National Defence Défense nationale

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TROOPS AND GUNS CAN NOT DEFEAT GLOBAL WARMING ALONE: A WHOLE OF GOVERNMENT APPROACH TO SOVEREIGNTY AND SECURITY IN THE ARCTIC

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JCSP 44

Exercise *Solo Flight*

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PCEMI 44

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CANADIAN FORCES COLLEGE – COLLÈGE DES FORCES CANADIENNES
JCSP 44 – PCEMI 44
2017 – 2018

EXERCISE *SOLO FLIGHT* – EXERCICE *SOLO FLIGHT*

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Word Count: 5038

Compte de mots: 5038

TROOPS AND GUNS CAN NOT DEFEAT GLOBAL WARMING ALONE: A WHOLE OF GOVERNMENT APPROACH TO SOVEREIGNTY AND SECURITY IN THE ARCTIC

Before the 1990's, there were very few people in the world who knew what global warming or climate change was and what effects it would have on the Arctic over the next thirty years. However, fast forward to 2018 and the Artic is now becoming more accessible and with this increased accessibility, new threats to regional security and Canadian Arctic Sovereignty are becoming evident. In the past, when the Federal Government felt its Arctic sovereignty was being challenged or questioned, it would dispatch the Canadian Armed Forces (CAF) to the Arctic in order to conduct exercises or sovereignty patrols. In one extreme case the Federal Government even went so far as to uproot Inuit families from established southern Arctic communities and move them to Resolute Bay and Grise Ford to act as human sovereignty poles in order to demonstrate Canadian sovereignty over the Arctic.[1]

The current reality facing the Federal Government is that there is no easy solution to this situation. Global warming has not only exposed the Arctic to possible territorial threats, but more so to human and environmental security threats. Climate change has begun to affect Arctic infrastructure, the Arctic environment and poses a significant threat to the Inuit and Aboriginal People's traditional ways of life. Coupled with these problems, the sheer size of the region and harshness of the environment presents logistic issues when attempting to resolve problems and operate in the Arctic.

[1] The Globe and Mail. "The myth of Arctic sovereignty: Do we really need to defend the North?" Last updated 25 March 2017. https://www.theglobeandmail.com/news/national/the-north/the-myth-of-arctic-sovereignty-do-we-really-need-to-defend-the-north/article16444454/

The Arctic is a vast area spanning three Canadian territories and four provinces comprising of Manitoba, Ontario, Quebec, Newfoundland and Labrador and stretches as far North as the North Pole.[2] This large area comprises 40 percent of Canada's land mass and 75 percent of its coastlines due to the arctic archipelago which consists of 36 000 islands.[3] Most of the Arctic communities can only be accessed by the use of aircraft or by sea during brief periods of the summer months when Arctic sea ice is low in concentration.

In order to properly address the issues of Arctic sovereignty and security threats brought on by global warming and climate change the Federal Government needs to apply a whole of government approach to this problem. There is no one single department within the government that has the resources or expertise needed to address all of these issues concurrently.

This short essay takes the position that in order to resolve the current security and territorial threats the Arctic is facing due to global warming and climate change, a whole of government approach involving diplomacy, capability development and economic investment must be utilized.

Arguments will first highlight the past successes Federal Governments have had in resolving challenges to Canadian sovereignty through diplomacy as well as recent diplomatic work conducted at the Arctic Council. Next, arguments will address current capability deficiencies which the Federal Government will need to resolve in order to address future and current security threats. Finally, areas where the Federal Government can invest in Arctic economic development will be explored.

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[2] Robert Bone. *The Canadian North: Issues and Challenges*. (Ontario: Oxford University Press, 2012,) 7.

[3] Department of National Defence. *Strong Secure Engaged: Canada's Defence Policy*. (Ottawa: Canada Communication Group, 2017), 79.

Given the past rhetoric and chest pumping by government officials as well as intensive media coverage regarding Arctic sovereignty, one could believe that Canadian sovereignty over the Arctic is continually being challenged. This is simply not the case. It is important to note that Canada only has three outstanding disputes which are still being negotiated regarding the Arctic. The first is the status of the Northwest Passage (NWP) as it relates to whether it is an international straight as claimed by the United States and the European Union or if it is internal Canadian waters as claimed by Ottawa. The second, is an ongoing dispute with Denmark over ownership of Hans Island which is located in the Davis Strait. Lastly, Canada's final dispute, is a boundary dispute with the United States concerning a pie shaped sector of the Beauford Sea comprising an area of 21 436 square kilometers.[4] In all three examples, Canadian diplomats continue to work on solutions to these disputes and Canada still has strong relationships will all countries involved.

