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AIM

1. The aim of this paper is to demonstrate why the Canadian Armed Forces (CAF) operational intelligence need to better integrate intelligence-enabling expertise from Other Government Departments (OGD) and the private sector to align itself with the Pan-Domain Employment Concept (PFEC). This integration will enable a greater fulfilment of operational intelligence requirements by leveraging expertise and authorities from OGDs as well as technology available in the private sector but not currently in the CAF to successfully fight and win within the hybrid warfare reality our adversaries are currently exploiting. In so doing, the CAF operational intelligence will be better aligned with the Whole of Nation concept described in the PFEC.

INTRODUCTION

2. The PFEC provided “guidance” while avoiding “prescriptive solutions” and concluded that it “may require a shift in our thinking”.[1] This document highlighted 14 elements of which four directly speak to a shift required in operational-level intelligence. Because Canada’s adversaries target along all elements of national power, the *whole of government* coordination necessarily involves CAF operational intelligence working closely with other departments of the government that may have the lead role.[2] *Artificial intelligence* enhancement seeks to “enable information processing and analysis for tasks that are narrow and well-structured.”[3] *Adapted intelligence* seeks to leverage intelligence capabilities from other government departments that were previously considered to be non-military and to collaborate for purposes of attribution.[4] *Broad interoperability* seeks to extend our interoperability with OGDs and the private sector in what is coined a Whole of Nation interoperability.[5] For these four elements to achieve the desired effects, CAF operational intelligence must shift its thinking.

[1] Department of National Defence, *Pan-Domain Force Employment Concept (PFEC): Prevailing in a Dangerous World* (Canadian Defence Academy, 2023): 35.
[2] *Ibid:* 21.
[3] *Ibid:* 25
[4] *Ibid:* 26.
[5] *Ibid:* 31.

3. This paper will follow a logical structure on how the operational level intelligence processes would be better served by better integration with OGDs and technologies readily available from the provide sector. For the Royal Canadian Air Force (RCAF), the focus will be on recent announcement of the acquisition of the P-8A Poseidon and the MQ-9B SkyGuardian and how it represents a titanic increase in requirement for Processing, Exploitation, and Dissemination (PED) that can only be answered with swift onboarding of AI-enabled processing and exploitation capabilities. This will recommend the establishment of a centralized processing and exploitation unit that supports the operational levels of the RCAF. Finally, understanding the hybrid or irregular warfare tactics that our adversaries employ, an application of Whole of Nation concept includes bringing in OGDs at the operational planning levels and embedding them within our task forces so that our traditional embeds from OGDs not only provide support, but have the mandate to use their authorities to achieve the effect desired. This recommendation also includes private sector intelligence expertise being hired to support the operational intelligence needs of the CAF. While this would be new terrain that understandably comes with risk, that is what is required to "shift our thinking".

DISCUSSION

Operational Intelligence Within the RCAF

4. The RCAF recently announced the purchase of the P-8A Poseidon and the MQ-9B SkyGuardian and these come with tremendous collection capability which demand much greater processing and exploitation capability that can only come from the private sector. The P-8A comes with an MX-20HD digital electro-optical and infrared (EO/IR) multi-spectral sensor turrets build by L3Harris Wescam in Burlington, Ontario.[6] As a surveillance, Anti-Submarine Warfare (ASW) and maritime patrol aircraft, it can be fitted with many additional sensors which would require a much larger processing capability than just the Full Motion Video (FMV) and still imagery it would capture with its MX-20 sensor turret.

5. The MQ-9B SkyGuardian also comes with significant collection capabilities. A range of 1,850KM and up to 34 hours of flying time allows this platform to collect tremendous amount of data which needs processing.[7] It will be capable of "detecting, recognizing, identifying, tracking, and engaging" and it will enhance our NORAD commitment in the Arctic.[8]

6. With many of the Wing and Squadron level intelligence staff already undermanned, it is inconceivable to be able to take full advantage of these platforms without the use of some automation. FMV Analysts and Imagery Analysts (IA) are in extremely short supply in the CAF.

[6] John Keller, "Boeing to Build 11 new P-8A Maritime Patrol Aircraft With Integrated Sensors, Avionics, and Communications," *Military Aerospace Electronics,* 01 April 2022. Accessed 20 February 2024: https://www.militaryaerospace.com/sensors/article/14200526/avionics-p8a-poseidon-sensors.

[7] Ken Pole, "Canada to Acquire Fleet of MQ-9B SkyGuardian Drones," *Skies Magazine,* 19 December 2023. Accessed 20 February 2024: https://skiesmag.com/news/canada-to-acquire-fleet-of-mq-9b-skyguardian-drones/.

[8] Department of National Defence, "Canada Acquiring Remotely Piloted Aircraft Systems for the Canadian Armed Forces," News Release, 19 December 2023. Accessed 20 February 2024: https://www.canada.ca/en/department-national-defence/news/2023/12/canada-acquiring-remotely-piloted-aircraft-systems-for-the-canadian-armed-forces.html.

