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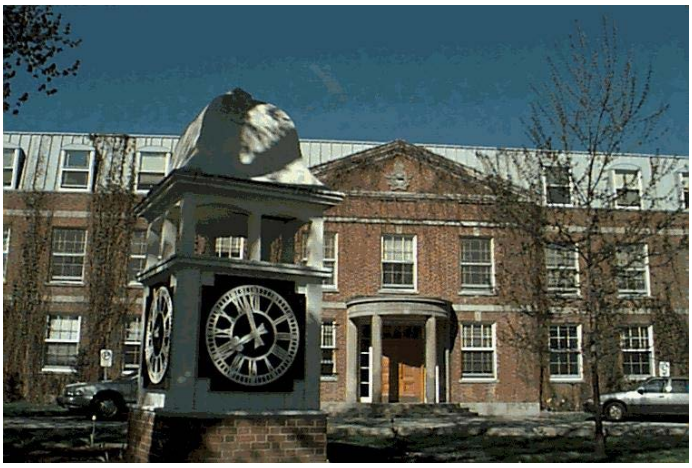

ARCTIC OPERATIONS: FACILITATING MOBILITY THROUGH AIRFIELD DEVELOPMENT

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JCSP 45

Service Paper

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Word Count: 2,553

Nombre de mots: 2553

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AIM

1. The aim of this service paper is to assess the principle factors associated with the selection of airfields to allow the Royal Canadian Air Force (RCAF) to better support Canadian Armed Forces (CAF) operations in the Arctic environment within the Government of Canada Arctic Strategy Framework.

INTRODUCTION

2. The Government of Canada recognizes the importance of the Arctic. As described in Canada's Arctic Foreign Policy, "we [Canada] exercise our sovereignty in the Arctic through our laws and regulations, as we do throughout Canada."[1] Supporting Canadians in the Arctic and being able to uphold government programs in the Arctic is challenging, but key to affirming Canada's sovereignty.[2] In the Arctic, unlike the mainland communities of Canada, the dispersed population and lack of ground line of communication profoundly affects Federal and Territorial Governments from projecting their services in the same manner. The objective of asserting sovereignty through presence has been the principle model of the Government of Canada since the 1950s. The ability for the CAF to operate in the Arctic is a piece of that puzzle, a way of shaping an environment to defend its sovereignty and support the people of the region. The Arctic is not solely a CAF problem, but a national matter. The CAF is a supporting agency in this context. This applies to airfield development more than anything else given the political,

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[1] Canada. Department of Foreign Affairs and International Trade. *Statement on Canada's Arctic Foreign Policy: Exercising Sovereignty and Promoting Canada's Northern Strategy Abroad* (Ottawa, 2010), 5

[2] Franklyn Griffiths, Rob Huebert, Whitney P. Lackenbauer. *Canada and the Changing Arctic: Sovereignty, Security and Stewardship* (2011), 29

economic, and social benefits and risks associated with constructing, operating and maintaining this infrastructure from a liability and community support perspective[3].

3. The key RCAF roles in supporting the CAF and the government of Canada in the Arctic are defined in Canada's Defense Policy. It includes the provision of Search and Rescue (SAR) and support for the CAF ability to detect, deter and defend against threats or attacks on North America (through North America Aerospace Defense Command (NORAD) but also through presence patrol and surveillance).[4] The RCAF is therefore a key player in providing mobility and facilitating sustainment of CAF personnel throughout the world, and specifically throughout the Arctic. Although other options may be considered to provide sustainment and mobility (airships, drones, naval assets), RCAF aircraft are currently the only method of movement that can move masses of people in a short period of time in the Arctic.

4. Climate change is expected to influence the activities and risks associated with the Arctic. Not only will it impact the environment and livelihood of the people of the Arctic. As stated in Canada's Statement on Arctic Foreign Policy:

> While the opportunities are great, there are also important social, economic and environmental challenges. Some of these have important international dimensions. Over time, increased access to the Arctic will bring more traffic and people to the region. While mostly positive, this access may also contribute to an increase in environmental threats, search and rescue incidents, civil emergencies and potential illegal activities.[5]

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[3] Canada. Minister of Indian Affairs and Northern Development and Federal Interlocutor for Métis and Non-Status Indians. *Canada's Northern Strategy: Our North, Our Heritage, Our Future = Stratégie Pour Le Nord Du Canada: Notre Nord, Notre Patrimoine, Notre Avenir = Kanataup Ukiuqtaqtumiunginnut Upalungaijautingat: Ukiuqtaqtuvut, Iliqkusivut, Sivuniksavullu* (Ottawa, 2009), 14.

[4] Canada. Department of National Defence. *Strong, Secure, Engaged. Canada's Defense Policy* (Ottawa, 2017), 106.

