FALL EDITION
2021

FEATURE ARTICLE
Data Analytics: Beyond the Buzz

Automatic for the people – AI and the defence supply chain
Logistics officer course land from a student's perspective
Industry trends in logistics
The nutritional fitness imperative

INTERVIEWS
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& MUCH MORE

PRAEFECTUS ANNONAE

PRAEFECTUS ANNONAE

i. A Leader in sustainment.
ii. One who stands in front and supports.
iii. An organizer of provisions.
iv. A permanent, distinguished, superior, and distinct support leader.
v. The name of the Royal Canadian Logistics Service journal.

COVER PHOTO:
CFLTC MSE Op, QL3 0051E, Graduation Parade
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MWO Roger Gonsalves
31 Service Battalion – Bellum est Cras

During the development of this journal, members of the Canadian Forces Logistics Training Centre were invited to propose names for it. Submissions included French, English, Esperanto, and Latin names. Submissions often related to memorabilia, symbolism, history, and cap badges.

These elements were taken into account with an emphasis on both sustainment and leadership. Dean of Humanities and Latin professor Dr. Hugh Elton of Trent University was consulted in order to discuss the various submissions. From this process, Praefectus Annonae was selected as the term that captures the spirit of both sustainment and leadership. We thank Dr. Elton for his expert advice and encouragement as well as all those who submitted suggestions.

The views expressed in this journal are those of the authors and not those of their organizations, DND, or the CAF.

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PHOTO BY ARNO SENONER ON UNSPLASH

Artificial Intelligence Integrated Applicant Management Process for Recruitment

By Major Roger Coutu

Major Roger Coutu is a staff officer within the Directorate of Air Reserve. His responsibilities are to provide overall strategic planning, performance metrics and analysis on matters pertaining to the management of the RCAF Reserve Program, with specific focus on recruiting and intake programs; strategic intake plans; absorption and training requirements; and communication strategies.

AIM

The aim of this paper is to detail how the integration of Artificial Intelligence (AI) into the Canadian Armed Forces (CAF) applicant management system would reduce processing timelines and increase efficiency.

INTRODUCTION

The length of time required to recruit new members into the CAF has long been an area that garnered much attention. Successive Auditor General Reports in 2002, 2006 and 2016 have all identified that the recruiting system was in need of improvement. Over the years there have been several changes to how the Canadian Forces Recruiting Group processes applicants. The CAF has adopted electronic procedures, however, only incremental improvements have been seen in processing times.

In 2017, the Government of Canada released its new Defence Policy with 113 new initiatives. The first initiative specifically addressed the need for the CAF to reform military recruitment to improve efficiency and significantly reduce processing time before enrolment. This initiative serendipitously coincided with rapid developments in the digitization of human resource activities, specifically, the integration of artificial intelligence and automation for recruiting and selection processes.

This paper will argue that the integration of Artificial Intelligence (AI) into the CAF applicant management system would reduce processing timelines and increase efficiency. In the civilian human resources sector, the use of AI enabled recruitment and selection has increased dramatically. The greatest efficiencies can be found in industries that manage large volumes of applications, like the CAF. Routine and repetitive tasks such as applicant screening, scheduling and updates can be automated with AI and free recruiting staff to focus on essential face to face activities.

DISCUSSION

In 2015, according to the 2016 Auditor General Report, the average processing time from initial application to enrolment for the Regular Force was approximately 200 days . Since that time, the Canadian Forces Recruiting Group (CFRG) has implemented changes to processing procedures, resulting in only modest improvements. While reviewing the main recruiting website, applicants are informed that the CAF "strives to maintain an average processing time of between 90 and 120 days". In reality, it takes many applicants several months to complete the enrolment process.

Why does it take so long? Joining the CAF is more complicated than the average job and it involves multiple steps, including: application, reliability screening, medical examination, and interview. Each step of the process is managed by CFRG military and civilian staff. The applicant management process requires multiple manual checks and inputs by staff into the Canadian Forces Recruit Information Management System 2 (CFRIMS2). However, many of these tasks could be automated, accelerating processing speed with the additional benefits of improved applicant communication and engagement. Three labour-intensive areas that could benefit from AI integration will be explored: applicant screening; follow-up and updates; and scheduling.

Applicant Screening

The first process we will examine is called Prospect Management by CFRG. This is the review of the initial application for quality control and checks for age, citizenship, and education. Additional checks are also performed for screening out nuisance applications and checking for previous or duplicate applications using the manual search function in CFRIMS2. These steps are conducted manually by military personnel before the application can be accepted into CFRIMS2 for further processing. Checking only three criteria and performing a manual database search for one application is not a high demand task on its own. What makes this process labour-intensive is the volume of applications received. Since CFRG receives tens of thousands of applications each year, is apparent that automation of this process could yield significant savings in time and human resources.

Prospect Management is one step that could easily be improved through the integration of an automated AI pre-screening tool. This process has clear and objective criteria that can be compared against submitted applications. The duplicate application task can also be completed with an automated search of the existing CFRIMS2 database using multiple criteria, such as name, date of birth, phone number, address, and service number for those with prior service. The additional advantage of automating this process would be that it would be screening and accepting applications 24/7. Applications will not have to wait until normal business hours to be screened, thereby improving response times.

[1] Auditor General of Canada, *2002 April Report of the Auditor General of Canada, Chapter 5—National Defence—Recruitment and Retention of Military Personnel* (Ottawa, 2002)
[2] Auditor General of Canada, *2006 May Status Report of the Auditor General of Canada, Chapter 2—National Defence—Military Recruiting and Retention* (Ottawa, 2006)
[3] Auditor General of Canada, *2016 Fall Reports of the Auditor General of Canada, Report 5—Canadian Armed Forces Recruitment and Retention—National Defence* (Ottawa, 2016)
[4] Department of National Defence, *Strong Secure Engage: Canada's Defence Policy (2017), p 22*
[5] Auditor General of Canada, *2016 Fall Reports of the Auditor General of Canada, Report 5—Canadian Armed Forces Recruitment and Retention—National Defence* (Ottawa, 2016), para 5.78
[6] CAF Recruiting Website, *https://forces.ca/en/help-centre/#/view/61*

Applicant Outreach

The second area where AI could provide efficiencies is with applicant outreach, which includes follow-up for completion and validation of applications, provision of missing documentation and medical forms. This process is managed by recruiters and file managers. Contacting applicants for missing information takes a significant amount of time and usually entails multiple attempts by email and phone. The CAF does not have statistics on time spent contacting candidates, however, research by Entelo, an HR Technology company, states that recruiters spend on average 20 hours per week on candidate outreach and 77% of recruiters stated that it takes up to two emails to get a response from candidates.

An AI solution could be employed for routine applicant outreach. Auto-generated emails and text messages could be sent to applicants as reminders to complete their online applications or provide missing information. These actions could be recorded in the applicant log in CFRIMS along with their responses. An AI solution could also be utilized to maintain applicant engagement through the provision of reminders and file updates. This would free recruiters from routine file management duties, allowing for more direct interactions with applicants and increased attraction activities.

Applicant Scheduling

Processing clerks are employed for booking applicants for testing, medicals and interviews. This is again conducted manually through the use of emails and telephone. This is a labour-intensive process, often requiring multiple attempts to contact applicants and schedule appointments within normal business hours. It is further complicated by the high volume of applicants who require an appointment, often adding weeks or months to the process.

An intelligent scheduling assistant, could access the Recruiting Detachments' processing timetable and contact applicants to schedule their appointments. This would allow them to book online or from their mobile phone at any time. It would significantly reduce delays in the booking of appointments and further automate processing workflow. The system could then generate and send reminders to candidates for scheduled appointments, reducing no shows as well. And, if an applicant did not show-up for their appointment, no human resources would have been wasted; the system could automatically follow-up to confirm if the applicant is still interested and re-schedule if required. To illustrate the potential of AI enabled scheduling, Modern Hire, an international recruiting and hiring solutions firm, found that clients using their scheduling platform have seen "candidate response rates increase to 84%, and time to schedule an interview drop from days to just hours". The potential impact of converting this process to AI cannot be overstated.

CONCLUSION

Advancements in AI can provide the CAF with a golden opportunity to modernize the recruitment process through its integration into applicant management systems. The use of AI would mean that many of the repetitive, routine tasks that are currently performed by staff can become automated. The specific areas examined in this paper, if implemented, would increase the responsiveness of the recruiting system, reduce processing times and save resources. The CAF should move towards integrating AI into its applicant management systems immediately.

[7] Ibid, https://forces.ca/en/how-to-join/#st
[8] Entelo Inc., *2019 Recruiting Automation Report*, www.entelo.com
[9] Modern Hire Inc., *Your Questions on Recruiting Chatbots Answered*, https://modernhire.com/your-questions-on-recruiting-chatbots-answered/

DATA ANALYTICS: Beyond the Buzz

by By Evert Akkerman

WHAT IS DATA ANALYTICS?

While the term "data analytics" has been bandied about for years, it seems unclear to some what it entails, and how to move from talk to practical application.

The discipline of data analytics is focused on gleaning insight from facts, figures, numbers, and records. A big part of it is collecting, processing, managing, and analyzing data, and selecting techniques to do so. The main goal is to identify trends and patterns, and, in turn, facilitate decision-making. Over the past several years, data analytics has become increasingly important in business processes, specifically in determining direction and strategy. The idea is that if we're able to describe factors and correlations between them, we can predict and direct performance.

Data analytics is not a purely mathematical or statistical process—don't expect to run a bunch of raw data through a computer and presto, the perfect decision just rolls off the printer. While software can detect patterns, there will always be a need for sound judgment in interpreting data. This is where experience in the battlefield can be crucial. Obviously, a good decision can result in winning the battle or eliminating a target, while a bad decision can result in a failed mission and/or cost lives. This highlights the importance of translators in the Canadian Armed Forces—for languages as well as data. That is, as long as the translators of the data know how to use the systems in place, what data is required, and how to interpret the data.

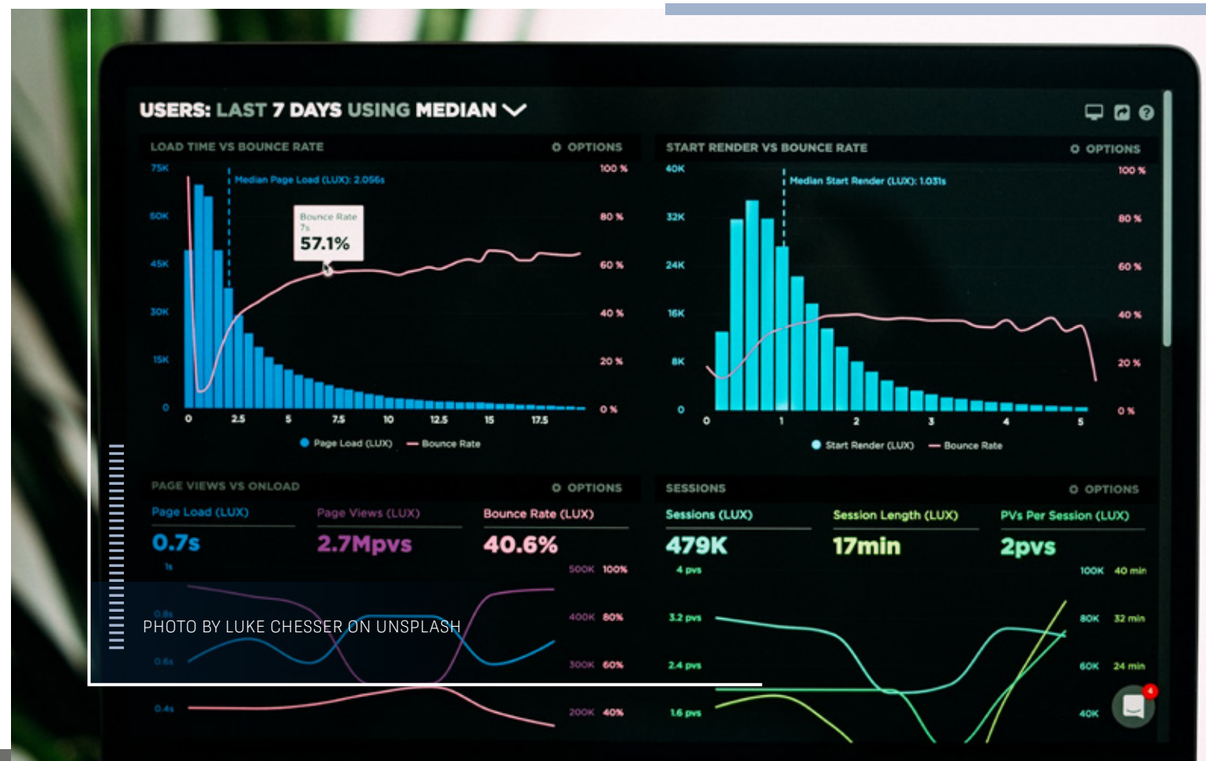


PHOTO BY LUKE CHESSER ON UNSPLASH

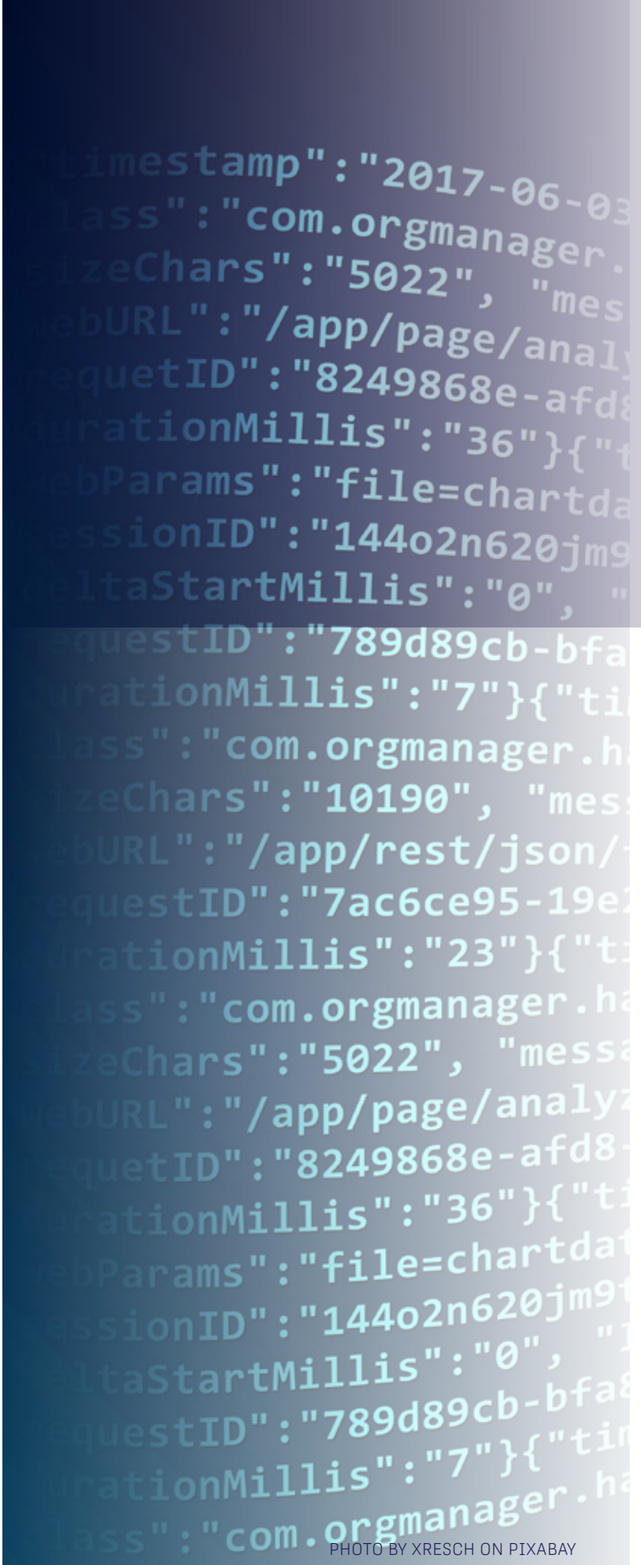


PHOTO BY XRESCH ON PIXABAY

> Once systems are in place, we need to know how to use them. Also, people have to check current databases before hitting the panic button. In a recent example, a base received an urgent call for a certain skill set to fill a task. The task was fairly straight forward and when the DND human resource software systems were consulted, the skill was readily apparent throughout the CAF, including at the requesting unit, that had failed to use the human resource software to determine who had the needed skill. Data analytics are useless if users, managers, or leaders do not know how to use the systems currently in place.

Steps to structure

So what is required when considering data analytics?

For a structured approach, literature on the topic typically lists the following steps:

1. Defining the objective
2. Getting the data and understanding the source
3. Preparing the data
4. Analyzing the data
5. Interpreting the results

To ensure an optimal and reliable outcome, we must keep in mind that each of these steps comes with built-in opportunities to miss the mark. For example, poor inputs will not yield good results. Likewise, an inability to organize data or interpret results will not result in good information for decision making.

First, it must be decided why we need the analysis, (e.g., what problem are we trying to solve, what do we want to achieve, and what are possible outcomes)? To avoid wasting time and resources, we need an appropriate, relevant, and realistic goal. For example, if our goal is to do preventive maintenance on vehicles, we need to forecast the lifecycle of various parts so these can be replaced before the vehicle breaks down and we have to wait for replacements. If we use incorrect or only select data, the result can be that we overestimate the durability of parts or when they will be required. We end up being reactive instead of preventive. And, if we underestimate durability by looking only at worst-case scenarios, we may replace good parts too soon, running up cost and wasting resources.

Second, we have to figure out what kind of information is required, and where to get it from. Are the data readily available, do we need to collect them ourselves, do we ask the IT staff to provide data, or can this task be outsourced? In other words: "Who has the data we need?"

To increase the validity of both data and outcomes, it may make sense to collect information from multiple sources—which may either confirm or contradict each other. For example, if we want to predict the personnel training required for a particular combat scenario, we may want to look at data from desert, urban, and jungle warfare operations. This not only gives us a range of possibilities, but also offers lessons learned from each environment.

Third, when it comes to preparing the data, you must ask yourself whether you need it to be cleaned (screened for quality) and normalized (eliminating redundancies). In terms of quality, there will be at least some information that is meaningless or cannot be interpreted. In terms of cleaning, data may be incomplete or contain duplicates or errors (e.g., spelling errors are particularly problematic). Normalization is the process of making data appear similar across all fields, to increase legibility and reliability.

Fourth, you will need to decide which tests to run on the data you have. Once you've completed the tests, the results may or may not make sense. This is where others in the organization may provide clarity or further direction. Maybe you ran the wrong test, or you're not sure what the test results mean. Your team members and supervisor may be of help in such situations.

