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PER ARDUA AD ARCTICUM? EVALUATING ROYAL CANADIAN AIR FORCE SUPPORT TO ARCTIC SOVEREIGNTY

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Service Paper

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AIM

1. The aim of this service paper is to analyze the current ability of the Royal Canadian Air Force (RCAF) to support Arctic sovereignty. This analysis will identify weaknesses based on air functions and initiate discussions of possible geostrategic airfields in the High Arctic.¹ It will suggest that further development of the Resolute Bay airport could improve the RCAF functions of *reach* and *speed* for counter air and search and rescue (SAR) roles.

INTRODUCTION

2. *Arctic sovereignty* has long been advocated by various Canadian governments as a strategic priority, but what does this really mean? Donald McRae, professor emeritus at the University of Ottawa, explains that Arctic sovereignty is really just “a responsible government provid[ing] for proper policing, surveillance, search and rescue and other services throughout its territory.”² This is precisely the position that the past two federal governments have taken with regards to Arctic sovereignty as outlined in their respective policy documents.³ Thus, this definition will serve as the lens through which the current capabilities of the RCAF will be analyzed.

3. To start, this paper completes a strategic audit using a TOWS matrix to critically analyze the internal and external factors shaping the RCAF mission to support Arctic sovereignty. A TOWS analysis was selected for this review due to its systematic examination of strengths, weaknesses, opportunities, and threats.⁴ The paper then discusses three possible geostrategic airfields in the High Arctic that may enhance RCAF northern operations.

DISCUSSION

Strategic Audit

4. The TOWS analysis of the current RCAF contribution to Arctic sovereignty was performed with a focus on three core capabilities of air power: Control of the Air; Air Mobility; and Intelligence, Surveillance and Reconnaissance (ISR).⁵ In addition, all enabling capabilities were grouped together and focussed on activities that have a key role in the Arctic sovereignty mission space.⁶ The following paragraphs will summarize the key points discussing possible strategies for maximizing strengths and opportunities while minimizing weaknesses and threats. The complete TOWS matrix can be found at Annex A.

¹ For the purpose of this paper, High Arctic in Canada is considered above 70°N latitude.

² Donald McRae, "Arctic Sovereignty? what is at Stake?" *Behind the Headlines* 64, no. 1 (2007)3.

³ *Canada's Northern Strategy: Our North, our Heritage, our Future*, Indian and Northern Affairs Canada, 2009).

⁴ Additional information about this modified SWOT analysis can be found in Terrance P. Power, *Power's Case Study Analysis and Writer's Handbook*, (Toronto, ON: Nelson Education, 2009) 31.

⁵ Department of National Defence, B-GA-400-000/FP-001, Royal Canadian Air Force Doctrine (Trenton, ON: Canadian Forces Aerospace Warfare Centre, 2016a): 30-37.

⁶ *Ibid.* 38-43.

5. Control of the Air. Canada has effectively supported North American Aerospace Defence Command (NORAD) for over 60 years with great success.⁷ Unfortunately, the North Warning System (NWS) is ageing. Furthermore, the new Canadian Air Defence Identification Zone (CADIZ) limits are beyond the capabilities of the current NWS radars causing a disconnect between area of operations management and counter air roles.⁸ As such, non-cooperative aircraft may enter the CADIZ unknown to Canada until they reach the old CADIZ limits. Fortunately, the Canadian governments' Strong, Secure, Engaged (SSE) policy has allocated resources for the "renewal" of the NWS, which should resolve this capability gap.⁹

6. The CF-188, Canada's multipurpose fighter jet, is an ageing and fragile platform that has a high support dependency and requires high integrity paved airfields. In addition, it is heavily dependent on ageing air-to-air refuelling (AAR) platforms—the CC-130HT Hercules Tanker and the CC-150 Polaris—to meet the extreme ranges required for most air intercept missions. Due to this AAR dependency and the extreme ranges the jets must fly from suitable alternate airfields, CF-188 pilots become serious SAR dangers every time they are called to respond to an air threat coming from the High Arctic.¹⁰ The government has recognized that the CF-188, the CC-130HT, and the CC-150 are ageing¹¹. As such, the SSE policy allows for the replacement of fighters and tankers to meet NORAD requirements.

