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THE FUTURE OF JOINT TRAINING AND THE NEED FOR A CHAMPION OF SIMULATION IN THE CANADIAN ARMED FORCES

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JCSP 47

Service Paper

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PCEMI 47

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CANADIAN FORCES COLLEGE - COLLÈGE DES FORCES CANADIENNES

JCSP 47 - PCEMI 47
2020 – 2021

SERVICE PAPER – ÉTUDE MILITAIRE

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Word Count: 2,622

Nombre de mots : 2.622

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AIM

1. Fiscal restraints, green initiatives, and stressors on service personnel are pushing the Canadian Armed Forces (CAF) and coalition allies to consider simulated joint exercises instead of conventional live joint training. However, a lack of centralized management, challenges with interoperability, and cultural ignorance of simulation benefits are impeding this evolution. This service paper will demonstrate how interoperability and joint readiness will improve with the appointment of a CAF Champion for simulation. More research should be done on how best to exploit modeling in support of joint capability development and the human resource requirements needed to support a CAF Champion and Synthetic Coordination Office (SECO).

INTRODUCTION

2. One central theme throughout Canada's Defence Policy, *Strong Secure and Engaged* (SSE), is the need for joint service interoperability to counter pan-domain threats.[1] According to the Canadian Joint Operations Command (CJOC) in their recent Joint Operations Symposium call letter it is "the complexity of the current and future operational environment [that] demands a new perspective and a broader set of military capabilities, integrated across domains, and with other instruments of national power."[2] While it would seem intuitive to develop these joint capabilities with more conventional joint training, fiscal pressures, efforts to cut greenhouse gas emissions (GGE), and stressors on service personnel are making this increasingly difficult.

3. Recent advances in technology have taken simulation training to the next level. Virtual environments, like distributed mission training (DMT), are so advanced, cost-effective and efficient, that Five Eyes (FVEY) is looking to replace at least 50 percent of conventional large-scale joint exercises with simulation by 2035.[3] With real constraints on our ability to do more live training, the CAF must be committed to exploiting simulated training options like DMT. Unfortunately, with a lack of centralized management of simulation in the CAF, the services are having difficulty overcoming several institutional challenges that hinder this evolution. This service paper will show how the appointment of a CAF Champion for simulation will resolve issues with technical interoperability and effect the necessary cultural change to ensure a more interoperable and joint force within the CAF.

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[1] Department of National Defence, *Strong, Secure, Engaged: Canada's Defence Policy* (Ottawa: DND Canada, 2017), 41.
[2] Department of National Defence, *JOINTEX Executive Summary: Joint Operations Symposium 2020* (Ottawa: Canadian Joint Operations Command, 2019), 2.
[3] Five Eyes, *Five Eyes Distributed Mission Training.* (Five Eyes Operational Training Infrastructure Interoperability Working Group, 31 March 2020), 7.

DISCUSSION

4. The word joint in a military context is "an adjective used to describe activities, operations, and organizations in which elements of at least two environments participate."[4] SSE pushes the need for joint interoperability, and for good reason. The modern battlespace is pan-domain, extending well beyond traditional air, land, and maritime realms to include cyber and space. Couple this with our adversaries' development of asymmetric capabilities and the CAF has no choice but to develop joint interoperable capabilities to prepare for future conflicts. Yet this shift must take into account a growing number of constraints on live joint training. For the CAF and our coalition allies, the benefits of live joint training must be weighed against efforts to curb climate change, fiscal restraints, and impacts on personnel.

Challenges with Live Joint Training

5. Climate change is real and the Defence Energy and Environment Strategy (DEES) has singled out the Royal Canadian Air Force (RCAF) and Royal Canadian Navy (RCN) fleets as significant contributors to the Department's carbon footprint.[5] There are essentially three ways to reduce GGE: modify the platform, change the fuel source or find greener alternatives to train and conduct operations. While the RCN and RCAF are actively working to conserve fuel and modify their platforms where possible, they are heavily constrained in their ability to reduce GGE until a sustainable alternate fuel supply chain is present in Canada and around the world where they can expect to operate. Knowing this, the DEES commits to "adopt a forward-looking approach to identify and trial emerging energy-efficient technologies that could have a significant impact."[6] While there will always be a requirement to effectively train and defend national interests using RCAF and RCN platforms, the concerted push for GGE reductions will push the CAF to consider green alternatives to large-scale live training activities.