Fifth, ask yourself: will senior officers understand the results and accept your interpretation of the data? And, what is the best way to present your findings? Handing your CO a fifty-page report full of fine print won't do. We need to avoid offering high volumes of raw data—what superiors are looking for is a summary that helps them make a decision. You have to do the grunt work, mindful of the old adage that a good writer works hard so the reader won't have to.

For convenience, speed, and visual appeal, experts suggest working with infographics whenever possible. If people want to know more, or feel that your interpretation may be off, they can always ask for substantiation. Good information focuses on the "why"—facilitating decision making and coming up with a plan.

Biases and risk

We must be aware—and wary—of the human factor. As with any technology, databases, spreadsheets, and artificial intelligence systems are only as good as the people who create and/or use them. First, there is no guarantee that the people operating systems and mining databases have been properly trained in selecting data that are representative and relevant, or trained in correctly interpreting the results.

Second, a factor that is difficult to overcome is our mindset as interpreters, as we all have our own filters, biases, and preconceived notions. We may not find the right source of data, we may misinterpret them, and bias can impact the process. Biases that we are not aware of—but that are hardwired into our brain—can lead to mistakes when we evaluate, judge, and decide.

Examples of bias include recency. A well-known statistic is that 90 percent of the world's data was created in the last few years. Reportedly, the amount of data in the world increases about 10 times every two years. One of the consequences is that, when you start mining, the volume of recent data will crowd out information from several years ago. This leads to over-valuing the short-term data at the expense of the longer-term view, and decisions may have too narrow a focus.

Another common type of bias is the propensity to maintain the status quo, which tends to happen in recruitment. Specific search terms, key phrases, and parameters that are entered into a system can generate false positives and false negatives. The result will be that the system identifies people who lack required skills or fails to identify people who do have the needed skills, which will pose a risk in mismatching people with employment. You want to identify people who are qualified and determine whether

additional training is needed to achieve the goal you have in mind. The role of bias may not be flagged until someone makes a decision based on your presentation and interpretation of data, and this decision turns out to be wrong.

A related problem is information overload: the sheer volume of data can overwhelm our own capacity for processing, and when we start culling for efficiency and ease of digestion, we may make the wrong call in using certain sets of data while disregarding others.

Business and military applications

For the military, data analytics can provide excellent insight into a range of factors that impact combat- and mission-readiness. Senior officers will have instant access to mission-critical information, which enables them to make solid decisions, from special skills of personnel to availability, location, and transportation of equipment. Practical application is key in military data collection, interpretation, and decision making.

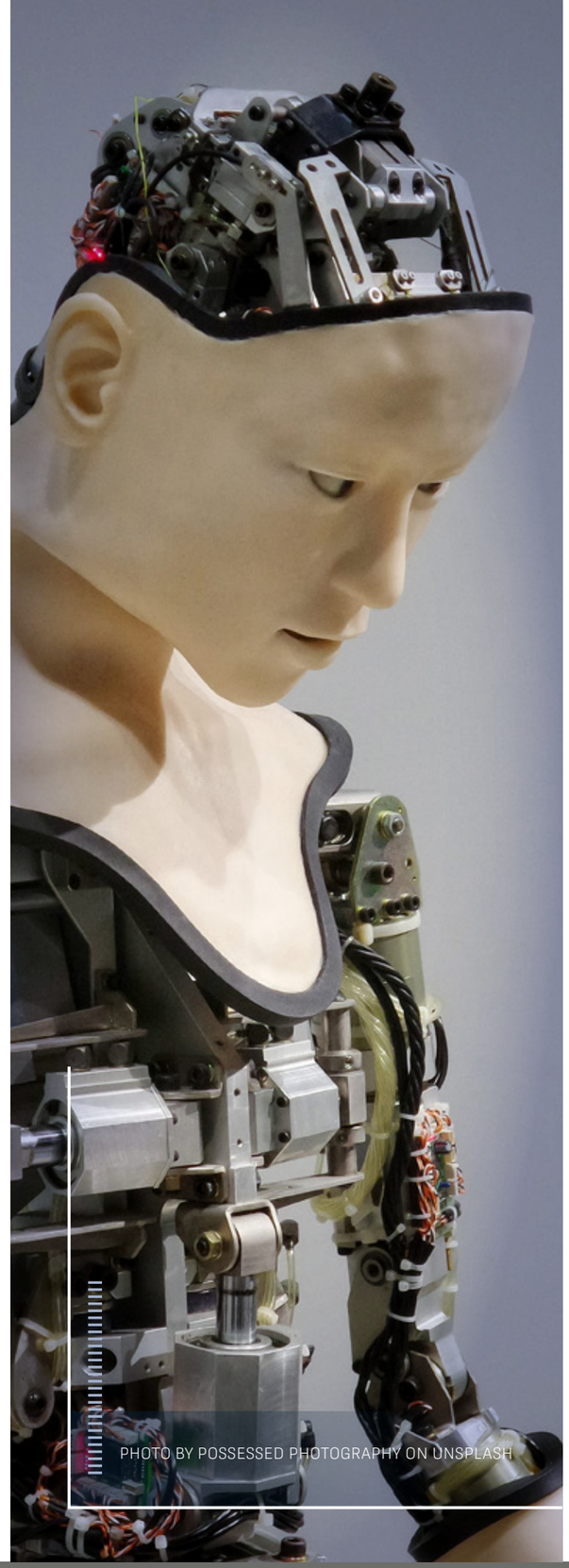
Keep in mind that even if we have access to the best systems and the latest information, the opportunity is wasted if we do not use them effectively. If you have systems in place, learn to use them or find someone who can. If you have databases available, mine them.

User-friendliness is also part of the equation. Many years ago, Apple nailed it when one of its Macintosh commercials asked what the most powerful computer in the world was. And it had nothing to do with bits and bytes. The answer was, "The most powerful computer is the one that people actually want to use." Ergo, the best databases and AI systems are the ones that are user-friendly and don't require endless amounts of training. This ties to the principle of simplicity in logistics.

Finally, when everything is in place and being used as intended, we can't let technology dictate outcomes—there will always be a need for common sense, dissenting opinions, and tactical pivots in the field.

[1] Feige, E. (14 February 2020). The Army Needs Full-stack Data Scientests and Analytics Translators. War on the Rocks. https://warontherocks.com/2020/02/the-army-needs-full-stack-data-scientists-and-analytics-translators/
[2] Lawton. G. (26 October 2020). 8 Types of Bias in Data Analysis and How to Avoid Them. https://searchbusinessanalytics.techtarget.com/feature/8-types-of-bias-in-data-analysis-and-how-to-avoid-them
[3] Olavsrud. T. (8 Feburary 2021). What is Data Analytics? Analyzing and Managing Data for Decisions. *CIO*. https://www.cio.com/article/3606151/what-is-data-analytics-analyzing-and-managing-data-for-decisions.html
[4] (30 June 2016). Five Critical Steps to Applying Data Analytics to Your Internal Audit Workflow. https://www.wolterskluwer.com/en/expert-insights/5-critical-steps-to-applying-data-analytics

Author Bio
Evert Akkerman is a founder and partner at XNL HR and Communications, a firm that specialises in human resources, recruiting, and executive coaching. He is based in the Greater Toronto Area.



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AUTOMATIC FOR THE PEOPLE – ARTIFICIAL INTELLIGENCE AND THE DEFENCE SUPPLY CHAIN

By Major Mark Henneberry, CD, B.A., B.Comm.

MAJ MARK HENNEBERRY ENROLLED IN THE CANADIAN Armed Forces as a Direct Entry Officer in 2000. Throughout his career he has worked in a variety of Transportation and Air Movements positions at the tactical, operational and headquarters levels. Additionally, he gained deployed experience as the OP CALUMET/Multinational Force and Observers Vehicle Fleet Manager (2011-12), Mobile Air Movements Section Officer Det Comd for OP BOX TOP (2015) and EX RIMPAC (2016), and OP IMPACT J4 Movements (2017). In 2019 he was posted into his current position as Officer Commanding, Transportation and Electrical and Mechanical Engineering Flight under the 14 Mission Support Squadron. Major Henneberry holds a Bachelor of Arts from Mount Allison University (1998) and a Bachelor of Commerce from Saint Mary's University (2006).

AIM

This paper will present the need for investment in AI technology within the supply chain system of the Canadian Armed Forces (CAF), including the potential benefits and the risks of being left behind in our ability to cross-share with our allied partners who have already begun investing in this area.

INTRODUCTION

When John McCarthy first coined the term Artificial Intelligence (AI) in 1956, the modern computer age was still in its infancy. He and other theorists (Bush 1945 and Turing 1950), envisioned a future where thinking machines would have the potential to integrate and influence many aspects of daily life. Consider that only twelve years earlier, the grandfather of digital computers, the Electronic Numerical Integrator and Calculator (ENIAC), was built, measuring an enormous 20' by 40' and comprising 18,000 vacuum

tubes. Even though their visions were revolutionary for the times, the available technology was severely limited by processing power, infrastructure and cost, and was primarily focused in areas of algorithms and mathematics.

Fast forward to 2021, computers have become exponentially more powerful, smaller and affordable, and the AI dream is close to realization. Evolving from mathematics and computer science origins, AI is increasingly being adopted across all industries and becoming a critical factor for companies wanting to maintain competitiveness. Over the past 15 years many of the leading global companies that leverage a supply chain system (e.g. Walmart, Amazon etc.) have adopted, and in many cases developed, their own AI technology in order to better manage their supply chains. The U.S. military is increasingly investing in AI and has included it as part of the National Defense Strategy, defining AI as the ability of machines to perform tasks that normally require human intelligence, such as recognizing patterns, learning from experience, drawing conclusions, making predictions or taking an action.[1] The potential exists for diverse applications within the defence supply chain and, as a result, some of our allied partners have already begun trialing and integrating such technologies into their supply chains. The CAF has the potential to significantly benefit domestically and operationally by adopting AI technology in order to improve interoperability with our allies. A failure to realize the unlimited potential that AI can offer threatens to put CAF at a strategic disadvantage in the coming years.

DISCUSSION

The CAF supply chain system is in a state of transformation. The implementation of the Modernization & Integration of Sustainment and Logistics (MISL) aims to integrate the functionality of stand-alone logistics systems including; National Material Distribution System (NMDS), Fleet Management System (FMS), Ammunition Information Management System (AIMS), and Defence Customs and Brokerage System (DCBS). It will also enhance current Defence Resource Management Information System (DRMIS) functionalities by transforming them into a robust, integrated SAP Enterprise Resource Planning (ERP) System for Warehousing and Distribution (W&D) within the Defence Supply Chain (DSC).2 The amalgamation of these separate products into a single platform is long overdue and the benefit of being able to track freight in real time, customize dashboards and share information based on user requirements, promises to reduce data entry and processing times. Despite the numerous positive outcomes MISL is sure to bring, there are limitations to what the project can deliver now and into the future. According to Moore's Law computing power doubles every two years. Taking into consideration the number of years it has taken to develop and roll out MISL, it is entirely possible that as it goes live, its technology will already be obsolete.

Supply Chain Evolution & The Internet Of Things (IoT)

To get a sense of where the future of supply chain management lies, one needs only to look at what technologies corporations are investing in today in order to maintain a competitive edge, attract customers and sustain growth and profitability. In many cases they are aggressively funding their own AI research and development (R&D) programs and patenting innovations, covering everything from improving the customer experience, to making their supply chain uber efficient. One of the greatest enablers has been the continual improvement of Internet technology and the parallel development of smart devices and sensors, coined as the Internet of Things (IoT) by Kevin Ashton while he was working in supply chain optimization for Proctor & Gamble in 1999. This is a network of physical objects -"things"- that are embedded with sensors, software, and other technologies for the purpose of connecting and exchanging data with other devices and systems over the Internet. These devices range from ordinary household objects to sophisticated industrial tools. Experts are expecting the number of such devices to reach 10 billion by this year and 22 billion by 2025.[3]

A global leader in brick-and-mortar stores, ecommerce and supply chain management, Walmart has fully embraced AI integrated IoT technology. It was an early adopter of Radio-Frequency Identification (RFID) to track stock and now has a tech incubator store in Silicon Valley to foster, commit resources to, and work with different new businesses, financial investors and academics to build up its own exclusive robotics, virtual and augmented reality, machine learning and artificial intelligence technologies. To date, Walmart has recorded approximately 1,500 patents for everything from a smart shopping cart that identifies a customer's pulse rate, to a temperature-controlled delivery vehicle.[4] The possibilities for integration of these types of technologies within the DSC are almost endless. While it has little need for such an extensivet investment in R&D of AI/IoT technology as Walmart, one of the capabilities that MISL promises to deliver is RFID that will be able to track freight in real time as it is dispatched from and received at a location and provide a more accurate picture of stock-on-hand. The ability to track freight as it moves in real time between locations may be offered in future upgrades, however, it is currently limited by the lack of IoT infrastructure within CAF warehouses and in-transit tracking of those fleet vehicles that are used on the National Freight Run (NFR), among others.

AI IoT technology presently exists to provide an item with an RFID tag and embedded sensors that can be tracked from the moment of purchase from the supplier, and provide full in-transit and warehouse visibility, lifecycle usage and disposal. Additionally, embedded AI/IoT technology can trigger an automatic replenishment from the supplier as an item is consumed, or is identified as defective, with minimal human intervention. The technology is not currently at a point where sensors are able to be widely used across a spectrum of products, however, critical items like equipment spares, medical supplies and ammunition offer some of the greatest potential to benefit from this technology as it evolves and becomes mainstream. Recently, Walmart launched Pick-up Towers in select stores that are strategically placed near the queue that processes online orders. Customers can simply scan a barcode tag on their online receipt and within 45 seconds the items they purchased will show up on a conveyor belt.[5] Imagine this in the DSC setting: an order is processed through MISL that generates a receipt, the user then goes to the parts counter, or clothing stores, scans the receipt, and the part is automatically delivered to them without any other interaction. There would have to be redundancies built-in to resolve any issues, perhaps having a local or remote help desk available in the event of an error with the order.

> The Defense Logistics Agency (U.S. DoD) is working with industry to 3D print hard-to-source parts and is also experimenting with printed food.

AI/IoT Invades the Sustainment Battlespace

With the growth of emerging and rapid evolution of existing technologies, there are significant efforts underway across all industries to capitalize on the now and invest in the future. One area of noted interest is Additive Layered Manufacturing (ALM). The Defense Logistics Agency (U.S. DoD) is working with industry to 3D print hard-to-source parts and is also experimenting with printed food. Printed human organs are finding their way into the medical field.[6] As more potential is harnessed from AI and IoT technologies, it is easy to imagine a fully integrated supply chain where systems are able to perform self-diagnostics, emerging failures can be detected prior to systems and equipment degrading, and systems can identify required parts, organs etc. as soon as failures appear. If articles can be produced through ALM rather than waiting for non-stocked items to be ordered and delivered, the potential exists for significant reductions in downtime and the overall amount of inventory that needs to be managed.[7]

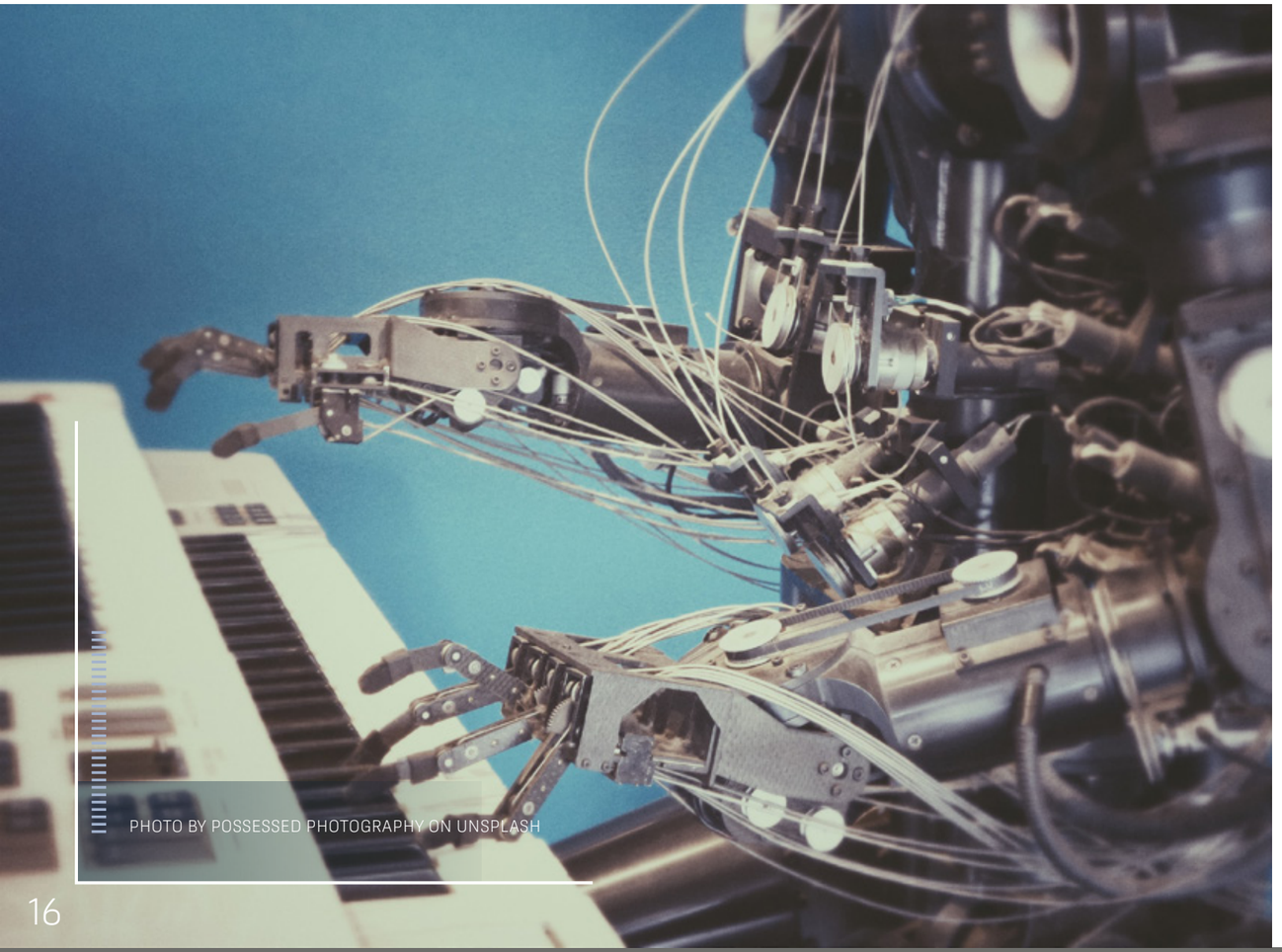
In addition to ALM, advances have been made with AI-integrated autonomous vehicle systems. The United States Army has been researching the feasibility of autonomous logistics vehicles for a number of years under the Autonomous Ground Resupply Program (AGRP). The Expedient Leader-Follower (ExLF) concept is based on a crewed lead vehicle with virtually tethered unoccupied vehicles in tow. The technology can be retrofitted into existing vehicles, eliminating the need for new platforms and helping to reduce overall costs, with the ultimate goal of reducing the number of casualties associated with ground resupply missions.[8] From the reduced numbers of drivers required to operate vehicles, to delivering smaller amounts of raw materials to be used in ALM compared to large amounts of equipment spares, once fully realized, both ALM and AGRP will be game changers for the DSC both at home and in a theatre of operations.