Since taking possession of the Artic in 1880 from the British Empire there has only been three occasions when Canadian Artic sovereignty has been challenged. These events consisted of two separate voyages of the United States Supertanker (USS) *MANHATTEN* in 1969 and 1970 as well as the 1985 voyage of the United States Coast Guard icebreaker *POLAR SEA* through the NWP.[5] All three of these voyages received extensive press coverage in the local media and were resolved through the use of diplomacy and policy development.

In the case of the USS *MANHATTEN* voyages, the Federal Government of Pierre Elliot Trudeau introduced the Arctic Waters Pollution Prevention Act (AWPPA) in 1970. "The

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[4] Michael Byers. *Who Owns The North: Understanding Sovereignty Disputes in the North*. (Vancouver: D&M Publishers INC, 2009),98.

[5] Library of Parliament of Canada. " Canadian Arctic Sovereignty." Last accessed 28 March 2018. http://www.res.parl.gc.ca/Content/LOP/ResearchPublications/prb0561-e.htm

AWPPA established a 100 nautical mile pollution zone around the outside of the Arctic Archipelago as well as the waters between the islands."[6] This gave the Federal Government the ability to control and if necessary, provide support to the vessel wishing to transit the waters. Initially, the Americans were not happy with the introduction of the APWAA act by the Trudeau government. However, in 1982 the United States supported Canadian sponsored Article 234 of the United Nations Convention of the Law of the Sea (UNCLOS).[7] UNCLOS allows "the right to adopt and enforce non-discriminatory laws and regulations for the prevention, reduction and control of marine pollution from vessels in ice covered areas within limits of the exclusive economic zone."[8]

Aside from the development of the AWPPA, the Trudeau government also introduced the Northern Canada Vessel Traffic Services Zone Regulation (NORDREG) in 1977. NORDREG was organically developed as a voluntary program aimed at ensuring the safe and swift movement of shipping vessels in Canada's Arctic waters as well as to protect the environment of the Arctic region. However, as of July 1st, 2010 NORDREG was made mandatory by the Federal Government. Under NORDREG, any vessel wishing to transit through the Canadian Arctic must contact Canadian authorities prior to entering Canadian waters and once entered into Canadian waters, provide a daily position update to Canadian authorities.[9] Furthermore, the ship's Captain must also disclose information regarding the type of cargo being transported, condition of the vessel, if the vessel intends on berthing in Canadian waters and the final destination of the vessel.

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[6] Franklyn Griffiths, Rob Huebert, and P. Whitney Lackenbauer. *Canada and the Changing Arctic: Sovereignty, Security, and Stewardship*. (Waterloo Ontario: Wilfred Laurier University Press, 2011), 77.

[7] Franklyn Griffiths, Rob Huebert, and P. Whitney Lackenbauer. *Canada and the Changing Arctic: Sovereignty, Security, and Stewardship*. (Waterloo Ontario: Wilfred Laurier University Press, 2011), 77.

[8] The Arctic Governance Project. "UNCLOS Article 234." Last accessed 30 March 2018. http://www.arcticgovernance.org/unclos-article-234.4668244-142904.html

[9] Government of Canada. "Justice of Laws website: Northern Canada Vessel Traffic Services Zone Regulations." Last modified 6 March 2018. http://laws-lois.justice.gc.ca/eng/regulations/SOR-2010-127/FullText.html

[10] NORDREG can also assist vessels who transit through Canadian Arctic waters by providing updated information on pack ice conditions as well as providing icebreaker assistance if required.

In 1985 the United States Coast Guard icebreaker *POLAR SEA* transited through the NWP on return from the United States military base in Thule Greenland. This event, like the *MANHATTAN* voyages sparked a media firestorm in Canada. As outlined in the AWPPA, all vessels wishing to use the NWP must request permission form the Canadian government to do so. However, as previously stated the United States views the NWP as an international straight as such, and vessel wishing to transit the NWP does not need to request permission from Canada to do so. If the United States did seek permission from the Canadian government to transit the NWP at any time it could potentially prejudice their own legal position on the matter and weaken their claim should the matter be presented to the international court.[11]

In reaction to this event, the Mulroney government outlined a laundry list of capabilities which it intended to either develop or purchase in the 1987 Defence White Paper to bolster both sovereignty and security in the Artic. However, three years later after much negotiation the Federal Government under Brian Mulroney in cooperation with the US government developed the Arctic Cooperation Agreement. Under this agreement, United States Coast Guard Vessels wishing to utilize the NWP would acquire Canadian consent before transit.[12] In doing so, the agreement was drafted in a manner which would not prejudice their position in the international court of law.

