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Empowering Modernization, Digitization and Innovation at the Operational and Tactical Level

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at the Operational and Tactical Level**

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EMPOWERING MODERNIZATION, DIGITIZATION & INNOVATION AT THE OPERATIONAL AND TACTICAL LEVEL

AIM

1. The CAF/RCAF provides strategic guidance on the need to modernize, digitize, and innovate our forces at the speed of relevance. While this top-down policy direction is important to lay down the path to a more effective and efficient institution, it fails to capitalize on the members at the operational and tactical level who possess creative and tangible ideas ready for implementation. This paper shall provide the Commander of the RCAF (CRCAF) with five pragmatic recommendations for short fuse implementation based on examples gleaned from the aircraft maintenance trades' context.

INTRODUCTION

2. With CAF Reconstitution, increased attrition and a decreased recruitment/in-take rate results in fewer members conducting the same amount or more work, which is expected to last until 2030.¹ To counter this challenge, the Reconstitution Directive underscores modernization and digitization as foundational pillars of action. Similarly, a common theme extracted from like-strategic documents, such as the CAF Digital Campaign Plan,² DND Data Strategy,³ Pan-Domain Force Employment Concept, RCN⁴ & CA Digital Strategy⁵ and RCAF Strategy,⁶ emphasize a propensity towards solutions related to *modernization*, *digitization*, and *innovation* (MDI). While the strategic intent is sound, these visionary end-states are often shackled to lengthy major capital projects, namely the Future Fighter Capability Program⁷ or NORAD

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Government of Canada. 2022. *CDS/DM Directive For CAF Reconstitution*. October 6. Accessed February 21, 2023. <https://www.canada.ca/en/department-national-defence/corporate/policies-standards/dm-cds-directives/cds-dm-directive-caf-reconstitution.html>.

² National Defence. 2022. *Canadian Armed Forces Digital Campaign Plan*. June 10. Accessed February 27, 2023. <https://www.canada.ca/en/department-national-defence/corporate/reports-publications/canadian-armed-forces-digital-campaign-plan.html>.

³ —. 2019. *The Department of National Defence and Canadian Armed Forces Data Strategy*. 2019. Accessed February 27, 2023. <https://www.canada.ca/content/dam/dnd-mdn/documents/reports/data-strategy/2019/dgm-25419-j4j-data-strategy-dia-en.pdf>.

⁴ —. 2020. *Digital Navy: A Strategy to Enable Canada's Naval Team for the Digital Age*. Accessed February 27, 2023. http://www.navy-marine.forces.gc.ca/assets/NAVY_Internet/docs/en/innovation/rcn-digital-navy-initiative_v2.pdf.

⁵ —. 2022. *Modernization Vital Ground: Digital Strategy*. June. Accessed February 27, 2023. https://www.canada.ca/content/dam/army-armee/migration/assets/army_internet/docs/en/digit-strag/Digital_Strategy.pdf.

⁶ —. 2023. *RCAF Strategy: Agile - Integrated - Inclusive*. February 8. Accessed February 28, 2023. <https://www.canada.ca/en/air-force/corporate/reports-publications/royal-canadian-air-force-strategy.html>.

⁷ —. 2023. *Future Fighter Capability Project*. January 9. Accessed February 27, 2023. <https://www.canada.ca/en/department-national-defence/services/procurement/fighter-jets/future-fighter-capability-project.html>.

Modernization⁸ that serve as the impetus for transformational MDI change due to the accompanying digital technology, software, and infrastructure requirements. The CAF cannot simply rely on such prolonged program deliveries to bring MDI to operations. Rather, empowering operational and tactical members as change agents to implement practical ideas at the coal-face would yield more timely and relevant results.

DISCUSSION

3. At the tactical level, RCAF squadrons already possess the tools to modernize and digitize their business practices but seemingly lack the innovative empowerment to execute. To the author's knowledge, RCAF wings and units do not employ these extant digital tools to their full potential save at 436 Transport (T) Squadron where the author achieved, as the CC130J Fleet Squadron Aircraft Maintenance Engineering Officer (SAMEO), moderate success to modernize business processes within the maintenance flight.

4. The existing digital tools coupled with refined processes were able to increase operational effectiveness, partially automate workflow, and enhance overall situational awareness and communications. Examples within the CC130J fleet at in 8 Wing Trenton will illustrate the potential for innovative change at the tactical level. When deployed aircrafts encounter materiel defects, a mobile repair party (MRP) is often tasked to deploy to the location to conduct a repair or replacement with the requisite technicians and spare parts. Prior to MRP deployment, a full understanding of the state of the aircraft is required and initial troubleshooting is traditionally conducted via emailed photos and telephone correspondence. This dated process prohibits multi-stakeholder collaboration and introduces information gaps akin to a game of broken telephone. With the advent of MS Teams, videos of the damaged component or a hosted video conference would enable much more detailed and inclusive troubleshooting among all subject matter experts – enabling a comprehensive understanding of the unserviceability for immediate resolution or full confidence to deploy the MRP.

