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Adaptation in the Canadian Armed Forces

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JCSP 49

Service Paper

Disclaimer

PCEMI n° 49

Étude militaire

Avertissement

Canada

CANADIAN FORCES COLLEGE - COLLÈGE DES FORCES CANADIENNES

JCSP 49 - PCEMI n° 49
2022 - 2023

Service Paper – Étude militaire

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AIM

1. The aim of this service paper is to highlight the requirement for the Canadian Armed Forces (CAF) to be more adaptative to the contemporary operating environment, of particular importance due to the constant state of competition in the pan-domain environment. Using a case study on the Royal Regiment of Canadian Artillery (RCA), this paper will demonstrate that strategic guidance in policy and strategy statements are not enabling action at the operational and tactical levels due to institutional and systemic problems.

INTRODUCTION

2. Military adaptation in both peace and war time, has evolved over centuries of warfare. Peacetime gives the luxury of time, wartime the urgency of the near-fight. As Murray notes when discussing the similarity between peace and wartime adaptation: "Both require imagination and a willingness to change; both involve imagination as to the possibility and potential for change; and both demand organizational cultures that encourage the upward flow of ideas and perceptions as well as direction form above."[1]

3. What is new is the speed of technological advancement in the contemporary operating environment. Technological changes in the digital era occur at a pace which is proving difficult for the current procurement system to maintain competency. However, it is not just the procurement environment, it is also the responsibility of subject matter experts in their respective fields to remain current on the evolving technological and allied and partner advancements in order to maintain involved and evolved in the fight. This paper will examine the RCA experience with digital fires as an example of missed opportunities leading Canada to be decades behind its Allies with regards to the digitization of joint fires.

DISCUSSION

4. Adaptation is defined as the process of changing to suit different conditions.[2] Military adaptation is further defined as change to strategy, force generation, and/or military plans and operations, undertaken in response to operational challenges and campaign pressures.[3] This includes force levels, equipment, training, and doctrine.[4] Farrell's discussion on the relationship between strategic and operational level adaptation is of particular relevance to this paper. Adaptation at strategic levels shapes the operational level. A change or lack of change, in direction or resources, fueling necessary adaptation, here, such as technological adaptation, shapes the operational level. In analyzing the mix of drivers and factors shaping military adaptation, Farrell observes that the most common and significant driver to military adaptation is

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[1] Williamson Murray. *Military Adaptation in War: With Fear of Change.* (Cambridge: Cambridge University Press, 2011), 308.
[2] Cambridge Dictionary, https://dictionary.cambridge.org/dictionary/english/adaptation, accessed at 26 Feb 2023.
[3] Ibid.
[4] Ibid.

operational challenges.[5] Significant academic work has been conducted on military adaptation during war. For example, Farrell uses organization theory in arguing that competing militaries, facing similar operational pressures, co-adapt to the environment.[6]

5. The CAF has issued strategic guidance that it must continue to remain adaptive to new and emerging technologies, threats, and continued operating along the continuum of conflict.[7] However, this guidance is not translating to timely action down to the tactical level of operations, namely in the procurement of equipment required to achieved such direction. The CAF must improve its approach and commitment to adaptation. As described by Barno and Bensahel, "Adaptability is one of the most, if not the most, important attributes of military forces… The rapidly changing 21st-century strategic environment, and its exponential rates of change, will make adaptability even more critical in the future than it has been in the past."[8] The contemporary operating environment sees Canada operating in a continued state of competition, confrontation and potentially conflict.[9]

6. The Pan-Domain Force Employment Concept identifies 14 elements which address the imperatives of the strategic and operational environment. These include modern and complete capabilities, evolved C2, multi-dimensional capabilities and a more agile and innovative operational culture.[10] CDS guidance issued 07 February 2023 outlines four focus areas for the CAF, one being Modernization: "We cannot be so consumed with the challenges of today that we mortgage our future, and thus modernizing the CAF continues to be an area of focus."[11] Despite strategic guidance on being prepared to operate in a pan-domain environment, the CAF is not adaptive enough to evolve with the environment at a rate in which Canada can remain competitive. The Canadian military procurement process is slow, and an adaptative mindset is not pervasive enough to succeed through the red tape.

