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## AEROSPACE DEFENCE AND NON-DEFENCE MISSIONS - LEVERAGING OF REAL PROPERTY TO INCREASE SOVEREIGNTY OF THE ARCTIC

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# **AEROSPACE DEFENCE AND NON-DEFENCE MISSIONS - LEVERAGING OF REAL PROPERTY TO INCREASE SOVEREIGNTY OF THE ARCTIC**

## **AIM**

1. The Canadian Defence Policy - Strong, Secure, Engaged (SSE) calls for the enhanced mobility, reach, and footprint of the Canadian Armed Forces (CAF) in Canada's North to support operations, exercises, and the Canadian Armed Forces' ability to project force into the region<sup>1</sup>. The aim of this service paper is to examine and provide recommendations to the Commander 1 Canadian Air Division (1 CAD) on areas for enhancements to the Royal Canadian Air Force's (RCAF) real property portfolio in the Canadian Arctic that will improve participation in the mission to defend Canada's North. This service paper will focus on the real property enhancements that take advantage of the existing RCAF Arctic facilities and locations, while leveraging existing and potential inter-governmental agreements. Enhancements to the existing facilities would improve the RCAF's agility, integration, and reach during sovereignty operations in the Canadian Arctic<sup>2</sup>.

## **INTRODUCTION**

2. The Canadian Arctic Archipelago is the world's largest high Arctic land area, covering an area of 1.4 million square kilometers, consisting of over 36,000 thousand major and minor islands, and has an extremely harsh environment with temperatures reaching as low as minus 50 degrees Celsius in the winter and as warm as plus 20 degrees Celsius in the summer<sup>3</sup>. The lack of overland transportation routes and the multi-year sea ice presents a unique challenge in constructing, operating, and maintaining real property in support of RCAF operations in the Canadian Arctic. The extreme environment and weather, lack of industrial base, and poor access conditions in the Canadian Arctic add to the challenge of constructing new real property assets in new locations in the Arctic. This gives good cause to examine existing locations and assets with the idea of upgrading the real property instead of building new real property at new locations to improve operations. The current real property portfolio in Canada's North is antiquated, built with construction technologies prevalent during the 1970s and 1980s with the majority of construction occurring in the 1990s. The current portfolio locations and capabilities limit persistent RCAF access to the Canadian Arctic. The extreme environment, weather, and poor access conditions affect the ability of the Real Property Operations Group (RPOG) to conduct preventive and correct maintenance, resulting in a reduced facility condition assessment of the RCAF real property in the Canadian Arctic. Constraints on funding from the Department of Defence (DND) and lack of access to a robust industrial base in

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<sup>1</sup> Department of National Defence, *Canada's Defence Policy-Strong, Secure, Engaged* (Ottawa: Canada, 2017), 80.

<sup>2</sup> Department of National Defence, *B-GA-400-000/FP-001, Royal Canadian Air Force Doctrine*, (Ottawa: Canada, 2015), 3-5 -4-2. The airpower characteristic of reach, combined with the airpower tenet of integration (internal and external to the RCAF), creates the agility needed for the RCAF to execute the operational function of ACT.

<sup>3</sup> The Canadian Encyclopedia, "The Arctic Archipelago," last accessed 5 February 2021, <https://www.thecanadianencyclopedia.ca/en/article/arctic-archipelago>

the region also reduce effectiveness of real property programs at these sites. Leveraging our current assets to improve capabilities could make the case for additional funding, while drawing interest from a larger industrial base.

3. This service paper will examine the question of how can existing RCAF real property assets be improved to better the RCAF participation in the mission to defend Canada's North. The suggested improvements are examined with consideration for Canada's Greening Government strategy and are intended to increase the RCAF's core capabilities of Control of the Air, Air Mobility, and Intelligence, Surveillance and Reconnaissance (ISR) in the Canadian Arctic<sup>4</sup>.

## **DISCUSSION**

4. The discussion of potential real property improvements will begin with Canada's Greening Government mandate and how the RCAF can leverage this mandate to assist in accessing additional funding for green related projects. After this, the discussion will focus on each location the RCAF operates in the Canadian Arctic and what changes and enhancements are envisioned at each location to improve the ability of the RCAF to operate in the Canadian Arctic while greening the RCAF portfolio.

