National Defence Défense nationale

Canadian Forces College

Collège des Forces Canadiennes

ARCTIC SITUATIONAL AWARENESS: A MULTIDOMAIN PERSPECTIVE

Major Dusty Burleson

JCSP 45

Service Paper

Disclaimer

Opinions expressed remain those of the author and do not represent Department of National Defence or Canadian Forces policy. This paper may not be used without written permission.

PCEMI 45

Étude militaire

Avertissement

Les opinons exprimées n'engagent que leurs auteurs et ne reflètent aucunement des politiques du Ministère de la Défense nationale ou des Forces canadiennes. Ce papier ne peut être reproduit sans autorisation écrite

Canada

CANADIAN FORCES COLLEGE/COLLÈGE DES FORCES CANADIENNES
JCSP 45/PCEMI 45
15 OCT 2018

DS545 COMPONENT CAPABILITIES

ARCTIC SITUATIONAL AWARENESS: A MULTIDOMAIN PERSPECTIVE

By / Par le Major Dusty Burleson

Word Count: 2606

Nombre de mots : 2606

ARCTIC SITUATIONAL AWARENESS: A MULTIDOMAIN PERSPECTIVE

AIM

1. The aim of this service paper is to highlight capabilities that the Canadian Armed Forces (CAF) requires for situational awareness (SA) in the Arctic. More specifically, it is an informational product intended to provide the Commander of Joint Task Force North (JTFN) a multi-domain perspective regarding comprehensive SA in the Arctic. Considering the context that I am a member of the United States (US) armed forces, I have drawn from both CAF and US military doctrine in shaping my approach to this problem set. This service paper explores the idea that even though the Royal Canadian Navy (RCN) has been given the lion's share of the burden for developing situational capabilities in the Arctic, other military components working through other military domains are critical to providing the CAF a comprehensive SA capability.

INTRODUCTION

2. In concert with the changing climate, Arctic sea ice is retreating at an unprecedented pace. This makes the Arctic increasingly more accessible and the world is awakening to the importance this region will play in the future. There are numerous factors that make an accessible Arctic appealing to the world's great powers: shorter trade routes, resources, and tourism are just a few. That said, with these benefits come a number of liabilities for Arctic nations such as safety, security, and sovereignty concerns. While Canada is geographically positioned to reap the potential benefits that the Arctic has to offer, it is also vulnerable to these liabilities. For this reason, investments must be made in the CAF with regard to Arctic capabilities.

3. Some might pose that the nation's commitment to the Arctic region has waned in recent years. As evidence, one can look to the national level military guidance signed out by successive Prime Ministers Harper and Trudeau. In the 2010 Canada First Defence Strategy, Prime Minister Harper's government sets the aggressive expectation that "Canadian Forces must have the capacity to exercise control over and defend Canada's sovereignty in the Arctic".[1] Inherent in this guidance is essentially all capabilities within the full spectrum of military operations which touches every Canadian military branch and the domains in which they operate. Surely this includes the need for SA, but only as one among many capabilities. Next, the Trudeau government's 2017 Strong, Secure, Engaged (SSE) Defence Policy calls out a number of specific defence capabilities across the military branches that are needed to attain the nation's Arctic goals.[2] Most of these capabilities fall within the larger requirements of Arctic SA, communications, and response.[3] Although these capabilities are inherent to the defence of one's sovereign territory, SSE stops short of describing them in such terms. Arctic maritime security expert Adam Lajeunesse describes the Trudeau government's guidance in SSE as more focused

---

[1] "Canada First Defence Strategy". Government of Canada: 2010. Pg. 8.
[2] "Strong, Secure, Engaged: Canada's Defence Policy". Government of Canada: 2017.
[3] Lajeunesse, Adam. "What Canada's New Defense Policy Means for the Arctic". 16 June 2017. <https://www.newsdeeply.com/arctic/community/2017/06/16/what-canadas-new-defense-policy-means-for-the-arctic>. Accessed 9 October 2018.

on safety/security in the Arctic than the military defence of Canadian sovereign territory.[4] That said, even though there may be a difference in the importance placed on the Arctic by these two prime ministers, the need for developing Arctic SA capabilities has proven to be an enduring requirement regardless of the political party that is in power and as such, will be the focus of this service paper.

