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Maximizing CAF Arctic Capabilities by Building the Necessary Infrastructure

JCSP 47

Exercise Solo Flight

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Lieutenant-Colonel Robert Arbuckle

Maximizing CAF Arctic Capabilities by Building the Necessary Infrastructure

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In recent years Canada has increased its focus on having a military presence in the Canadian North. All services within the CAF have been involved in annual training exercises such as Op Nanook where capabilities are tested and operators trained in conducting missions in the Canadian Arctic. The Arctic presents substantial challenges for the CAF to execute its mission. Adverse weather and cold temperatures coupled with limited infrastructure and the enormous distances and challenges from a logistical support area are a constant challenge. As Canada continues to push for a presence in the North and climate change opens shipping passages the CAF's mandate is continually shifting towards increasing its ability to operate and conduct missions in the North. In order to address the increasing level of operations in the North, the CAF has purchased or is in the process of purchasing a significant amount of new equipment that will increase its ability to operate there. That includes modern Fixed-Wing SAR aircraft for search and rescue, the F35 and A330 MRTT refueler which will support the NORAD mission in the North and a fleet of eight Arctic and offshore patrol vessels which is meant to increase the RCN's ability to operate there. While the procurement of new equipment is underway, the spending on Northern infrastructure has not been commensurate. Without robust investment in Northern infrastructure, the CAF will not be able to maximize the utility of its new assets and will struggle to meet its mandate in the North. Modern SAR aircraft are being procured with the FWSAR platform and the Rotary-Wing SAR Cormorant remains a relatively modern aircraft in the fleet, however no permanent base to conduct SAR operations exists anywhere in the North. The F35 and A330 MRTT will constitute Canada's future fleet for conducting NORAD operations in Canada's North, yet the A330 is an enormous aircraft that needs purpose-built facilities in the North to operate. Underpinning the RCAF's challenges with operating in the Arctic are a host of challenges including weather, remoteness and logistical supply which drive a need to have at least one robust footprint in the North. Similarly, the RCN has purchased its new vessels, however it has not yet developed a robust plan for supporting those ships operating in Canada's North and the distance to ports where they can be supported will limit their operational capability.

The requirement for the CAF to demonstrate its capability to operate in the Canadian North is currently widely recognized as one of its required roles. While the Arctic area which Canada

claims has essentially remained unchanged for a substantial period of time, the focus on protecting Canada's Arctic and the need to assert Canada's sovereignty there has increased substantially over the past two decades. Climate changes, specifically global warming is actively opening Northern sea routes which is increasing commercial shipping interest and the debate as to whether countries have a right to ship through those passageways is currently disputed.[1] Canada considers the passages internal waters however the US, Russia China and others consider them international straits joining two High-seas, and subsequently believe they have the right to transit.[2] In addition to new waterways, the warming climate is opening lands that were previously considered inaccessible to the possibility of commercial activity and resource extraction. In order to capitalize on that commercial potential and in order for Canada to demonstrate that it exclusively has the right to commercial activities in the Canadian Arctic, it must demonstrate that it is in fact present in the Arctic and that it is capable of defending its sovereignty there. Further, Canada must be able to demonstrate its ability to respond to an accident or emergency of any size which might occur in the area and given the lack of other dedicated and capable SAR assets in the North, that response currently falls to RCAF SAR Sqns. In addition to demonstrating presence, Canada also has a commitment through NORAD to work with the United States in defence of North America.[3] Historically, Canada's role in that defence has included defending the North and the Aircraft Defence Identification Zone(ADIZ).[4] Strong Secure and Engaged lays out that commitment to both protecting the Artic in years to come while also ensuring that Canada retains the ability to respond to emergency situations as government and commercial interests increase there.[5] SSE lays out a number of procurements that Canada will make in the coming years to support CAF members in completing those roles, specifically discussing the new Strategic Tanker(now confirmed A330 MRTT), Future Fighter(now confirmed F35) and outlines the substantial take ahead with the National Shipbuilding Program.[6] SSE is also specific in the additional Capital that will be invested into

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[1] Byers, Michael, "Canadian Government Cannot Afford to dither on Arctic Sovereignty", The Hill Times, Iss 859(Oct 2006).
[2] ibid
[3] Pole, Ken, "NORAD at 60", Skies Mag, 25 July, 2019. https://skiesmag.com/features/norad-at-60/
[4] ibid
[5] Canada, Department of National Defence, "Strong, Secure, Engaged" last modified 2019-05-21 https://www.canada.ca/en/department-national-defence/corporate/reports-publications/canada-defence-policy.html
[6] ibid

the defence budget in order to purchase that equipment. It does not, however, outline an additional amount for the infrastructure to house and support that equipment either at a main operating base or any forward locations in the Arctic. Canada's role in the North is significant and its operations there will likely increase over time as the Northern passages open for longer periods of time.