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[10] Government of Canada. "Justice of Laws website: Northern Canada Vessel Traffic Services Zone Regulations." Last modified 6 March 2018. http://laws-lois.justice.gc.ca/eng/regulations/SOR-2010-127/FullText.html

[11] Franklyn Griffiths, Rob Huebert, and P. Whitney Lackenbauer. *Canada and the Changing Arctic: Sovereignty, Security, and Stewardship*. (Waterloo Ontario: Wilfred Laurier University Press, 2011), 78.

[12] Franklyn Griffiths, Rob Huebert, and P. Whitney Lackenbauer. Canada and the Changing Arctic: Sovereignty, Security, and Stewardship. (Waterloo Ontario: Wilfred Laurier University Press, 2011), 78.

Although the listed examples happened in the 1970s and early 1980s, diplomacy is still a critical tool used by Canada to address threats such as environmental pollution and climate change. The most recent success stories of Canadian Arctic diplomacy can be found in its dealings with the Artic Council. "The Arctic Council is the leading intergovernmental forum promoting cooperation, amongst the Arctic States, indigenous communities, and other Arctic inhabitants."[13] In this forum issues on sustainable Arctic development and environmental protection are discussed and action plans developed.[14] The Arctic Council comprises of eight primary member states: Canada, Denmark, Norway, Sweden, Russian Federation, Iceland and Finland as well as six different Indigenous aboriginal groups who reside in the Arctic and provide insight before discussions are drafted and agreed upon by member states.

Since its founding in 1996, Canada has chaired the Arctic Council twice.[15] The most recent appointment was from 2013-2015. During this timeframe, Canadian diplomats advanced three key initiatives aimed at protecting the Arctic environment. The first were changes to the Polar Code. "The Polar Code sets out regulations for shipping in the Polar regions, principally relating to Ice navigation and ship design."[16] These regulations clearly outline what type of construction a ship must possess in order to sail in Arctic and Antarctic waters, the training crews require, protocols for Search and Rescue (SAR), the types of environmental pollution prevention equipment vessels must possess and spill reporting and clean up procedures vessels

[13] Arctic Council Secretariat. "The Arctic Council: A backgrounder." Last updated 03 January 2018. https://www.arctic-council.org/index.php/en/about-us

[14] Arctic Council Secretariat. "The Arctic Council: A backgrounder." Last updated 03 January 2018. https://www.arctic-council.org/index.php/en/about-us

[15] *Ibid*

[16] International Maritime Organization, "Shipping in polar waters: Adoption of an international code of safety for ships operating in polar waters (Polar Code)," last accessed 8 April 2018, http://www.imo.org/en/mediacentre/hottopics/polar/pages/default.aspx

are required to follow.[17] The Polar Code was fully adopted by the International Maritime Organization (IMO) which is the regulatory body for international shipping on January 1st 2017.[18]

The second key line item which was successfully negotiated by Canadian diplomats was the Agreement on Cooperation on Marine Oil Pollution Preparedness and Response in the Arctic. "The objective of the Agreement is to strengthen emergency cooperation and coordination of Arctic oil spill response operations amongst the eight Arctic States Canada, Denmark, Finland, Iceland, Norway, Russia, Sweden, and the United States."[19] The key element of this agreement is the commitment by Arctic nations to provide "mutual assistance in the event that an oil spill exceeds one nation's capacity to respond."[20]

Finally, Canadian diplomats working in cooperation with Arctic Council member states were able to develop and agree upon the frameworks for the reduction of black carbon and methane emissions, an Arctic Adaptation Exchange Portal which allows Arctic communities to exchange best practices in a changing climate, and a circumpolar Biodiversity Monitoring Program.[21] Despite no longer being the chair of the Arctic Council, Canadian diplomats continue to use this forum to further advance issues and concerns of the Federal Government as well as the indigenous peoples of the North.

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[17] International Maritime Organization, "Shipping in polar waters: Adoption of an international code of safety for ships operating in polar waters (Polar Code)," last accessed 8 April 2018, http://www.imo.org/en/mediacentre/hottopics/polar/pages/default.aspx

[18] *Ibid*

[19] Government of Canada. "Agreement on Arctic Marine Oil Pollution." Last modified 10 August 2017. https://www.canada.ca/en/environment-climate-change/corporate/international-affairs/partnerships-organizations/arctic-marine-oil-pollution.html

[20] Government of Canada. "Agreement on Arctic Marine Oil Pollution." Last modified 10 August 2017. https://www.canada.ca/en/environment-climate-change/corporate/international-affairs/partnerships-organizations/arctic-marine-oil-pollution.html

[21] Arctic Council Secretariat,"Iqaluit Declaration: Iqaluit," last modified 24 April 2015, https://oaarchive.arctic-council.org/bitstream/handle/11374/662/EDOCS-2547-v1-ACMMCA09_Iqaluit_2015_Iqaluit_Declaration_formatted_brochure_low-res.PDF?sequence=6&isAllowed=y

However, in order to ensure that Canadian policies are enforced, compliance monitored, and security situations dealt with, a country must have the capabilities to do so. This is one area where numerous Canadian governments have failed to address the equipment requirements of the CAF or other Federal Government agencies who have been given mandates to work and support operations in the Arctic.