DISCUSSION

4. For the purposes of this paper the term "Arctic" refers to the "Arctic region" which is defined in the RCN Arctic Operations Manual as including "the High Arctic and extends from Alaska, in the West, to Davis Strait, in the East, from 60º North to over 83° North… includes Yukon, the Northwest Territories, Nunavut, Nunavik (northern Quebec), and all of Labrador".[5] The document goes on to include "Canada's Arctic Archipelago, the territory, the islands and inlets of the region, which represent about 40 percent of the Canada's landmass and two-thirds of Canada's coastline."[6] Additionally, there are eight sovereign countries that, based on international law, have territorial claims within the Arctic: Russia, Finland, Sweden, Norway, Iceland, Denmark, Canada, and the United States[7].

5. US military doctrine is centered on the fundamental belief that national security issues should be addressed through joint operations. Planning for joint operations requires an understanding of the operational environment, which according to Joint Pub 3-0 Joint Operations encompasses the air, land, maritime, space and cyberspace domains.[8] Each of these domains and the military components that operate in them can bring powerful SA capabilities to bear in the Arctic.

6. **MARITIME:** The first and most obvious domain that one should consider with respect to Arctic SA is the maritime domain. The fact that the Arctic is essentially a maritime environment naturally leads one to assume that the RCN will have a large share of the associated capabilities and responsibilities in that region. Accordingly, there has been a steep increase in non-military ship traffic through Canada's Arctic in recent years. The Commissioner of the Canadian Coast Guard, Jeffery Hutchinson during testimony to the House Standing Committee on Foreign Affairs and International Development in September of 2018 highlighted that "traffic in the Canadian Arctic has doubled since 2010" with more than 350 voyages in 2017 alone.[9] One of the greatest strengths of a navy is its ability to provide access to geographically remote areas of the world and the Arctic is no different. Its mere physical presence can provide SA on much of the surface traffic that traverses the Arctic area. That said, the RCN is not particularly well suited to operate in the Arctic with its current fleet. In his article "Bridging the Gap: The Limitations of Pre-AOPS Operations in Arctic Waters", RCN Commander Paul Forget acknowledges that the RCN's Halifax-class frigates are capable of operating in the Arctic to

---

[4] Ibid.
[5] "Royal Canadian Navy Arctic Operations Manual". Government of Canada: 2017. Pg. 8.
[6] Ibid.
[7] "Arctic Sovereignty". McCormick, Ty. Foreign Policy; May/Jun 2014; 206; ProQuest. Pg. 20
[8] Joint Publication 3-0 Joint Operations. 17 Jan 2017. <http://www.jcs.mil/Portals/36/Documents/Doctrine/pubs/jp3_0_20170117.pdf>. Pg. IV-1. Accessed 10 Oct 2018.
[9] "Military Commander Downplays Threat to Canada's Arctic from Russian Subs". Pinkerton, Charlie. 19 Sep 2018.