6. Fiscal restraints are another limitation to scaling up live joint training. Operational budgets within the CAF are extremely limited in their flexibility and are based on lean historical expenditures. Taking the RCAF as an example, in the fiscal year 2019/2020 after removing the cost of salaries, fuel, minor capital procurement, contractual arrangements, and fuel, only 17% of the program or $168 million (M) remained.[7] That is not to suggest that $168M was available for great ideas. Quite to the contrary, $168M was then spread thinly across 13 active Wings and three other Level 2 organizations to conduct all air operations, training, and force development for the RCAF. While simulation technology is certainly not free to operate, once investments are made to secure the necessary infrastructure, Level 1 budgets would start to see immense savings in fuel, associated repairs and maintenance, and temporary duty travel expenses.

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[4] Department of National Defence, *Canadian Forces Joint Publication 03 Canadian Military Doctrine, B-GJ-005-000/FP-001* (Ottawa: Canadian Joint Operations Command, 2011), 1.
[5] Department of National Defence, *Defence Energy and Environment Strategy 2020-2023*, (Ottawa: DND Canada 2020), 12.
[6] *Ibid*.
[7] Department of National Defence, *RCAF Business Plan Presentation* (Ottawa: Royal Canadian Air Force, 26 February 2020), 4.

7. Lastly, the military lifestyle presents challenges to scaling up live joint training. According to a study by Defence Research and Development Canada, "military families experience a number of life stressors, such as frequent geographical moves, recurring periods of separation, geographic isolation from extended family support systems, and the potential of the military member being deployed into a hostile environment."[8] Couple these stressors with the added requirement for members to travel away from home for extended periods to conduct live joint and coalition exercises and you increase the strain on military members and their families. Any effort to develop high fidelity joint training solutions that can keep members at home would alleviate stress for those in uniform.

The Future of Joint Training

8. While the vast majority of joint training is conducted using live exercises, recent advances in simulation have pushed the question of whether or not joint simulated training deserves more attention going forward.[9] When a joint training system moves from conventional live training to a more simulated training environment, several benefits emerge. The first is more effective training in terms of improved privacy and security of tactics, in addition to the safety of personnel and equipment.[10] Another key benefit is the ability to train under austere conditions like severe weather or to train for mechanical failures or complex manoeuvres that, due to the degree of risk to human life and equipment, are not attempted in live training scenarios. The second key benefit to simulation is more efficient training, where simulators lessen the time and resources needed to maintain readiness. The final benefit is the idea of training smarter, where the time spent in a simulator equates to less wear and tear and, in turn, extends the life expectancy of the respective platform.[11] While the services see an opportunity to exploit advances in simulation to maintain joint readiness, there are limits to how far they have been willing to rely on simulation to achieve operational effectiveness.

9. The United States National Security Strategy defines operational effectiveness as "the ability to achieve interoperability in an agile, multi-domain, full-spectrum training environment."[12] Advances in simulation have led to DMT systems that essentially allow geographically remote simulators to perform training activities in a virtual battlespace.[13] Coalition Virtual Flag 21-1, the most recent DMT exercise was a "train-as-you-fight exercise, integrating the full spectrum of joint and coalition air, land, surface, space, and cyber warfighters into a virtual battlespace. Forces from the United States, Australia,

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[8] Julie Coulthard, *The Impact of Deployment on the Well-being of Military Children:A Preliminary Review* (Ottawa: Director General Military Personnel Research & Analysis, 2011), 4.
[9] Five Eyes, *Five Eyes Distributed Mission Training . . ., 4.*
[10] Department of National Defence, *Royal Canadian Air Force: Simulation Strategy 2025* (Ottawa: Director Air Simulation and Training, 2015), 1.
[11] *Ibid*., 7.
[12] Five Eyes, *Five Eyes Distributed Mission Training . . ., 2.*
[13] Royal Canadian Air Force, *Air Force Order 8007-0 RCAF Modelling and Simulation Policy* (Trenton: DND Canada, 2017), 3.