The Canadian Coast Guard (CCG) is one Government agency which is facing a significant capability gap in terms of its ability to operate in the Arctic. One of the mandates assigned to the CCG is the "requirement to conduct ice breaking and ice management services in Canada's Arctic, Saint Lawrence Seaway and Great Lake regions."[22] In order to conduct this mandate, the CCG has a fleet of 15 icebreakers of which only two are capable of operating in the multi-year ice of the Arctic.[23] The largest of these vessels is the Canadian Coast Guard Ship (CCGS) *LOUIS S. ST-LAURENT* which is entering its 47th year of service. This April, the *LOUIS S. ST-LAURENT* will be in dry dock again undergoing a retrofit unit the end of June in hopes of extending its service life to 2022.[24] At this time, it is believed that the *JOHN D. DIEFENBAKER* icebreaker will finally be complete after 15 years in development. This will leave Canada with only one modern heavy icebreaker in its fleet. Canada's second heavy icebreaker the CCGS *TERRY FOX* will be 39 years old at this time. In the short term, if the *LOUIS S. ST-LAURENT* as well as the *TERRY FOX* have maintenance issues simultaneously, preventing the vessels from sailing from port, Canada will have no heavy icebreaking capability as a nation.

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[22]Government of Canada. "Canadian Coast Guard Mission, Vision and Mandate." Last modified 28 February 2017. http://www.ccg-gcc.gc.ca/eng/CCG/Mission http://www.ccg-gcc.gc.ca/eng/CCG/Mission

[23] Government of Canada. " Canadian Coast Guard Icebreaking Operations." Last modified 23 March 2018. http://www.ccg-gcc.gc.ca/icebreaking/home

[24] Government of Canada. "Canadian Coast Guard Planned Icebreaker Deployment." Last modified 02 February 2018. http://www.ccg-gcc.gc.ca/Icebreaking/Icebreaker-Requirements/Planned-Icebreaker-Deployment

These two vessels are not fully dedicated to just arctic operations. They have been called upon to conduct ice maintenance in the Saint Lawrence Seaway. The CCG has been able to effectively manage this to date as the Arctic shipping season does not normally open until the end of June.[25] However, as climate change continues to warm the Arctic, the Arctic shipping season will continue to lengthen and open earlier which will not allow the Coast Guard to maintain this current operational schedule and will place additional demands on an already old and unreliable fleet.

Without this capability, it will be extremely difficult for maritime enforcement and SAR assets to access and operate in the Arctic Ocean. Although the Royal Canadian Navy is scheduled to receive its first new Arctic Offshore Patrol Vessels (AOPS) in the summer of 2018, this vessel can only operate in first year ice and will only be able to do so during the summer and fall shipping season. Access to the NWP and Arctic Ocean in the winter months can only be done by heavy icebreakers. Other than the CCGS *JOHN D. DIEFENBAKER*, no additional icebreaking vessels are currently being planned for or construction at this time in Canada.

Like the CCG, SAR units of the CAF are also facing critical equipment and personnel issues. "The CAF is specifically responsible for the conduct of aeronautical SAR and the effective coordination of aeronautical and maritime SAR."[26] It exercises control through three Joint Rescue Coordination Centers (JRCC) located in Victoria, Trenton and Halifax. "The Canadian area of responsibility within which SAR teams must operate comprises of 18 million square kilometers including land and water, more than 243,800 kilometers of coastline, three

[25] Government of Canada. "Canadian Coast Guard Planned Icebreaker Deployment." Last modified 02 February 2018. http://www.ccg-gcc.gc.ca/Icebreaking/Icebreaker-Requirements/Planned-Icebreaker-Deployment

[26] Report of the Standing Senate Committee on National Security and Defence. " Reinvesting in the Canadian Armed Forces: A plan for the Future." Released May 2017, 57. https://sencanada.ca/content/sen/committee/421/SECD/Reports/SECDDPRReport_FINAL_e.pdf

oceans, three million lakes, and the St. Lawrence River system."[27] Given the sheer size of the area that SAR units are responsible for covering, they conduct rescue operations on a regular basis. Last year alone CAF SAR units responded to over 1000 calls for assistance nationwide.[28] These requests for assistance will only continue to increase as the effects of climate change and Global Warming increase the accessibility of the Arctic region. In May of 2017 a report published by The Standing Senate Committee on National Security and Defense highlighted a variety of capability shortfalls which CAF SAR units are facing.