CHALLENGES

There are a number of challenges with adopting any new technology; while the following list is not comprehensive, it does cover some of the most significant hurdles with implementation and maintenance.

Cyber

Cyber-attacks are increasingly becoming the weapon of choice of non-state actors and belligerent forces. For instance, without robust cyber security covering networks, technical files and hardware; hacks will occur and disable systems, and internal flaws can be inserted into ALM printed parts that are difficult to detect. These structural flaws have the ability to degrade weapons systems and create equipment and even personnel casualties. Therefore, program managers must implement risk assessment and mitigation strategies to counter these cyber vulnerabilities before fielding ALM.[9]



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Financial

New technology comes at a cocst premium. To date billions have been invested in R&D to create and integrate AI technology into SCM systems. Costs will continue to increase with the rapid pace of growth in emerging tech, but will stabilize over time as production costs decline. Savings for the CAF might be realized through partnerships with our allies already investing in these areas. The CAF has extensive experience with unpredictable funding and any commitment to implementing this technology will require long term buy-in from stakeholders at all levels.

Training

Training for new technology is often initially delivered by the manufacturer and continues to be offered by them through contracting, outsourced to our allies who have an existing program, or absorbed by CAF training institutions. It will have to be determined if one or a combination of these methods are to be used and appropriate internal resources will need to be dedicated.

CONCLUSION

The development and implementation of AI-enabled technology within the supply chain is evolving at a rapid pace. While MISL provides a much needed modernization of several components within the DSC, it falls short in compatibility with emerging AI technology in several areas. There is also an inherent risk with compliance and allowing this enterprise to stagnate without continued predictable investment in training, funding and technological upgrades. A world of possibility now exists and our most important ally (U.S.) is actively researching and trialing AI technology that promises to offer efficiencies that will significantly reduce the amount of supply chain resources required in the battlespace. The CAF has the opportunity to profit from the potential that AI offers now and share in the future of its application within DSC. Hesitancy in adopting it will only increase the likelihood of obsolescence of our current systems and interoperability challenges with our allies.

[1] Lockheed Martin, "How Artificial Intelligence Will Transform the Future Battlespace," last accessed 15 November 2020, https://www.lockheedmartin.com/en-us/news/features/2020/how-artificial-intelligence-will-transform-the-future-battlespace.html

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Interview with Susan Walsh

of The Classification Guru, a data organization company

Susan is Founder and Managing Director of The Classification Guru ltd, a specialist data classification, taxonomy customisation and data cleansing consultancy. She is an industry thought leader, TEDx speaker and author of the soon-to-be-published 'Between the Spreadsheets: Classifying and Fixing Dirty Data'. She's also the founder of COAT.

She has developed a methodology to accurately and efficiently classify, cleanse and check data for errors which will help prevent costly mistakes. This could save days of laborious cleansing and classifying and can help your business find cost savings through spend and time management - supporting better, more informed business decisions.

Susan brings clarity and accuracy to data and procurement; helps teams work more effectively and efficiently; and cuts through the jargon to address the issues of dirty data and its consequences in an entertaining and engaging way.

Can you tell us a bit about your background and how you got involved with the data industry and what role you and your firm currently play in it?

My first job was as a paint merchandiser, travelling all over Scotland. Then it was print sales, telesales, and a move into account and then national account management roles. But I realised I was doing what I thought I should be doing rather than what I wanted to do, but I didn't know at that stage what I wanted to do, so I decided to set up my first business and open a ladies clothing shop!

Unfortunately it didn't work out, and by the time I was making headway I was basically broke. I had to shut and go bankrupt. I was so broke from the shop I actually had to save up to go bankrupt - I couldn't afford it!

And so I needed a job, and one quickly. I ended up getting a data classification job through an online ad, I'd never done it in my life, but I thought 'hey, I can give this a go' and I found took to it really quickly. I was fast and accurate, and more than that I really loved it.

The classification role eventually became full-time, and as their business grew, I recruited a team and trained and managed them, along with project workloads. I was there for 5 years and after all that time I found myself looking for something more. That's when I decided to set up my own business so I could keep doing what I loved and here I am - The Classification Guru!

And it's paying off, there's a huge need for spend data classification, supplier normalisation and data cleansing services. The difference with The Classification Guru is that my team and I do not use any software to cleanse the data, we do it by eye, which in reality doesn't take much longer than automation, as that still needs to be checked.
The difference with us, is that we really get to know your data, we can tell you things about your organisation that you'll never find from software. Like a client that has "fruity Fridays" for their staff, or the people entering addresses into systems that are missing key information.

One of the biggest issues organizations often see is determining the relationship between data and information and then deciding what is needed for decision making. In your line of work, what problems do you often see customers having between collecting data to making decisions with the information derived from that data?

The biggest issue I see is that the data is collected without an end objective in mind. This can mean the wrong information is collected, for example do you need the age of customer, or the longitude and latitude of a client's address? There can end up being too much of the wrong information that drowns out the good information. Or worse, the right information is not collected at all, for example product dimensions and then it's time to get the ruler out!

And even when it is collected, it can be messy, disorganised and hard to interpret without a huge investment in time of in cleaning and categorising it. Start with the end in mind, and involve as as many people from different areas of the organisation as possible. You never know what you might be missing.

Accuracy in data affects how decisions are ultimately made. What are some of the problems you see with data accuracy and how can organizations address these issues?

Where to start! A lot of issues I see are at the point of data entry. It could be a finance person assigning the wrong GL or categorisation to a supplier, or a sales or marketing person entering the wrong information about a prospect into their CRM, or even someone setting up the wrong product information, which in turn could affect the supply chain...

But it's not just that alone, without maintenance of the data it becomes redundant very quickly. There can be accidental deletions, cut and paste errors, or someone might have a different opinion and change the data. And if it's not maintained then it stays forever incorrect. That's why it's so important to regularly spot check and update your data to minimise these errors.

Some of the services your organization provides include supplier normalisation, taxonomy customization, and data cleansing. Can you tell us a bit about how these work and why they are beneficial?

Of course, firstly my main specialism is spend data classification. This is generally assigning a 3 or 4 level taxonomy that is applied to the data. For example, Level 1 might be IT, Level 2 Hardware and Level 3 Laptop. This means that procurement can get a true picture of what they are buying, where and at what price, which means better negotiations and better business decisions.

And this principle can be applied to supply chain too, as well as many other areas. You might want to track usage of different types of containers, track if deliveries are on time etc.. I've even categorised products for a retailer website, so the principles can be applied to virtually anything.

But before I can do that, I normalise suppliers. Quite often I see IBM, I.B.M, IBM Inc, or IBM limited, and so I normalise them all to IBM. Why? Well from a procurement perspective you get a true picture of how much you're actually spending with one supplier, from a supply chain perspective it could be how many suppliers are you actually using for services etc...

And if a client has a need for classification of their data that is specific to them, I can build a customised taxonomy so they get exactly the classification they need to report and analyse what they are doing.

An example of classification

Supplier Name	Normalised Supplier	Description	Total	Date	Month	Level 1	Level 2	Level 3
I.B.M.	IBM	Server	£ 16,859.00	21/03/2019	Mar	IT	Hardware	Servers
I.B.M. Inc	IBM	Monitors	£ 2,356.00	05/05/2019	May	IT	Hardware	Monitors
IBM Ltd	IBM	Mouse	£ 150.00	06/05/2019	May	IT	Hardware	Peripherals
P.W.C	PWC	Services 01/01-01/03	£ 75,000.00	01/04/2019	Apr	Professional Services	Consulting	Management Consulting
PWC	PWC	Services 01/06-01/07	£ 36,000.00	01/08/2019	Aug	Professional Services	Consulting	Management Consulting
Price Waterhouse Cooper	PWC	Services 01/03-01/05	£ 45,000.00	01/06/2019	Jun	Professional Services	Consulting	Management Consulting
PriceWaterhouse Coopers	PWC	As per SoW	£ 150,000.00	15/09/2019	Sep	Professional Services	Consulting	Management Consulting
PWC Inc	PWC	Consultancy	£ 26,400.00	15/04/2019	Apr	Professional Services	Consulting	Management Consulting
PriceWaterhouse Coopers Ltd	PWC	Consultancy	£ 5,600.00	22/07/2019	Jul	Professional Services	Consulting	Management Consulting
Staples	STAPLES	Pens	£ 45.96	01/06/2019	Jun	Facilities	Office Supplies	Writing instruments
Staples Inc	STAPLES	Stapler	£ 25.36	15/09/2019	Sep	Facilities	Office Supplies	Staplers & Staples
Staples	STAPLES	Office Supplies	£ 486.21	05/05/2019	May	Facilities	Office Supplies	
Staples	STAPLES	Paper	£ 350.51	04/03/2019	Mar	Facilities	Office Supplies	Paper
Staples	STAPLES	Coffee	£ 36.23	15/02/2019	Feb	Facilities	Catering supplies	Coffee
E.On	EON	Gas	£ 12,506.00	30/06/2019	Jun	Utilities	Gas	
Eon	EON	Electricity	£ 10,494.00	01/07/2019	Jul	Utilities	Electricity	
Eon	EON	Charges 01.01-31..03	£ 5,450.00	01/04/2019	Apr	Utilities		
Ryman	RYMAN	Paper	£ 750.12	05/05/2019	May	Facilities	Office Supplies	Paper
Ryman	RYMAN	Pens	£ 84.56	04/03/2019	Mar	Facilities	Office Supplies	Writing instruments
Ryman	RYMAN	Paper	£ 250.00	07/07/2019	Jul	Facilities	Office Supplies	Paper
Office Depot	OFFICE DEPOT	Pens	£ 5.95	24/01/2019	Jan	Facilities	Office Supplies	Writing instruments
Office Depot	OFFICE DEPOT	Paper	£ 175.89	23/06/2019	Jun	Facilities	Office Supplies	Paper

You have spent a number of years working with data in artificial intelligence (AI) systems and machine learning. What are some of the misconceptions surrounding AI and data?

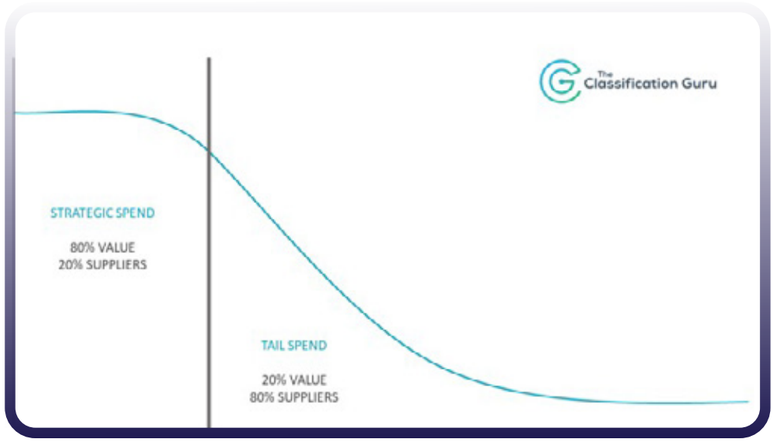
It's more like I've skirted around it, the main reason being it's not up to the level it needs to be when it comes to spend data classification, so I think it's better to do it manually and semi-automate.

And that's the biggest misconception for me, that the AI is doing all of it. In most cases it's simply not true, you need a mix of human and machine to get the task done, and done properly.

On your blog, you speak to "tail spend". For many of our readers, this is likely a new concept. What is tail spend and how does it relate to logistics operations?

The definition of tail spend is subjective. Some organisations class tail spend as the bottom 20% of spend, while others might set a financial level such as £100k or £1million, but it's basically what an organisation would class as low value and often seen as not important.

According to CIPS in the UK, tail spend "can often be referred to as rogue spend or maverick spend, is usually small value purchases that are conducted by the organisations outside of a contract and often outside of the awareness of the procurement team."



The best way to really explain it is to visualise it, mainly because it actually looks like a tail...

I find there are actually lots of opportunities in the tail spend for cost savings, but it's a laborious job as it can be thousands of rows of data, and no one wants to do it. Except me...

Are there any tips, tricks, or lessons learned you can provide that can help logistics people use data effectively?

Absolutely, the more you use/look at your data, the less intimidating it becomes. And you'll find it actually makes your job easier if you look at it regularly, because it makes it easier to spot errors faster, or flag unusual activity.

Think about how you might be able to group and categorise your data together, by depot, supplier, product, country etc.. that means you'll be able to have better data and make better decisions.

Finally, make sure your data has its COAT on:

It's Consistent – Generally data is used by many people or teams, which can lead to multiple classifications of one product. For example, one person might put DHL as a 'courier', while another might log it as 'logistics' or 'warehousing', or it could even be something like units of measurement. One person may use 'Litre', another 'Ltr' and another 'L' – but these should all be one format. This means everything can be reported accurately, you get a true picture of what's going on and better business decisions can be made.

It's Organised – Data is only useful if it's organised. Think of a messy closet, you're looking for your favourite top but can't find it as everything has been thrown in there. And, much like your closest, you can organise your data in different ways, depending on what you want to get out of it and that will produce different reports/ analytics. You may want to assign data to employees, teams, departments, functions or internal categories, as well as time periods such as months and quarters, or year groups like P1, P2 etc... So, for example, when you need the information on the accounts that Sharon in Finance is working on, or the sales teams' performance for the quarter - you can pull that information quickly.

It's Accurate – This can mean different things to different people. At its most basic level, accurate data is correct. In more detail, this could be no duplicate information; correct invoice descriptions; correct classifications; no missing product codes; standard units of measure (e.g. ltr, l, litres); no currency issues; correctly spelled vendors; fully classified data; or the right data in the right columns.

It's Trustworthy – This is critical. Business decisions around jobs, staffing, budgets, cost savings and more are all based on data. Data is used by everyone from the bottom to the top of an organisation. You have to be able to trust that what you're looking at is the right information, and you need it to be accurate in order for your teams to use the data in their daily jobs.

And if all else fails... call in the Guru.

The Classification Guru

PHOTO BY KARSTEN WINEGEART ON UNSPLASH

"SCIENCE OF SUBTERRANEAN STEALTH"

CFB logistics article – by Ted Barris

UNTIL OCT. 27, 1941, LOGISTICS FOR P/O WALLY FLOODY meant fighter tactics, estimating enemy strength, and calculating fuel range of his WWII Spitfire Mk V. That day, when he was shot down by Bf 109s during a Fighter Command sweep over Dunkirk, however, everything changed. Captured, interrogated, assigned a *Kriegsgefangenen* (POW) card and assigned to a barracks hut at Stalag Luft I, prisoner-of-war Floody revealed to the senior British officer in the prison camp that he'd worked in northern Ontario gold mines for his college tuition.

"If you'd worked in a mine," said Floody, from Chatham, Ont., "the Englishmen figured you had to be an engineer ... and you knew a lot about tunnelling."

For most of the next four years, *kriegie* Floody was pegged as "the tunnel king" imprisoned in German air force *(Luftwaffe)* POW camps – first at Stalag Luft I, near Barth, Germany, then in 1943 at Stalag Luft III, the famous Great Escape camp in Poland. He came to know how to transform barracks utensils into illegal tunnel-digging tools, how deep to dig before you hit water, how much sand could be excavated in a day by each tunneller, how many procured bunkbed boards it took to shore up sand per foot of tunnel, and – perhaps the most important logistical concern of all – how to do it all secretly under the noses of Luftwaffe guards.

Initially, tunnelling out of a prison camp was trial-and-error science. Aircrew POWs learned to dig fake tunnels (to be discovered) which camouflaged deeper actual escape tunnels. They learned to dig deep enough that they were out of the range of the camp's buried microphones, but shallow enough to build and hide air holes, so tunnellers didn't resurface vomiting or blacking out for lack of oxygen. They hid excavated dirt inside walls, ceilings and Red Cross boxes. At their first camp, Luft I, the Canadian and

other Commonwealth POWs dug forty-eight tunnels. The Germans found every one and thwarted every escape. Forgery specialist P/O Tony Pengelly, from Truro, N.S., explained they kept failing because no one *kriegie* could fashion his own digging tools, dig his own tunnel and forge his own identity papers.

"From our futility," he said, "we knew we had to organize to be successful." In other words, if they capitalized on each man's capability, built a foolproof security system – used teamwork – they'd more likely manufacture a successful escape.

Every logistical challenge and every logistical solution presented itself when Luftwaffe guards dumped 1,500 Commonwealth airmen into the North Compound of Stalag Luft III, the Germans' "inescapable" POW camp, just outside Sagan, Poland. His first night inside Luft III, S/L Roger Bushell convened the escape committee section heads – tunnellers, tailors, forgers, diversion, sand-dispersal and security section heads. He proposed not one, not two, but three tunnels dug simultaneously to deliver not a handful, but 200 or more POW officers outside the wire in one mass breakout.

"Now you're talking!" Floody told Bushell. "I started tunnelling in 1941, but by the time we got to [Stalag Luft III] we were expert at it."

That meeting happened April 1, 1943. During nearly a year that followed, a population of several thousand trained Commonwealth military pilots, navigators, flight engineers, bomb-aimers, wireless radio operators and gunners improvised with whatever was available inside a POW camp, invented primitive technology, and used brute strength and stealth to create the world's most famous wartime breakout - The Great Escape – on March 24/25, 1944.

Besides the sophisticated system of excavating and making sand disappear around the compound, the recurring problem of keeping tunnellers safe and functioning underground was resolved when engineer F/O Bob Nelson fashioned a ventilation system. "The air pump consisted of two canvas kit-bags attached to a central wooden valve box," Nelson said. "A reciprocating movement of a wooden frame caused one bag to be compressed in a delivery stroke, while the other expanded in a suction stroke." A suction pipeline made from Klim (powdered milk) cans soldered together ran up the shaft to a fresh-air supply, and the delivery pipeline, or air duct, was then laid along the floor of the tunnel as it was dug. Fresh air was always available for the tunnelling crew, and for escapers throughout the night of the escape.

In eleven months of tunnelling, they'd removed and dispersed several hundred tons of sand from three tunnels. Scrounging from every corner of the compound, they'd incorporated 4,000 bed boards, 90 double bunk beds, 1,212 bed bolsters, 1,370 battens, 1,699 blankets, 161 pillow cases, 635 mattresses, 192 bed covers, 3,424 towels, 76 benches, 52 twenty-man tables, 10 single tables, 34 chairs, 30 shovels, 246 water cans, 1,219 knives, 582 forks, 478 spoons, 1,000 feet of electric wire, 600 feet of rope, and 69 lamps into tunnels "Tom," "Dick" and "Harry." "Harry" covered 336 feet (over 400 including two vertical shafts) and expedited the escape of 80 men.