### **Canada's Greening Government**

5. As part of the government's response to climate change, Canada has developed a strategy to reduce Green House Gas (GHG) release to the atmosphere and to increase the resilience of assets, services, and operations by mitigating or adapting to the effects of climate change. Canada's Greening Government strategy mandates that all federal departments will maintain a real property portfolio that is climate-resilient and carbon net-zero by 2050<sup>5</sup>. This includes leveraging opportunities for portfolio rationalization, sharing facilities, maximizing energy efficiency, and switching to lower carbon fuels<sup>6</sup>.

6. The Greening Government strategy comes with opportunities to submit for special funding to achieve the Greening Government targets. Any improvements to RCAF Arctic real property that reduces GHG release by improving the energy efficiency of the facilities or by lowering dependence on fossil fuels can be considered for the program.

### **Forward Operating Locations**

7. The Forward Operation Locations (FOL) at Iqaluit, Rankin Inlet, Yellowknife, and Inuvik were constructed in the early 1990s. The facilities are in fair condition; however, all of the locations need significant energy performance improvements to ensure operational efficiency. The facilities suffer from constant corrective maintenance issues caused by poor insulation packages, inefficient heating and air exchange systems,

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<sup>4</sup> Department of National Defence, *B-GA-400-000/FP-001, Royal Canadian Air Force Doctrine*, (Ottawa: Canada, 2015), 5-2.

<sup>5</sup> Treasury Board of Canada Secretariat, *Greening Government* (Ottawa: Canada, 2017).

<sup>6</sup> *Ibid.*

and older lighting systems. Energy performance enhancements to these systems would be eligible for the Greening Government program and would bring the sites closer to reaching Canada's net-zero targets. The improvements would also reduce the temporary denial of facilities caused by frequent corrective maintenance issues, improving access to the sites by the RCAF while conducting Control of the Air tasks.

8. As part of these energy performance improvements, changes to the Standard Operating Procedures (SOPs) should be considered for all FOLs not activated. Minor changes to the SOPs such as ambient temperature reductions at non-activated FOLs, combined with improvements to the building envelope, heating systems, lighting systems, and air exchange systems will significantly reduce operations costs, contribute to the reduction of GHG production, and assist the DND to meet Canada's Greening Government targets.

9. As the Cities of Yellowknife and Iqaluit develop and grow, FOLs at these locations suffer from municipal encroachment, reducing standoff distances to undesirable limits, potentially affecting operations. The reduced standoff distance also complicates the installation of other defensive assets in the immediate vicinity of the FOL. There are very limited solutions to this problem, and if the location becomes untenable due to these constraints, then relocating the FOL to a new location presents new partnership opportunities for sharing assets with other federal departments. Replacement FOLs would be designed to meet Canada's Greening Government targets; while leveraging a new location in the Arctic that may provide the RCAF greater agility, integration, and reach while exercising Control of the Air in the defence of Canada's North.

### **North Warning System**

10. The North Warning System (NWS) modernization is key to increasing the RCAF's ability to conduct ISR in defence of the Canadian Arctic. The current system was constructed in the early 1990s and is antiquated. Due to the lack of interaction between the various North American Aerospace Defence (NORAD) detection systems such as the NWS, maritime defence network, and the United States (US) North Command's Ballistic Missile Defence (BMD) system, modern Russian and Chinese weapons are able to exploit the gaps in our continental defence<sup>7</sup>. Although a complete system replacement for the NWS is not included in SSE, Science and Technology (S&T) aspects of an All Domain Situational Awareness (ADSA) program are included<sup>8</sup>.

11. The existing NWS utilizes a large amount of electrical power to function, and is a significant producer of GHG. The majority of NWS sites rely on diesel powered electric generators as the sole source of electricity and heat. The opportunity for the RCAF to include energy reduction measures in the ADSA program must start during the S&T phase in order to minimize power consumption and reduce GHG production. Defence

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<sup>7</sup> Network for Strategic Analysis, "Thinking About the Modernization of NORAD," last modified 24 November 2020, <https://ras-nsa.ca/publication/thinking-the-modernization-of-norad/>

<sup>8</sup> Department of National Defence, *All Domain Situational Awareness Program* (Ottawa: DRDC, 2016), 1-2.