5. Another tactical example would be to leverage the existing automated Aircrew Information File (AIF) functionality found in *Dispatch*⁹ and apply it to the mandatory technical awareness documentation that maintainers must read to be aware of urgent airworthiness-related information. The AIF functionality was originally designed as bespoke software by the RAWC's innovation hub with the aircrew as the target audience. Due to the similarities between maintenance-related AIFs, the software can scale to automate the workflow for maintenance supervisors – saving multiple person-hours to distribute, track, record, and report on the percentage of a squadron's maintainers who have completed mandatory readings of urgent technical bulletins.

⁸ —. 2022. *Fact Sheet: Funding for Continental Defence and NORAD Modernization*. July 21. Accessed February 27, 2023. <https://www.canada.ca/en/department-national-defence/services/operations/allies-partners/norad/facesheet-funding-norad-modernization.html>.

⁹ Sheahan, Andrew. 2020. *Dispatch: Transforming RCAF Operations*. March 1. Accessed February 27, 2023. <https://www.canada.ca/en/air-force/corporate/reports-publications/rcaf-perspectives/dispatch-transforming-rcaf-operations.html>.

6. To enhance awareness at the tactical level, squadron operations centres which include both flying and maintenance operations should start to use live-chat such as MS Teams to communicate with the Wing's Operations Centre (WOC) for real-time situational awareness. Unforeseen delays to aircraft launch times due to ramp-snags should be communicated by technicians on the tarmac via cell-phone enabled live-chat to the WOC for instantaneous awareness or contingency planning. The current process used at 8 Wing still relies solely on email correspondence complemented with telephone-voice updates which is inherently slow and distorts real-time decision-making. MS Teams chat is approved up to Protected B, however should higher security levels dictate, multi-domain secure live-chat could be used such as Transverse Chat¹⁰ – a tool that CJOC's CFICC employs exclusively for monitoring and communicating with deployed operations in real-time – another institutional *silo* of excellence. The aforementioned illustrations, while not an exhaustive list, provide a glimpse of the innovation that could be implemented in short order and with nil funding costs. The missing resource would be robust governance and oversight at the operational level.

7. From a different hierarchal perspective, the operational level [Level 2 (L2)] at 1 Canadian Air Division could provide the governance needed to enforce a consistent application of local best practices of MDI among RCAF wings. Operational level leadership would focus to break through individual silos of excellence that exist across the RCAF wings and units by sharing each success via a deliberate cross-pollination effort. A recent example of this has been the Yearly Flying Rate (YFR) reporting feature found within *Dispatch*. The manual effort to tabulate and delineate YFR data among Force Employment, Force Generation, and Force Development is an onerous process. With the digitization employed at 8 Operational Support Squadron to leverage the single source of truth data inputted by the pilot, the ability to roll-up the data and create dashboards for higher headquarter reporting drastically reduced person-hours dedicated to the YFR reporting process. This automation which became the standard operating procedure at 8 Wing Trenton was then quickly adopted within the tactical aviation units, and then at the operational level at 1 Canadian Air Division (1 CAD) in Winnipeg since it provided accurate and timely data to the Commander. Another operational role would be shouldering the administrative burden on behalf of the tactical level to pre-approve funding across all RCAF units to hire temporary agency laborers. The employment of temporary agency workers would either augment the existing staff positions at a squadron or replace extant technicians who are in clerical or general-duty positions; the latter would re-align technical experts to work on-aircraft related maintenance tasks. This workforce augmentation concept was trialed at 436 (T) Squadron to employ a parts courier to deliver and return aircraft parts which maximized on-aircraft wrench time for the technicians. The detriment was the burden of formally requesting for these funds and enacting the administrative process for a call-up to this standing offer – all of which could be frontloaded by an operational staff providing the adequate oversight and governance to support the tactical level workforce.

¹⁰ Strategic Joint Staff. 2022. *JIIFC C2 Applications Training Page*. May 16. Accessed February 27, 2023. <http://intranet.mil.ca/en/organizations/sjs/dgo-jiihc-c2-applications-training.page>.