Three *kriegies* completed "the home run" getting back to England, 77 were recaptured, and of them 50 murdered by the Gestapo.

Was it worth the tragic loss? For the human life, no. For the hope – a shot at freedom – it gave thousands of imprisoned airmen, and for the historic legacy of barebones innovation and ingenuity, achieving what seemed the impossible, yes.

Ted Barris is author of *The Great Escape: The Untold Story,* published in paperback by Dundurn.

PHOTO BY HENRY HUSTAVA ON UNSPLASH

The Principles of Sustainment, Sustained:
A Case Study of the Norman Invasion of 1066

By Major Michael Feiner

MAJOR FEINER JOINED THE CANADIAN ARMED Forces in 2010 as an Army Logistics Officer. He has enjoyed postings to Shilo, Edmonton and Calgary and deployments to Afghanistan (OP ATTENTION) and Iraq (OP IMPACT). He holds a Master's degree in history from Western University (2008) and maintains an amateur interest in history and art. Major Feiner is employed as the 41 CBG G4 in Calgary, AB, where he lives with his wife and two young children. He is an avid runner and fitness enthusiast, and in his free time enjoys current events, history and comic books!

AIM

This paper will illustrate that the principles of sustainment should be incorporated into operational planning.

INTRODUCTION

The study of doctrine is an oft dry and mind-numbing affair. Eyes glaze over and grow bleary as lists of "fundamentals" and "principles" are duly read and committed to memory. Doctrine, however, is of vital importance to the profession of arms, as its application contributes to the successful planning and conduct of military operations. [1]Indeed, history is rife with instances of successful, doctrinally sound, operations. One example of note, the amphibious operation[2] which initiated the Norman Conquest of 1066, serves as the case study for this paper.

Principles are defined as "a fundamental truth or proposition that serves as the foundation for a system of beliefs or behavior or for a chain of reasoning."[3] This paper will utilize the Norman invasion of 1066 as an example to demonstrate that the principles of sustainment are valid as guiding tenants for the planning and conduct of operations. The reader will first be introduced to the scale and scope of the amphibious invasion. This will be followed by an account of how the planning, preparation and conduct of the operation adhered to the principles of foresight, survivability, economy and simplicity. Lastly, a direct correlation will be drawn between the logistical successes of the crossing, to William's decisive victory at Hastings, which led to the Norman Conquest of England.

DISCUSSION

Medieval warfare is often thought of in highly dramatic terms: Set piece battles, one-on-one combat and knightly vows. However, behind all these romantic trappings, well organized logistical support was a major factor in victories. Just as in the present day, medieval armies required reliable, well thought out sustainment in order to be successful.[4] This requirement is perhaps most pronounced when considering the medieval knight.

While including a variety of foot soldiers, the Norman's primary force was cavalry. Outfitted with heavy horse, hauberk, sword and helmet, they required particularly high upkeep: grooms to care for the horses, squires to assist the knights, food for rider and horse alike, and so on, and so on.[5] Such sustainment challenges were only amplified when these behemoths were amassed in high numbers, as they were in the fall of 1066.

William the Conquer's crossing of the English Channel on the night of 27 September 1066, was a massive logistical feat for the time. Contemporary sources place the size of the fleet at between 696 and 3,000 ships, 2,000-3,000 horses, and somewhere between 5,000 and 12,000 soldiers. The operation itself, inclusive of embarkation, 70 kilometer crossing and disembarkation, was likely to have taken no more than 26 hours. The significance of this accomplishment is further amplified by the fact that this was the first large scale military crossing of the English Channel in over 1,000 years, since Julius Caeser's campaigns of 54 BC.[6] This grand accomplishment was only possible due to the thorough application of the principles of sustainment. Of these principles, foresight was evident from the outset of William's planning, many months before the first ship set sail.

Foresight

Foresight is characterized by long term planning aligned with the commander's intent.[7] William's preparation for the invasion shows extensive planning. Gathering and equipping the army described above took over nine months. In spite of this extended timeframe, given the limitations imposed by medieval technology, this was still considered a highly rapid buildup of forces.[8] Furthermore, as William amassed and prepared his army, he concurrently went on a diplomatic offensive, gaining the support of the Papacy and most of Latin Christendom for his cause from the outset.[9]

Foresight also requires the capacity of a plan to respond to unexpected events.[10] William's invasion fleet was forced to stage at their point of embarkation for six weeks, waiting on favourable winds to carry them across the Channel.[11] The ability to maintain and support such a large force over an extended and ultimately indeterminate period demonstrates that the Conqueror's preparations were sufficient to meet unforeseen developments. While considerable foresight brought William's forces to the line of departure, it was through the application of another principle, survivability, which allowed them to cross the Channel successfully.

Survivability

Survivability is defined as "the capacity of the sustainment system to prevail in the face of potential or actual destruction."[12] A nighttime crossing of the English Channel in September, when it is notoriously prone to rough seas, certainly posed a potential threat to the survival of William's force.[13] However, due to the inclusion of survivability aspects in the planning and preparation of their fleet, it was a risk that the Normans were well prepared to meet head on.

While there is some debate as to the origin of William's fleet, with different historians attributing it as Byzantine, Flemish or Viking in origin, there is consensus that he utilized ships which were task-tailored to the difficult job of transporting horses across open water. Horses transported on a ship without proper ramps, stalls and other specific fittings were liable to be disabled in transit.[14] As such, the design of the Norman ships contributed to the successful deployment of their forces.

In addition to being custom made for horse transport, the fleet also utilized advanced Byzantine sailing techniques and navigation equipment, which allowed the Channel to be crossed safely at night. Such preparations mitigated the otherwise high likelihood that a nighttime crossing would have led to hundreds of ships being scattered and lost, forestalling the invasion. While crossing under the cover of darkness provided a stealthy approach, thus guarding against premature detection and potential counter-attack, the greatest benefit was adding considerable economy to the plan.[15]

Economy

Economy is defined as "providing the most efficient support to accomplish the mission."[16] Crossing the channel at night added significant efficiency to the Norman plan, as only a nighttime crossing allowed for the fleet to load, transit and unload without interruption, since this timetable coincided with high tide, an absolute necessity given the locations of the embarkation and disembarkation points. Where the actual operation took 26 hours, if the crossing had occurred during the day, an additional 24 hour delay would have been imposed.[17]

The specific embarkation and disembarkation points also increased the efficiency of the operation. The fleet used existing ports built in the Roman era for embarkation (Saint-Valery-sur-Somme) and disembarkation (Anderita). The invading army required only two and a half hours to embark (having pre-loaded most of their equipment previously), and an additional seven hours to disembark. When deprived of port facilities on other operations, the Normans were obliged to construct earthen ramps to facilitate the offloading of their horses and equipment, imposing considerable delay.[18] Utilizing built up ports was due to another aspect of William's plan, simplicity. In consideration of this principle we return to the design of the Norman ships.

Simplicity

Doctrine dictates that "a sound plan strives for simplicity" and that "Simple, yet flexible plans will withstand shock and have a much greater chance of success."[19] The design of William's ships met both of these criteria.

William's horse transports could carry twenty mounted horses. His cavalry was organized into units of 10 horses, modelled after the Byzantine imperial forces whom the Norman's had frequently served alongside as allies and mercenaries. As each transport could hold two fully formed units, they were able to disembark in a coherent fashion, ready for combat and follow-on operations.[20] While history records an unopposed landing, by being prepared to rapidly engage with the enemy, William was able to select a built-up location for his disembarkation, confidant in his ability to respond to a counter-attack. As noted above, the use of port facilities greatly enhanced the speed of the operation. The success of the Norman crossing, enabled by careful sustainment planning and preparation, paid huge dividends in the decisive battle of the invasion.

Hastings

On 8 September, as the Norman forces waited at Saint-Valery-sur-Somme for favourable winds to cross the Channel, the Anglo-Saxon army which had been assembled for their arrival was forced to disperse due to a lack of

provisions.[21] Compounding this setback, on 23 September, four days prior to the Norman landing, Harold II, King of England, successfully repulsed a significant Norwegian-led invasion of York, in the North of England, at the battle of Stamford Bridge.[22] Harold learned of the Norman invasion to the South on or about 1 October, requiring him to rapidly reconstitute his army. This reconstitution was a massive failure, as in the coming engagement Harold's army is estimated to have been at only thirty percent strength.[23] On 14 October, Harold's and William's forces met in battle at Hasting, some 400km South of Stamford Bridge. The Anglo Saxon army was defeated decisively and Harold was killed.[24] If William's forces had been delayed at any stage in the crossing operation; at sea due to mediocre ships, or on shore due to an improvised landing location, Harold's army would have had additional time to reconstitute and history may have changed.

CONCLUSION

William the Conqueror's invasion incorporated the principles of sustainment to great effect. The considerable foresight in William's long term plan enabled the survivability of the Norman fleet, allowing economy and simplicity to be achieved in the landing operation. This logistically sound plan left the Normans well positioned to exploit the vulnerability of their enemy as the campaign progressed to the decisive engagement at Hastings. While this episode in history reinforces the validity of the principles of sustainment, it also serves to emphasise the importance of sustainment planning overall. In short, it is crucial to have a supportable manoeuver plan, else the erstwhile commander share the fate of Harold Godwinson, the last Anglo-Saxon King of England.

[1] CFEC Joint Doctrine Branch, *The Canadian Forces Operational Plannng Process,* 2008.
[2] Directorate of Army Doctrine, 2008. *Land Operations.* Kingston: Army Publishing Office, 2008. An amphibious operation is defined as "a military operation launched from the seas by a naval and landing force embarked in ships or craft, with the principal purpose of projecting the landing force ashore tactically into an environment ranging from permissive to hostile. This particular operation was chosen both as it serves as both an intriguing historical example, and, as a joint operation it includes many of the same type of challenges that are faced in present day military operations.
[3] Stevenson, Angus and Lindberg, Christine. *New Oxford American Dictionary.* 3rd ed. Oxford; New York: Oxford University Press, 2011.
[4] Bradbury, Jim. *The Routledge companion* to medieval warfare. London; New York: Routledge, 2004.
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[8] Bachrach, 506.
[9] Brown, Allen R. "The Battle of Hastings." In Medieval Warfare 1000-1300, London: Routledge, 2006.
[10] Directorate of Army Doctrine 2015, 13.
[11] Brown, 150.
[12] Directorate of Army Doctrine 2015, 14.
[13] Bachrach, 515.
[14] Smith, Kelly DeVries and Douglas, Robert. *Medieval military technology.* Toronto: University of Toronto Press, 2012.
[15] Bachrach, 515.
[16] Directorate of Army Doctrine 2015, 13.
[17] Bachrach, 516.
[18] Ibid.
[19] Directorate of Army Doctrine 2015, 13.
[20] Bachrach, 516, 520.
[21] Brown 2006, 151.
[22] Garnett, George. *The Norma Conquest: A Very Short Introduction.* Oxford; New York: Oxford University Press, 2009.
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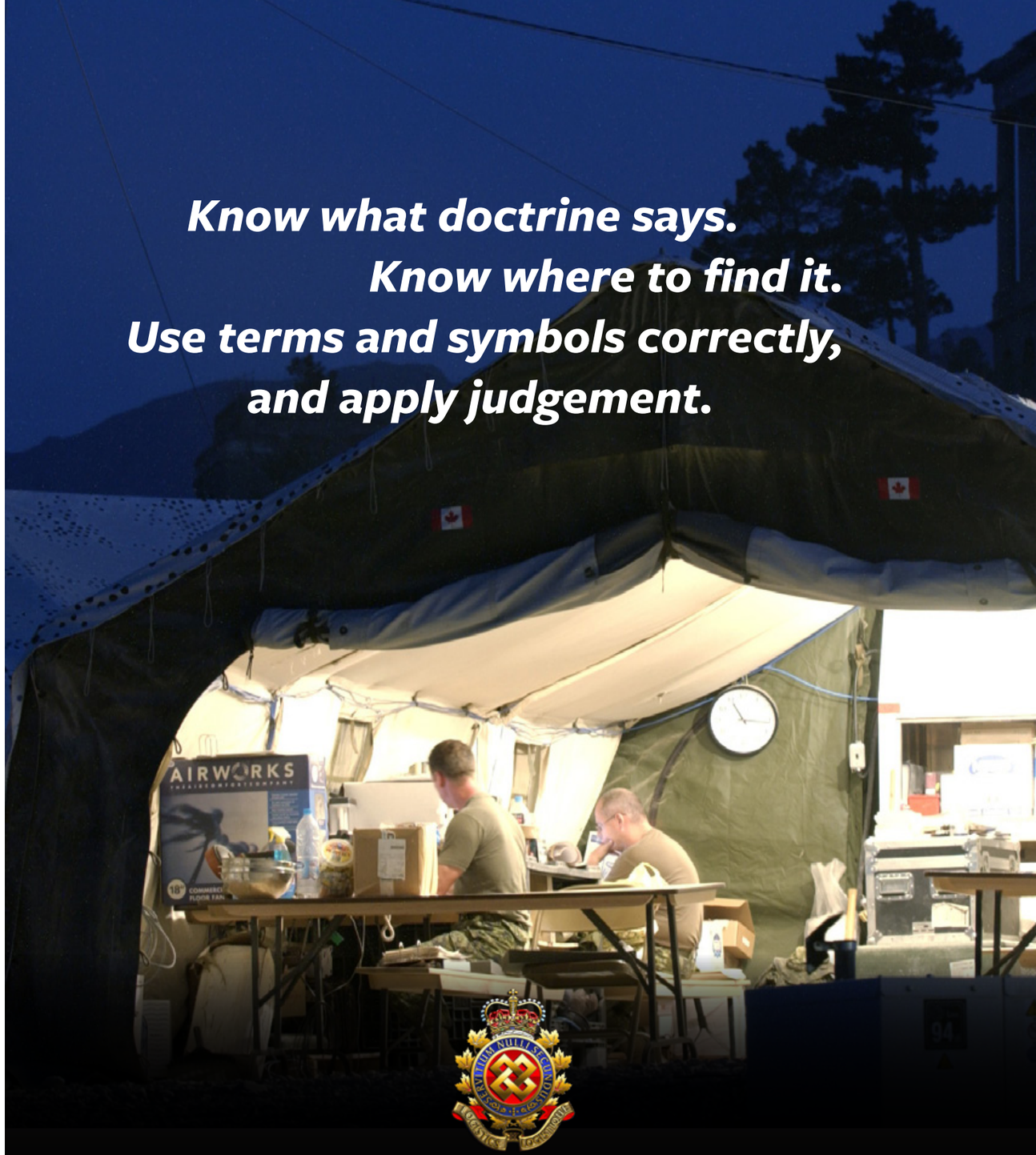
[24] Garnett, 2.



I'M A LOGISTICIAN!

THE NAVAL ESTABLISHMENT ON LAKE HURON:

Naval Supply and Provisioning in the Great Lakes

Taken from "Historic Naval & Military Establishments Management Planning Committee Report #1" January 1975. Reprinted with Permission.

WHEN THE FIRST EUROPEANS ARRIVED IN HURONIA during the early 1600's, they were visiting an area which archaeological research has shown to have had continuous human habitation for six thousand years. Despite this proven use-history for the area, no evidence of Indian occupation has been found on the Naval and Military Establishments' site. The active fur trade of the 18th and 19th centuries also almost totally by-passed this small acreage.

It was Lieutenant-Governor John Graves Simcoe who, in 1793, recognized Penetanguishene Bay's strategic naval importance and arranged for the area's purchase from the Ojibwa Indians. The long, narrow, steep-sided bay not only was admirably suited to host a naval dockyard for the Upper Lakes, but also with the development of an overland communication from York, could provide a safer internal supply line to the isolated post in the Mackinac Straits upon which British control of the fur-rich north-west depended.

Events of the War of 1812 created the necessity for development. First came the need to supply Michilimackinac using Yonge Street, a nine-mile portage, and a naval depot at the mouth of the Nottawasaga River. Then, in 1814, came the need to provide protected dockyard facilities on Lake Huron for shipbuilding and repair. Work began on cutting the Penetanguishene Road so that necessary stores could be transported and a small dockyard established. The activity at Penetanguishene quickly came to an end. The signing of the Treaty of Ghent, late in 1814, ended hostilities and the necessity for a large warship on Lake Huron.

There was still a need for a naval establishment on Lake Huron following the war; however, the most important requirement was to maintain supply routes on the Upper Lakes, particularly to the British post on Drummond Island, near Sault Ste-Marie. Although Penetanguishene was an excellent harbour, the Penetanguishene Road had only been roughly cut and there was no proper line of communication between Penetanguishene and Lake Simcoe. The Nottawasaga River was the developed route and for this reason, its depot remained the Naval Establishment on Lake Huron.

In 1817, the Rush-Bagot Agreement imposed restrictions on the number of armed commissioned vessels on the Lakes. These restrictions, however, did not preclude the maintenance of existing vessels in a state of readiness. Once again, the dockyard role for Penetanguishene became important. In 1817, the Nottawasaga depot was closed and Penetanguishene became the Naval Establishment on Lake Huron.

The period between 1817 and 1822 saw the most activity at the Naval Establishment: the largest complement of men, erection of all building and development of garden areas to provided fresh vegetables to a base ninety miles from the nearest supply depot.

> A responsible Canadian government, unwilling to spend money in its own defence, and a threatening European situation resulted in British troops being withdrawn from Canada and alternated in methods of manning these posts being sought.

In 1822, the activity that had keynoted the life of the Establishment for the previous five years was halted by a reduction of naval forces in Canada. Due to improved Anglo-American relations, the Navy Board decided to discharge many of the men and officers employed on foreign stations. Financial considerations were also involved in this decision. The upkeep of wooden vessels was costly. The expense could no longer be justified in light of new plans to strengthen Canada's land fortifications.

The 1822 reductions, however, did not mean an end to the Naval Establishments in Canada, merely a sharp decrease in activity. Penetanguishene's complement was reduced to a minimum number of men who continued to watch over the ships, the stores, and the buildings, but there was little new construction.