7. With these SSE capital investments, the new fighter may still not be able to meet its mandate for *reach* as neither the CF-188 nor the CC-150 can land in the High Arctic.¹² Consequently, it is worth re-evaluating current forward operating locations (FOLs) or considering adding another one. Understanding that FOLs are very expensive to maintain, merely a paved runway capable of accommodating a CF-188 and CC-150 in the High Arctic would greatly enhance mission flexibility. This paved airfield would not only reduce range requirements, but it would provide a High Arctic alternate.

8. Air Mobility. Canada's air mobility community has developed an extensive hub and spoke network throughout the Arctic. For airlift, the CC-130J has approximately 17 airfields where it can land north of the Arctic Circle¹³, while the CC-177 has three.¹⁴ This does not include Thule Air Force Base in Greenland, which continues to be used extensively for OP BOXTOP staging. This dependency on the US can pose a minimal threat to Canada that could strengthen the case for adding a hub in the High Arctic.

⁷ Joseph T. Jockel and Queen's University (Kingston, Ont.). Centre for International Relations, Canada in NORAD, 1957-2007: A History (Kingston, Ont: Queen's Centre for International Relations and the Queen's Defence Management Program, McGill-Queen's University Press, 2007).

⁸ Jody Edmonstone, "Canada's Expanded ADIZ." Command and Staff Course Solo Flight Paper, Canadian Forces College, 2015).

⁹ Canada, Department of National Defence, Strong, Secure, Engaged: Canada's Defence Policy (Ottawa: Department of National Defence, 2017).

¹⁰ Stephen Latwaitis, "The Challenges of Air-to-Air Refuelling and Search and Rescue Support to Arctic Fighter Operations" Command and Staff Course Solo Flight Paper, Canadian Forces College, 2018).

¹¹ Since the CC-150 AAR tanker is integral to CF188 Fighter support, it has been included in this section in lieu of the air mobility section.

¹² M. Cromwell, Joint Task Force (North) Brief to ACCE WG (Yellowknife, NWT: Joint Task Force (North), 2011).

¹³ The Arctic Circle is defined as above 66°33'N.

¹⁴ Cromwell, Joint Task Force (North) Brief to ACCE WG.

9. The SAR branch of the air mobility capability has come under scrutiny due to the *speed* at which SAR air resources can reach a victim in the High Arctic. With the growing number of Northwest Passage (NWP) transits annually, the RCAF helicopter resources for SAR are too far away to be effective.¹⁵ This is particularly important since the Canadian government signed an Arctic council legal agreement assuring its allies that Canada will promote the establishment, operation, and maintenance of an adequate and effective international SAR capability within its Arctic region.¹⁶ This designated area expands slightly beyond the latest CADIZ demarcations.

10. Research on this perceived *speed* weakness is mixed. Some argue that the Trenton Search and Rescue Region (SRR) should be split and a fourth SRR be created. Based out of CFB Yellowknife, this SRR would take over all SAR operations north of the Arctic Circle.¹⁷ Others argue that SAR is a whole-of-government approach and that there is no requirement to change the Trenton SRR region. The Canadian Coast Guard, Canadian Air Search and Rescue Association, and other local agencies continue to step up to support SAR operations. Moreover, if the Canadian Armed Forces (CAF) staggers annual exercises to maximize northern presence, the status quo is completely acceptable.¹⁸ A third position to reduce the *speed* limitations would be to forward deploy SAR assets during the busiest times of the year for NWP transits. With substantially different perspectives, it is clear that additional research needs to be done on Arctic SAR. However, as Arctic presence is a key effect sought by the government of Canada, having a High Arctic staging point, capable of supporting temporary SAR operations near the NWP, would be an asset.

11. ISR. The principle RCAF-led ISR comes from a variety of air and space sources. In the air domain, all aircraft provide some form of ISR; however, the CP-140 is most known for its ISR capabilities. The CP-140 is getting old and has a forecasted ELE of 2030.¹⁹ It has demonstrated immense success completing a variety of northern patrols with other government departments (OGDs), however it is restricted to landing on paved airfields. The Canadian government has recognized the importance of ISR and has not only planned for a CP-140 replacement, but also a Remotely Piloted Aircraft System (RPAS). Intended to launch from existing FOLs, the RPAS project will provide a medium-altitude long-endurance unmanned aerial system that will greatly improve ISR in the Arctic.²⁰ It is likely that both of these new platforms will be restricted to paved airfields, but this is not considered a factor in Arctic operational support given their extensive ranges.

¹⁵ Michael Byers, "Canada's Not Ready to have the World in the Arctic," *Globe and Mail*, August 15, 2012. <https://www.theglobeandmail.com/opinion/canadas-not-ready-to-have-the-world-in-the-arctic/article4481519/>.