some extent, but goes on to say that every commanding officer must recognize the risks and realities of conducting Arctic operations with a warship designed for combat in the open north Atlantic".[10] Indeed, the Arctic requires a purpose built ship designed to operate in ice conditions, such as the one called out in SSE: the Harry DeWolf-class Arctic offshore patrol ship (AOPS).[11] Specifically, the SSE Policy calls for the CAF to "Acquire five to six Arctic Offshore Patrol Ships".[12] The RCN also has the unique capacity to provide SA capabilities in a particularly important dimension of the Arctic: the subsurface maritime region. One of the greatest potential benefits of the Arctic is the natural resources that may lie under the seabed. According to the US Geological Survey, as much as "30% of the world's undiscovered gas and 13% of oil waiting to be found are inside the Arctic Circle" along with "coal, diamonds, uranium, phosphate, nickel, platinum and other precious minerals" worth hundreds of billions of dollars.[13] For this reason, subsurface rights and sovereignty concerns will increasingly become a top concern of Arctic nations in the near future. One of these Arctic nations, Russia, has gone so far as to place a Russian flag on the sea floor in 2007 in an apparently "symbolic claim to billions of dollars' worth of oil and gas".[14] The RCN's small number of Victoria Class submarines give it an initial capability today, but further investment in subsurface monitoring is required. This doesn't necessarily have to be manned submarines, which can be extremely expensive, but unmanned underwater vehicles and passive underwater sensors can be networked back into a higher level command and control center to provide an integrated subsurface situation awareness picture for senior decision makers.

7. **AIR:** The air domain will be particularly important to developing better SA of the Arctic going forward. This is due, in part, to two underlying principles of air power. First, airpower provides speed, in that it can physically respond faster to the scene of a potential situation than physical assets in other domains. Second, airpower has the ability to provide reach. In light of the vast distances that need to be covered in the Canadian Arctic, airpower's reach brings a lot of capability to bear. A key role that takes advantage of both is the maritime patrol mission, currently executed by the Royal Canadian Air Force's fleet of 18 CP-140 Aurora.[15] Although this is a capable aircraft, frankly, having been procured in the early 1980s they are out of date. According to retired Brigadier General R.D. Daly, president of the Maritime Air Veterans Association, as of 2016 only 14 of 18 Auroras were scheduled to undergo upgrades that will lengthen their life span to 2030.[16] Brig Gen Daly also highlights that "fleet sizing studies for the Aurora procurement indicated that 24 aircraft were required to deal with the two-ocean sub-surface threat".[17] It's likely that even Gen Daly would agree that the 24 aircraft estimate is now

---

[10] "Bridging the Gap: The Limitations of Pre-AOPS Operations in Arctic Waters". Forget, Paul. Canadian Naval Review; Volume 7, Number 4 (Winter 2012). Pg. 16.
[11] "Strong, Secure, Engaged: Canada's Defence Policy". Government of Canada: 2017.
[12] Ibid. Pg. 35.
[13] Jordans, Frank. "Battle for Arctic Resources Heats up as Ice Recedes". 23 Aug 2017. <https://global news.ca/news/3690400/arctic-resources-shipping-routes/>. Accessed 10 Oct 2018.
[14] Parfitt, Tom. "Russia Plants Flag on North Pole Seabed". 2 Aug 2007. <https://www.theguardian. com/world/2007/aug/02/russia.arctic>. Accessed 10 Oct 2018.
[15] "CP-140 Aurora". RCAF Fact Sheet. <http://www.rcaf-arc.forces.gc.ca/en/aircraft-current/cp-140.page>. Accessed 11 Oct 2018.
[16] "Preserve Canada's Strategic Surveillance Capability: A Study by the Maritime Air Veterans Association". Daly, R.D. and E.S.C. Cable. 26 Jul 2016. <https://cdainstitute.ca/preserve-canadas-strategic-surveillance-capability/>. Accessed 11 Oct 2018.
[17] Ibid.

wildly outdated in light of the fact that a melting Arctic now means that Canada requires a three-ocean maritime patrol capability. Gen Daly also goes on to recommend that all 18 Auroras undergo the necessary upgrades and that a replacement be acquired by 2030, a sentiment that I wholeheartedly agree with.[18] Indeed, SSE does call out the need to acquire a "CP-140 Aurora maritime patrol aircraft replacement" but does not direct a timeline for completion.[19] Finally, SA in the Arctic can be boosted in the air domain by using ground radar based surveillance of the airspace over the Canadian Arctic. SSE addresses this requirement through the expansion of the Canadian Air Defence Identification Zone (CADIZ) and an overhaul of the radars that perform this surveillance mission.[20] The expansion of the CADIZ was accomplished in May of 2018; however, the updating of ground based radars to cover the entire CADIZ does not have an associated acquisition strategy.[21]