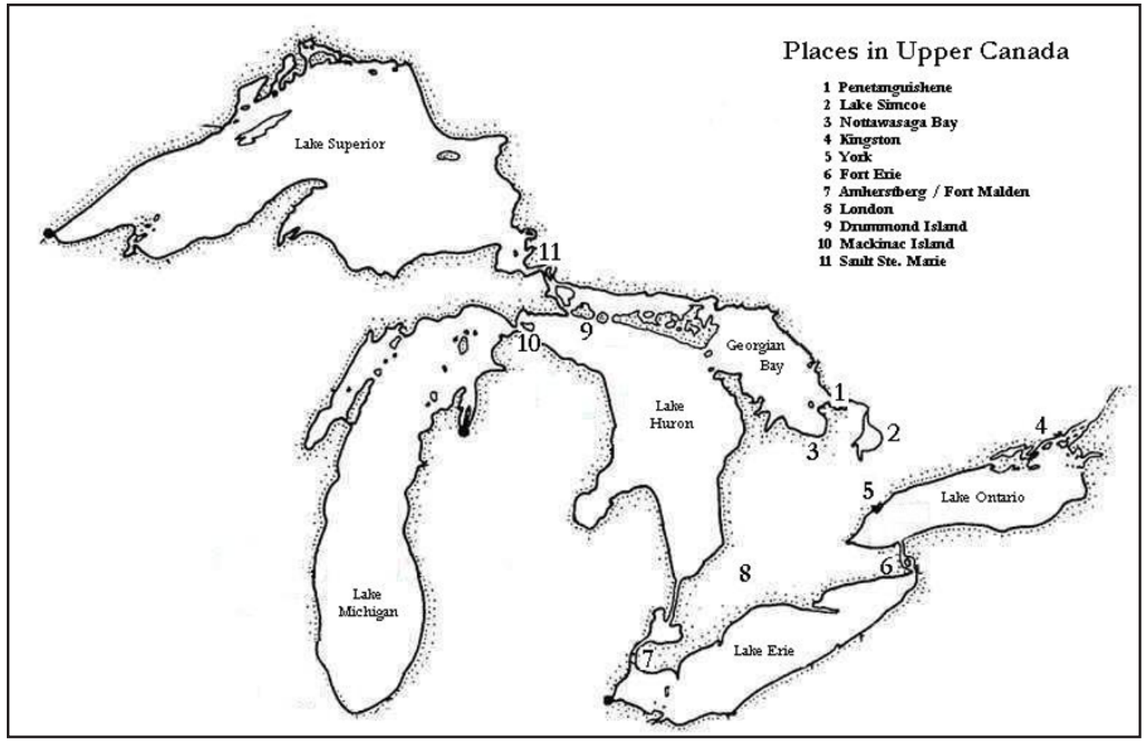
A final reduction of the naval forces in Canada occurred in 1834. The reason for naval establishments on the Great Lakes - preservation and repair of naval vessels - was no longer valid. Most of the ships, despite the care given them, were in an advanced state of decay and the extensive repairs would have been too costly.

The Welland Canal had removed the practical necessity for a standing fleet on the Upper Lakes and improved relations with the United States removed the strategic necessity. New steamships were more mobile than sailing vessels and could be chartered for less that the cost of repairs to the sailing vessels.

Penetanguishene's other role - that of a supply depot for Drummond Island - had already been abrogated in 1828 when the Drummond Island post had to be abandoned and its garrison split between Penetanguishene and Amherstburg.

The British government had lost Drummond Island following the Boundary Survey in 1822, which awarded it to the Americans. A combination of factors - lack of another suitably defensive position in the area, cost and difficulty of supplying a post in the area, and improved Anglo-American relations, led to the garrison being re-established elsewhere. The Army was not confident enough in the American acceptance of British sovereignty in the northwest to risk totally removing the garrison from Lake Huron. Sir James Carmichael-Smyth, in 1825, had warned also of the need to maintain some force north of York to prevent an attack on the rear of Upper Canada. This force would act to encourage settlement north of York, and thus provide a buffer of militia in case of attack.

Many of the military garrisons in Upper Canada had received stone fortifications following the War of 1812 - 1814. Drummond Island, because its ultimate ownership was in doubt, had not. When this garrison was moved to its new permanent position at Penetanguishene, plans were



Map 1: Places in Upper Canada
Mike Serafin, Sept. 2003

immediately drawn up for elaborate stone fortifications and redoubts. Construction, except for immediately necessary barrack accommodation, was held up while the Navy's future requirements were discussed. By 1834, when the Navy left, the British Government could not justify a large capital expenditure for buildings, although the expansionist movement in the United States during this period justified the maintenance of a garrison. The old naval buildings were repaired and re-used.

The pressure in Britain to reduce military spending affected Penetanguishene in another way. In order to reduce the financial outlay of pension payments to retired soldiers, a program was instituted whereby pensions could be commuted for a lump sum of money and land in Canada.

Due to age and infirmity, a significant number of Commuted Pensioners who arrived in Upper Canada were totally incapable of supporting themselves, and were sent to Penetanguishene to be supported again from the Military Chest. These men and their descendants eventually settled in North Simcoe County.

The pressure in Britain to reduce the number of regular troops abroad and thereby expenses was relieved during the Rebellions of 1837 - 1838 when regular troops from outposts such as Penetanguishene were transported to the Rebellion centres and an active militia was raised for replacement duty. Additionally, the Royal Navy returned to the Lakes in steam vessels. Following the Rebellions, one of these steam vessels was stationed at Penetanguishene, but responsibility for the Establishment continued to rest with the British Army.

The British Government, pressured by public opinion, eventually became disenchanted with the expense of manning the garrisons. A responsible Canadian government, unwilling to spend money in its own defence, and a threatening European situation resulted in British troops being withdrawn from Canada and alternated in methods of manning these posts being sought. In 1851, the detachment of the Royal Canadian Rifle Regiment was withdrawn and replaced by the even less "regular" Enrolled Pensioners. By 1856, even this expense could not be justified and the garrison closed down totally.

In 1858, the Attorney-General of Upper and Lower Canada, John A. Macdonald and George-Etienne Cartier were instrumental in the passage of a statute establishing Juvenile Reformatories at the former establishments of Penetanguishene and Isle-aux-Noix.

The Juvenile Reformatory at Penetanguishene acquired the buildings which had belonged to the Military Establishment. The Officers' Quarters was used as the warden's residence and the men's barrack was converted into the Reformatory building proper.

New buildings were built farther up the hill and gradually, the old military and naval buildings disappeared. The entire complex was taken over in 1904 as a "Hospital for the Insane" – now the Waypoint Center for Mental Health. By 1950, the only visible remains of the Naval and Military Establishments were a small cemetery, the Keating House chimney, and the Officers' Quarters.

CFLTC DRAGON BOAT RACE ON LAKE SIMCOE, BARRIE

PICTURE BY WO SCHMID

PHOTO BY DANIEL SCHLUDI ON UNSPLASH

WHAT THE COVID SAID...

REFLECTIONS OF A SUB UNIT COMMANDER AT THE TACTICAL LEVEL

By: Maj Leona Ahn

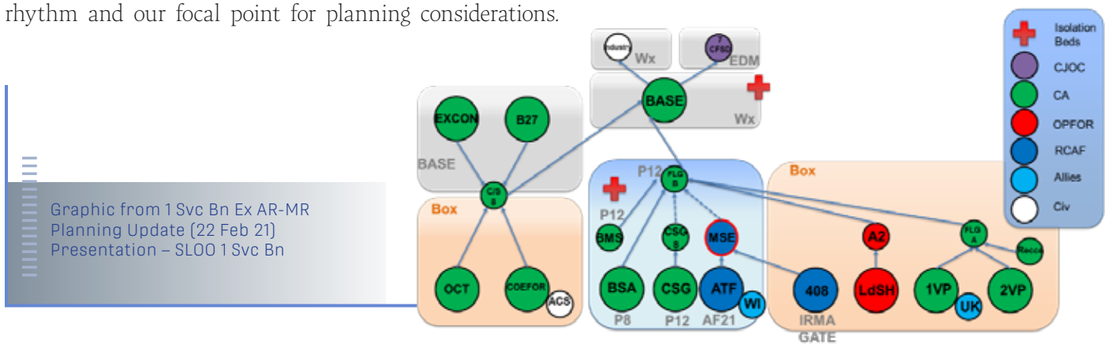
A tribute to Col (retired) John Conrad's What the Thunder Said – Reflections of a Canadian Officer in Kandahar

A RECENT RE-IMAGINING OF THE CANADIAN ARMY (CA) strategic readiness plan impacted 1 Canadian Mechanized Brigade Group (1CMBG) in significant ways. Having just come off of a year of high readiness filled with operational deployments, soldiers and officers were already fatigued. The brigade was ordered to abandon its plans for a moderated tempo reconstitution year and launch immediately into a high-tempo training calendar as a consequence of the global pandemic.

The Service Battalion took on the challenge and throughout the year prepared by conducting gateway training in the Fall of 2020 and individual training that led to the culmination exercise this spring, Ex MAPLE RESOLVE 21. Getting a service battalion combat service support ready in the best of years can be challenging, even more so in a year of 'working from home.' Cancelled training and a struggle to build cohesive teams while being behind a mask, forced to stand 6ft apart and to only meet behind a computer screen, really took a toll on the personnel and severely disrupted the natural teambuilding we have taken for granted over the years.

However, as a Battalion we successfully persevered through these challenging times. COVID force protection measures became an intrinsic part of 1 Service Battalion's battle rhythm and our focal point for planning considerations. It took the herculean efforts of sustainment planners in multiple and differing agencies, strong vision from commanders at each level and the technical expertise of our soldiers to accomplish this mission. With an ever-changing operating picture of COVID-19, fused with the evolving science, the planning efforts on how to get to and sustain a Brigade in Wainwright seemed daunting.

The concept of support was driven by COVID-19 isolation zones, which required an increase in redundancy while faced with finite numbers of vehicles, resources and personnel in order to maintain those zones. Driven by these extra layers of constraints, 1 Service Battalion deployed under the architecture of two Forward Logistics Groups (FLG A and FLG B); a novel concept departing from any contemporary or recently tested doctrine. There were strict rules, such as a seven day isolation period and a negative COVID-19 test, to get a ticket 'into the box.' This drove the need for greater redundancy 'in the box', as you could not just reassign a soldier from Edmonton (rear party), should one be repatriated from Wainwright.



Graphic from 1 Svc Bn Ex AR-MR Planning Update (22 Feb 21) Presentation – SLOO 1 Svc Bn

Incorrect nomenclature aside, the emphasis was to separate the entities physically, where one sub-unit would be the tactical sustainment interface with the Battle Groups (FLG A) located in a 'tactical BSA' and the other would be the administrative sustainment conduit (FLG B) on hard stand between CFB Wainwright and FLG A. This was done to add a level of redundancy, 'touchless' sustainment and force protection measures in the event of a COVID-19 outbreak in any of those entities. No longer could any member of the Svc Bn freely go up to Base to 'sort out' an issue or visit their buddies, as they were separated by COVID-19 zones.

There were obvious pitfalls in this sustainment plan due to the fog of Wainwright, skill fade, lack of build-up training and uncertainty. The concept didn't feel intuitive, as we were adding another level of inefficiency to an arguably less than perfect system. It wasn't clear to many, especially those who have grown up in the Army, how an Ex MAPLE RESOLVE should be supported under these conditions. Additionally, officer and soldier resiliency and capacity levels were at an all-time low due to the effects of the global pandemic and executing back-to-back high readiness years. Anecdotally, the Padres would often mention that this was a very trying time for everyone, at a level they have not previously seen in their careers. This situation at the personnel level, combined with the dark cloud of COVID-19, made some days feel intolerable.

However, once the dust settled and members got comfortable operating in the COVID-19 environment, this concept enabled 1 Service Battalion to get back to the basics. FLG A, predominately made up of Transportation Company and a Maintenance Platoon, were able to concentrate on sustainment operations. As Col (retired) Conrad spoke of in his book, What the Thunder Said, we were able to concentrate on the last 300m of where the thunder is heard in combat service support operations. Tactical delivery points, direct deliveries, or commodity points ran nightly as a part of the 24 hour sustainment cycle. Junior leaders got to practice leading sustainment operations, siting and defending terrain, moving material without the luxury of material handling equipment, conducting night driving and achieving sharp proficiencies in convoy drills in a tactical training environment. As per Colonel Conrad's reflection, logistics and maintenance soldiers needed to be tough, physically fit, turn a wrench or wield a rifle while wiping away their work/rest cycles to ensure the Brigade's combat power was sustained.

FLG B was set up administratively with Maintenance Company, Administration Company and a Supply and Transport Platoon. Technicians were able to focus on their craft without worrying about digging a trench, and were enabled with office and warehouse space and connectivity that would support the deployed DRMIS architecture and the administrative foot print of CAF supply chain operations. FLG B did extensive heavy lifting, being not only the administrative second line entity, but also responsible for setting up Camp Services to support the Canadian Combat Support Group, 408 Squadron, and the Engineers. It was also the conduit that solved the communication challenges between '3rd line', Rear Party, CMTC, Log Support Company and anything 'outside the box', as they were the only personnel that were allowed on CFB Wainwright terrain. At the beginning, there were obvious glitches in the supply chain, however, as the days passed, both it and maintenance production developed a steady rhythm, where the Battle Groups never lacked the necessary materiel to do what they do best.

At the tactical level, COVID-19 made us re-examine doctrine, our equipment and the way in which we can train sustainment professionals in an ever-changing and restrictive environment

At the tactical level, COVID-19 made us re-examine doctrine, our equipment and the way in which we can train sustainment professionals in an ever-changing and restrictive environment.

Combat service support has seemed like an afterthought in the midst of MRP cycles and institutional support functions, where the force generation requirements of support capabilities for deployed operations almost always surpass the finite human and resource capital at the tactical level.

At this level, does it make sense to have a tactical Brigade Support Area, considering the new initiatives that will be rolled out in the next five to ten years? With amazing initiatives to be more efficient and accountable (MISL, DRIMIS Modernisation and AIT), it begs the question of how that fits into the way we have traditionally operated. There is also the requirement to be more agile, mobile and adaptive in the close engagement and AoT environment.

How will we achieve sustaining the AoT with current equipment and the requirements needed to sustain a Brigade or Battle Group? Maybe the question is do we necessarily need to anymore? There are also discussions on the Service Battalion taking on the Rear Area battle space as a second line of operation to sustainment. How can the Service Battalion achieve this without eroding a slice of the Brigade's combat power? We have limited abilities to be mobile and fight if required. We cannot withdraw from an adversary with any sort of meaningful fire power. There is a dire need to ensure all systems, structures, equipment, doctrine and culture are synchronized under an engaged and collaborative governance framework in order to be able to adequately train and generate the required combat service support in the battle space.

However, innovation, creativity and growth are what are bred from discomfort, should we choose to take advantage of the opportunities presented to us.

The silver lining of COVID-19 can be summed up as follows:

COVID-19 said "Redo the estimate". The situation had changed, so it was crucial not to fall into the trap of trying traditional concepts in the face of heretofore unseen circumstances. For 1 Service Battalion, we have proven that we can accomplish the mission at hand, despite shortfalls in capacity, personnel, vehicles and logistical architecture, and excel in all facets of combat service support operations. COVID-19 forced us to reach a healthy balance between the basics of combat service support and providing the real life support that was necessary for this iteration of Ex MAPLE RESOLVE. It was the first time in a long time that we were more concerned about how we are going to accomplish the mission instead of what we were going to accomplish.

COVID-19 said "Lead with empathy". Given the current situation, the Battalion will feel the impacts of this unsustainable battle rhythm for years to come. COVID-19 reminded us to have empathy for each other, our subordinates and our superiors. It allowed us to be vulnerable in the midst of the collective trauma that has touched all of humanity across the globe. It reminded us that we are fallible humans and that COVID-19 does not discriminate against anyone, as long as the virus had a human vector to pass it onto the next victim. It allowed us to take a pause, look at our institution and to want better and to lead better. COVID-19 has allowed us to reflect, unlearn, learn and reach the epiphanies we may have never stopped to consider if it had not been imposed on us. It forced all ranks to display the best of their leadership skills during a time of chaos, unpredictability and hardship. If they waivered, problems that would have normally been resolved in non-pandemic times might expand to catastrophic proportions. Nobody had a pandemic playbook or previous experience leading during a similar situation. Any leadership shortcomings were exposed, which allowed our leaders the opportunity to review their actions, listen to divergent perspectives and lead their soldiers to mission success.

COVID-19 said "Things must be different for logisticians". It forced us to make changes to our everyday lives which have been uncomfortable for most. However, innovation, creativity and growth are what are bred from discomfort, should we choose to take advantage of the opportunities presented to us. We have a chance, before the pandemic is over, to set the conditions to not rush back to the previous 'normal' but to create a new one based on lessons learned. As Colonel Conrad alluded:

If we truly want a home grown and organic logistics enterprise that is proud and not treated like the "country cousin", or at the risk of being contracted out, we need to do better.

Systemic and structural change of significant and meaningful magnitude demands a generation of visionary leaders who can drive change and restructure systems. A major goal of any such initiative must be a "coming together" of combat arms and logistics. After all, logistics would not be required without troops to support and the combat arms will not have a fighting chance to win the war without logistics. We, as logisticians, need to move beyond mechanical compliance, challenge ourselves to see how we can effectively support the AoT and be proud of how integral we truly are to every training or operational event. This challenge is one that I am passionate to pursue, so that the Canadian Army can have a credible and legitimate sustainment framework that will enable them to train and operate effectively in any contemporary operating environment.

LOGISTICS OFFICER COURSE LAND FROM A STUDENT'S PERSPECTIVE

Lt Shawn LaRusic LOCL Course Candidate

I'd like to share with you my experiences as a Logistics Officer Course Land (LOCL) candidate and my takeaways from the course thus far. I have been in the Canadian Armed forces for 17 years and have gone through the training system as an NCM for various trade and leadership courses before becoming a Logistics Officer. Prior to course loading, I had the opportunity to complete just under two years of on the job training with Personnel Support Squadron at CFB Kingston. During that period, I was mentored, guided, and given leadership roles within the Squadron. It was an extremely beneficial experience and included lots of learning and the opportunity to apply it within the unit. The reason I mention this is because it directly correlates to my current experiences with LOCL and what I perceive to be a positive shift for the training of our future soldiers and leaders.

Due to the current COVID 19 pandemic, the traditional presentation of courses has been fundamentally altered. What used to be large volumes of candidates in lecture halls has now changed to a virtual environment wherever possible. These changes have happened on a timeline that could not have been anticipated, and implemented extremely fast in order to avoid a large backlog of personnel awaiting training. In most cases, rushed changes, and pilot courses have had many issues as instructing staff adjust content to meet the intent and the requirements of the course. With this in mind, the LOCL course was adapted from an in-house model to a blended one that included distance learning and an in-person field portion. While the majority of candidates knew what course content was to be covered, I don't think any of us were expecting the way it has been presented.

The start of the distance learning portion of the course was fairly normal. We were broken down into syndicates and assigned a course director. Our first teleconference was straight forward, with introductions, a discussion on how tasks would be assigned and some administrative points for the course. For the first few days, the focus was on leadership principles and Logistics Doctrine in a Land setting. These topics were taught in a manner familiar to the majority of CAF members. We received PowerPoint presentations, reviewed publications in the morning and were required to complete readings in advance of the next teleconference. There we would discuss as a syndicate, have the opportunity to ask any clarifying questions and be quizzed by the Course Director.