Research and Development Canada (DRDC) is currently working with the Greening Government program to trial a renewable energy source for incorporation at existing NWS sites. The new power source will utilize a Micro-grid in conjunction with energy efficiency improvements to achieve a 37% reduction in fuel usage and a corresponding reduction in GHG emissions<sup>9</sup>. If this technology is applied to the ADSA program, it would be more attractive for green funding, operational costs would be significantly reduced, and the DND would be several steps closer to achieving the Greening Government targets. Doing so would also improve the ISR capabilities of the RCAF in the North by improving the resilience of the NWS site power systems.

### **Resolute Bay**

12. Although the RCAF has very little in the way of real property in Resolute Bay, the Canadian Army (CA) operates the Arctic Training Center (ATC) utilizing a mixture of DND owned facilities and partnership facilities shared with Natural Resources Canada (NRCan)<sup>10</sup>. The RCAF could leverage the accommodations and kitchen facilities at the ATC as overnight accommodations for flight crews and passengers while operating in the Arctic. Sharing of facilities is a key real property tenet of Canada's Greening Government strategy. If the shared facilities at Resolute Bay were augmented with new RCAF real property such as a multi-use hangar and aircraft fuel storage, the RCAF's agility, integration, and reach in the Arctic would improve due to the central location of Resolute Bay within the high Arctic. Other federal departments could be partners in these facilities to enhance the greening of this location. Resolute Bay could also play an integral role in improving material airlift to high Arctic sites and operations as the location receives sealift annually.

### **Canadian Forces Station Alert**

13. Canadian Forces Station (CFS) Alert is the most Northerly site operated by the RCAF. The station is currently undergoing a \$55 million plus energy performance upgrade that will bring the DND closer to Canada's Greening Government goals; however, the site represents the greatest airlift challenge for the RCAF due to the distance from the airlift embarkation location and the frequency of extremely harsh weather conditions at the station<sup>11</sup>.

14. This airlift challenge affects the performance of real property maintenance and repair activities as all construction materials are currently funnelled through 2 Air Movement Squadron at 8 Wing Trenton or through the annual dry replenishment operation. The deficiency in real property maintenance and repair is affecting the station

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<sup>9</sup> Department of National Defence, *DRDC sets AMAZE-ing goal to reduce Greenhouse Gas Emissions in Arctic facilities* (Ottawa: The Maple Leaf, 2020), 1.

<sup>10</sup> The DND owned facilities located at Resolute Bay NU consist of austere storage facilities and a Search and Rescue training site. NRCan operates the Polar Continental Shelf Program and DND has collaborated with NRCan in a long-term agreement to provide a shared facility to allow the CAF to conduct land based Arctic training. The DND portion of the shared facility can accommodate up to 140 personnel.

<sup>11</sup> University of Manitoba Transportation Institute, *Preliminary Assessment of Alternate Delivery Mechanisms for CFS Alert Resupply* (Winnipeg: University of Manitoba, 2012), 1.

facility condition and needs to be corrected in order for the RCAF to fully utilize the station to defend Canada's North.

15. Upgrades to the CFS Alert aerodrome would assist the RCAF in defending Canada's North by improving the RCAF's agility and reach in the high Arctic. Potential improvements include extending and surfacing the existing gravel runway to maximize RCAF strategic airlift and extend the usage of larger commercial aircraft for airlift. The construction of a multipurpose hangar would facilitate air mobility and ISR tasks, and upgrading the air navigation systems would improve poor weather operability. The potential upgrades would also assist the DND in achieving Canada's Greening Government goal by providing an onsite facility for RCAF aircraft to stay in the event of extreme weather, eliminating significant costs associated the air routes frequently driven by accommodation availability<sup>12</sup>.

#### **440 Transport Squadron**

16. 440 Transport Squadron (Sqn) lacks adequate forward refuelling and operating sites. Legacy fuel caches have the potential to create environmental issues for the DND with federal and territorial regulators<sup>13</sup>. A joint project with RPOG, DRDC, and NRCan is under development to create a modular series of structures that provide an energy efficient building and power system<sup>14</sup>. A prototype structure was installed in Resolute Bay to provide a safety shelter for Search and Rescue (SAR) Arctic survival training during extreme weather events. The modular systems are sea and airlift capable, and can provide over 200 square meters of energy efficient living or operational space per module. The construction of austere, self-sufficient, and energy efficient sites would improve the RCAF's agility, integration, and reach in delivering Air Mobility and ISR in Canada's North while reducing the RCAF's environmental liabilities associated with legacy fuel caches. The forward operating locations could be shared by the Canadian Rangers to enhance the defence of Canada's North.