The RCAF has multiple mandates in Canada's North which include both its commitments to NORAD and the requirement that they be able to respond to emergencies with Search and Resue assets. Currently there are no dedicated SAR assets based in Canadas North with Comox, Winnipeg, Trenton and Greenwood being the bases for SAR. Most of the Arctic is the responsibility of the Joint Rescue Coordination Centre(JRCC) in Trenton Ontario.[7] The reliance on SAR assets located thousands of kilometers away has been cited as a major problem as the Arctic opens up, with critiques coming from many sectors including aviation and shipping highlighting the increasing level of use .[8] The case for increased SAR in the North is closely tied to the increase in human use that is occurring and is likely to continue to occur over the near future. Sea ice is rapidly disappearing which is creating the opportunity for shipping, sea research and other commercial activities.[9] Simultaneously, that sea ice is becoming less stable presenting an increased risk to those ships along with all the other inherent dangers that come for ships operating in the Arctic.[10] With increased ships in the North, operating in challenging conditions will come the inevitability of the need to conduct SAR operations. There have been multiple aviation crashes over the past several years and the significant distance that must be covered by RCAF assets in order to respond to such a crash poses a significant obstacle to a timely response.[11] Norway recently conducted such an operation when the cruise ship *Viking Sky* lost power and 479 passengers were airlifted to safety by helicopter.[12] In the event Canada

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[7] Bouzane, Bradley, "Third crash underlines need for improved SAR in Arctic, analyst says", Postmedia News, Don Mills, On, 5 Oct 2011.
https://www.proquest.com/docview/896751612/B16CC87027374BC2PQ/2?accountid=10524
[8] ibid
[9] Byers, Michael, Covey, Nicole, "Arctic SAR and the 'Security Dilemma'", *International Journal*, 2019 Vol 74(4), 501.
[10] ibid
[11] Bouzane, Bradley, "Third crash underlines need for improved SAR in Arctic, analyst says", Postmedia News, Don Mills, On, 5 Oct 2011.
https://www.proquest.com/docview/896751612/B16CC87027374BC2PQ/2?accountid=10524
[12] Byers, Michael, Covey, Nicole, "Arctic SAR and the 'Security Dilemma'", International Journal, 2019 Vol 74(4), 500.

was required to conduct a similar operation, the response time would be hampered by the substantial distance helicopters would need to transit and the ability to affect such a large offload of passengers might end up highly dependent on how close the accident occurred to supporting infrastructure and fuel to keep the aircraft operating.

While the need for SAR capability in the Canadian North and Arctic is clear, no SAR assets are currently based there. For several years, SAR assets have participated in Northern exercises such as Op Nanook, which simulates the type of emergency they would need to be prepared to respond to[13], however these have been brief events with substantially different support requirements than a long-term detachment or even a seasonal footprint would require. The infrastructure and footprint required to maintain even a modest SAR capability in an area is significant. 103 Sqn in Gander is one of the smallest SAR Sqns, only operating the CH 146 Cormorant Helicopter with no accompanying Fixed Wing aircraft for support.[14] 103 Sqn employs 50 military personnel and 26 civilians in order to execute their mission and that does not include other support services at 9 Wing that are required such as airfield maintenance and air traffic control.[15] In addition to the personnel, the aircraft would need hangars, as the climate in the Arctic makes performing maintenance actions outside extremely challenging. Taken together the requirement for likely close to 100 military personnel, their families, a hangar and the host of other required support pieces drive the need for a dedicated base. Even if the solution to Arctic SAR was to maintain it for several months per year, the requirement to house families might disappear, but the need to be protected from the harsh elements while performing maintenance and house the military personnel for extended periods of time would still be needed. Ultimately, in order to have a SAR presence in the Canadian Arctic, infrastructure, generally resembling a small base will be required. That base may not necessarily need to be constructed from scratch and may be based at an existing Arctic airfield, but it will need to be a dedicated CAF resource given the significant time during the year SAR operations will need to be conducted.