Major General Seymour, Chief of Staff Operations, Canadian Joint Operations Command informed the Senate Committee during an interview that Canada needs more Search and Rescue Technicians (SARTEC) in order to meet the current demand.[29] There are currently 950 trained SARTECs CAF wide.[30] General Seymour informed the panel that the CAF has developed a plan which will take steps to increase SARTEC numbers in the coming years. However, training new technicians has been a continuing issue for the past decade due to the serviceability of the fixed and rotary wing flight.[31] Although CAF SAR units have been able to maintain the required

[27] Auditor General of Canada, "Federal Search and Rescue Activities," in 2013 Spring Report of the Auditor General of Canada to the House of Commons, Ottawa: Office of the Auditor General of Canada, 2013: 3. 2 Department of National Defence, "Quadrennial Search and Rescue Review – Report," National Search and Rescue Secretariat, last modified December 20, 2013. http://www.nss.gc.ca/en/quadrennial-review: II

[28] Report of the Standing Senate Committee on National Security and Defence. " Reinvesting in the Canadian Armed Forces: A plan for the Future." Released May 2017, 57. https://sencanada.ca/content/sen/committee/421/SECD/Reports/SECDDPRReport_FINAL_e.pdf

[29] Report of the Standing Senate Committee on National Security and Defence. " Reinvesting in the Canadian Armed Forces: A plan for the Future." Released May 2017, 57. https://sencanada.ca/content/sen/committee/421/SECD/Reports/SECDDPRReport_FINAL_e.pdf

[30] *Ibid.,* 57.

[31] Government of Canada. "Evaluation of DND/CAF Contribution to the National Search and Rescue Program." Released January 2015. http://publications.gc.ca/collections/collection_2016/mdn-dnd/D58-263-2015-eng.pdf

number of aircraft needed to support SAR operations, this has come at the expense of available aircraft to conduct SAR training for new technicians.[32]

CAF SAR units employ two types of fixed wing aircraft to conduct SAR operations. The first is the legacy Hercules aircraft which were provided to SAR Units back in the earlier 1990s from the Royal Canadian Air force (RCAF) and the second model is the CC-115 Buffalo which entered service in 1967. Both of these aircraft passed their estimated life expectancy in 2015 (Buffalo) and 2017 (Hercules).[33] Similar to the CCG icebreaker situation, it took the government 14 years to finally decide on what type of aircraft would replace these two platforms.[34] In 2016, the Federal Government announced the purchasing of 16 CC-295 airbus aircraft which will be delivered by 2022.[35] In the short term, the Buffalo and Hercules aircraft will continue to be used and training schedules for new SARTECS will continue to be effected by the availability of airframes.

Although these new aircraft should resolve the current serviceability issues facing the SAR fleet, it will require all currently trained SARTECs to undergo training on the new platform as the Airbus has a number of advanced sensor systems on board. This required training will further reduce the numbers of available SARTECS for a short period of time when the aircraft is initially launched.

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[32] Government of Canada. "Evaluation of DND/CAF Contribution to the National Search and Rescue Program." Released January 2015, vi.I

[33] *Ibid.,* 11.

[34] Report of the Standing Senate Committee on National Security and Defence. " Reinvesting in the Canadian Armed Forces: A plan for the Future." Released May 2017, 77. https://sencanada.ca/content/sen/committee/421/SECD/Reports/SECDDPRReport_FINAL_e.pdf7

[35] Government of Canada. "Fixed-wing search and Rescue Procurement Project." Last accessed 5 April 2018. http://www.forces.gc.ca/en/business-equipment/fixed-wing-snr.page

Given the immense size of Canada, SAR units have always had to deal with the tyranny of distance and time when responding to calls for assistance in the Arctic. The response time will only increase as the CC-295 is a slower aircraft than the two models currently being used by SAR units.[36] In order to address this issue, the Federal Government must look to position at least one detachment of SAR personnel with aircraft capability in the Arctic either in Yellowknife or Iqaluit. This will address the lack of speed that the new SAR aircraft possesses. If positioned in Yellowknife, the SAR detachment could utilize the infrastructure and Command and Control offered by 440 Squadron thus reducing operating costs. By forward deploying a SAR element, it would also increase the time on station that the aircraft has to support SAR missions.