#### **5 Wing Goose Bay**

17. 5 Wing Goose Bay represents a significant green success story within the RCAF real property portfolio. Over the next few years, RPOG will replace the existing fossil

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<sup>12</sup> Air routes from 8 Wing Trenton to CFS Alert are generally determined by availability of commercial accommodations for crew and passengers as well as aircraft servicing and hangar availability during the winter season.

<sup>13</sup> Department of National Defence, Taking Care of Our Land, (Yellowknife: JTFN, 2019), 21-23, [https://www.algomau.ca/wp-content/uploads/2019/07/TakingCareOfOurLand-Cott-May2019\\_Final.pdf](https://www.algomau.ca/wp-content/uploads/2019/07/TakingCareOfOurLand-Cott-May2019_Final.pdf). Dr. Peter Cott, the Joint Task Force North (JTFN) environmental officer presented a summary of DNDs legacy fuel caches located in the Canadian Arctic at the Gdo Akiiminaan Ganawendandaan (Taking Care of Our Land) Symposium held at Algoma University, 6-9 May 2019. The CAF legacy fuel caches present a significant risk to the DND.

<sup>14</sup> The Sustainable Northern Housing Project was envisioned by NRCan – Canmet ENERGY. DND entered into a partnership with NRCan to prototype and trial energy efficient Northern Shelters for use by the CAF in austere Arctic locations. Due to early investments in the project by the DND, the DND has acquisition options not available to other levels of governments or industry. More information is available from RPOG.

fuel steam heating plant with a new electric steam heating plant. The province of Newfoundland and Labrador will install a new electrical line from the Lower Churchill hydroelectric power plant to the wing to provide clean power. This project is receiving funding through Canada's Greening Government program and will make 5 Wing Goose Bay the first green wing in the entire portfolio within the DND.

18. However, the real property portfolio at 5 Wing Goose Bay is mostly comprised of inefficient and older buildings and works. There are significant energy improvements that can be implemented on the wing, but until a clear plan for the future of 5 Wing Goose Bay real property is developed, any rationalization of unused buildings, repairs, or energy upgrades could be a waste of valuable resources. Inline with Canada's Greening Government strategy of sharing real property assets across the federal government, the availability of unused real property at 5 Wing Goose Bay should be rationalized with the future plans and security requirements of the RCAF.

## **CONCLUSION**

19. Canada's Greening Government strategy has set significant targets for the reduction of GHGs related to real property. These targets will be impossible to achieve with the RCAF's current real property portfolio in the Canadian Arctic and difficult to achieve with all the measures identified in this paper. The RCAF's projection of airpower into Canada's North can be improved with a combination of greater operational efficiency, greater access to existing RCAF sites and new forward sites as discussed above.

20. To align with Canada's Greening Government strategy and to improve the RCAF's ability to defend Canada's North, the RCAF can leverage real property enhancements at a relatively low cost compared to constructing completely new sites, while possibly accessing specialized green funding.

21. All of the real property enhancements discussed would provide the RCAF sites in question with multiple secondary and tertiary follow-on benefits. These benefits include increased operational efficiency, increased compliance with Canada's Greening Government Strategy, and increased morale at the operation sites, decrease operational costs, reduced GHG production, and positive government and public perception.



## **RECOMMENDATION**

22. Summary of recommendations:
  - a. Energy performance upgrades and operational changes at FOLs.
  - b. Move FOLs that are constrained by municipal encroachment.
  - c. Construct a multi-use hangar, extend and surface the runway and upgrade navigation capabilities at CFS Alert.
  - d. Incorporate leading-edge renewable energy systems in the ADSA program.
  - e. Construct self-sufficient and modular refuelling and operating sites for 440 Transport Sqn.
  - f. Increase the partnership capabilities with NRCan at Resolute Bay, and construct a multi-use hangar with federal partners.
  - g. Develop a plan for the future of the 5 Wing Goose Bay real property to allow rationalization and energy efficiency upgrades of the portfolio.
  
23. It is recommended that 1 CAD liaise with RPOG to conduct a detail review of the RCAF's real property portfolio in Canada's North.

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