United Kingdom, and Canada participated."[14] The exercise spanned 12 days, trained over 600 participants, including joint and coalition forces, and completed 6,469 training events over 23 sites and three continents.[15]

10. In addition to the benefits outlined above, DMT enhances joint training across all domains by creating a congested battlespace, improving operational security, and restricting the ability of adversaries to monitor the development of tactical plans. It also keeps the majority of forces at their home base and offers a green alternative to costly live training activities. What DMT does not do is attempt to replace the synergy, confidence, or strategic messaging that is inherent in joint live training events.[16] Despite the benefits that DMT offers and the FVEY push to have at least 50 percent of all coalition training via DMT by 2035, the CAF has several institutional challenges inhibiting the evolution of a DMT enterprise.[17]

Institutional Challenges with Simulation in the CAF

11. To remain interoperable with FVEY, and relevant in the increasingly congested pan-domain battlespace, the CAF must appoint a CAF Champion of Simulation to address institutional challenges that, to date, have stalled the evolution of a DMT enterprise. These challenges include a lack of centralized management, technical interoperability, and cultural indifference to the use of simulation over live training.

Lack of Centralized Management

12. In 2006, the Vice Chief of Defence Staff (VCDS) issued direction to guide the use and management of simulation across the CAF. Under Defence Administration Orders and Directives (DAOD) 2010-0, the VCDS acknowledges the need for senior-level management and lays out the responsibilities for a SECO.[18] Unfortunately, over time SECO responsibilities and dedicated resources were devolved from Capability Force Development (CFD) to CJOC and now rest with the Canadian Joint Warfare Centre (CJWC). This devolution has resulted in a loss of centralized simulation management across the CAF. The move to a pan-domain DMT enterprise demands CAF-wide synchronization through a directed governance and control framework under a CAF Champion and supported by a manned SECO.[19]

13. While informal working groups across the services have tried to bridge the gap, several challenges have proven difficult to overcome. This includes technical interoperability issues and an inability to effect widespread culture change on the use of simulators over live training exercises.

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[14] Deb Henley, "Coalition VIRTUAL FLAG: Joint and Coalition Partners Train as they Fight," *505th Command and Control Wing,* 24 November 2020, 1.
[15] *Ibid*.
[16] Five Eyes, *Five Eyes Distributed Mission Training . . ., 7.*
[17] *Ibid*.
[18] Department of National Defence, DAOD 2010-0, Modelling and Simulation (Ottawa: VCDS, 2006)
[19] Department of National Defence, *Air Force Order 8007-0 RCAF Modelling and Simulation Policy . . ., 4.*

Lack of Technical Interoperability

14. The importance of creating and maintaining a virtual environment that supports joint training cannot be overstated. There is hesitation from units to participate in joint virtual exercises when there is no clear training objective to do so. According to the RCAF Simulation Strategy, what is needed to overcome these challenges is "a systems approach that promotes understanding of training requirements to inform the development and maintenance of skills necessary for pan-domain training."[20] Having a CAF Champion that can push the development of combined training objectives from all participants is the key to ensure everyone benefits from joint simulated training.

15. There is also the need for interoperability standards in the procurement process to ensure all simulators can connect across the CAF and with allied training systems. Also, the reason FVEY cannot exploit DMT to the fullest extent possible is because allied forces do not hold the requisite network capability and infrastructure maturity that the United States currently possesses.[21] There is an expectation the CAF will make investments in its DMT enterprise which requires advocacy to ensure consistent funding across the services to support this evolution.

16. With any piece of equipment that relies heavily on technology, there is a risk of obsolescence at delivery. This is of particular concern for simulators given the fact that, according to SSE, "70 percent of all projects have not been delivered on time."[22] Currently, each service develops and acquires its simulators in stovepipes, making it increasingly difficult to effect change to how simulators across the CAF are procured. A CAF Champion is needed to advocate for a flexible procurement cycle and agile in-service support contracts to address the sustainment challenges inherent with technology-dependent equipment.[23]

17. To enable interoperability and joint training in a pan-domain virtual environment, a Champion of simulation would oversee the development of an integrated DMT system across the CAF. This would ensure consistency in procurement decisions and would provide guiding principles to support joint readiness requirements.

Need for Culture Change

18. The suggestion that more simulation equates to better efficiency and operational readiness receives mixed reviews. Despite the long list of benefits, simulation is still seen as second-tier to live training. Limited oversight, interoperability issues, and challenges with service delivery have made it difficult to effect a CAF-wide culture embracing simulation. If the CAF is serious about developing joint capabilities and remaining interoperable with FVEY, a CAF Champion must be appointed from outside the services, to change this mindset.