8. **LAND:** In light of the fact that an estimated 40 percent of Canada's land mass is located in the Arctic region, it is natural to assume that land capabilities will be needed to fully develop a SA picture of that area.[22] This is the role of the Royal Canadian Army (CA), particularly its Rangers. Established in 1947, the Canadian Rangers are part of the CA reserves "working in remote, isolated and coastal regions of Canada" where, among other missions, they serve to report "unusual activities or sightings".[23] These remote regions are mostly in the Arctic where some 100,000 Canadians call home.[24] The Rangers in the Arctic embody the core strengths of land power in that they are physically present, persistent as part of the local community, and critical to developing a SA of what is going on at the human level. Indeed, SSE somewhat addresses the land aspect of Arctic requirements when it advocates to "enhance and expand the training and effectiveness of the Canadian Rangers to improve their functional capabilities," but as in other cases it does not assign a dollar amount or a timeline.[25] There should be a direct correlation between CAF investments in the Rangers' capabilities and increasing Arctic accessibility as we go into the future.

9. **SPACE:** Air, land, and maritime capabilities are the domains that most entities can easily exploit for the purposes of building SA. That said, space based capabilities are becoming increasingly important in the modern world and due to the increase commercialization of space, are no longer reserved for major nation-states. The underlying tenants of space power lend itself to being a major contributor to Canada's SA needs in the Arctic. Defined by Joint Publication 3-14 Space Operations as "the area above the altitude where atmospheric effects on airborne objects become negligible," this domain provides a truly global perspective.[26] Termed by some

---

[18] Ibid.
[19] "Strong, Secure, Engaged: Canada's Defence Policy". Government of Canada: 2017.
[20] Ibid.
[21] "Canadian Air Defence Identification Zone Now Aligned with Canada's Sovereign Airspace". 24 May 2018. <https://www.canada.ca/en/department-national-defence/news/2018/05/canadian-air-defence-identification-zone-now-aligned-with-canadas-sovereign-airspace.html>. Accessed 11 Oct 2018.
[22] "Royal Canadian Navy Arctic Operations Manual". Government of Canada: 2017. Pg. 8.
[23] "The Canadian Arctic". <http://www.canadainternational.gc.ca/united_kingdom-royaume_uni/bilateral_relations_bilaterales/arctic-arctique.aspx?lang=eng>. Accessed 13 Oct 2018.
[24] "Canadian Rangers". <http://www.army-armee.forces.gc.ca/en/canadian-rangers/index.page>. Accessed 13 Oct 2018.
[25] "Strong, Secure, Engaged: Canada's Defence Policy". Government of Canada: 2017.
[26] Joint Publication 3-14 Space Operations. 10 Apr 2018. <http://www.jcs.mil/Portals/36/Documents/Doctrine/pubs/jp3_14.pdf>. Pg. 16. Accessed 11 Oct 2018.

as the "ultimate high ground," with the proper constellation of satellites the CAF could provide near full time surveillance of the surface of the Arctic region in all weather conditions.[27] Between considerable development, launch, and operations costs, maintaining a constellation of satellites in polar orbit over the Arctic could prove extremely costly, but frankly that may radically exceed the CAF's SA requirement in the Arctic. However, building a constellation that provides satellite coverage in areas where capabilities in other domains are lacking or have gaps is likely much more feasible. SSE does not call out any space based capabilities specific to the Arctic; however, it does generically reference the need for more satellite communications capabilities.[28] I concur with this recommendation particularly in light of the fact that much of the Arctic is so remote that traditional means of communications do not exist. With an organic satellite communication network in the Arctic, each CAF member who operates in this area of responsibility (AOR) will become a sensor who can connect back into the larger SA picture. A final reason that investment in space capabilities over the Arctic is valuable for the CAF is the fact that our adversaries may be there as well. Speaking at a 2017 Air Force Association conference, US Secretary of Defense Jim Mattis stated that space is becoming a "more dangerous military region" and that he now considers it "contested".[29] For this reason, a tenant of space power known as space SA, or the "characterization of space objects" may be particularly relevant over the Arctic in so much as true SA of the Arctic may have to include the characterization of adversary capabilities in space".[30]