Similar to the aeronautical SAR issues the CAF is facing, the CCG is facing similar issues with regards to their Maritime Arctic SAR capabilities. The CCG is responsible to conduct SAR activities in Canada's maritime environment in coordination with the JRCCs.[37] Other than a small refueling base in Hay River NWT, the CCG has no coastal bases or facilities in the territories to station permanent staff or house and maintain equipment. Recently, there have been two significant incidents involving commercial fishing vessels who needed assistance in the Arctic and the CCG was not able to respond quickly to the vessels. In each case, a Danish naval vessel responded to the calls for assistance and saved the lives of the crews.[38] The first vessel, the *ATLANTIC CHARGER* sank and the second vessel *SAPUTI*, struck Arctic ice and was escorted back to Greenland for repairs.[39]

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[36] Government of Canada. "Fixed-wing search and Rescue Procurement Project." Last accessed 5 April 2018. http://www.forces.gc.ca/en/business-equipment/fixed-wing-snr.page

[37] Government of Canada. "Canadian Coast Guard Mission Vision Mandate." Last modified 28 February 2017. http://www.ccg-gcc.gc.ca/eng/CCG/Mission

[38] CBC News. "Nunavut officials press for Arctic search and rescue base." Last updated 7 March 2016. http://www.cbc.ca/news/canada/north/arctic-search-and-rescue-needs-1.3477252

[39] CBC News. "Nunavut officials press for Arctic search and rescue base." Last updated 7 March 2016. http://www.cbc.ca/news/canada/north/arctic-search-and-rescue-needs-1.3477252

In order to address this capability shortfall the CCG is attempting to expand its Coast Guard Auxiliary SAR capability into the coastal communities of the Territories.[40] The CCG is hoping that the Canadian Rangers (CR) or local population who live in these communities can be recruited to fill this role when called upon. Before this can happen, a number of events must take place. The material used to support training must be translated to the local dialects as English is not the most common language spoken in Northern Inuit communities. This will take time and will cost a significant amount of funds to do so. The largest and most expensive issue will be the requirement to purchase Arctic vessels which Coast Guard Auxiliary units can use to safely conduct Maritime SAR activities. Given the government of Canada's current track record with procurement of ships, it is a safe assumption that these vessels will not be available in the near future. In the short term, the Canadian Government should look to contract out this capability during the Arctic shipping and fishing seasons. This will ensure that the Canadian Government has the capability to conduct SAR operations in the maritime environment until the equipment is made available to do so with CCG assets.

The CR has been the CAFs permanent militia presence in the Arctic for over seventy years. Their ability to provide surveillance, conduct sovereignty patrols in isolated regions, assist Canadian forces in Arctic training and their links to local communities have make the CR an extremely valuable asset in the Arctic. Over the past three decades, CR have drastically increased in numbers from 1500 personnel located in 38 patrols in 1987 to 4985 personnel working out of 197s patrols in 2018.[41] The Federal Government is currently exploring the option

[40] Report of the Standing Senate Committee on National Security and Defence. " Reinvesting in the Canadian Armed Forces: A plan for the Future." Released May 2017. 60. https://sencanada.ca/content/sen/committee/421/SECD/Reports/SECDDPRReport_FINAL_e.pdf.

[41] These numbers represent the number of Canadian Rangers stated in the 1987 Defence White Paper and what is currently serving in the CAF as of 2018.

of increasing the force by an additional 2000 personnel.[42] Given the large increase in numbers, the CR have been reorganized into 5 distinct Canadian Ranger Patrol Groups (CRPG) operating in the Territories (1st CRPG), Quebec (2nd CRPG), Ontario (3rd CRPG) Manitoba, British Columbia, Alberta, Saskatchewan, (4nd CRPG) and Newfoundland and Labrador (5th CRPG). The largest of these organizations is the 1st CPRG comprising of approximately 1725 members and 60 patrols.[43]

Despite becoming a permanent fixture in all defense policies over the last three decades, the Federal Government has done little to modernize the equipment used by the CR. Other than providing the rangers with CADPAT clothing and slowly issuing a new Sako rifle, the rangers continue to use the same equipment as their fathers did in years past. In order to make the CR a more efficient and modern force, the CAF and the Federal Government must invest money into providing modern equipment in order to meet the demands of the changing Arctic climate.

When a ranger enlists into a CRPG he or she is only issued with a ranger hoodie, hat, t-shirt, red toque, CADPAT pants, boots, high visibility vest, gortex jacket, pants and either a new Sako or Lee Enfield rifle .[44] They don't receive any additional equipment such as arctic sleeping bags, rucksack, additional CADPAT uniforms including thermal underwear, Arctic socks etc, which is part of a normal issue of equipment for a Regular or Primary Reserve soldier. Although the CR is

[42] Report of the Standing Senate Committee on National Security and Defence. " Reinvesting in the Canadian Armed Forces: A plan for the Future." Released May 2017. 60. https://sencanada.ca/content/sen/committee/421/SECD/Reports/SECDDPRReport_FINAL_e.pdf

[43] Report of the Standing Senate Committee on National Security and Defence. " Reinvesting in the Canadian Armed Forces: A plan for the Future." Released May 2017. 64. https://sencanada.ca/content/sen/committee/421/SECD/Reports/SECDDPRReport_FINAL_e.pdf

[44] Lackenbauer, Whitney. "T*he Canadian Rangers and Search and Rescue (SAR) MASS 15, St. John's, NL.*" Last accessed 02 April 2018. http://www.maritimearcticsecurity.ca/documents/10182/14060/P16_Whitney+Lackenbauer_University+of+Waterloo.pdf/60275cfc-93d6-4ce7-bc75-069f0cbc2119

a unique organization within the CAF, they should benefit from the same clothing allotment as both Primary and Regular Force members.