[5] Canada. Department of Foreign Affairs and International Trade. *Statement on Canada's Arctic Foreign Policy: Exercising Sovereignty and Promoting Canada's Northern Strategy Abroad* (Ottawa, 2010), 2.

5. As summarized in Kristina Schönfeldt book on Arctic Laws and Policies: "how the region as a whole evolves will have major implications for Canada and our role as an Arctic power".[6] The impact of the climate change is affecting other federal departments just as much (if not more) than DND. It will lead to an increase in the expectations on the Coast Guard to respond in the North West Passage, greater complexity for Border Services and the RCMP to police the entry into Canada, and for Fisheries and Oceans policing of the fisheries across Arctic Water. Those are only a few examples of departments that may have an interest in better infrastructure to operate in the Arctic[7]. Moreover, as a member of the Arctic Council, Canada has agreed to cooperate with Russia, the United States, Finland, Denmark, Iceland and Sweden in sharing information and resources for the provision of Search and Rescue in the Arctic.[8] A failure to respond in a timely manner in Canada's area of responsibility would have negative effect on Canada's reputation.

6. Canada's ability to project services, support to communities and assert its sovereignty is linked with the availability of suitable airfield infrastructure. This Service Paper will focus on the airfield gap for the RCAF that is currently affecting its ability to fulfill their role as a mobility provider. In the interest of scope and operational security, it will not consider NORAD requirements although in order to truly gain economy of effort, those needs should also be considered. It will specifically look at the issues with the current permanent footprint of the RCAF in the Arctic, which will include physical infrastructure, security and support assets. These factors will be analyzed with the intent of increasing reach and reducing vulnerabilities.

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[6] Kristina Schönfeldt. *The Arctic in International Law and Policy.* (Bloomsbury Publishing, Aug. 24, 2017), document 4.
[7] Canada. Standing Senate Committee on Fisheries and Oceans. *Controlling Canada's Arctic Waters: Role of the Canadian Coast Guard* (Ottawa, 2009), 31.
[8] Arctic Council. *Agreement on cooperation on Aeronautical and Maritime*. (Arctic Council Secretariat, 2011), article 7.

Since this is a broader problem than the RCAF, the intent is to be able to verbalize the RCAF requirements in order to ensure a broader, federal whole-of-government framework meets its needs.[9]

DISCUSSION

7. The concept of support for Canadian Joint Operations Command (CJOC), as described in the Canadian Forces Joint Publication (CFJP) 4.0, makes the case for the use of hubs and spokes to support deployments of CAF resources across the globe.[10] This concept can be applied to the Arctic. Given the very specific and unique requirements in operating in the Territories, it would be to the advantage of the CAF to establish main support hubs in both the Northwest Territories and Nunavut, in the low and high Arctic. This may help solidify relations with the territorial governments and communities and balance the CAF's presence in the North.

8. Since multiple government departments have an interest in the North, a cooperative effort will undoubtedly lead to economies of scale and savings for the Government of Canada. The Government of Canada is currently developing an Arctic Policy Framework which should identify a leading agency that will execute a national plan. This initiative is on-going, with the Department of Northern Affairs as the lead agency.[11] This approach will augment the sustainability of the infrastructure, ensuring duplicate efforts are avoided. This federal leadership in Arctic development does not remove the opportunity to leverage private sector industry needs in this assessment. This public-private partnership can help share the capital and Operation and

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[9] Canada. Standing Senate Committee on Transport and Communication. *One size does not fit all: the future growth and competitiveness of Canadian Air Travel* (April 2013), 6.
[10] Department of National Defence, B-GL-005-400/FP001, *Canadian Forces Joint Publication 4-0 Support.* (Ottawa: DND Canada, 2014), 2-14.
[11] Canada. Crown-Indigenous Relations and Northern Affairs Canada. *Arctic Policy Framework investment roundtable session: Toronto. 13 February 2018.* (Last accessed 12 Oct 2018) https://www.rcaanc-cirnac.gc.ca/eng/1534170209475/1537885856817?wbdisable=true

Maintenance costs of airfields. This however must be done in a careful manner to ensure that the interest of the communities and DND is considered.

9. In terms of support, the concept of support hub relies not only on the right airfields for the aircraft to be used, but it also necessity significant storage space and the ability to protect aircraft from the harsh environment of the Arctic. This implies that in addition to investing in runway development (Instrument Landing System (ILS), pavement, extension, lighting, etc.), the CAF will have to invest in permanent hangar space. As it is currently done, there might be a potential to leverage industry under a lease agreement. However, in order to maintain security, it is advisable to consider dedicated hangars for the major hubs and leased (as-needed basis) for secondary spoke locations.