10. **CYBERSPACE:** The final and least obvious domain that we should consider with respect to gathering SA for the Arctic is cyberspace. In their 2010 book "Cyber War: The Next Threat to National Security and What to Do About It" authors Richard Clarke and Robert Knake define cyberspace as "all of the computer networks in the world and everything they connect and control".[31] The nature of cyberspace is that it is inherently coupled with each of the other four physical warfighting domains (air, land, maritime, space).[32] Joint Publication 3-12 Cyberspace Operations describes this relationship with the physical domains by stating that "cyberspace, while part of the information environment, is dependent on the physical domains of air, land, maritime, and space".[33] At the most fundamental level, this means that in the Information Age, when militaries employ capabilities in any of the physical domains, cyberspace will almost certainly be present and by extension the ability to project cyberspace capabilities will be present. The impact that this has on a battle field – to include the Arctic – is that capabilities brought to bear through cyberspace operations are theoretically ubiquitous in all other domains. This absurdly high degree of reach and persistence is unique to cyberspace and is a reason that the CAF must explore the procurement of defensive cyberspace capabilities to ensure their own physical assets are not being exploited by an adversary who is also operating in the same

---

[27] Ibid.
[28] "Strong, Secure, Engaged: Canada's Defence Policy". Government of Canada: 2017.
[29] "Mattis Sees Need for New Space Programs". Fabey, Mike. 20 Sep 2017. <https://spacenews.com /mattis-sees-need-for-new-space-programs/>. Accessed 11 Oct 2018.
[30] Joint Publication 3-14 Space Operations. 10 Apr 2018. <http://www.jcs.mil/Portals/36/Documents/Doctrine/pubs/jp3_14.pdf>. Pg. 27. Accessed 11 Oct 2018.
[31] Clarke, Richard A. and Robert Knake. "Cyber War: The Next Threat to National Security and What to Do About It". Harper Collins: 2010. Pg. 70.
[32] Joint Publication 3-12 Cyberspace Operations. 8 Jun 2018. < http://www.jcs.mil/Portals/36/Documents/Doctrine/pubs/jp3_12.pdf?ver=2018-07-16-134954-150>. Pg. 9. Accessed 12 Oct 2018.
[33] Ibid.

physical domain in the Arctic. Likewise, cyberspace operations can provide the capability to exploit an adversary's military force projection in the Arctic. Information gained from these methods can be fed back into the larger CAF SA picture. Finally, cyberspace operations provide operational CAF commanders some unique levers that can be pulled to influence the larger information environment. In keeping with authors John Arquilla and David Ronfeldt's sentiments in the RAND Corporation published book "Networks and Netwars", success in future wars are likely to favor the force that can win the "battle of the story" or influence the "turn of mind" within a target population.[34] Insight gained from studying centuries of armed conflict is quite clear: shear military force is not the most effective way to influence a populace. Moving forward in the modern interconnected world, cyberspace capabilities will prove to be increasingly effective in achieving this goal, and the Arctic will be no exception.

CONCLUSION

11. In conclusion, even though the Royal Canadian Navy (RCN) has the most obvious role for providing SA in the Arctic, a more comprehensive end capability can be achieved through looking at this problem set through a multi-domain lens. Other military services operating in other military domains can bring valuable capabilities to bear in order to provide the CAF a comprehensive SA picture.

[34] "Networks and Netwars: The Future of Terror, Crime, and Militancy". Arquilla, John, David Ronfeldt. Rand Corp: 2001. Pg. 20.