CR patrols also lack reliable communications platforms when they deploy on sovereignty patrols, SAR missions or training events. Although each patrol group is provided with 2 Iridium Satellite phones, these systems usually do not work well in the Arctic environment.[45] Given a proper long range radio, the patrol would be able to maintain communications with its home base, better coordinate with other patrols groups on joint operations as well as aircraft and ships that may be operating in the area.

Climate change has changed the physical environment that the CR patrol. Areas which were once accessible by normal civilian equipment such as ATVs, snowmobiles or small boats now require more robust equipment to navigate and patrol. If not provided with this equipment, it will become extremely difficult for patrol groups to conduct sovereignty patrols, respond to ground based SAR requests, or assist in training CAF personnel on Arctic survival techniques. Providing the CR with equipment is more cost effective than using aircraft or deploying CAF forces to the region to conduct the same activities. Furthermore, the CAF would see an excellent return on investment as it is common for most rangers to serve at least 20 plus year in the CRs.

It is estimated that the Artic undersea oil reserves constitute 13 percent of the global total of undiscovered oil and 30 percent of the undiscovered natural gas reserves.[46] Aside from the fossil fuel deposits, the Arctic is an extremely mineral rich environment with large deposits of

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[45] Lackenbauer, Whitney. "T*he Canadian Rangers and Search and Rescue (SAR) MASS 15, St. John's, NL.*" Last accessed 02 April 2018. http://www.maritimearcticsecurity.ca/documents/10182/14060/P16_Whitney+Lackenbauer_University+of+Waterloo.pdf/60275cfc-93d6-4ce7-bc75-069f0cbc2119

[46] P. Whitney Lackenbauer, Robert Hubert, and Ryan Dean. *(Re)Conceptualizing Arctic Security: Selected Articles from the Journal of Military and Security Studies* (Calgary: University of Calgary, 2017), X.

iron ore, diamonds and gold, all of which is currently being mined in various location across the Arctic. This has caused the economy to be largely dependent on resource extraction and has done little to further develop the long term economical potential of the area. When natural resources are depleted in an area or mines are closed, Arctic communities historically suffer as their local economies are not diversified and lack the infrastructure needed to develop or attract new business to the community. This lack of adequate infrastructure in the Arctic continues to pose significant challenges not only to the economic development of the community, but also its social development.[47] The infrastructure located in these Arctic communities is generally in poor shape and is endangered of being further effected by the thawing of permafrost.[48]

The Federal Government could resolve a number of these problems and help generate long term economic development and social growth by investing in three key infrastructure areas; energy infrastructure and development, telecommunication modernization, and transportation development.

Telecommunication services provided to Arctic communities are generally slower and in most cases are more expensive than the same service found in southern Canada. Approximately 50 percent of the telecommunication networks in the Arctic are supported by modern land based infrastructure such as microwave towers.[49] The remaining communities utilize satellite connection which tends to be less reliable, slower, and cost more to maintain and operate. By

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[47] National Aboriginal Economic Development Board. " Recommendations on Northern Infrastructure to Support Economic Development National Aboriginal." Last updated January 2016. http://naedb-cndea.com/reports/recommendations-on-northern-infrastructure.pdf

[48] National Aboriginal Economic Development Board. " Recommendations on Northern Infrastructure to Support Economic Development National Aboriginal." Last updated January 2016. http://naedb-cndea.com/reports/recommendations-on-northern-infrastructure.pdf

[49] *Ibid*., 3.

updating the remaining communities to the land based option, it would provide businesses with the same level of connectivity found in the Southern portion of Canada and reduce their overall operating budget. Aside from providing businesses with one of the essential services needed to operate in today's economy, Arctic communities would benefit as well. Cost to access this service would drop and access to online educational programs, tele-health and e-health services would be readily available to the community.[50]

The electrical power requirements for the north are largely provided by diesel generators. "Among the 80 communities in the territories, 53 rely exclusively on diesel electric generators for power."[51] These systems are reliable, and are easy to install and maintain. However, the operating costs continue to rise due to high fuel prices and the cost of transporting diesel fuel to the communities. Diesel power generation also has negative effects on the environment as it emits greenhouse gasses when generating power. A large number of the diesel generators are still being used to provide electricity despite operating past their estimated life expectancy. The Territory of Nunavut alone operates a total of 25 diesel electric generators and 16 were constructed before 1980.[52] The two oldest generators located in Grise Ford and Qikigtarjuag were constructed in 1963 and 1936.[53] The replacement of these inefficient diesel generation systems has been a slow process in the territories due to cost and the resources needed to move generators to the communities requiring a replacement. However, advancements in green