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[13] Canada, Department of National Defence, "Op Nanook", last modified 2022-03-18 https://www.canada.ca/en/department-national-defence/services/operations/military-operations/current-operations/operation-nanook.html

[14] Canada, Department of National Defence. "103 Sqn" last modified 2019-07-10 https://www.canada.ca/en/air-force/corporate/squadrons/103-squadron.html

[15] ibid

Limited infrastructure at Northern airfields will increasingly limit and challenge CAF operations as the CAF transitions to modern, and larger aircraft. At present only a limited number of airfields in Canada's North can handle the C177 Globemaster.[16] The current model proposed by LCol Ziprick (ret'd) is one of hub and spoke for cargo where the C177 delivers cargo or personnel to the larger airfields where it can land, then the C130J, or other smaller aircraft are the 'spokes' which deliver cargo further on to the more remote locations.[17] A challenge to this model is that in order to offload the 17+ pallets from the C177 and onto other aircraft a robust logistical footprint is required. Further, as multiple trips may be required, protection from the elements for the cargo or people is also needed in case the spoke cannot move them immediately. Not all Northern airfields that have sufficient runway are also equipped with the logistical footprint to handle multiple iterations of C177 aircraft. While this aircraft provides incredible ability to land enormous amounts of cargo at relatively small airfields, those airfields are often unaccustomed to handling aircraft of that size. In addition to the C177, Canada has recently narrowed is search for its next tanker aircraft down to only the A330 MRTT.[18] The A330 MRTT is expected to replace the CC150T[19](based on the Airbus 310), but with the CC130H also being replaced by the Airbus 295 which is not capable of aerial refueling, the A330 MRTT is slated to become Canada's only tanker moving forward. The Globemaster has presented a challenge to Northern bases with its size, however, the A330 MRTT will present an exponentially greater challenge. Not only is the footprint significantly bigger with an approx. 200 ft wingspan on the A330[20] vs the 169 ft wingspan of the Globemaster[21], but it also requires several other pieces of handling equipment such as stairs and has over a 200,000lb fuel capacity which is unlike any other aircraft currently operating in the Canadian Arctic.

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[16] Ziprick, Darwin. "Leveraging Air Mobility to Support Canadian Arctic Sovereignty," in P. Whitney Lackenbauer & Heather Nichol, Whole of Government through an Arctic Lens (Antigonish, NS: St. Francis Xavier University, 2019); 164-199. https://www-deslibris-ca.cfc.idm.oclc.org/ID/10099781

[17] ibid

[18] Thatcher, Chris, "Airbus, and not Boeing, qualifies for FCAF future tanker", Skies Mag, 2 Apr 2021. https://skiesmag.com/news/airbus-boeing-qualifies-rcaf-future-tanker/

[19] ibid

[20] Australia. Royal Australian Air Force. "KC-30A Multi-Role Tanker, Transport (MRTT) Aircraft". https://www.airforce-technology.com/projects/kc-30a-multi-role-tanker-transport-mrtt-aircraft/

[21] United States America. United States Air Force, "C-17 Globemaster III". https://www.af.mil/About-Us/Fact-Sheets/Display/Article/1529726/c-17-globemaster-iii/

The government of Canada has started to address the issue of operating large aircraft in the Canadian North, primarily by extending the runway length of the Inuvik airport from 6,000 to 9,000 feet.[22] This project was approved for $150 million dollars, but at present construction is halted due to cost overruns.[23] While the project covers the extension of the runway, in its current state it does not address any additional DND infrastructure that would allow the A310 currently being flown, the future A330 or the C177 to operate there. In the long run, if the project continues that airport could serve as the hub for the RCAF to support Arctic operations, however at present, with the current level of funding it's unclear that even the requisite runway will get built. With multiple procurement projects underway for modern aircraft that can operate in the North, it appears that the RCAF has procured or is in the process of procuring the aircraft it will need to operate in the North. However, in order to actually operate those aircraft in the North and affect the mission sets they need to complete, they need supporting infrastructure and it is not apparent at this time that a commensurate investment is being made in to the infrastructure that will be required to actually make those aircraft effective in their Arctic missions.