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[20] Department of National Defence, *Royal Canadian Air Force: Simulation Strategy 2025 . . ., 8.*
[21] Five Eyes, *Five Eyes Distributed Mission Training . . .,* 7.
[22] Department of National Defence, *Strong, Secure, Engaged: Canada's Defence Policy . . ., 74.*
[23] Department of National Defence, *Royal Canadian Air Force: Simulation Strategy 2025 . . ., 15.*

19. Institutional change to push DMT as a value-added alternative requires a communication strategy and simulation-first policy. While live training will remain a critical component of training, it needs to be balanced against the institutional responsibility of effective stewardship. With a simulation-first policy, all future training decisions would be defensible and accountable.[24] This culture shift would require consistent messaging from the CAF Champion that "whenever live and virtual training methods offer the same training value, the preference will be to choose the virtual training method."[25] Over time, and with continued improvements to the DMT enterprise, the attitude towards simulated training will change. Pushing consistent messaging on the benefits of simulation not only down and into the organization, but up and out to other government departments (OGDs), industry, Canadians, and our coalition allies will demonstrate the CAF commitment to effective stewardship.

20. Simulators need to be seen as enablers and not obstacles to operational readiness. Messaging needs to promote the value that simulation brings to joint training. For example, it is not well advertised that DMT offers a unique ability to train in a congested battlespace under complex scenarios that would otherwise be precluded in a conventional live training environment.[26] In short, a CAF Champion must not only promote the fact that simulation is here to stay but then must explain how exploiting this type of training is necessary to prepare forces for the complex pan-domain battlespace. Failure to do so will simply mean the continuation of ineffectual stovepipe attempts within the services to effect necessary institutional change.

CONCLUSION

21. According to CAF joint doctrine, "the future operating environment will be as volatile, uncertain, complex, and dynamic as it is today, if not more so, and will be driven by increasing global trends."[27] The complex pan-domain battlespace is here to stay and it is pushing military forces to rethink the way they train their forces. Training in large conventional ways is cost-prohibitive, not in line with Canada's efforts to reduce GGE, and puts added strain on military members and their families. DMT offers a green alternative to overcome these challenges and, to some degree, offers a superior means of developing joint capabilities.

22. FVEY is committed to the development of a DMT enterprise across the alliance. This will promote interoperability and optimize training efforts in the face of fiscal restraints and efforts to curb climate change. It will develop more combat-capable forces in a secure training environment free from adversary monitoring. The goal for coalition

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[24] Royal Canadian Air Force, *Air Force Order 8007-0 RCAF Modelling and Simulation Policy . . ., 5.*
[25] Department of National Defence, *Royal Canadian Air Force: Simulation Strategy 2025 . . ., 15.*
[26] *Ibid*., 3.
[27] Department of National Defence, *Canadian Forces Joint Doctrine Note 02-2014 — Command and Control of Joint Operations* (Ottawa, ON: Canadian Joint Operations Command, 2014), 1.

training is to move to at least 50 percent simulated training by 2035.[28] This evolution presents an opportunity to enhance the strategic management of simulation in the CAF.

23. If the CAF truly wants to reap the benefits of simulated joint training, there must be a concerted effort and commitment from the institution to ensure high fidelity in the DMT enterprise. This includes modifying the procurement cycle in a way that mitigates the risk of obsolescence at the time of service delivery. Without change management within the CAF and with OGDs, systemic issues with technical interoperability and ignorance of simulation will persist. In short, a more interoperable and joint force is dependant on the appointment of a CAF Champion for simulation.

RECOMMENDATIONS

24. It is recommended that a CAF Champion for simulation be appointed outside of the core services to improve interoperability and joint readiness within the CAF. This Champion would then be supported by a SECO embedded at the CFWC to effect the necessary institutional changes needed to develop a DMT enterprise. More research needs to be done to determine the human resource requirements to support the creation of a CAF Champion and operating the SECO.

25. Modeling and simulation are now used to test and evaluate new equipment and, according to the RCAF Simulation Strategy, provide "objective analysis required for the agile force development (FD) that is necessary for continual operational improvement."[29] More research should be done to determine how best to exploit modeling and simulation in the area of joint capability development.

[28] Five Eyes, *Five Eyes Distributed Mission Training*. . ., 7.
[29] Royal Canadian Air Force, *Air Force Order 8007-0 RCAF Modelling and Simulation Policy . . .,* 4.

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