¹⁶ Arctic Council, *Agreement on Cooperation on Aeronautical and Maritime Search and Rescue in the Arctic* (Nuuk, Greenland: Arctic Council, 2011).

¹⁷ J. G. R. Leroux, "The Arctic SAR Region: Frozen in Time." *Command and Staff Course Solo Flight Paper*, Canadian Forces College, (2017).

¹⁸ Jim Shella, "Political Lessons Learned, and Relearned," *Indianapolis Business Journal* 33, no. 40 (Dec 3, 2012): 443-453.

¹⁹ Department of National Defence, "CP-140 Aurora Fleet Modernization and Life Extension," last modified n.d., accessed Oct 12, 2018, <http://www.forces.gc.ca/en/business-equipment/procurement-projects/aurora-cp-140.page>.

²⁰ "Update and New Name for the Joint Unmanned Surveillance Target Acquisition System (JUSTAS) Project," last modified Nov 2014, accessed Oct 13, 2018, <http://www.rcf-arc.forces.gc.ca/en/article-template-standard.page?doc=update-and-new-name-for-the-joint-unmanned-surveillance-target-acquisition-system-justas-project/j9u7rzyf>.

12. In the space-based ISR realm, the Polar Epsilon 2 project will significantly improve Canada's current ability to detect, identify, and track vessels of interest in Canada's Arctic region. Although primarily a maritime system, it can also be used to enhance land-pictures by providing "all-weather, day-and-night, active-wide-area-surveillance".²¹ As the space lead for the CAF, the RCAF will need to maximize the use of this asset in the future.

13. One factor that continues to complicate the overall ISR domain in the north is communication. Poor communication in the Arctic results from incompatible radio frequencies, different encryption types, and unfavorable atmospheric conditions.²² As new and improved ISR sources arrive, it is important that the RCAF stay abreast of communication challenges. Likewise, the CAF must overcome numerous data fusion challenges to maximize ISR capabilities. This includes working with OGDs and the other CAF elements to ensure that a complete intelligence picture is formed.

14. Enabling Capabilities. The RCAF has strong command and control capabilities and has historically demonstrated that it is capable of sustaining and supporting Arctic operations when required. This is most noticeable by the success of the CF-188 community to forward deploy to designated FOLs under NORAD and by the enormous efforts taken to resupply CFS Alert annually. Unfortunately, there are several challenges that the RCAF faces in the Arctic. First, infrastructure costs 3 to 5 times more in the Arctic.²³ Next, since the RCAF is an impermanent force, there is little time to forge strong and lasting relationships with the local population. These two challenges must be mitigated by careful planning and cooperation with Arctic governments and local Inuit communities.

15. The strategic audit has revealed that the greatest weakness of the RCAF is its *reach* to the high Arctic region for control of the air and its *speed* to get full support to SAR operations. In addition, with no paved runways in the High Arctic, certain air platforms (CC-150, CP-140, CF-188) are limited. Under the SSE policy, the RCAF is acquiring resources to replace its ageing platforms and is investing in new capabilities that will enhance air operations in the Arctic. Unfortunately, there is no mention of Arctic infrastructure projects in the SSE policy to help address this potential weakness. As such, the following section will evaluate geostrategic airfields in proximity to the NWP with on-going initiatives that may benefit the RCAF.

Geostrategic Airfields

16. Nanisivik (formerly CYSR). The Department of National Defence (DND) is completing the construction of the Nanisivik Naval Facility (NNF). This facility is a resupply facility that will be used by the RCN and the Canadian Coast Guard (CCG). The Nanisivik airport was closed in 2011 after the decision was made to upgrade the regional Arctic Bay airport to better

²¹ Department of National Defence, "Polar Epsilon 2 Project," last modified Jun 2017, accessed Oct 12, 2018, <https://www.canada.ca/en/department-national-defence/news/2016/06/polar-epsilon-2-project.html>.

²² Adam Lajeunesse, "What Canada's New Defense Policy Means for the Arctic," last modified June 2016, accessed Oct 13, 2018, <https://www.newsdeeply.com/arctic/community/2017/06/16/what-canadas-new-defense-policy-means-for-the-arctic>.