The Royal Canadian Navy has been attempting to address their own Arctic infrastructure issues for well over a decade. Similar to the RCAF, the RCN is also attempting to expand its operations into Canada's North to assert Canada's sovereignty and demonstrate that it has the capability to conduct operations there. In 2007, Prime Minister Harper announced that a new refueling station would be built in Inisivik to support and supply Navy ships that were operating there.[24] This announcement came at the same time as the announcement to buy eight Arctic and offshore patrol vessels and the first of those vessels have now been delivered.[25] The port and refuelling station, however, has been significantly scaled down from the original vision. That original plan included an airport capable of landing jets, a year-round facility, newly constructed accommodations and a robust new inventory of fuel tanks which would be heated and able to

[22] Williams, Ollie, "Inuvik runway extension, '$40M over budget,' is halted", Cabin Radio, March 30, 20022. https://cabinradio.ca/89030/news/beaufort-delta/inuvik-runway-extension-40m-over-budget-is-halted/
[23] ibid
[24] Coyne, Todd, "Military hopeful new Arctic port will open in 2022, but 'significant' uncertainty remains", CTV News, 9 July 2021. https://vancouverisland.ctvnews.ca/military-hopeful-new-arctic-port-will-open-in-2022-but-significant-uncertainty-remains-1.5502188
[25] ibid

store fuel year-round.[26] That plan was significantly re-scoped in 2011; the jet-capable airstrip replaced with a shorter gravel strip, the year-round station becoming a seasonal station, no longer capable of heating and storing fuel over the winter and with no plan to house people throughout the year.[27] There is still hope that the Naval facility will be completed by 2023, which will be capable of refuelling the patrol boats, however the scaled-down version will not be able to link RCAF and RCN capabilities in the same way the original plans would have allowed.

There is an active discussion within the RCN as to what other resupply ports can be used and whether the Nanisivik facility was the right decision in the first place. One major critique of the Nanisivik facility is that given the relatively small local population there is minimal ability for the military infrastructure to benefit the local community.[28] The whole of government approach would seek to align military investment with other government initiatives that would benefit a larger cross-section of the population and become an economic driver going forward. By investing substantial funds in a project that primarily only benefits the CAF, the government of Canada would not be reaping the synergistic effects from their investment that they might in other areas. Several other sites in the Arctic or close to it have also been suggested that might offer those benefits. Churchill, while likely not as far north as the Navy would prefer, has existing port facilities, a linked rail line, a population experienced in managing a port and the opportunity for significant synergistic economic effects.[29] Tuktoyaktuk presents another option in for a permanent port with benefit to a civilian population and close proximity to the aforementioned airfield in Inuvik.[30] Further, Iqaluit has a significant civilian port already in development which could be leveraged for military purposes in the years to come and also has a sizeable airfield.[31] The RCN clearly has multiple options at its disposal for development in order to resupply its ships in the future. One or a combination of several of those options needs to be leveraged to support its growing fleet and enable that fleet to demonstrate its presence in the Canadian Arctic.

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[26] Bell, Jim, "Nanisivik: Nunavut's incredible shrinking Naval facility", Nunatsiaq News, Mar 22, 2012. https://nunatsiaq.com/stories/article/65674nanisivik_nunavuts_incredible_shrinking_naval_facility/

[27] ibid

[28] Bunt, Ryan, "Long Term Feasibility of the Nanisivik Naval Facility", Canadian Forces College 2021, 10.

[29] Giammaria, Jose Assis, "Third Base: The case for CFB Churchill", Naval Review, 15:1(2019), 14. https://www.navalreview.ca/wp-content/uploads/CNR_pdf_full/cnr_vol15_1.pdf

[30] Bunt, Ryan, "Long Term Feasibility of the Nanisivik Naval Facility", Canadian Forces College 2021, 12.

[31] ibid

Canada has committed to buying a wide array of new aircraft and ships to operate in the Arctic and assert Canada's sovereignty there. It has not, however made the same investment in infrastructure to support that equipment and without that investment, operating those new machines will be challenging and they will not be able to be used to their maximum potential. The concept of a base and a footprint in Canada's Arctic is one that has merit and would allow those new capabilities to be supported in an equivalent way to how they are supported by bases throughout southern Canada. There are several options that could or should be considered such as Inuvik/Tuktoyaktuk, Nanisivik, Iqaluit, Churchill and likely others. It may even be that multiple bases are preferable to give those capabilities an even greater operating range. In conducting a fulsome evaluation, the whole of government approach could be considered such that any synergies between the investment in military infrastructure could benefit OGD's and commercial interests. The construction of such a base would likely have cost overruns as other Northern projects have, but if the Government of Canada wants to get serious about having a military presence and capability in Canada's North, then a significant investment in infrastructure to support those operations is urgently needed.