7. The nature and characteristics of the contemporary operating environment are significant because the pace of operations has increased and the speed of technological advancement and the follow-on effects on warfare increase the pace of adaptation required. Being too slow to respond puts one at a decisive disadvantage. Future trends analysis of the future operating environment notes "a combination of technology, speed of human interaction, and the convergence in the realms of nanotechnology, quantum computing, biology and synthetic biology, neurological advancements, and the omnipresence of information moves us into the Era of Contested Equality."[12]

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[5] Ibid, 3.
[6] Ibid, 719.
[7] Department of National Defence, *Strong, Secure, Engaged: Canada's Defence Policy*. (Ottawa: Canada Communications Group, 2017).
[8] David Barno and Nora Bensahel. *Adaptation Under Fire: How Militaries Change in Wartime.* (New York: Oxford University Press, 2020), 270.
[9] Department of National Defence, *Draft Pan-Domain Force Employment Concept* (Ottawa, 2022)
[10] Ibid, 4-5
[11] Chief of the Defence Staff 2023 Focus Areas, 07 February 2023.
[12] TRADOC Pamphlet 525-92, *The Operational Environment and the Changing Character of Warfare,* 8.

Case Study – Digitization in the Royal Regiment of Canadian Artillery

8. In order to be competitive in the contemporary operating environment, the CAF must adapt to and anticipate the future fight. For joint fires, that fight is digital. It sees multinational operations with integrated command and control networks capable of passing both information and mission data between headquarters.

9. Joint Fires is defined as "Fires applied during the employment of forces from two or more components, in coordinated action toward a common objective."[13] Joint Fires involve "the full spectrum of munitions and non-munitions-based effects that may be provided by land, air or maritime assets."[14] Examples of assets employed include field artillery, naval gun fire, air delivered munitions, electronic warfare and information operations.

10. Digital fires is the overall term used to encompass the digitization of artillery command and control systems, increasing response times and digitally linking in key players in the joint fires fight: forward observer, gunline, command post, Fire Support Coordination Centre, and Higher Joint Fires headquarters. Digital fires "enhances the fires process, reduces fratricide risk, and increases lethality, all due to the proliferation, speed, and accuracy that digital information transmission enables for decision making and targeting."[15] From a strategic, operational, and tactical perspective, linking into higher headquarters is vital. The passage of key information, such as availability of assets and Fire Support Coordination Measures, is vital in both the multinational and multi-national multi-domain fight. Passage of digital information is more accurate, and removes language barriers persistent with radio communications.

11. The RCA's progress towards a digitized system has been slow to evolve and adapt into a digitized environment and is decades behind its partners and allies in this domain. The RCA Strategic Capabilities Assessment of 2016 identified Digitization of artillery as second last of its priorities.[16] Despite being bound by NATO Standardization Agreement (STANAG) 2245 which details levels of field artillery and fire support data interoperability, Canada was delayed into entering the digital fight by decades.

12. The multinational organization Artillery Systems Cooperation Activities (ASCA) is an allied and partner organization which outlines the interface definitions and procedures to be used for the technical processes to work jointly with allies. ASCA originated in 1987 from the development of automated field artillery systems by allied nations. The concept evolved from the need to have a common digital interface capable of communicating with allies across a common boundary.[17] This would permit not only fire missions and target acquisition information to be passed in a multinational operational context, but would quickly pass mission essential information outside of common language requirements, without the use of voice radio, therefore

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[13] NATO, AJP 3-09, *Joint Fire Support* (2010) Chapter 1, 1-2.
[14] Strategic Context Document – Joint Fires Modernization, Canadian Army, Directorate Land Requirements. 2018. Page 9.
[15] Major J. Bruce, Statement of Capability Deficiency, Digital Fires (31 May 2017), page 3.
[16] RCA Strategic Capabilities Assessment, 26 April 2016.
[17] Capt C.T. Cutting, "The Artillery Systems Cooperation Activities (ASCA) Program." Briefing Notes for the Deputy Director of Artillery, 11 April 2016.

increasing the speed of he transmission of information, an imperative requirement in an operational context.

13. Bizarrely, the RCA did not seek to join ASCA until 2016, twenty-nine years after ASCA's creation. At the time of joining, the RCA was not fully digitized. Digital applications were used in the gunline command post for the computation of firing data to be issued (via voice) to the gunline, however a Canadian made solution which would serve as the interface to the multinational ASCA digital interface was, and still remains, in development.