²³ Rob Huebert, "The Shipping News Part II: How Canada's Arctic Sovereignty is on Thinning Ice," *International Journal* 58, no. 3 (2003), 295-308. doi:10.2307/40203861. <http://www.jstor.org.ezproxy.royalroads.ca/stable/40203861>.

serve the local population.²⁴ The airport, which was 15 kilometers south of Nanisivik, had the full suite of regional airport services including a 6,400-foot gravel lit runway with navigational aids and a small terminal. As Nanisivik airfield is 32 kilometers from the nearest town of Arctic Bay and it has been unkept for seven years, this airfield would require significant investment if it were to be turned into a legitimate RCAF hub. As the RCN and CCG will have helicopter landing capabilities at the port, this airport is not-likely to get any attention from any other government agencies.

17. Arctic Bay (CYAB). The closest active airport to the NNF is the Arctic Bay airport, which is roughly 26 kilometers by road. When the Nanisivik mine was operational, there was an all-season highway to the town. However, one reason the government of Nunavut upgraded the Arctic Bay airport was to save winter maintenance expenses on the highway. Arctic Bay has a healthy population of approximately 900 people, but its only hotel sleeps a mere 20 people. First Air and a few other small companies use this airport, but there are no other signs of government involvement in the area. Arctic Bay airfield has a newly redone 4,000-foot gravel runway with navigational aids and a small terminal.

18. Resolute Bay (CYRB). The DND, led by the Canadian Army, has recently completed the CAF Arctic Training Center in Resolute Bay. Able to house 140 DND/CAF personnel, this facility was developed to partner with the Natural Resources Canada Polar Continental Shelf Program (PCSP). The Resolute Bay PCSP facility serves as an Arctic logistics hub for science and government priorities. The Resolute Bay airport, classified by Transport Canada as a regional hub and commonly used by First Air, has recently received new navigational aids. Resolute Bay has been used extensively for northern CAF operations in the past, and has contracted support capability on-site for surge operations. The geostrategic location of this airport cannot be under-stated. It is in the center of the Canadian High Arctic on the edge of the NWP at a crucial juncture for maritime transit routes. It is for this reason that Resolute Bay has been considered for air upgrades by the RCAF in the past. Resolute Bay is approximately 380 kilometers from Nanisivik and therefore within the range of all RCAF and CCG helicopters.²⁵

CONCLUSION

19. There is no debating that in order for the CAF to establish a greater permanent presence in the Arctic region, they will have to rely on air power. Through many years of successful northern operations, the RCAF has demonstrated that it is capable of meeting government mandates for the Arctic. Nevertheless, as the NWP sea and air traffic increase, there is a strong case for the RCAF to strategically plan for a High Arctic hub that may even develop into a FOL over time. This hub would improve *reach* capabilities for control of the air assets and increase *speed* for effective Arctic SAR responses. Of the geostrategic locations considered to effectively boost air capabilities, Resolute Bay is considered the best option.

RECOMMENDATION

²⁴ Wikipedia, "Nanisivik Airport," last modified -06-16, accessed Oct 13, 2018, https://en.wikipedia.org/w/index.php?title=Nanisivik_Airport&oldid=846149271.

²⁵ Based on technical specifications found on the RCAF website <http://www.rcfarc.forces.gc.ca/en/aircraft.page>.

20. Joint Task Force (North) should engage with Transport Canada, the government of Nunavut, and the national research council of Canada to further conceptualize and quantify the benefits of establishing a joint air hub in Resolute Bay.

21. 1 Canadian Air Division (CAD) should evaluate the recent accident and incident trends in the High Arctic to determine if there is a case for pre-positioning SAR assets further north at certain times of the year.

22. 1 CAD should research CF-188 abilities to intercept non-compliant aircraft in the expanded CADIZ from existing FOLs.