What came next is where the fundamental change occurred. In our syndicate, we were broken down into two sections, given a warning order of a probable humanitarian aid mission and directed to complete the "Service and Support" paragraph of the Op Order, as well as its Logistics annex. We were given the remainder of the day and the following morning, to conduct research and "recce" the location and staging areas, while utilizing any and every asset we could. Collaboration was highly encouraged, as well as using any type of information found on the internet, while being guided by the Logistics Land Doctrine. The amount of information that the nine people in our section produced was staggering. However, what all that information led to was an overall picture of what we, as Logisticians, could and could not do to support the Commander's intent before the Orders were disseminated. At this point, my section had several courses of action under consideration. The plan for the following teleconference was to have an information session with a CAF member currently deployed to the host nation. We were afforded the opportunity to ask this person anything we wanted to know about the area, current civil situation, etc. Essentially, we were given free rein to ask questions to fill in any gaps in information that we had identified. This meeting proved to be absolutely invaluable to all of our logistics planning. Through the teleconference we were able to determine that several of the courses of action we had planned were not viable, and to open up alternative possibilities that would work extremely well in the given scenario. We were then directed to complete the Op Order and the Logistics annex for the following day.

The entire section collaborated on one set of orders that was then submitted to the course staff. The course director reviewed our Orders with us, however, he also did something that I was not expecting. He went line by line through our submission and we discussed it in detail, including whether it required some adjustments to be feasible. This was all done in a manner not indicative of a "school environment" but more of a back brief to a Commander, with them subsequently noting what they wanted changed based on their vision of the mission. At no point in time did I feel like I was being evaluated. Rather, I felt that I was being mentored by a person who had experience in the area and was now passing it on to me. This mentorship, combined with a plausible, real life scenario, led to a better understanding of how to apply the doctrine, and resulted in better retention of its concepts.

Fast forward a week and we have now deployed to the Borden training area to continue the course. Although we are only a few days in at this point, the structure and feel of the course that had started with the distance learning portion has indeed carried over. The course staff has left the camp setup and routine to the candidates while providing guidance and mentorship along the way. However good or bad the experience is, is dictated by the decisions we make. I have found that this is a great way to instill leadership principles into junior leaders. The decisions we make here will have a significant impact on us moving forward. The key takeaway is, while that may only affect the current course candidates, in the very near future our decisions will have an impact on the soldiers we will lead, and that will impact the trust that our subordinates will have in us.

As this course continues, the overarching message is that the learning model is about mentorship and creating the foundations to produce a competent Logistics Officer. The staff (both officer and NCM) have been sharing a myriad of experiences with us, and guiding us along the way. The perspectives we receive from all ranks in the environment in which we find ourselves have led, not to just simply learning the course curriculum, but doing so in a way that I have found makes it easier to retain. The stressors of being in a training and a field environment are still there, but not in the same way that I have experienced during previous courses. In the past my primary focus was on surviving to the next day, or the next meal, putting the course material a distant second. Now the primary focus is on the course material. In my opinion, it is no longer about surviving, but absorbing as much as I can from the mentorship offered by the course staff and applying it to the course. As we junior officers gain more experience within the CAF, the solid foundation that is now being built at CFLTC will make for ever more competent leaders in the future.

PHOTO BY SIMON BERGER ON UNSPLASH

Major Joel Grineau joined the Canadian Armed Forces in 1999 and has been an army logistics officer for his entire career. Prior to joining the military, he obtained a BA and a MA in History. He has served domestically in Saskatoon, CFB Borden, Calgary, CFB Suffield and on Operation Peregrine. His international operations include Operation *Athena* – Afghanistan, *Task Force Middle East* – Jordan and *Joint Task Force Impact* – Kuwait. Although he did not personally observe the experiment of using mules in Afghanistan, he did hear about it in various 'Orders Groups' while on mission.

If you don't have my army supplied, and keep it supplied, we'll eat your mules up, sir.

- William Tecumseh Sherman

THE RETURN OF THE MULESKINNER

RE-APPRAISING THE USE OF BEASTS OF BURDEN IN FUTURE CANADIAN FORCES LOGISTICS OPERATIONS

By Major Joel Grineau

AIM

The use of beasts of burden, and their attendant handlers – in the case of mules, the muleskinners[1] – was a common practice in military logistics for centuries. Animal borne logistical transport has been mostly absent for the last one hundred years in the Canadian Armed Forces (CAF). The aim of this paper is to re-appraise the use of animals as part of future logistics operations.

INTRODUCTION

The CAF moved to total mechanization during the 1930s, and thereby lost the institutional capability to use pack animals in logistics. However, the CAF has been in a continuous cycle of rediscovering the need for this capability in conflicts and then divesting itself of this capability when it was no longer necessary. The use of animals in transport applications may be a niche capability, but the absence of this asset removes a valuable option in the delivery of materials during certain types of operations. This paper will provide a history of the twentieth and twenty-first century use of beasts of burden. It will then illustrate the advantages of using animals in logistics operations, and it will also discuss what factors to consider in reacquiring this capability. It will show that re-adopting this resource will positively impact the supply chain in the future spectrum of operations, including combat, Civilian Military Co-Operation (CIMIC), and disaster relief, and help to surmount the issues of last mile logistics.

PHOTO BY RALPH (RAVI) KAYDEN ON UNSPLASH

DISCUSSION

History

The commercialized production of the internal combustion engine at the beginning of the twentieth century resulted in a significant change in logistics, in that trucks soon became the preferred option over animal drawn wagons for the delivery of goods. Despite the desire for mechanical transport in World War I (WWI) by military planners, early military trucks were not up to the task of delivering supplies over muddy and shell pocked roads. Despite gradual improvements to motorized transport during the conflict, hundreds of thousands of horses and mules were used in WWI to meet the logistical needs of the Western Front.2

Demobilization after WW1, and the ambition for total mechanization, brought about the end of animal borne transport, and the subsequent demise of the Royal Canadian Veterinary Corps.[3] However, the desire for total mechanization was unrealistic. Many sources note the use of mules in World War II (WWII), particularly in the mountains of Italy and in the Far East campaigns. Mules were used by the elite Devil's Brigade for logistical supply during the battle of the Berdhardt Line in 1943.[4] In addition, the Veteran Guard, comprised of WWI veterans too old or injured to fight, was tasked to transport mules from the United States to the jungles of India in order to support the campaign in Burma.[5]

Despite very limited mule use during the Korean War, the CAF, inlater missions again considered this option, resurrecting the use of beasts of burden in Afghanistan. CBC News, in speaking with an on-the-ground donkey expert, noted that they were found to be very adept at traversing the wadis, broken ground and dry river beds of the countryside.[6]

Advantages and Applications to Current Logistics

The use of animals in logistics is still covered in CAF doctrine, specifically in the Mountain Operations and Jungle Operations publications. A variety of animals can be considered, including: elephants, camels, mules, water buffalo and donkeys. The mule is considered the best all-round option. Mules can be utilized within the F, A, and B echelons, and within first-and second-line organizations, thereby paralleling traditional theatre logistics assets.[7] Due to the fact that feed and fodder is difficult to obtain in mountain, jungle and austere environments, the mule must carry two days of food and water for themselves and their drivers, in addition to their load of military supplies.[8]

Survivability on the modern battlefield requires that soldiers carry heavier loads into battle than in the past, including: body armour, crew weapons, ammo, breaching equipment, radios, batteries, food and water. Linda Bossi, a defence scientist, states that soldiers in Afghanistan were routinely carrying 45% of their body weight on marches, and 30% of their body weight on patrols and in advances-to-contact.[9] The use of animals to carry excess equipment will increase the fighting capability of soldiers, who, by carrying lighter loads, are not exhausted prior to combat. Interestingly, 1 Combat Engineer Regiment successfully integrated a mule into their front-line logistics during their 2008 rotation in Afghanistan.[10]

The use of animals to carry excess equipment will increase the fighting capability of soldiers, who, by carrying lighter loads, are not exhausted prior to combat.

Beyond the battlefield, there is utility in employing mules in the CIMIC realm as CIMIC operators often work in remote and austere areas. In addition to saving thousands of litres of petroleum per year,. CIMIC operators could have additional animals on hand to gift to the local population, the addition of which to developing economies could significantly improve farm output. Worn out animals could be donated for use as food. The use of beasts of burden would aid CIMIC operators in achieving their raison d'être: to be a "decisive element in operations where successful relationships with civil actors are key to achieving the mission."[11]

Such animals could also be utilized by the CAF in support of humanitarian relief in areas of natural disaster. An area that was hit by an earthquake or flood is likely to have many transportation arteries adversely affected. Using animal transport would allow supplies to traverse otherwise impassable routes. International aid agencies have used animals in several areas hit hard by natural disasters, most notably Nepal in 2005,[12] and Pakistan in 2010.[13]

The ability to deliver goods to the last mile of the supply chain is often difficult, due to a number of factors, including: distance, terrain, austerity, tactical considerations, fuel consumption and the weight of the goods.[14] As already discussed, animal borne logistics can address many of these issues. Materiel delivered via animal to the F echelon, and then cross-loaded over to the combat storesman's animal would greatly assist in last mile logistics. Even today, the Indian Army maintains several animal transport units, comprised of over 6,000 mules. They carry loads to remote mountain outposts in the Himalayas,areas inaccessible to mechanized transport.[15]

Planning Considerations to Reacquire this Capability

The formal adoption of this capability would require consideration in several areas, including training, veterinary support, mission task assignment and theatre level support. By way of example, the United States Marines Corps Mountain Warfare Training Center runs a course on pack mules that is "designed to aid Marine Corps units in alternative methods for transporting crew served weapons, ammunition, supplies, and wounded personnel to and from areas inaccessible to mechanized and air mobile transportation".[16] The Canadian Army Advanced Warfare Centre has sent members on this course in the past, and has made positive recommendations on the future delivery of this training to the CAF.[17]

The rebuilding of this resource will also require veterinary support. This can be achieved by contract, which is the current practice of the Lord Strathcona's Horse for their Ceremonial Troop. Conversely, Andrew Morrison, himself a veterinarian and Primary Reserve intelligence officer, believes that the occupation of military veterinarian should be re-established. This would rest within the Primary Reserve, and practitioners could learn from the experiences of dozens of other existing military veterinarian services.[18] Military veterinarian supplies would be covered by Class 8, and would provide animal-specific cold chain medicines, surgical instruments and medical diagnostic equipment.

The mission task of animal borne transportation should be assigned to a specialist group of Primary Reserve Service Battalion personnel. This achieves the Strong, Secured, Engaged defense policy recommendation (76): "Enhance existing roles assigned to Reserve Force units and formations, including: Combat Support and Combat Service Support."[19] This would provide Primary Reserve units with a capability not performed by the Regular Force. For instance, a militia unit in Calgary contracted a mule handling course, in 2018, with positive results.[20]

Lastly, theatre level support needs to be addressed. Beasts of burden are plentiful in North America and can be easily purchased. They could be shipped overseas via aircraft with pressurized cabins. Conversely, Charles Janzen, the CAF officer who spearheaded the experiment with mules in Afghanistan, noted that mules were purchased in theatre, with a contract that allowed for replacement, provisions, equipment, handlers and shoeing services.[21] Contracting in this way exemplifies the Counter Insurgency doctrine of General David Petraeus, Commander International Security Assistance Force, of generating employment and assisting in the development of the economy, thereby supporting state governments and strategic campaign objectives.[22]

CONCLUSION

Since the advent of full mechanization within the CAF in the 1930s, animal logistics have gone through a repeated cycle of rediscovery, only to be forgotten again. Animal borne transportation of goods can be applied to a spectrum of operations including combat, CIMIC, and disaster relief. They can overcome many of the challenges of last mile logistics. The planning considerations to reacquire this capability include training, veterinary support, the assignment of this mission task to the Primary Reserve and theatre level support, all of which are readily achievable.

RECOMMENDATION

It is recommended that the CAF conduct a detailed study on the viability of the use of beasts of burden in future logistics operations.

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PHOTO BY MARJAN BLAN ON UNSPLASH

LOGISTICS IN A NATO ENVIRONMENT

Non-Attributed

Canada's role within the enhanced forward presence Battle Group (eFP BG) located in Latvia presents an interesting view into the role of logisticians and the possible future trend of Canadian deployments within a NATO framework. It highlights the importance and impact of NATO Allied force logistics cooperation and at the same time presents several unique challenges to logisticians. By nature, logisticians never shy away from a challenge and strive to provide creative and unique solutions to improve the level of support. Within the BG, Canada plays a lead role as the Framework Nation, along with eight other Sending Nations (SN): Albania, Czech Republic, Italy, Montenegro, Poland, Slovakia, Slovenia and Spain. This BG is a part of the Latvian Mechanized Infantry Brigade (MIBde) making it an organization with ten different countries.

The first challenge that a logistician must become familiar with and be able to deftly manoeuvre within is command relationships within a multi-national force. The role of the National Support Elements (NSE) within a NATO framework is also a topic with unique requirements. Logistics within the BG for sending nations becomes increasingly complex when the NSEs are not under control of the BG commander. This is where the creative and unique solutions begin to become critical for the success of any logistics operation. Understanding command relationships is not a topic of study for Logistics Officers until the Army Tactical Operations Course (ATOC). The key is to ensure that junior officers continue to be provided with further professional development or training to reinforce this very important element. The Command relationships are always a sticking point in multinational operations, as countries are cautious to detach any assets. In Latvia, the "go to" command relationship has been affectionately named "FriendCon" where informal agreement in the name of friendly nation cooperation is prevalent. This creative agreement between outgoing and professional Canadian logisticians has proven to be highly successful, and truly highlights the level of cooperation within NATO nations.

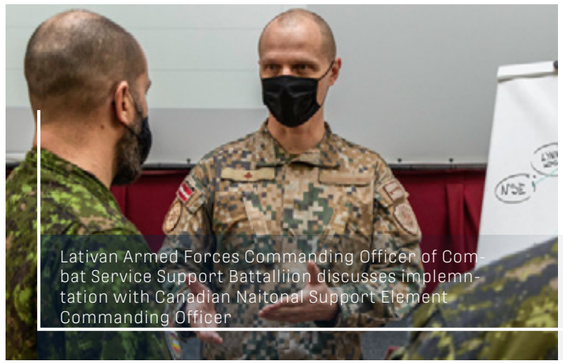
REHEARSAL FOR DELIVER POINT OPERATIONS WITH THE MULTINATIONAL LOGISTICS COORDINATION CENTRE.

The second challenge is understanding NATO support doctrine as well as partner nation Logistics doctrine. Within the CAF training system, very little time is spent on multinational deployments and NATO operations. CAF members, as part of Op REASSURANCE are currently working within Multinational Division North East (MND NE), and Latvian MIBde. The amount of NATO standing agreements (STANAGs) that apply to logistics take a considerable amount of time to become familiar with in order to effectively plan and coordinate operational support. These STANAGs are critical to brigade and division support concepts, since they have been agreed upon by senior national representatives. It is critical for logisticians in Canada to begin to think of how we can effectively operate within a multinational team.

Looking at these two challenges it may seem like we have a lot of work to do. However, Canadian Logisticians have shown a tremendous amount of success over past years due to their flexibility and adaptability. More recently, there have been numerous examples of important achievements during the first portion of this rotation for Op REASSURANCE eFP BG and Canadians at various levels. The first such example is the ongoing real life support provided to nations within the eFP BG using the "FriendCon" to ensure seamless support through all the NSEs in Latvia. The ability to have ten nations work together and support a BG is an accomplishment in itself.

The second success is the ability to have all nations come together to discuss and arrive at an agreement on standard operating procedures. As part of the mentoring tasks for Canadians within MIBde, a CSS rehearsal was conducted to ensure that all ten nations were confident with procedures to support their national contributions to the eFP in a tactical environment. This rehearsal showed the need to have more detailed discussions about logistics assets required in a real time situation. Through multiple discussions and creative problem-solving skills, it was agreed that any national asset that would take part in a tactical setting (delivery point, commodity point, etc) would only ever be detached TACON to ensure that all nations maintained control. This is not an issue for exercise scenarios where logistics support is largely static and run from pre-established posts. However, if a multinational joint logistics unit or a multinational integrated logistics unit (NATO terms pulled from STANAGs) must be formed in a post article 5 scenario, then we have failed as logisticians because we have not determined how this works.

Logistics in a NATO environment has proven challenging but rewarding, with two key factors that can be implemented in logistics training in Canada. The first is a focus on command relationships and how they can be used in a logistics environment. This will benefit not only junior logisticians before a NATO deployment, but provide a direct example before being asked to utilize this information on ATOC or AOC. The second factor is discussions about NATO policy and procedures for logistics. As the FN for the eFP BG Latvia, it is critical for Canadian Logisticians to understand what has already been agreed upon for support and utilize this to facilitate the "FriendCon" command relationship to ensure success. It is still early in this rotation of OP REASSURANCE and one can only hope that we will see even more success by providing our creative and unique solutions to problems on the ground.



Lativan Armed Forces Commanding Officer of Combat Service Support Battallion discusses implemntation with Canadian Naitonal Support Element Commanding Officer

Rehearsal of support concepts with all nations and Latvian support entities before the international certification exercise.