10. The current and upcoming platforms within the RCAF are characterized by a few key specifications that will influence what the right footprint requirement is. The principal ones being the reach of the aircraft and its fragility (ability to land on short runways, gravel, ice runways, etc.). Those two factors are summarised in the table below. Paired with a geographic assessment of the Arctic communities, it provides a simple basis for an estimate of the requirements by the RCAF.

		Max Range (NM)	**Runway Length Required**
CH-146	Griffon	354.21	-
CH-148	Cyclone	399.57	-
CH-149	Cormorant	549.68	-
CH-147F	Chinook	593.95	-
CC-138	Twin Otter	770.52	1200
CC-115	Buffalo	1209.50	1041
CC-295C	New SAR Platform	2000.00	2200
CC-144	Challenger	3200.00	5640

CC-130J	Hercules	3699.78	3127
CC-130H	Hercules	3899.57	3586
CP-140	Aurora	3995.68	5000
CC-150	Polaris	5183.59	8000
CC-177	Globemaster III	5200.00	3000

Table 1 - RCAF Aircraft Specifications[12]

11. The CAF current footprint in the Arctic does not meet the needs of the RCAF. For example, Forward Operating Locations (FOL) in Inuvik, Yellowknife and Iqaluit offer limited hangar, work and storage space for the RCAF and cannot support significant operations. The naval refuelling station in construction in Nanisivik will not be useful for the RCAF given the distance to the airfield and its condition[13]. The nearest airfield, Arctic Bay, is over 50 kilometres away, on a road that is unlikely to be maintained all year around. Resolute Bay, home to the Canadian Forces Arctic Training Centre and the Polar Continental Shelf Program of Natural Resources Canada, has received certain upgrades in terms of storage and facilities, however the runway is still gravel. An advantage of Resolute Bay is that the airfield is equipped with ILS. Further North, Eureka is presently managed by Environment Canada, with a small CAF footprint. It can be reached by Coast Guard vessels in the summer. Canadian Forces Station Alert's infrastructure is maintained by DND; however, the cost of maintenance is extremely high as the site is solely accessible through airlift. Canadian Rangers are present in all communities, however, the permanent infrastructure supporting their role is negligible. Table 2 summarizes eleven main airfields within the Low and High Arctic which could be potentially utilized by the RCAF.

[12] Royal Canadian Air Force, "Aircraft Specifications". (Last accessed 12 October 2018) http://www.rcaf-arc.forces.gc.ca/en/aircraft.page

[13] PROLOG Canada. *The Northern Transportation Systems Assessment, Phase 2 Report, Infrastructure Needs Assessment*, (2011), 115.

Distance (NM)	Inuvik	Yellowknife	Iqaluit	Rankin Inlet	Cambridge Bay	Resolute Bay	Pond Inlet	Alert	Eureka	Arctic Bay	Nanisivik
Inuvik											
Yellowknife	588.46										
Iqaluit	1599.29	1247.8									
Rankin Inlet	1072.59	616.33	638.22								
Cambridge Bay	619.7	458.85	929.3	492.43							
Resolute Bay	817.95	841.19	852.01	268.99	385.2						
Pond Inlet	1136.17	1017.96	574.08	670.6	573.1	310.64					
Alert	1267.87	1428.13	1129.85	1261.09	977.41	529.83	618.42				
Eureka	1009.19	1159.65	1016.16	1037.03	714.45	337.94	451.39	260.94			
Arctic Bay	996.54	906.23	659.53	613.38	454.25	194.61	126.74	630.14	419.61		
Nanisivik	1004.98	912.43	653.42	632.41	460.98	201.63	119.01	629.4	421.25	7.75	
Runway Length (Ft)	6001	7500	8600	6000	5056	6504	4006	5500	4802	6400	3935
Runway Width (ft)	150	150	200	150	150	197	98	150	150	150	98
Surface	Asphalt	Asphalt	Asphalt	Asphalt	Gravel	Gravel	Gravel	Gravel	Gravel	Gravel	Gravel

Table 2 - Airport Characteristics and Distances[14]

12. Reach and speed are key concept for the RCAF[15] and when considering SAR operation in the Arctic, understanding the sheer distance associated with air travel in the Arctic is necessary.[16] Although SAR cases in the Arctic constitute only 4% of all SAR responses, over 50% of cases are considered to be of high complexity.[17] Having the ability to pre-position resources (aircraft, technicians, equipment) regionally can be beneficial during periods of high traffic or high risk. Separately, considerations must be given to the risks associated with weather and navigation aids. A diversity of options or distances between developed airfields allowing for diversions must be considered and investment in ILS at various airports will improve air navigation and safety.