8. Similarly, 1 CAD's equivalent L2 under the Deputy Minister (DM) of National Defence at the Directorate General of Aerospace Engineering Program Management (DGAEPM) oversees the Technical Airworthiness Authority (TAA) of each RCAF aircraft platform. The subordinate L3 employs a Weapon System Manager (WSM) team who hold airworthiness authorities of each aircraft fleet and they also have a pivotal role to play in transformational change via MDI of the RCAF. The WSM should lever all of the maintenance data that is gathered for their fleets and analyze it to provide leaders with more informed decision-making. All aircraft maintenance records for corrective and preventive maintenance are stored inside an Electronic Record Keeping System (ERKS) via an Enterprise Resource Planning platform such as SAP (known as DRMIS for the RCAF). The vast amount of data is kept inside the ERP's business warehouse and is largely unused, especially for analytical processing. At the DGAEPM, MDI would be explored by reviewing the most frequently occurring defects, compared versus different seasons/environmental conditions, and even flight profiles year-over-year to glean trends for useful life-cycle materiel management insight. This could be partnered initiative with the in-service support contractor (e.g. Lockheed Martin, Boeing, Airbus, etc.) to optimize aircraft parts inventory levels for high-use items, drive aircraft modifications due to high-failure rates, or even increase/decrease inspection periodicities to maximize aircraft availability – all insights sourced from maintenance data analysis. An even more novel example would be to exploit the contractors existing innovations such as Airbus' *Skywise*¹¹ platform to transform how maintenance repair and overhaul activities are conducted within the RCAF – in essence fusing advanced analytics from aircraft sensors and maintenance data to 'maximize asset availability... failure prediction, supply stock optimization and on-site interpretation of aircraft health monitoring.'¹² Airline operators would conduct recommended *predictive* maintenance tasks vice *fixed* calendar-based or hours-based maintenance tasks thereby reducing maintenance down-times.¹³ These innovative partnerships should be built into the in-service support contracts as options for additional work requests that would not trigger new and cumbersome project approval processes where "most project delays were observed."¹⁴

9. Beyond traditional defence contractors, a partnership with industry leaders in the aviation sector would help broaden creative approaches to transform the RCAF in terms of MDI. To only look inwardly would be an overly insular methodology that would inhibit true transformational thinking. Born out of an informal initiative between the tactical and operational level, the author and the RAWC initiated an inaugural fellowship between the RCAF and Air Canada (AC) from April to September 2022.¹⁵ The fellow

¹¹ Airbus. 2023. *Airbus Skywise*. Accessed February 27, 2023. <https://aircraft.airbus.com/en/services/enhance/skywise>.

¹² Labbé, Christian. 2021. *Leveraging Data Sciences and Analytics for the RCAF*. February. Accessed February 27, 2023. <https://www.cfc.forces.gc.ca/259/290/23/192/Labbe.pdf>.

¹³ Izzo, Filomena. 2019. *Management Transition to Big Data Analytics: Exploratory Study on Airline Industry*. September 16. Accessed February 27, 2023. <https://pdfs.semanticscholar.org/efc0/a7e3545e5acdaaabb07631b150cf2da19e2.pdf>.

¹⁴ Sloan, Elinor. 2014. *Something Has to Give: Why Delays Are the New Reality of Canada's Defence Procurement Strategy*. October. Accessed February 27, 2023. <https://www.policyschool.ca/wp-content/uploads/2016/03/something-has-give-sloan.pdf>.

¹⁵ Hirsimaki, Konsta. 2023. *RAWC inFORM Article: An Aerospace Engineer's Glimpse into Air*

was an AERE¹⁶ whose main objective was to conduct experiential learning at the AC Maintenance Facility in Toronto to exchange and learn aircraft maintenance related best practices. The six-month fellowship provided insight on how technology such as tablets & Wi-Fi enabled paperless maintenance recording processes, and RFID & GPS would help expedite signing-in/out and tracking the location of tools, thereby creating a robust tool control program. It also provided a basis of comparison on how maintenance operations are conducted between the RCAF and AC, or rather, critical introspection on areas such as AC's interoperable and seamless software versus RCAF's disparate and clunky software systems. This fellowship was fully supported by AC's Vice-President of Maintenance Operations and the request for even more subsequent RCAF fellows to span Canada was received. However, the lack of operational reinforcement and reduced staffing levels due to RCAF Reconstitution meant follow-on fellows were not available nor deemed a priority. This chance to build on the Fellowship program and solidify rapport with industry was definitely a missed opportunity. The ability to collaborate to extract new means to modernize, digitize, and innovate was again cost-free yet arguably invaluable in terms of its potential to vector the RCAF towards a future of modern, digital, and innovative means of maintenance operations – a reality that private industry is already experiencing today.