Annex: A. Strategic Audit Summary

ANNEX A: STRATEGIC AUDIT SUMMARY

Table A-1: TOWS Matrix evaluating RCAF strengths and weaknesses in the Arctic

	External Opportunities	External Threats
	<ul style="list-style-type: none"> - Governmental support through Strong, Secure, Engaged. - Increased traffic through Northwest Passage may stimulate local Inuit economy (tourism, commerce, etc...). - Continued strong diplomatic relationships with arctic governments through the Arctic Council. - Transport Canada is investing in Northern Transportation Safety. - Several regions in high Arctic known to contain large oil and mineral deposits. - Strong government momentum on Arctic region provides opportunities for collaboration. 	<ul style="list-style-type: none"> - No clear RCAF arctic infrastructure in SSE. - Canada officially expanded its Air-Defence Identification Zone (ADIZ). - Continued border and maritime disputes with US and Denmark. - An estimated 50% of world's natural resources in arctic. - Technology improvements are increasing ability to economically harvest resources in northern climates. - Enemy military forces continue to strengthen their Arctic capabilities. - Increasing NWP traffic. - Harsh elements and unpredictable weather.
Internal Strengths	+ Strengths to + Opportunities	+ Strengths to - Threats
<p>ISR:</p> <ul style="list-style-type: none"> - Reliability proven through routine Northern Patrols (NORPATs). - Polar Epsilon 2 (RADARSAT Constellation Mission) coming online <p>Control of the Air:</p> <ul style="list-style-type: none"> - Proven track record (NORAD). - Proven effective use of current FOLs. - Proven Counter Sea capabilities (CP-140, CH-148) <p>Air Mobility:</p> <ul style="list-style-type: none"> - Solid experience using hub and spoke system to capitalize on <i>reach</i> (OP BOXTOP). - Breadth of assets allows for multiple solutions to mobility problems. - Receiving new C-295 SAR aircraft. <p>Enabling Capabilities:</p> <ul style="list-style-type: none"> - Strong C2, solid force sustainment abilities. 	<ul style="list-style-type: none"> - Leverage off of existing capability strengths to boost northern RCAF image and further enhance OGD relationships. 	<p>Control of the Air:</p> <ul style="list-style-type: none"> - Evaluate changing or adding a new FOL to <i>reach</i> ADIZ boundaries. <p>Air Mobility:</p> <ul style="list-style-type: none"> - Pre-plan arctic lines of tasking to anticipate added <i>support/sustain</i> requirements. <p>Enabling Capabilities:</p> <ul style="list-style-type: none"> - Continue leading technological advances.
Internal Weaknesses	- Weaknesses to + Opportunities	- Weaknesses to - Threats
<p>ISR:</p> <ul style="list-style-type: none"> - Unable to maintain strong airborne persistence on ground and maritime threats (CP-140). - Complex communications and data sharing with OGD. - Restricted to paved airfields (CP-140) <p>Control of the Air:</p> <ul style="list-style-type: none"> - Inability of current NWS to detect airborne threats at the border of the new CADIZ. - Limited by range and SAR (CF-188). - <i>Dependence</i> on AAR and paved airfields. - Ageing and <i>fragile</i> fleet. <p>Air Mobility:</p> <ul style="list-style-type: none"> - Over-tasked for exped. tasks (CC-177, CC-130). - Restricted to paved airfields (CC-150). - Limited high Arctic response time (<i>speed</i>) to SAR as assets require ample time to deploy from MOBs (CC-130, CC-138, CC-115). - Dependence on US' Thule AFB in GL. <p>Enabling Capabilities:</p> <ul style="list-style-type: none"> - Infrastructure costs are 3-5 times higher than elsewhere in Canada. - <i>Impermanence</i> in Arctic leads to weak personal connections with locals. 	<p>ISR:</p> <ul style="list-style-type: none"> - Continue acquisition of MALE UAS to expand airborne ISR. - Continue acquisition of CP-140 replacement to resolve ageing fleet. - Continue to build relationships with CA, RCN, and OGD to improve data sharing. <p>Control of the Air:</p> <ul style="list-style-type: none"> - Continue dialogue on NWS replacement. - Continue acquisition of CF-188 replacement to resolve ageing fleet. <p>Enabling Capabilities:</p> <ul style="list-style-type: none"> - Work with Transport Canada to heighten strategic importance of certain high Arctic airfields. - Capitalize on commercial interests in exploration to support infrastructure improvements. 	<p>Air Mobility:</p> <ul style="list-style-type: none"> - Evaluate creating new SAR region. - Evaluate creating new SAR MOB or moving SAR assets to Yellowknife. - Evaluate possibility of pre-positioning SAR assets in the high Arctic during summer timeframe. <p>Enabling Capabilities:</p> <ul style="list-style-type: none"> - Evaluate high Arctic airfields for possible paving.