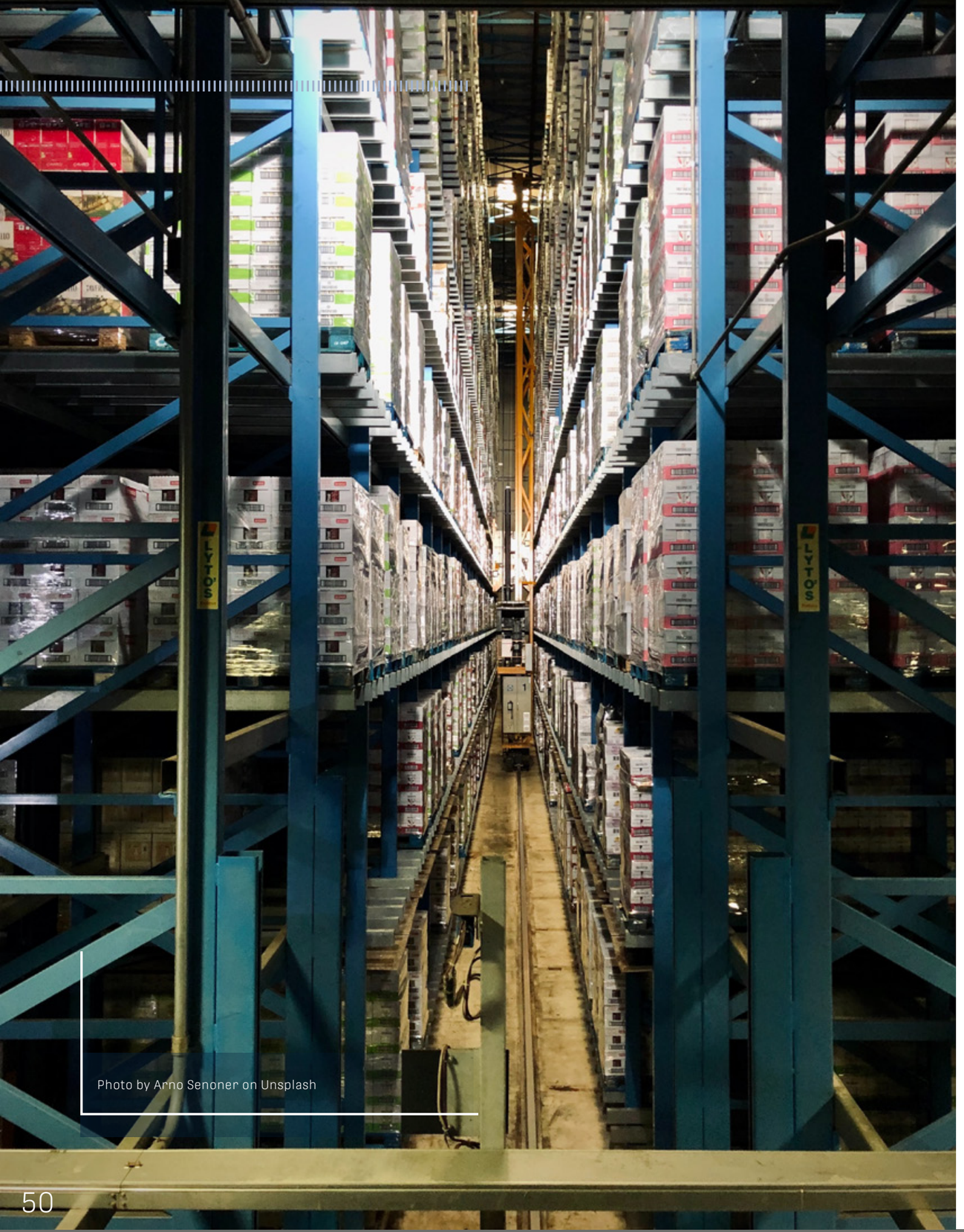


Photo by Arno Senoner on Unsplash

INDUSTRY TRENDS IN LOGISTICS

by Major Christopher M. Wood

Major Wood is an Army Logistics Officer who grew up in Halifax, Nova Scotia. He joined the military in 2004 and was posted to 2 Service Battalion. In 2008 he was posted to 2 CMBG Headquarters & Sigs where he was employed as a Movements Officer, followed by a posting to 31 Service Battalion in London, Ontario, as the Adjutant. Major Wood was posted to 1st Canadian Div Headquarters in 2017 and filled a number of key positions including the J4 for both DART and NEO. He is currently posted to Petawawa with 1 Canadian Field Hospital as the Officer Commanding Services Company.

AIM

The purpose of this paper is to discuss key trends in industry and how they could potentially be applied within the Canadian Armed Forces (CAF) to improve our conduct of operations at home and abroad.

INTRODUCTION

In order for companies to remain competitive in today's market they need to constantly seek the best technology and business practices to maximize the use of their limited resources and bring the best possible products and services to their customers. With many organizations delivering high quality services and products, customers' expectations have risen considerably over the last few years. If a company fails to keep up with current practices, their chances of survival and growth diminish significantly. Since the CAF has identified that many of the ways we do business require modernization, adopting appropriate, current industry trends may help shape the way we move forward. DHL, named after its founders Adrian Dalsey, Larry Hillblom and Robert Lynn who are world leaders in logistics research and innovation, has created a Logistics Trends Radar. Some of the key trends that will become relevant in the next five years will be discussed.
becomes increasingly complex when the NSEs are not under control of the BG commander. This is where the creative and unique solutions

DISCUSSION

Transportation Trends

There has been much focus placed by industry on transportation optimization. Products can be moved through the country and around the world at a much-reduced fuel and maintenance cost, in an environmentally responsible manner, and achieve significant time savings, if current technology and best practices are applied. By implementing the best possible methods of transportation companies can maintain or improve their competitive edge.

On-Demand Delivery

The use of on-demand delivery has become more mainstream than ever before and is expected to continue to apply to even more products and services. Customers used to have to go into a store to find and purchase a product. With the rise of the internet, they are able to shop from the comfort of their home, using their computer, and have purchases delivered directly to their residence. To improve on this even more, on-demand delivery options now allow customers to buy a product online and have it delivered to them quickly no matter what the destination address, significantly compressing delivery time and adding value to the customer's shopping experience. To achieve this, businesses are implementing on-demand crowd-sourced delivery networks that link delivery companies with delivery demands in order to move products quickly and efficiently. The key to the success of this process is that delivery companies can take on multiple deliveries that fit into a carefully planned and coordinated route.[2] It allows the right products to be delivered at the right time and location to satisfy customer demands. In addition, companies are using advanced route optimization software that helps them improve transportation techniques by recommending best times, best routes and best weather conditions to move products.

De-Stressing the Supply Chain

Companies are dealing with increasing distance, complexity, and vulnerability of supply chains as we become more globalized. Warehousing infrastructure is

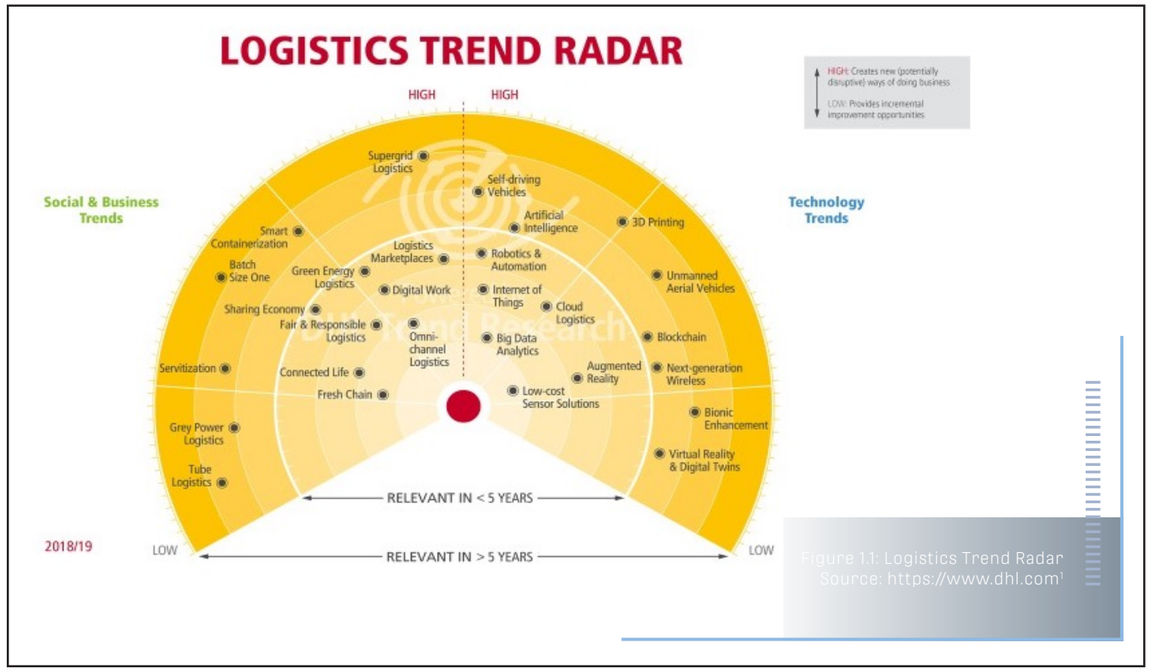


Figure 1.1: Logistics Trend Radar
Source: https://www.dhl.com[1]

operating at capacity and is expensive to maintain and operate. To overcome these problems companies need clear visibility of the entire system and need to provide seamless transport of products. The quicker and more efficiently orders can be placed, processed, loaded on transportation assets, and delivered, the lower the stress on the entire supply chain. By not having the capability to deliver products quickly, costs of warehousing and storage are increased and transportation assets can encounter bottlenecks when trying to transport products under tight timelines. New information technology systems, including freight transport planning tools and better coordination, allow companies to effectively use different transportation modes, creating flexibility and simplicity in deliveries to the end customer. This use of technology to synchronize transportation assets enhances the movement system and de-stresses the entire supply chain.[3] It also helps companies maintain accurate inventory, and improve forecasting and decision making, allowing them to make the most of their resources.

The trends of on-demand delivery and de-stressing the supply chain will add significant responsiveness and flexibility to military operations. On CAF Bases/Wings these trends can assist in making best use of resources. A recent Auditor General Report identified that the military supply chain delivers late 50% of the time and there is inadequate control over transportation costs.[4] Most items are distributed to CAF locations by the National Movements and Distribution System (NMDS) employing the National Freight Runs. This system works well when there are no time constraints but does not allow much flexibility in moving material. Units can also use their own integral assets when it makes sense to do so, but this creates additional costs and strain on resources. The NMDS also does not maximize the use of its own transport assets, taking a long time to distribute material and lacking oversight on costs. Commercial delivery options are often not used due to the added costs but would have added value if used appropriately. The CAF could benefit from implementing on-demand crowd-sourced delivery and technology to synchronize transportation assets, thereby improving deliveries.

Information Technology Trends

Information technology (IT) is a critical component in today's business environment, but in order to maximize its effectiveness it needs to make maximum use of data collection, analysis, and decision making. The potential advantages of best IT practices include significant cost reductions generated by having the ability to make the best decisions to utilize resources.[5]

Big Data

With the use of IT applications, companies are receiving vast amounts of near real time data from sensors, smart phones, and company data exchange services. Big Data aims to assist companies receive this information, process and analyze it, in order to enable them to make the best decisions for their businesses. This leads to better and more current information for planning and operations staff, managers, and end customers. It enables the production of analytics that permit mangers to reduce risk by optimizing business efficiencies. Products can be tracked throughout the entire supply chain, poor business practices can be quickly discovered and processes improved.[6] Big data will no doubt continue to have a significant impact well into the future.

Internet of Things

The Internet of Things refers to the ability of devices to connect through the Internet and share information. The availability of internet connections to people all around the world and the number of devices that can be connected are increasing daily. We now have the ability to access devices like speakers, lights, and cameras from our mobile phone from anywhere we have access to the Internet.[7] We are just beginning to see the advantages and potential uses of this technology, which will continue to advance exponentially. Although this is a powerful capability, there are serious

PHOTO BY CHUTTERSNAP ON UNSPLASH

security concerns emanating from the constant threat of hackers who seek ways to access devices and information, usually for nefarious purposes.

The CAF has had significant problems with maintaining the appropriate level of asset visibility. The driving factor of this problem has been keeping accurate counts on what is being held on hand and anticipating consumption rates. Our current systems, which include NMDS, which performs the shipping and receiving function, and Defence Resource Management Information System (DRMIS), which shows what inventory we have in our Bases and depots, don't communicate. This creates problems for asset visibility, and inaccurate reporting, and reduces the ability to make informed decisions at high levels. Logistics Functional Area Services (LOGFAS), used for the planning, coordination and monitoring of the logistical support with NATO, is a good example of available technology, but we have struggled implementing it due to security and interconnectivity concerns across our DWAN, CSNI, and NSWAN networks.

The CAF will be implementing a program called Modernization, Integration of Sustainment and Logistics (MISL) in an effort to improve warehousing and distribution processes by having one single, integrated system of sensors to manage the supply chain. This robust system will take advantage of the capabilities of the Internet of Things and Big Data to allow large amounts of data to be acquired and processed in support of decision making.[8]

Sustainability Trends

A focus on environmental sustainability has become key as more customers are sensitive to the negative impacts businesses have had on the environment and society, and who want to see significant change moving forward. To achieve sustainability, companies are making better use of resources and introducing more environmentally friendly alternatives that support their business vision for the future.

Shareconomy Logistics

Companies are exploring options to share assets such as warehouse space, transport resources and skilled workers, which can significantly reduce costs, and borrow these resources on-demand only when they are required. This is a great way for a company to acquire assets when they are needed and for their sharing partners to maximize use of resources when they are not needed in-house. We have seen significant success with these methods in the hospitality industry with AirBnb and in ride-sharing with Lyft and Uber, with plenty more yet to be implemented. The benefits to companies that are considering these options include flexibility, increased efficiencies, reduced costs, and capitalizing on under-utilized assets.[9]

Fair and Responsible Logistics

Companies need to consider not only profits in today's market but also fair and responsible ways of doing business. Customer's expectations are changing and companies need to adapt to them. Companies are implementing creative ways of using their assets to not only make money but also protect the environment and advance society. Fair and responsible packaging solutions are replacing current shipping material such as plastics, cardboard, Styrofoam and bubble wrap that end up in the garbage versus being reused or recycled. These items used by the CAF will need to be replaced with more environmentally-friendly options. Sustainable packaging materials currently exist and will become more mainstream in the near future.[10]

Shareconomy and Fair and Responsible Logistics are areas where the CAF continue to improve. For example, Canada has entered into agreements with other nations in an effort to better share resources. The Air Force is utilizing the program titled Air Transport and Air to Air Refueling and other Exchange of Services (ATARES) and the Navy is employing the Surface Exchange of Services (SEOS) in an effort to improve transportation services and avoid unused space.[11] Also, the CAF implemented the Innovation for Defense Excellence and Security program to improve operations by seeking creative Canadians to submit plans to help improve business practices that will support Shareconomy and Fair and Responsible Logistics.[12] In addition to this program, that CAF has introduced the Defence Energy and Environment Strategy that aims to make it much more sustainable by seeking eco-friendly shipping material, reducing emissions from DND buildings and vehicles, and appointing energy managers to implement best environmental practices.[13]

CONCLUSION

Key trends in industry can be applied to the CAF in the areas of transportation, information technology, and sustainability. There are better methods available that could take advantage of on-demand crowd-sourced delivery and related technology. MISL will provide one single, integrated system for improved asset visibility. ATARES, SEOS, the Defence Energy and Environment Strategy, and the Innovation for Defense Excellence and Security Program will make the best use of resources while protecting the environment.

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IMPROVING OPERATIONAL SUPPORT THROUGH QUANTITATIVE RISK

By Lieutenant-Commander (LCdr) J.W. (Jason) Stewart

LCdr Jason Stewart is originally from Cape Sable Island, Nova Scotia and joined the CAF as a Reservist in 2000. Since entering the ROTP program in 2002 he has earned a Bachelor of Arts in Economics from RMC, certificates from Cornell University and the University of Victoria, a Master of Science in Global Supply Chain Management from HEC Montréal, and a PMP designation.
LCdr Stewart's career within the Navy includes his time at sea on HMCS OTTAWA, HMCS CALGARY and as the Fleet Logistics Officer. He has also worked jointly while posted to JTF(N) and deployed overseas in support of Op PROTEUS, Task Force Middle East, and Op PROJECTION.

AIM

To identify risk management best practices and the benefits of quantitative risk assessment in order to maintain an agile and resilient Canadian Armed Forces' (CAF) supply chain, which will ensure operational support is maintained if threats are realized and disruptions occur.

INTRODUCTION

The CAF assesses operational risk through a subjective and qualitative process. The purpose of this process is to empower leaders to make decisions based on the probability of an event occurring, combined with the potential impact that an event may have on operational effectiveness, safety, and/or security.[1] Risk to deployed operations is only formally assessed twice during the Operational Planning Process (OPP), first in the orientation stage and subsequently during the Courses of Action (COA) development phase.[2] However, sustainment is often assessed as a holistic concept, as it relates to COA viability, and not further analysed in sufficient detail post-COA selection to ensure operational support can be maintained in the event of a supply chain disruption.

As the CAF's reliance on industry, local economies, Host Nation support, and Strategic Lines of Communications (SLOC) continues to increase, so do the interdependencies with the global economy. This introduces a new layer of risk to any operational support structure, as CAF supply chain activities are now subject to disruption at local, national, international and global levels.[3]

Thesis statement

With the increasing frequency and severity of national disasters, civil unrest, and isolated catastrophic global events such as COVID-19, the CAF needs to map and assess its supply chain in order to implement risk mitigation strategies in anticipation of disruptions. To ensure that operational effectiveness can be maintained, at home and abroad, advanced risk management and assessment practices can be implemented to measure risk quantitatively, enabling optimal decisions to be made.

DISCUSSION

Supply Chain Management (SCM) has become increasingly important for industries, governments and militaries to be effective in their respective areas of responsibilities. If global economies continue to become more interdependent, and the supply chain remains horizontal, disruptions will occur and impact the CAF's ability to effectively and efficiently support deployed forces. However, the impact of these disruptions can be reduced through improved risk management practices.

Supply Chain Disruptions

There are numerous categories of threat which may affect the CAF's supply chain, ranging from minor delays in delivery to equipment obsolescence. In the context of this article, supply chain disruption threats include: natural disasters, labour disputes, supplier bankruptcy, war and terrorist attacks.[4] While from a risk assessment perspective these events are unlikely to occur, their impact on the CAF's supply chain could be immediate and long-lasting.

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Supply Chain Disruption Risk Reduction and Efficiency

There are numerous risk reduction strategies that may be implemented to ensure that the impact of a supply chain disruption is minimized. Two methods commonly used within industry are to have excess inventory and redundant suppliers.[5] However, the CAF is attempting to reduce the number of spare parts held both centrally at the depot level and locally at Bases and Wings. Additionally, within the CAF there is an increasing trend for in-ice support contracts and contractor managed spares. While it is important for the Forces to use taxpayers' dollars effectively and to leverage industry to conduct activities for which they are better suited to perform, these initiatives have second and third order effects on the CAF supply chain's ability to support operational requirements. It is important to remember that supply chain efficiency, through reducing inventory, limiting the number of suppliers and centralizing activities, increases the probability that the supply chain may be disrupted. In order to ensure that the CAF can be efficient while simultaneously manage risk, these competing objectives should be optimized holistically, considering both the expected cost of disruptions and the increased cost of implementing mitigation strategies.[6]

PHOTO BY CPL THOMAS LEE, OPTIC

Supply Chain Mapping

Before assessing risk, it is imperative that the supply chain is mapped from end to end for critical spare parts and components. Typically, from an operational support risk assessment perspective, the only factors that are considered are how many parts may be required, how long will it take for the part to arrive from the supplier, and whether or not there is a mechanism to get the part into theatre when required. This assessment is often done in a vacuum, a perfect world scenario, that does not include external factors which may impact timelines. Due to global supply chain interdependences, critical items must be mapped from raw material extraction to delivery to the end user.[7] In Lawrence W. Reed's essay "I, Pencil", he describes the complexity of manufacturing a simple pencil. He emphasizes that it takes a global effort to manufacture one and most importantly, no one person or organization in the world knows all the steps and processes required to ensure it's manufactured and ends up, at the appropriate time, in the hands of those who require it.[8]

Qualitative Risk Management

Risk management practices have been integrated as part of government, military, NGO and the private sector decision making processes. However, as risk assessments are often completed with imperfect information, most organizations utilize a qualitative method to evaluate the level of risk a certain threat poses to their mission and overall objectives. This qualitative approach uses defined categories of probability, the likelihood that a threat will occur, and the impact that threat would have on the organization's ability to continue operations.[9] While this method allows for a speedy analysis, it is a one size fits all tool and is highly subjective. Probabilities and impacts are decided by individuals based on their experiences, personal perceptions and, in some instances, biases.