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[14] Winnipeg Aviation. *Flight Calculations*. (Last accessed 12 October 2018) http://www.winnipegaviation.com/flight_calculation_maps_list.php

[15] Department of National Defence, Canadian Forces Aerospace Warfare Centre, B-GA-404-000/FP-001. *Canadian Forces Aerospace Move Doctrine*. (First ed. Trenton., ON: Canadian Forces Aerospace Warfare Centre, D2-288/2011E-PDF 978-1-100-19460- 8 November 2011), 6.

[16] Pierre Leblanc. "Canada's Northern People Deserve Better Arctic SAR Capabilities." (*Maritime Executive*, 2018). (Last accessed 8 October 2018) https://www.maritime-executive.com/editorials/canada-s-northern-people-deserve-better-arctic-sar-capabilities

[17] Adam Lajeunesse and P.W. Lackenbauer. *Canadian Arctic Operations. 1941-2015: Lessons Learned, Lost, and Relearned*. (University of New-Brunswick, The Gregg Centre for the Study of War & Society Book Series; no.1, 2017), 404.

13. Accessibility of the sites, both through land, sea and air will play a significant role in selecting suitable Arctic hubs for the CAF. The Arctic is all about logistics, and as seen with CFS Alert, an isolated site is a significant burden on the RCAF to support and replenish. The potential for ground and naval replenishment must be considered as factors in selecting sites, and again, it is in the best interest of the CAF and Government of Canada to leverage industrial development in the Arctic as a means to share the financial burden.

14. Physical security of our Forward Operating Locations is not easy to maintain, and the accessibility of a site has a direct impact on our ability to maintain access control. Additionally, the lack of permanent personnel on site can complicate the CAF's ability to maintain security. Those factors can be used to our advantage – by utilizing infrastructure in a whole-of-government approach, we rapidly augment the presence of personnel on site. Remote surveillance system may help augment awareness, but not necessarily in stopping intrusions. The CAF must therefore balance such risk.

15. No CAF infrastructure in the North can be developed without prior consultation and approval from the local government. Significant changes in the CAF's presence in their communities will impact them and this development requires access and authorization to develop their land. [18]

16. Four sites can be considered as a Low Arctic hub, when taking into considerations the factors above: Inuvik, Yellowknife, Iqaluit, and Rankin Inlet. Realistically, the Low Arctic base will serve as a major hub to project logistical support forward. Inuvik and Yellowknife distinguish themselves by the potential for ground distribution to those sites. Yellowknife

[18] Adam Lajeunesse. *The Canadian Armed Forces in the Arctic: Purpose, Capabilities, and Requirements* (St. Jerome's University, 2015), 4.

Airport is in a better state than Inuvik Airport. It has two runways, a decisive advantage in terms of continuation of operations. Additionally, fuel availability in Yellowknife is more consistent and significant. The continued presence of CAF personnel in Yellowknife helps with the provision of physical security, however, real estate for further development of infrastructure is limited due to the commercial footprint and safety templates may be difficult to establish.

17. Five sites can be considered for a potential High Arctic hub: Alert, Eureka, Resolute Bay, Cambridge Bay and Nanisivik (Arctic Bay).[19] The development of Nanisivik Airport would be in isolation given the low commercial and community interest in this airport. The isolation of the site would go against the Government of Canada's goal to strengthen the communities and provide services through this development. The development of the Nanisivik Deep Water Fuelling Station is of interest to the Navy; however, the airfield would be too expensive to develop.[20] Resolute Bay offers sea access and a current footprint from which to build up. With the Canadian Forces Arctic Training Centre and the Search and Rescue Arctic Training Centre, Resolute Bay is a familiar area for the CAF. Cambridge Bay, although located in the southern end of the High Arctic, is receiving significant federal funding at the moment, with the construction of the High Arctic Research Centre.

CONCLUSION

18. The RCAF footprint in the Arctic is not currently suitable to successfully achieve its missions. Investments must be made; however, they must be made in a very deliberate, whole-of-government approach which can address the issues of reach and sustainment for the RCAF

[19] Although Nanisivik has its own airfield, it was abandoned in 2011; the Artic Bay Airfield is approx. 50 km from the Nanisivik Naval Station.
[20] Franklyn Griffiths, Rob Huebert, P. Whitney Lackenbauer. *Canada and the Changing Arctic: Sovereignty, Security, and Stewardship* (2011), 103.

and the CAF. The concept of hubs can be leveraged and provide the RCAF with the adequate footprint to project mass forces forward in a sustainable manner. This pre-positioning of resources, and the physical infrastructure required to support RCAF operations will positively affect all of other CAF activities (and other government department activities as well) in the Arctic by establishing a backbone to access this land.

RECOMMENDATION

19. It is recommended that the RCAF renews its Arctic Strategy and for it to engage, through the Government of Canada and other departments, in a serious development of permanent infrastructure in the Arctic. This should include both Low and High Arctic support hubs.

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