The courseware is rigorous which leads to high quality graduate but also a high failure rate and the specialty training can take over a year. Attrition from these specialists is extremely high to the private sector which leads to the lack of manpower to process the data in a timely fashion with the relatively low level of collection we currently have. With the addition of the P-8A and the MQ-9B, the RCAF now must rethink how it will do processing and exploitation at the operational level.

7. The PFEC stated the need for artificial intelligence enhancement to include "image, video and data classification" capabilities.[9] This AI enhancement is much more developed in the private sector than in the RCAF. For example, Tesla's self driving algorithm uses a neural network backbone that functions much like a human brain which allows the processing of terabytes of data to be matched to a library that allows it to contextualize and categorize the data it collects.[10] It does this process with such accuracy that self-driving is now normalized. It is this level of analysis and processing that is needed for the processing and exploitation of Intelligence, Surveillance, and Reconnaissance (ISR) feeds.

8. Project Maven is a USAF program which the RCAF could benefit from. This is an attempt very similar to Tesla's original solution of applying industrial image-recognition and object detection technology to defense. This program focuses on solving the issue presented in the previous paragraph: too much data and not enough personnel to glean the essential elements of information. AI must be used to support the analyst. This program was reported to have been successful to "assist in intelligence processing in actual operational use in the fight against the Islamic State of Iraq and the Levant (ISIS)."[11]

9. The problem of processing and exploitation is not a new one in the RCAF and initially came to the fore when Canada used Unmanned Aerial Vehicles (UAVs) for the first time. In Afghanistan, the RCAF operated the Canadian Heron UAV Detachment (CHUD). In this configuration, initial processing and exploitation was done by the operator, with replicated feeds sent out to the Task Force All Source Intelligence Center (ASIC) where further analysis could be made by dedicated FMV Analysts and IAs. Other feeds were also sent more broadly to the Tactical Operations Center (TOC) and the Battle Group G2 section for example, although this was more for Situational Awareness (SA) then for actual processing and exploitation. Later on Op Impact, processing and exploitation was also done in the ASIC, although this time Canada had no more UAVs and were processing mostly data collected by the CP-140 Aurora FMV in an overland role. Therefore, the problem was partly solved in Afghanistan by having a dedicated processing and exploitation section in the ASIC and a more limited capability in Iraq through the ASIC. However, the acquisition of much more capable collection platforms with much larger data sets demand a radical shift from the ad-hoc arrangement to permanent and large-processing capability.

[9] Department of National Defence, *Pan-Domain Force Employment Concept (PFEC): Prevailing in a Dangerous World* (Canadian Defence Academy, 2023): 25.
[10] Inez Van Laer, "Tesla's Self Driving Algorithm Explained," *Towards AI,* 27 May 2022. Accessed 20 February 2024: https://towardsai.net/p/l/teslas-self-driving-algorithm-explained.
[11] Forrest E. Morgan *et al, Military Applications of Artificial Intelligence: Ethical Concerns in an Uncertain World* (California: RAND Corporation, 2020): 77.

9. The RCAF needs a dedicated and permanent standup of a distinct processing and exploitation centre of excellence. While there will always be a need for de-centralized processing and exploitation at the tactical (Squadron) or operational (Wing) level, the know-how, capability, and bandwidth requirement demands a centralized authority for management. A processing and exploitation centre has been discussed for years in the RCAF but to the authors knowledge, the slow pace of UAV acquisition has always precluded this option from advancing. The adage of "build it and they will come" cannot work anymore because of wide-spread personnel shortages. The answer may lie in having a centralized authority or center of excellence which uses the specialized AI capabilities available in the private sector combined with a largely civilianized workforce under RCAF leadership. This is similar to the increasingly civilianized workforce of the Canadian Forces Intelligence Centre (CFINTCOM), albeit aimed at the operational level. To be effective and to actualize the PFEC, this capability should be optimized to support the operational needs of the RCAF.

OGDs and Private Sector Intelligence at the Operational Level

10. OGDs and private sector intelligence must play a greater role at the operational level to implement the essence of the PFEC. Integration is not a novel idea at the strategic level but its implementation at the operational level needs to be enhanced. This section will look at the need for integration of OGDs and private sector at the operational level in a concrete manner.

11. The PFEC acknowledges the irregular forms of warfare our adversary uses to exploit at the gaps and seams between government security agencies. The PFEC also acknowledges that DND may not have the lead role for tackling certain security threats but we must be integrated and ready to coordinate and assist where required. The term Whole of Nation is used in the PFEC and is defined as "an integrated approach to a situation that incorporates government, the private sector, academia, civil society, communities, and individuals."[12] Operationalizing this aspect of Whole of Nation to mean CAF operational intelligence working with other intelligence agencies of the OGDs is how this is achieved.