[50] Standing Senate Committee on Energy, The Environment and Natural Resources. " Powering The Territories." Released 31 December 2014, 1. https://sencanada.ca/content/sen/committee/412/enev/rep/rep14jun15-e.pdf

[51] Standing Senate Committee on Energy, The Environment and Natural Resources. " Powering The Territories." Released 31 December 2014, 9. https://sencanada.ca/content/sen/committee/412/enev/rep/rep14jun15-e.pdf

[52] *Ibid*., 9.

[53] *Ibid*., 38.

technology such as solar panels and wind turbines offer Northern communities with an economic way to reduce their dependency on diesel generators and reduce overall operating costs.

Fort Simpson is the site of the NWT's first large solar facility. This facility currently generates 1.5 % of the community's annual power requirement.[54] However, the facility does not have any storage battery capability. If the Federal Government funded the purchase of solar batteries for the facility, it is estimated that power output of the solar facility would raise to 30 percent.[55] This would allow for the diesel generators to be shut down during the summer timeframe as the power needs of the community would be met through the use of solar.[56] Given this positive result, the Federal Government working with the Territory governments should assist in the acquisition of green power options to supplement the current diesel generation being used in Arctic. The funding saved by the reduction of power generation cost can be used to fund other community development projects.

Despite the amount of resource extraction underway in the Arctic and increase in shipping activity in the NWP, the territories still do not have a territory owned commercial deep water port. Although the Nunisivik refueling facility is on schedule to be complete by fall of 2018, it is not a true commercial deep water port. Nunisivik location was solely chosen due to its tactical location for military use vice the needs of the territories.[57] It consists of two large fuel storage facilities with a pump house and does not have any infrastructure developed to support permanent human habitation on a continued basis. There are plans underway to develop a port in Iqaluit. However, the Federal Government needs to stand firm on its commitment of 64 million

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[54] *Ibid.,* 32.
[55] *Ibid.,* 32.
[56] *Ibid.,* 32.
[57] CBC News. "Nanisivik Naval Refueling Facility in Nunavut on Track and on Budget for Fall 2018 Opening." Last updated 10 July 2017. http://www.cbc.ca/news/canada/north/nanisivik-arctic-bay-naval-refueling-2018-1.4195662

dollars to the project.[58] A modern deep water port in Iqaluit would not only be beneficial to the territory, it would also provide the opportunity to develop permanent facilities to house CCG officials and equipment. This would provide the CCG with a permanent Arctic base to operate out of and would greatly decrease their response time to request for maritime SAR assistance in Arctic waters.

A port in Iqaluit would reduce the cost of transporting goods to the region which in turn would lower the price of essential items. The Arctic population would not only benefit from a reduction in the cost of goods, but also from an increase in tourism. Cruise vessels such as the *CRYSTAL SERENITY* which has successfully navigated the NWP, could use this as a port of call. The location of Iqaluit is located near one of the major shipping access points to the NWP. It is reasonable to assume that a port in Iqaluit would also see an increase in commercial shipping traffic from vessels leaving and entering the NWP. Finally, a modern port in the Arctic would set the conducts to attract more economic investment by large scale organizations other than mining companies. This would diversify the Arctic economy and set the conditions for the region to be successful for decades.

As highlighted in this short essay, the unique challenges posed by both climate change and global warming to the security and sovereignty in the Arctic are complex and offer no easy solutions to these problems. However, as history and current events have shown, diplomacy will continue to be an important first step to address current and future challenges to Canadian Arctic sovereignty and security issues moving forward. The commitment to purchase resources required to address security and territorial challenges are slowly coming into service. In the short term, it is critical that organizations such as the CAF, CCG, and Territory governments work

[58] Nunatsiaq News. "New Iqaluit port aims for more sealift efficiency, safety." Last accessed 24 March 2017. http://nunatsiaq.com/stories/article/65674new_iqaluit_port_aims_to_increase_efficiency_safety_for_sealift/

together and maintain open lines of communication with the Federal Government in order to maximize capabilities, protect Canadian Arctic interest, and address security threats in the region.

Finally, the Federal Government needs to invest in infrastructure development in the Arctic. With a strong and modern infrastructure network, Arctic communities will have the tools needed to attract investors, develop new businesses and generate long term stability in the region. A stable Arctic region will provide the tools needed to enable the Federal Government to strengthen its sovereignty claims as well as address security issues as they develop for the foreseeable future.

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