Bibliography

Australia. Royal Australian Air Force. "KC-30A Multi-Role Tanker, Transport (MRTT) Aircraft". https://www.airforce-technology.com/projects/kc-30a-multi-role-tanker-transport-mrtt-aircraft/

Bell, Jim, "Nanisivik: Nunavut's incredible shrinking Naval facility", Nunatsiaq News, Mar 22, 2012. https://nunatsiaq.com/stories/article/65674nanisivik_nunavuts_incredible_shrinking_naval_facility/

Bouzane, Bradley, "Third crash underlines need for improved SAR in Arctic, analyst says", Postmedia News, Don Mills, On, 5 Oct 2011. https://www.proquest.com/docview/896751612/B16CC87027374BC2PQ/2?accountid=10524

Bunt, Ryan, "Long Term Feasibility of the Nanisivik Naval Facility", Canadian Forces College 2021. https://www.cfc.forces.gc.ca/259/290/23/305/Bunt.pdf

Byers, Michael, Covey, Nicole, "Arctic SAR and the 'Security Dilemma'", *International Journal*, 2019 Vol 74(4) pg 499-517.

Byers, Michael, "Canadian Government Cannot Afford to dither on Arctic Sovereignty", The Hill Times, Iss 859(Oct 2006). https://www.proquest.com/docview/208550958/C43EB35B2B794217PQ/15?accountid=10524

Canada, Department of National Defence. "103 Sqn" last modified 2019-07-10 https://www.canada.ca/en/air-force/corporate/squadrons/103-squadron.html

Canada, Department of National Defence, "Op Nanook", last modified 2022-03-18 https://www.canada.ca/en/department-national-defence/services/operations/military-operations/current-operations/operation-nanook.html

Canada, Department of National Defence, "Strong, Secure, Engaged" last modified 2019-05-21 https://www.canada.ca/en/department-national-defence/corporate/reports-publications/canada-defence-policy.html

Charron, Andrea & Jim Fergusson. NORAD: Beyond Modernization. Winnipeg: Centre for Defence and Security Studies, 2019; 6-43. https://umanitoba.ca/centres/cdss/media/NORAD_beyond_modernization_2019.pdf

Choi, Timothy. "Maritime Militarization in the Arctic: Identifying Civil-Military Dependencies," in Arctic Yearbook 2020. Akureyri, Iceland: Arctic Portal, 2020; 1-12 https://issuu.com/arcticportal/docs/ay2020

Coyne, Todd, "Military hopeful new Arctic port will open in 2022, but 'significant' uncertainty remains", CTV News, 9 July 2021. https://vancouverisland.ctvnews.ca/military-hopeful-new-arctic-port-will-open-in-2022-but-significant-uncertainty-remains-1.5502188

Giammaria, Jose Assis, "Third Base: The case for CFB Churchill", Naval Review, 15:1(2019), 11-16. https://www.navalreview.ca/wp-content/uploads/CNR_pdf_full/cnr_vol15_1.pdf

Lackenbauer, P. Whitney & Rob Huebert. "Premier Partners: Canada, the United States and Arctic Security," Canadian Foreign Policy Journal 20:3 (Fall 2014); 320-333 https://doi-org.cafvl.idm.oclc.org/10.1080/11926422.2014.977313

Olesen, Mihhel Runge. "Arctic Rivalries: Friendly Competition or Dangerous Conflict?" Copenhagen: Danish Institute for International Studies, 2017; 2-12. https://pure.diis.dk/ws/files/1141975/DIIS_WP_2017_6.pdf

Peacock, Emilie, "Inuvik Airport runway to expand in $150 million federal project", Cabin Radio, Sept 4, 2019. https://cabinradio.ca/20785/news/beaufort-delta/inuvik-airport-runway-to-expand-in-150m-federal-project/

Pole, Ken, "NORAD at 60", Skies Mag, 25 July, 2019. https://skiesmag.com/features/norad-at-60/

Thatcher, Chris, "Airbus, and not Boeing, qualifies for FCAF future tanker", Skies Mag, 2 Apr 2021. https://skiesmag.com/news/airbus-boeing-qualifies-rcaf-future-tanker/

Williams, Ollie, "Inuvik runway extension, '$40M over budget,' is halted", Cabin Radio, March 30, 20022. https://cabinradio.ca/89030/news/beaufort-delta/inuvik-runway-extension-40m-over-budget-is-halted/

United States America. United States Air Force, "C-17 Globemaster III". https://www.af.mil/About-Us/Fact-Sheets/Display/Article/1529726/c-17-globemaster-iii/

Ziprick, Darwin. "Leveraging Air Mobility to Support Canadian Arctic Sovereignty," in P. Whitney Lackenbauer & Heather Nichol, Whole of Government through an Arctic Lens (Antigonish, NS: St. Francis Xavier University, 2019); 164-199. https://www-deslibris-ca.cfc.idm.oclc.org/ID/10099781