese aggression, the RCAF should prioritize operations and force development that primarily support NORAD modernization, as this will permit the RCAF to contribute to overall deterrence measures while undertaking work that can realistically be accomplished with the personnel shortage it will experience over the next decade.

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<sup>46</sup> Guillaume Lasconjarias, "NATO's Response to Russian A2/AD in the Baltic States: Going Beyond Conventional?" *Scandinavian Journal of Military Studies* 2(1) (2019), 80, <http://doi.org/10.31374/sjms.18>

<sup>47</sup> Canada, Department of National Defence, "Operation REASSURANCE," Updated March 25, 2022. <https://www.canada.ca/en/department-national-defence/services/operations/military-operations/current-operations/operation-reassurance.html>

## **IMPLICATIONS OF A DETERRENCE BY DENIAL STRATEGY FOR THE RCAF**

To support deterrence by denial strategies for NORAD by extension NATO operations, the RCAF must provide forces to operational commanders that build a credible capacity to detect and defend North America and NATO member territory in Europe from Russian aggression. While these implications have been discussed broadly already, more specific implications follow.

The RCAF is in the definition stage of the Future Fighter Capability Project and is in negotiations with Lockheed Martin to purchase the F-35 Lightning II. This capability will permit the RCAF to expand the number of aircraft available for NORAD intercept tasking and to operate in contested environments presently too risky for the CF-18 in support of NATO defence in Europe. The F-35 also has the ability to conduct AEA, an important capability in NORAD and especially in NATO roles when flying against Russian air defence systems. The RCAF should equip Canadian F-35s with the AGM-88R Advanced Anti-Radiation Guided Missile-Extended Range to conduct SEAD missions. The RCAF would also be wise to pursue a 'loyal wingman,' teaming a remotely piloted combat aircraft with the F-35. The lower cost and unmanned nature of these make them attritable and employable in higher risk environments than the F-35. This will provide improved ISR capability, the ability better probe adversary air defence and an ability to more effectively operate against the defensive mass of Russian air defence.

The RCAF is pursuing improved space-based detection and surveillance through the Defence Enhanced Surveillance from Space Project (DESSP). This project will develop a follow on capability to the RADARSAT Constellation Mission and will carry a number of payloads including synthetic aperture radar, an automatic identification system (AIS) receiver, electro-optic/infrared and hyperspectral imaging sensors in addition to classified payloads to expand its

surveillance capability in Arctic and the approaches to North America.<sup>48</sup> The RCAF should expect and pursue expanded and follow-on space-based capabilities to continue enhancing its surveillance capability.

The RCAF is developing the Canadian Multi-mission Aircraft project that will deliver a “Command, Control, Communications and Computers (C4) and Intelligence, Surveillance and Reconnaissance (ISR) and Anti-Submarine Warfare (ASW) aircraft with extended capabilities to replace the CP-140 Aurora.”<sup>49</sup> The RCAF should consider if two aircraft would better fill these functions as no “off-the-shelf” (OTS) aircraft exists that can effectively fill both roles. The RCAF must take the lesson of the past 20 years that purchasing aircraft that are not OTS run high risk of delivering less capability and delivering it late and at higher-than-expected cost. For an example of aircraft that could deliver these capabilities, the US and Australia both use the E-7 Wedgetail AEW&C and P-8 Poseidon ASW aircraft, both built on the Boeing 737 platform.

Following the Russian invasion of Ukraine in February 2022 the Canadian government announced additional defence funding including \$1 billion in funding for the Arctic Over-the-Horizon Radar (OTHR) and \$6.1 billion to be spend on NORAD modernization, though it is unclear if the OTHR amount is included in the \$6.1 billion for NORAD.<sup>50</sup> The RCAF is likely to continue to see a boost in defence spending over the next few years, likely concentrated in projects related to NORAD modernization and the RCAF must capitalize on any short term funding increases.

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<sup>48</sup> Canada, Department of National Defence, “Defence Enhanced Surveillance from Space,” updated January 9, 2020, <http://dgpapp.forces.gc.ca/en/defence-capabilities-blueprint/project-details.asp?id=1791>

<sup>49</sup> Canada, Department of National Defence, “Canadian Multi-Mission Aircraft,” Updated January 9, 2020, <http://dgpapp.forces.gc.ca/en/defence-capabilities-blueprint/project-details.asp?id=975>

<sup>50</sup> Andrea Bellemare, “\$8-billion budget boost in military spending draws mixed reviews,” *CBC News*, April 10, 2022, <https://www.cbc.ca/radio/checkup/is-canada-spending-too-much-or-too-little-on-defence-1.6414255/8-billion-budget-boost-in-military-spending-draws-mixed-reviews-1.6414705>; David Pugliese, “Canada plans new \$1-billion radar to protect North American cities,” *The National Post*, April 25, 2022, <https://ottawacitizen.com/news/local-news/canada-plans-new-1-billion-radar-to-protect-north-american-cities>.

## CONCLUSION

A shift NATO and NORAD's strategy to from deterrence by punishment to deterrence by denial has significant implications for the RCAF. It will require investment in acquiring the capabilities required to detect threats and to defend against them. While there are some differences between those capabilities required in the context of NORAD operations as opposed to NATO operations, many of the capabilities required to support a NORAD deterrence by denial strategy will allow the RCAF to provide forces overseas to NATO to reinforce European denial efforts.

Over the next five to ten years, the RCAF will have limited personnel resources available to deliver what the Government of Canada will likely ask of them. As such, the most resource efficient contribution to both NORAD and NATO deterrence measures will be to prioritize capabilities to support NORAD. NORAD deterrence will have carry-over to NATO deterrence by ensuring that threats to North America will not coerce decision-making on NATO deterrence measures in Europe.



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