14. The CAF now has several approved projects which are fixing Canada's digital fire gap. The Fires Automation and Targeted Effects System (FATES), the RCA's digital fires program which will connect to NATO allies through ASCA, is a funded project in the final stages of development. The digitization of the RCA contains multiple projects, but encompass the digitization of fires command and control and targeting software, tactical equipment, training systems, in-service and future sensors, and in-service and future effectors. The Joint Fires Modernization Project entered the identification phase in 2017, with the aim to have Brigades fully equipped with Digital Joint Fires Capabilities by Fiscal Year 2029/2030. The Fires Automation and Targeted Effects System 4.0 (FATES), which is the digital fire control software and the gateway to ASCA compliance is in final testing phases and will be released in late 2023 or early 2024.[18] These are projects are good news, but far too delayed.

15. Investing in defence and ensuring effective management of the defence budget is a complex task. However, at the core of this issue is that projects are not moving fast enough through the procurement system which is crippled with bureaucracy. Combat elements are not being afforded the tools and equipment required to compete in the contemporary operating environment. As described in the case study of the RCA, the delay in a fires command and control system is an example where a command and control component required to link into higher headquarters is late to developing and Canada is thus decades behind its Allies in bringing effective joint fires to the multinational fight. Annual exercises with the United States Army, such as the Joint Warfighting Assessment, require a US Army Digital Liaison Detachment (DLD), operating the American digital fires platform, the Advanced Field Artillery Tactical Data System, in order to operate as a part of the exercise under the US-led Division.[19] Operational information, such as Fire Support Coordination Measures and requests for higher joint fires assets, are only passed over the digital net. Until the RCA has a functional ASCA compliant digital network, it is not able to operate in such a multinational context without support, such as a DLD.

16. Military procurement in Canada must become more adaptive and increase pace in order to speed up delivery of projects vital to keep Canada competitive amongst its Allies and partners. Canada is an outlier in its process for defence procurement, in that it does not have one single department or agency responsible for defence procurement, but rather three (National Defence, Public Services and Procurement Canada, and Innovation, Science and Economic Development

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[18] Royal Regiment of Canadian Artillery School, *Fires Automation and Targeted Effects System (FATES) 4.0 SITREP*, received 27 February 2023.

[19] Joint Warfighting Assessment 2019, After Action Review, 2nd Canadian Mechanized Brigade Group.

Canada.) Streamlining of the process and increased coordination, including with the Treasury Board Secretariat, are recommendations for improvement to this process.[20]

17. Canada is not alone is experiencing defence procurement difficulties. In a survey of defence procurement organizations worldwide, Auger concludes although Canada has a unique approach to defence procurement (decentralized, multi-departmental), other countries with other approaches

"…despite their differences and the introduction of defence procurement reforms in recent years, most processes – regardless of the model – continue to face similar challenges and criticism. Many processes are characterized by bureaucratic hurdles, political influence, cost overruns, and delays in delivering major projects. All industrialized countries, including Canada and its closest allies, have encountered difficulties with their defence procurement processes."[21]

18. Germany has created an interesting model for the acceleration of military procurement. *The Federal Armed Forces Procurement Acceleration Act*,[22] passed on 7 July 2022, orders the acceleration of military procurement of Armed Forces' range of capabilities with the aim to speed up the issuing of military contracts.[23] For a defined period of until 31 December 2026, this law offers a temporary opportunity to deviate from normal procurement laws if it is justified on economic, technical or time-related grounds, and an overall simplification of procurement processes.[24]

19. This law also prioritises solutions which are already on the market that would fulfill the specified requirements. This is an approach which would have improved the CAF's acquisition of digital fires solutions, given that the approach taken by the CAF was a made in Canada approach, which took over a decade to develop and is not fully interoperable with ASCA requirements.[25] Canada had the option to purchase one of the multiple systems available from Allies, yet a made in Canada solution was chosen, which caused delays in the fielding of the equipment and full incorporation into ASCA. It remains to be seen if this legislative approach will be effective, however German military procurement has not improved and Germany continues to fall short of the NATO guideline of 2% of GDP on defence spending, with the requested increases in defence spending denied.[26]

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[20] Lee Carson, *We Must Fixed Defence Procurement*. Canadian Defence Association Institute. https://cdainstitute.ca/lee-carson-we-must-fix-defence-procurement/. 25 July 2022. Accessed 27 February 2023.

[21] Martin Auger, *Defence Procurement Organizations Worldwide: A Comparison*. Library of Parliament. Ottawa, 2020. Page 18.