BIBLIOGRAPHY

"Arctic Sovereignty". McCormick, Ty. Foreign Policy; May/Jun 2014; 206; ProQuest. Pg. 20

"Bridging the Gap: The Limitations of Pre-AOPS Operations in Arctic Waters". Forget, Paul. Canadian Naval Review; Volume 7, Number 4 (Winter 2012). Pg. 16.

"Canada First Defence Strategy". Government of Canada: 2010. Pg. 8.

"Canadian Air Defence Identification Zone Now Aligned with Canada's Sovereign Airspace". 24 May 2018. <https://www.canada.ca/en/department-national-defence/news/2018/05/canadian-air-defence-identification-zone-now-aligned-with-canadas-sovereign-airspace.html>. Accessed 11 Oct 2018.

"The Canadian Arctic". <http://www.canadainternational.gc.ca/united_kingdom-royaume_uni/bilateral _relations_bilaterales/arctic-arctique.aspx?lang=eng>. Accessed 13 Oct 2018.

"Canadian Rangers". <http://www.army-armee.forces.gc.ca/en/canadian-rangers/index.page>. Accessed 13 Oct 2018.

Clarke, Richard A. and Robert Knake. "Cyber War: The Next Threat to National Security and What to Do About It". Harper Collins: 2010. Pg. 70.

"CP-140 Aurora". RCAF Fact Sheet. <http://www.rcaf-arc.forces.gc.ca/en/aircraft-current/cp-140.page>. Accessed 11 Oct 2018.

Joint Publication 3-0 Joint Operations. 17 Jan 2017. <http://www.jcs.mil/Portals/36/Documents/ Doctrine/pubs/jp3_0_20170117.pdf>. Pg. IV-1. Accessed 10 Oct 2018.

Joint Publication 3-12 Cyberspace Operations. 8 Jun 2018. < http://www.jcs.mil/Portals/36/Documents/Doctrine/pubs/jp3_12.pdf?ver=2018-07-16-134954-150>. Pg. 9. Accessed 12 Oct 2018.

Joint Publication 3-14 Space Operations. 10 Apr 2018. <http://www.jcs.mil/Portals/36/Documents/ Doctrine/pubs/jp3_14.pdf>. Pg. 16. Accessed 11 Oct 2018.

Jordans, Frank. "Battle for Arctic Resources Heats up as Ice Recedes". 23 Aug 2017. <https://global news.ca/news/3690400/arctic-resources-shipping-routes/>. Accessed 10 Oct 2018.

Lajeunesse, Adam. "What Canada's New Defense Policy Means for the Arctic". 16 June 2017. <https://www.newsdeeply.com/arctic/community/2017/06/16/what-canadas-new-defense-policy-means-for-the-arctic>. Accessed 9 October 2018.

"Mattis Sees Need for New Space Programs". Fabey, Mike. 20 Sep 2017. <https://spacenews.com /mattis-sees-need-for-new-space-programs/>. Accessed 11 Oct 2018.

"Military Commander Downplays Threat to Canada's Arctic from Russian Subs". Pinkerton, Charlie. 19 Sep 2018.

"Networks and Netwars: The Future of Terror, Crime, and Militancy". Arquilla, John, David Ronfeldt. Rand Corp: 2001. Pg. 20.

Parfitt, Tom. "Russia Plants Flag on North Pole Seabed". 2 Aug 2007. <https://www.theguardian. com/world/2007/aug/02/russia.arctic>. Accessed 10 Oct 2018.

"Preserve Canada's Strategic Surveillance Capability: A Study by the Maritime Air Veterans Association". Daly, R.D. and E.S.C. Cable. 26 Jul 2016. <https://cdainstitute.ca/preserve-canadas-strategic-surveillance-capability/>. Accessed 11 Oct 2018.

"Royal Canadian Navy Arctic Operations Manual". Government of Canada: 2017. Pg. 8.

"Strong, Secure, Engaged: Canada's Defence Policy". Government of Canada: 2017.