BIBLIOGRAPHY

- Arctic Council. *Agreement on Cooperation on Aeronautical and Maritime Search and Rescue in the Arctic*. Nuuk, Greenland: Arctic Council, 2011.
- Byers, Michael. "Canada's Not Ready to have the World in the Arctic." *Globe and Mail*, August 15, 2012. <https://www.theglobeandmail.com/opinion/canadas-not-ready-to-have-the-world-in-the-arctic/article4481519/>.
- Canada, Department of National Defence. *Strong, Secure, Engaged: Canada's Defence Policy*. Ottawa: Department of National Defence, 2017.
- Conway III, John L. "Toward a US Air Force Arctic Strategy." *Air & Space Power Journal* 31, no. 2 (2017): 68-81. <https://search-proquest-com.cfc.idm.oclc.org/docview/1910739118?accountid=9867>.
- Cromwell, M. *Joint Task Force (North) Brief to ACCE WG*. Yellowknife, NWT: Joint Task Force (North), 2011.
- Department of National Defence. *B-GA-400-000/FP-001, Royal Canadian Air Force Doctrine*. Trenton, ON: Canadian Forces Aerospace Warfare Centre, 2016a.
- . "CP-140 Aurora Fleet Modernization and Life Extension." Accessed Oct 12, 2018. <http://www.forces.gc.ca/en/business-equipment/procurement-projects/aurora-cp-140.page>.
- . "Polar Epsilon 2 Project." Accessed Oct 12, 2018. <https://www.canada.ca/en/department-national-defence/news/2016/06/polar-epsilon-2-project.html>.
- . "Update and New Name for the Joint Unmanned Surveillance Target Acquisition System (JUSTAS) Project." Accessed Oct 13, 2018. <http://www.rcaf-arc.forces.gc.ca/en/article-template-standard.page?doc=update-and-new-name-for-the-joint-unmanned-surveillance-target-acquisition-system-justas-project/j9u7rzyf>.
- Edmonstone, Jody. "Canada's Expanded ADIZ". Command and Staff Course Solo Flight Paper, Canadian Forces College, 2015.
- Government of Canada. *Canada's Northern Strategy: Our North, our Heritage, our Future*. Ottawa, ON: Indian and Northern Affairs Canada, 2009.
- Kines, Clare. "Arctic Bay: Eat, Sleep, Do." Accessed Oct 14, 2018. <http://findingtruenorth.ca/blog/arctic-bay-travel-guide>.

- Huebert, Rob. "The Shipping News Part II: How Canada's Arctic Sovereignty is on Thinning Ice." *International Journal* 58, no. 3 (2003): 295-308. doi:10.2307/40203861.
- Jockel, Joseph T. and Queen's University (Kingston, ON). Centre for International Relations. *Canada in NORAD, 1957-2007: A History*. Kingston, Ont: Queen's Centre for International Relations and the Queen's Defence Management Program, McGill-Queen's University Press, 2007.
- Lajeunesse Adam. "What Canada's New Defense Policy Means for the Arctic." Accessed Oct 13, 2018. <https://www.newsdeeply.com/arctic/community/2017/06/16/what-canadas-new-defense-policy-means-for-the-arctic>.
- Latwaitis, Stephen. "The Challenges of Air-to-Air Refuelling and Search and Rescue Support to Arctic Fighter Operations." Command and Staff Course Solo Flight Paper, Canadian Forces College, 2018.
- Leroux, J. G. R. "The Arctic SAR Region: Frozen in Time." Command and Staff Course Solo Flight Paper, Canadian Forces College, 2017.
- McRae, Donald. "Arctic Sovereignty? what is at Stake?" *Behind the Headlines* 64, no. 1 (2007): 1-23.
- Natural Resources Canada. "Polar Continental Shelf Program." Natural Resources Canada. Accessed Oct 11, 2018. <https://www.nrcan.gc.ca/the-north/polar-continental-shelf-program/polar-shelf/10003>.
- Power, Terrance P. *Power's Case Study Analysis and Writer's Handbook*. Toronto, ON: Nelson Education, 2009.
- PROLOG Canada Inc. *The Northern Transportation Systems Assessment, Phase 2 Report*. n.p: Transport Canada, 2011.
- Shella, Jim. "Political Lessons Learned, and Relearned." *Indianapolis Business Journal* 33, no. 40 (Dec 3, 2012): 6.
- Wikipedia. "Arctic Bay Airport." Accessed Oct 14, 2018. https://en.wikipedia.org/w/index.php?title=Arctic_Bay_Airport&oldid=863121921.
- . "Nanisivik Airport." Accessed Oct 13, 2018. https://en.wikipedia.org/w/index.php?title=Nanisivik_Airport&oldid=846149271.
- The Windsor Star. "Air Force Eyes Arctic Base; Plans to Expand at Resolute Bay." *The Windsor Star*, 2011. <https://search-proquest-com.cfc.idm.oclc.org/docview/913019782?accountid=9867>.