[22] Federal Armed Forces Procurement Acceleration Act | Gleiss Lutz Commentary, https://www.gleisslutz.com/en/Federal_Armed_Forces_Procurement_Acceleration_Act.html, accessed 23 February 2023.

[23] Ibid.

[24] Ibid.

[25] FATES will be tested on multinational operations in Fall 2023.

[26] Kamil Kowalcze and Michael Nienaber, "German Finance Chief Won't Bow to Defense Minister's Cash Appeal," *Bloomberg*, 28 February 2023, https://www.bloomberg.com/news/articles/2023-02-28/german-finance-chief-won-t-bow-to-defense-minister-s-cash-appeal?.

20. The delay in the RCA's road to digitization is not solely at the hands of the Canadian Defence Procurement organization. Situational awareness must be maintained on new and emerging technologies, allied programs and advancing partnerships, particularly in the digital environment. A high turnover rate of staff has degraded continuity of projects in the past, from both a technical and a tactical perspective. While staff turnover cannot always be avoided, it is important that there is some continuity in the maintenance of initiatives. Tactical level reporting, such as is mandated in the RCA,[27] must be consistent in order to fuel the adaptation process. Initiatives such as the Director of Land Requirements 2 Force Development Working Group, which is a proposed series of working group to help develop RCA thinking on Long Range Precision Fires and Indirect Fires Modernization in support of RCA Capability Development, is a positive development.[28]

CONCLUSION

21. Adaptation must be a mindset, and must be a continual and integral process. In describing adaptation as a multiplier of effectiveness, Ryan notes that in addition to well-resourced, cohesive military institutions, "The capacity to change quickly and remain effective in a rapidly changing geopolitical and technological environment" is vital.[29] The mindset of adaptation must exist within the institution to move ideas forward. It is these ideas which adapt the institution and move it forward. As noted by Murray, in both war and peace, adaptation requires imagination and a willingness to change, including "…organizational cultures that encourage the upward flow of ideas and perceptions as well as direction from above."[30] Canada must be better at adaptation to the current and future technological environment. Military adaptation matters because it is how the CAF will remain competitive in the contemporary operating environment.

22. Canada needs to be better at military procurement. The delays in the acquisition of new military equipment, capable of integration with allies and partners, reduces the effectiveness of the CAF by impeding its participation in multinational operations: "The Canadian Army's legacy capabilities have not evolved rapidly enough to meet the demands of operating in complex and dynamic multinational environments. In addition to coordinating effects from various elements of the CAF, a modern army must be capable of integrating coalition assets."[31]

23. In order to be competitive in the contemporary operating environment, Canada must increase its pace of technological acquisition. Strategic direction such as Strong, Secure, Engaged, the Pan-Domain Force Employment Concept, and additional CDS guidance outline a Canadian fighting force which must adapt to the future operating environment. SSE Initiative 42 details investments to be made to modernize land-based command and control, intelligence, surveillance and reconnaissance systems.[32] While SSE details increased investments in defence, it does not directly solve the fundamental delays and has not translated to a direct improvement

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[27] Chief Instructor in Gunnery Directive 40, *Gunnery Lessons Learned.*
[28] Director of Land Requirements 2 – Update Brief to the Regular Force Artillery Advisory Board, LCol John Zwicewicz, 28 February 2023.
[29] Mick Ryan. *War Transformed: The Future of Twenty-First-Century Great Power Competition and Conflict*. (La Vergne : Naval Institute Press, 2022), 154-155.
[30] Murray, 308.
[31] Department of National Defence. CAF Strategic Context Document – Joint Fires Modernization – 13/04/2018, 5.
[32] *Strong, Secure, Engaged,* 37.

of delays in military procurement. The vast bureaucracy which engulfs CAF procurement must be changed if Canada is to be a competitor in the contemporary operating environment.

24. Canada must further develop its approach to adaptation by two key measures. First, improving situational awareness on emerging technologies; and second, by taking faster action to procure and exploit such technologies. The delayed procurement cycle, highlighted in the above case study of the RCA, is an example of delayed adaptation, detrimental to both Canada's involvement in international partnerships and the CAF's preparedness for competition in the contemporary operating environment.

RECOMMENDATIONS

25. Improve an adaptative approach in reacting to technological advancements.

26. Increased and continued situational awareness on multinational joint fires advancements.

27. Increase continuity of personnel on key projects.

28. Increase priority and speed of defence procurement, with particular regard to command and control systems required for integration into joint operations.

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