10. The majority of the previous examples of MDI at the tactical level possessed the tools to execute but lacked the governance and top-down support. The RCAF's vulnerable parade state due to Reconstitution implies that drastic and creative suggestions are needed and entertained. At 1 CAD, the Aircraft Maintenance Standards and Evaluations Team (AMSET) have a mandate to conduct airworthiness compliance audits across all RCAF wings and units. This audit occurs on a recurring basis of two years to ensure Accredited Maintenance Organizations are conduct maintenance tasks in accordance with airworthiness policy in specific functional areas such as parts handling, tool control, maintenance recording, quality management system, organizational culture, safety programs, etc. Similarly, an organization with DGAEPM, called the Directorate of Technical Airworthiness and Engineering Support (DTAES) also audit RCAF units for airworthiness compliance on a recurring schedule that is offset to that of AMSETs'. While there are nuanced differences between DTAES and AMSET audits, there remains sufficient overlap to fulfill the purpose of heightened vigilance and compliance verifications at the RCAF unit level. To allow a Person-Year Neutral solution, the risk of a reduced set of audits from AMSET would be low and would enable AMSET to be repurposed into a consultancy section that focuses on promoting MDI activities by extracting the local successes to celebrate and share with the greater pan-RCAF. This new consultancy should also be funded to spur grass-roots initiatives. This new AMSET consultancy team should work closely with the RAWC as they share a mandate of RCAF innovation. The AMSET team would also serve as the operational level top-cover by

Canada Maintenance. January. Accessed February 27, 2023. <http://trenton.mil.ca/rcaf-awc/en/inform/inform.asp?Form=Y>.

¹⁶ AERE stands for Aerospace Engineering Officers who are responsible for all aspects of the engineering, maintenance and management of military aircraft; and all of their support equipment and facilities during military operations. Sourced from: <https://forces.ca/en/career/aerospace-engineering-officer/>

conducting administrative staff work to enable the tactical level personnel such as the aforementioned agency hires to augment RCAF units' clerical staffing levels.

CONCLUSION

11. Strategic level policies are important as they set the visionary destination of how the CAF/RCAF ought to be transformed for future operations. Equally as important, if not more, is the role that the tactical and operational level personnel play in terms of modernizing, digitizing, and innovating our RCAF. The ingenuity and creativity of their conjured solutions within their environment/operational realities can provide solutions at the speed of relevance. Building on minor tactical successes evangelizes peers to address larger problem-sets with innovative approaches – providing a secondary effect to spur contagious creative passion for continuous improvement. The reliance of major capital projects to drive MDI is insufficient due to bureaucratic processes and protracted timelines for results. It also relegates the operational and tactical level personnel to bystanders until the strategic effects are delivered.

RECOMMENDATION

12. Acknowledging the potential that the operational and tactical level personnel possess to truly transform the RCAF into a modern, digital and innovative organization, the following actions are recommended:

- a. The CRCAF should accept the risk of a reduced compliance audit effort such that AMSET is re-purposed to a primary consultancy function that provides operational level governance and support to tactical level units in terms of cultivating pragmatic solutions and ideas that will modernize, digitize and innovate the RCAF.
- b. The CRCAF should dedicate recurring funding to support grass-roots initiatives related to MDI, specifically to unit commanding officers' budgets to empower and resource them commensurately.
- c. The CRCAF should mandate a recurring working group among the RAWC, DGAEPM, and AMSET-consultancy to report on progress and provides a forum to integrate innovative solutions across the RCAF and DM L2's.
- d. The CRCAF should fully endorse and reinstate the RAWC Fellowship program with AC that aspires to include other trade competencies such as

CELE¹⁷ vis-à-vis IT, and LOG¹⁸ vis-à-vis supply chain management - all worthwhile long-term investments despite short-term costs.

- e. CRCAF should incentivize innovative minds with an overhaul of the promotion merit criteria for all trades – an extrinsic measure to praise efficiencies and promote a cultural shift towards MDI-centric transformation.

¹⁷ CELE stands for Communication Electronics Engineering Officers provide telecommunications and information management services that support Canadian Armed Forces (CAF) operations in Canada and abroad. Sourced from: <https://forces.ca/en/career/communication-electronics-engineering-officer/>

¹⁸ LOG stands for Logistics Officers provide the various means of transportation, equipment and supplies for the movement of Canadian Armed Forces (CAF) members and all types and sizes of cargo throughout the world. Sourced from: <https://forces.ca/en/career/logistics-officer/>

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