12. There is good interaction within the intelligence services of the OGDs and the CAF. For example, Public Safety, GAC, and RCMP have interactions and authorities to work together with the CAF within the legislative framework of the National Defence Act and other legislation. Embeds and Liaison Officers (LOs) are also represented from different government agencies within the intelligence apparatus of the CAF. Today the CAF at the operational level is faced with state-actor threats that uses hybrid tactics that necessitate replicating OGDs interaction not just at the strategic level but down to the operational level.

13. The way to have a Whole of Nation approach to intelligence aimed at closing the gaps between CAF intelligence and OGD intelligence is to operate seamlessly within the three environment at the operational level. The Canadian Defence Associate Institute has studied this problem and illustrated some of the challenges, but necessary reforms needed. This includes

[12] Department of National Defence, *Pan-Domain Force Employment Concept (PFEC): Prevailing in a Dangerous World* (Canadian Defence Academy, 2023): 47.

collaboration, operating and sharing with OGDs.[13] Further insights into responding to the hybrid threat include operating with non-traditional government and civilian partners, such as FINTRAC and Transport Canada. A second point mentioned cultivating closer relationships with the private sector to "enhance the mutual understanding of risk, enhance operational security, and build confidence in the employment of technologies necessary to operate in the contemporary security environment."[14] This will become increasingly important as CAF operational intelligence onboards AI from the private sector mentioned above to solve operational problems.

14. The current technique of embedding analysts and LOs at the strategic level is insufficient and much change. The original intent of having cross pollination of embeds between government departments such as Canadian Joint Operations Command (CJOC) and Public Safety was to bring with it lessons learned, access to know-how, and authorities to each department. However, these embeds and LOs are often employed simply as extra analysts and their positions are often first to get cut. What is needed are cross-functional teams made up of the right personnel with the right authorities to crack different operational challenges. For example, this could include acoustic research support to the RCN on novel adversary underwater capability. A team composed of different agencies would allow flexibility to assault the problem with the right authorities when CAF authorities are not sufficient. For example, if CAF operations are impeded by state actor use of cyber and illicit money laundering, the authorities for illuminating and compelling a change could lie with Communication and Security Establishment (CSE), FINTRAC and Public Safety.

15. The private sector also has much to offer for CAF operational intelligence but is currently underutilized. There are some private companies with some intelligence background that are hired for key tasks such as scenario writing in exercise development. However, this should be expanded dramatically to have such companies operating in Secure Compartmentalized Information Facility (SCIF) and with appropriate clearances to attack wicked intelligence problems at the operational level.

16. A prime example of such a model is the company Booz Allen in the United States. This company is reported to have 10,000 Top Secret cleared personnel, with over 1,000 ex-military intelligence personnel employed by the firm.[15] This firm is hired by many departments of the US Government, to include US Department of Defence, to attack wicked intelligence problems. Its staff is well trained and provides the US with the ability to retain experienced intelligence experts to continue to serve the nation in a Whole of Nation approach. Booz Allen has had negative press, to include Edward Snowden, and this speaks to the risk this author understands as part of the challenge of operationalizing intelligence according to the PFEC. However, CAF operational intelligence cannot improve its capability without the acceptance of risk, which can be mitigated through proper legislation and oversight.

[13] Chris Honeyman and Andrea K. Schneider, "Hybrid Warfare: Fighting Back with Whole of Society Tactics," *Conference of Defence Associations Institute* 30 (February 2023): 42.

[14] *Ibid:* 41.

[15] Tim Shorrock, "The Spy Who Came in From the Boardroom," *Salon,* 08 January 2007. Accessed 20 February 2024: https://www.salon.com/2007/01/08/mcconnell_5/.

17. CAF operational intelligence would be well served by the ability to out-source specific intelligence analysis to private companies such as a Canadianized version of Booz Allen. For example, certain wicked problems weigh heavily on overstretched and low manned intelligence directorates within the three environments. These special projects could be better and more rapidly analyzed by sourcing these tasks to experts in the field who do not get posted every three years. Many threat vectors that affect the operational level are very distinct in nature and require special knowledge in fields of science or cyber for example and these are hardly solved by your typical A2, N2 or G2 staff. The operational level should have the ability to out-source these distinct tasks to private intelligence companies instead of burdening OGDs such as Defence and Research Development Canada (DRDC) who also face similar challenges to the CAF.

CONCLUSION

18. CAF operational intelligence must be better aligned with the PFEC by onboarding AI technology found in the private sector and working more closely with OGDs and private sector intelligence. The nature of warfare includes hybrid and irregular forms of warfare which requires CAF operational intelligence to be more closely linked with a Whole of Nation approach. This includes onboarding technology from the private sector to meet the processing and exploitation of RCAF platforms, the establishment of a dedicated processing and exploitation centre, and more cross-functional teams comprised of defence and OGD intelligence staff at the operational level instead of the strategic level where it currently resides. Finally, the private sector intelligence field must be hired to solve some of the wicked intelligence problems confronting the three environments.

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