This type of approach may be suitable in some cases when assessing supply chain risk. However, the impact and probability definitions would need to be written specifically to analyse threats to sustainment and the overall supply chain. A limiting factor of a qualitative method to risk management is that it is highly labour intensive. Risk management is a continuous iterative process, where control measures are monitored, and risks are reassessed when new information becomes available.[10]

Improving Risk Management Practices

Due to the iterative nature of risk management and complexity of the CAF's supply chain, a process reliant on technology and quantitative analytics would be superior than the current qualitative practices. This process would leverage real-time data from internal and external sources, creating a holistic picture to inform decision making. Such a process would ensure continuous and objective risk assessment and measurement.

Supply Chain Analytics and Optimal Decision Making

The Supply Chain Operations Reference (SCOR) model was developed by the Association for SCM and links business processes, metrics, and performance to segmented supply chain activities: plan, source, make, deliver, and return.[11] Supply chain analytics are then entered into the SCOR model which provides the process by which data are analyzed objectively.[12] While all supply chain analytics applications could be applied to the CAF, "prescriptive analytics" is the application best suited for assessing and managing supply chain risk holistically. It provides recommendations on what should be happening by combining descriptive and predictive analysis.

Prescriptive analytics uses mathematical optimization models to provide decision makers with objective optimal recommendations based on defined constraints. Prescriptive models are normally developed as mixed-integer linear programs, allowing algorithms to be implemented in programing languages such as Python.[13] To ensure timely decisions and corrective actions are taken in the event of a supply chain disruption, the CAF will need to automate the data collection and analysis process, as the volume, variety, velocity and veracity of data is growing exponentially with time.[14]

Optimality Through Quantitative Risk Management

If the CAF were to adopt a quantitative approach, it could result in two major advancements in risk management practices. First, after a supply chain network is mapped, it allows for in-depth analysis to expose hidden risk factors, allowing for the proactive implementation of risk mitigation strategies to minimize the impact of a threat. Second, it could delay the risk response decision point

[5] *Ibid., 55.*
[6] *Sunil Chopra and ManMohan S. Sodhi, "Reducing the Risk of Supply Chain Disruptions," MITSloan Management Review, no.55 (3) (2014): 73-80.*
[7] *Gilvan C. Sauza, "Supply chain analytics," Business Horizon, no.57 (2014): 595-605.*
[8] *Leonard E. Read, "I, PENCIL – My Family Tree as told to Leonard E. Read," The Freeman, no. 8 (1958): 32-37,*
[9] *Department of National Defence, B-GJ-005-502/FP-000, Canadian Forces Joint Doctrine Manual – Risk Management for CF Operations (Ottawa: DND Canada, 2007) and United States, Joint Chiefs of Staff. Chairman of the Joint Chiefs of Staff Manual – Joint Risk Analysis, J-5.Washington, DC.: Joint Chiefs of Staff, 2016 and United Nations, JIU/REP/2010/4, Review of Enterprise Risk Management in the United Nations System. Geneva: UN, 2010.*

until after a supply chain disruption has occurred. By postponing the decision point, an individual will be able to evaluate the situation holistically, ensuring that any response taken considers second and third order effects.

The benefits of this approach to risk management were demonstrated through a research project conducted in conjunction with the Ford Motor Company. The researchers found that it would be impossible to apply traditional risk management techniques to Ford's supply chain, as it had over 4000 direct suppliers and, due to their global supply chain network, there was an infinite number of threats that would need to be analysed.[15] Additionally, the researchers assessed that from a SCM perspective, the type of disruption was irrelevant, and most risk response strategies were similar, no matter where or how the disruption occurred.[16] Thus, they determined that supply chain risk management needs to be assessed based on an organization's Time-To-Recover (TTR) and Time-To-Survive (TTS).[17] Using linear programming, the researchers were able to assess the risk exposure levels of all supply chain activities, to objectively determine critical nodes which required proactive risk mitigation strategies, and analyse disruption response strategies to minimize TTR and maximize TTS.[18]

CONCLUSION

Quantitative risk management, utilizing prescriptive analytics, would allow CAF leadership to make decisions considering all known variables. As this is an automated process, encompassing all available information and constraints, it will reduce the human capital required to present Commanders with optimal risk response COAs. However, current industry-based qualitative risk management algorithms would need to be tailored to the unique nature of CAF's sustainment priorities, as performance measurement objectives are typically based on reducing the delay in providing operational support, versus minimizing the loss of profit due to a supply chain disruption.

[10] *Ibid., 25.*
[11] *Association of Supply Chain Management, "Supply Chain Operations Refence Model," accessed 12 Novemeber 2020, http://www.apics.org/apics-for-business/frameworks/scor.*
[12] *Gilvan C. Sauza, "Supply chain analytics," . . ., 569 and Hans Ittmann, "The impact of big data and business analytics on supply chain management," Journal of Transportation and Supply Chain Management, no9 (1)(2015): 4*
[13] *Gilvan C. Sauza, "Supply chain analytics," . . ., 595-605.*
[14] *Hans Ittmann, "The impact of big data and business analytics on supply chain management," . . . , 3.*
[15] *David Simchi-Levi, William Schmidt, Yehua Wei, Peter Yun Zhang, Keith Combs, Yao Ge, Oleg Gusikhin, Michael Sanders, and Don Zhang, "Identifying Risks and Mitigating Disruptions in the Automotive Supply Chain," INFORMS Journal on Applied Analytics, no. 45(5): 377.*
[16] *Ibid., 377.*
[17] *Ibid., 378.*
[18] *Ibid., 379-390.*

3PL BENEFITS FOR THE CANADIAN ARMED FORCES

By Major Erika J. Valardo

Major Erika Valardo enrolled in the Canadian Forces as a reservist in January 2001as a Gunner with the 3rd Field Artillery Regiment. Upon completing the Basic Military Qualification, she transferred to a Resource Management Support Clerk. In June 2006, she enrolled in the Regular Force as an Air Force Logistics Officer with a specialty in finance.

Over the years, Maj E.J. Valardo, has worked in various finance positions; currently she is the revenue and receivables officer at ADM (Fin).

Major E.J. Valardo is married to Warrant Officer Steve Valardo, an Airborne Electronic Sensor Operator. Together they have two boys.

AIM/

The aim of this paper is to demonstrate that, on a global scale, the benefits of third-party logistics (3PL) outweigh the weaknesses. It will answer the question of how 3PL brings added value to the Canadian Armed Forces (CAF).

DEFINITION

3PL is defined as:

...essentially a variety of services and processes that are provided to a business by an external company for a variety of reasons such as wanting to reduce costs, improve efficiencies and expand capabilities. 3PL services are usually flexible and scalable based on the needs of the business, meaning that they can be utilized on an as-needed basis, or as a long-term solution depending on the goals and objectives of the business.

BACKGROUND

The official date the term 3PL was conceived is not immediately clear. According to Logistics List , the term 3PL can be traced back to the 1970s and 1980s as companies began outsourcing logistics services to third-parties. The use of 3PL began to rise when trucking regulation within the Motor Carrier Act of 1980 was alleviated , which reduced trucking rates.

That notwithstanding, the use of third-party logistics within the military can be traced back more than two centuries, having been utilized as early as 1867 during the reign of Emperor Meiji when Japan requested Western Military Missions to help modernize their armed forces. This became a major contributor to Japan's industrial rise in the later 1900's .

BENEFITS

3PL providers offer several benefits to the CAF. They include, among others, reducing costs by not having to maintain our own space for inventory.

Being the largest department within the Canadian Federal Government, the CAF accounts for approximately 7.3% of the total Main Estimates for Canada (transfer payments made to other levels of government).

One of the primary benefits when utilizing 3PL is the cost savings that outsourced services can achieve. Optimization of a limited budget enables financial resources a wider reach and allows for sound stewardship of monies.

By cutting out inefficient processes, 3PL providers can improve the military's supply chain management system. Many have a global network which allows for extremely efficient transportation of resources, thus decreasing the cost and further improving financial stewardship. 3PL offers the ability to rapidly fill temporary voids, which offers the CAF the ability to adapt to multiple environments easily and to quickly cancel those resources when the services are no longer needed. This results in additional cost savings to the CAF.

The CAF's contract with Logistik Unicorp to provide Non-Operational Clothing and Footwear (NOCF) to the CAF is an example of how the CAF does benefit from the use of 3PL suppliers. Logistik Unicorp specializes in the management of clothing. By engaging their services, the CAF ensures that clothing is managed by one entity that includes warehousing, shipping, stocktaking etc. This generates cost savings by reducing the footprint of NOCF at CAF supply depots, freeing up space and enabling the storage in-house of other essential items that are currently being stored at offsite facilities. Furthermore, Logistik Unicorp also provides the ability for personnel to order items they need online and have them shipped to their door. This service also allows for quicker turnaround times for product improvements, reduces the risk of depleting stockpiles, and saves personnel time by avoiding lineups for kit issues.

Flexibility and Versatility

The flexibility and versatility 3PL outsourcing activities bring to military sustainment continue to grow. Depending on the logistics transformation requirements within an operating environment, 3PL can be as simple as buying one "widget" or as multifaceted as outsourcing multiple logistical capabilities for multiple operations all at one time.

The CAF, along with many other militaries, use 3PL suppliers to enhance their flexibility during operations. Within the US military, Jessica McCarthy highlights this aspect by stating:

...the US military finds itself increasingly stretched to meet an intense and broad set of demands. With an increased operations tempo and cuts to budgets and force size, military contractors have shifted from supplemental to operational necessity. Contract support in both garrison and contingency environments is now not only common, but also expected by commanders.

World affairs have grown more unpredictable and have created an increased need for the Canadian military's involvement on a global scale. The CAF, like our US allies, continues to find itself trying to do more with less. Using 3PL allows the CAF to focus on their core tasks and leave non-core activities to outside providers, thus freeing up military personnel for duties only they can perform.

The use of the Calian contract is an excellent example of how 3PL within the Canadian military is advantageous and increases flexibility. Calian brings a significant number of supporting components to the CAF, such as providing training services (including learning material, delivering and evaluating training), offering the military family doctor networks, designing and delivering fundamental components for light armoured vehicles, and offering many other contracted logistic options. Calian provides a turnkey solution that supports military personnel in being more agile and allows commanders the flexibility to shift their focus to ensuring our military personnel are concentrated on domestic and global operations .

Strategic Alliances

3PL relationships are characteristically more complex than conventional ones, so building strategic alliances between the CAF and 3PLs to simplify these relationships is essential.

The CAF cannot be experts at everything. In order to continue to improve operational effectiveness and sustain military needs, strong alliances with 3PL suppliers are required when the CAF is seeking specific skillsets of capabilities, experience and innovation. The CAF can use these strategic alliances to enhance the organization's ability to meet rapidly changing conditions. 3PL alliances not only offer a foundation for improving military capabilities, but they also play a major role in-service support.

For example, the CAF is exploring the use of 3PL to provide future aircrew training. Col Pete Saunders, Director of Air Simulation and Training, stated "in the end, the foundation of the Air Force is our ability to generate qualified aviators" and for the Royal Canadian Air Force (RCAF) to obtain this foundation, the CAF is counting on 3PL bidders to design a training system that will combine two existing training programs involving seven different platforms . The winning bidder is expected to carry out the program for 20 years. This strategic and strong alliance with the winning provider will help the RCAF focus on core competencies by returning military personnel to the operational units where they are needed vice providing in-house instructional services.

INHERENT RISK

Focusing on the benefits of 3PL is relatively straightforward, but the risks must also be taken into consideration to determine if 3PL is a proper course of action. Ensuring that the effectiveness of, and the culture within, the CAF are not impacted negatively takes precedence over convenience.

Loss of Skills

Increasing the use of 3PL creates the significant risk that the CAF is replacing military personnel by contracted services. This replacement could result in a loss of skills and capabilities required while on operations or deployments where 3PL providers may not attend, and could have a detrimental impact on the effectiveness of an operation. As an example, 3PL staff could refuse to enter unstable regions due to security threats, thereby increasing the risk of the CAF not being logistically supported, potentially leading to mission failure. This reduces the confidence that a 3PL will provide the required services at all times. As such, there needs to be a balance between 3PL and integral logistic capabilities, an aspect that Jessica McCarthy highlights in her article .

Increased Costs

Replacing integral logistics capabilities with 3PL services can result in scope creep due to missions extending longer than expected, producing unexpected/unplanned increased costs. An example is the CAF's purchase of 28 CH 148 Cyclone helicopters. This contract was signed for $3.2B in 2004, however, due to delays and overrun costs, the total project cost almost doubled to $6.2B .

Loss of Control

The military is known for their controlled style structure and engaging with a 3PL service provider results in some loss of control within the organization. Once a 3PL provider is contracted to deliver a service, there is the potential for the loss of control in a situation resulting in the CAF being unable to successfully execute the mission. As a result, any unsatisfactory service received can portray an unfavourable image for the CAF and reduce morale in service members.

CONCLUSION

In the current volatile and complex operating environment, it is beneficial to use 3PL providers alongside our organic capabilities. While there are weaknesses and inherent risks involved in utilizing them, it is believed that the benefits of using another organization's skills and knowledge to foster enhanced financial stewardship, increase flexibilities and build strategic alliances will enable the CAF to re-align resources and focus more on mission success.

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THE CANADIAN ARMED FORCES AND THE RAILWAYS

FROM THE HEYDAY TO THE DECLINE

by Major Lubomir Tkacz

Maj Tkacz joined the Army Reserves in 1989 as a Vehicle Technician. In 2000, he transferred to the Regular Force as an Armoured Officer. In 2007 he became an RCAF Logistics Officer. He has deployed to Afghanistan and Poland, both NATO missions. He has commanded sub-units as a Transportation Officer, a Movement Control Detachment Commander and performed the duties of an Officer Commanding as a Replenishment and Engineering Officer. His postings have included Gagetown, North Bay, Comox, Winnipeg, Borden and Montreal.

AIM

Rail transport was once a significant contributor to military movements in Canada. During some operations it was the only means for deploying forces. This essay intends to demonstrate how the Canadian Armed Forces changed from a state of integration with the railroad companies to a minimal user of rail transport.

INTRODUCTION

Railways offer the most efficient means of transport and movement for militaries on land. Since the earliest days of rail, armed forces around the world have been using them as a strategic and operational advantage and force multiplier. In recent decades, the Canadian transportation system has faced a decline in rail transport and so the options available to Logisticians have been reduced.

Brief History Of Canadian Military And The Railways

The boom of Canadian railway building and expansion occurred in the decades prior to World War I. William C. Van Horne, a name synonymous with the Canadian Pacific Railway (CPR), became General Manager in 1885 and put into play the vast experience he gained from the American Civil War.[1] Railways in that conflict were used quite effectively and were even credited with winning battles such as the Confederate victory at Chickamauga in 1863.[2] By 1914, Canada was home to 90 railway companies, three of them transcontinental. The latter owned 80% of the track. Only the USA, Russia, Germany, India and France had more rail.[3]

World War I in Europe witnessed extensive use of railways for troop and equipment movement. Germany used the rails to their advantage in quickly deploying, redeploying and transferring its military might from one front to another.

SOLDIERS FROM CFB VALCARTIER PREPARE ARMOURED VEHICLES FOR TRANSPORT TO THE JOHN MOLSON RAILWAY STATION IN QUEBEC CITY, QUEBEC, ON MARCH 14, 2018, IN PREPARATION FOR EXERCISE MAPLE RESOLVE, TO TAKE PLACE IN WAINWRIGHT, ALBERTA.

PHOTO: CORPORAL NEDIA COUTINHO, VALCARTIER IMAGING SERVICES

Canada was asked for railway troop support by Britain in 1915. In response, the Dominion gave birth to the Canadian Overseas Railways Construction Corps (CORCC). This new specialist unit had 507 officers and soldiers on its roster, recruited mostly from the CPR. The corps was responsible for railway repairs and reconstruction in Europe throughout the conflict. By the Great War's end, nearly 15,000 troops had served in this entity.[4] They were a multi-purpose asset, not only building short distance, narrow gauge resupply lines and repairing existing railways, but also constructing defensive installations such as bunkers. One of the more famous victories of the conflict came at Cambrai in November 1917 where, prior to the battle, railway troops moved 460 combat tanks to the battle area in one night.

Throughout the war, the CPR, among others, made its vast resources available to the British Empire. From trains to tracks, shops, hotels, ships and people, all were offered to the war effort. The entire transport system moved over one million troops and passengers and delivered four million tons of cargo.[5]

World War II and the intensity of conflict reinvigorated the railways and their support to military operations. At its outbreak in 1939, railway units were recalled to active duty in the first wave of mobilization. They consisted of two Railway Operating Companies, two Construction Companies and one Workshop Company. Recruiting for these Royal Canadian Engineers sub-units was delayed, however, due to other priorities taking precedence such as the Commonwealth Air Training Plan. Finally, after repeated requests from Britain, who experienced a shortage of railwaymen, Canada stood up four companies in March 1943. Two were Railway Operating Companies, one Railway Workshop Company and one Railway Telegraph Company, part of the Signal Corps. These troops began training in England in military units, as well as with railway companies, under the authority of the War Office. Following the Normandy invasion in the summer of 1944, these companies began deploying to the European mainland to support operations. These operations included rebuilding railways damaged by fighting in France, Belgium and even Germany, with the help of German citizens. Work was also performed on repairing rolling stock and assembling American-made rail cars. Following the end of the war, in July 1945, the Canadian Army began disbanding the railway units. By November of that year, all sub-units and the Headquarters were dispatched into the history books.[6]

World War II saw the CPR involved on an even larger scale than in the Great War. The company shipped 307 million tons of freight and 150,000 troops. In addition to transportation, CPR offered its shops in Montreal and Calgary to make munitions and build naval guns and battle tanks.[7]

European Success – Military Rail Movements

Today, the European continent possesses a vast rail network, most of it is in the same standard gauge and reaches all corners of the continent, allowing for rapid deployments across the European Union. Military forces like the British and US Armies take full advantage of these networks. In 2017, these two allies even conducted an exercise encompassing a rail movement through the Channel Tunnel, which is normally reserved for civilian purposes.[8]

Russia deployed large, conventional infantry and armoured forces primarily by rail to its neighbour Belarus for Exercise ZAPAD in 2017. The intent was perhaps multi-faceted, but it underscored Russia's current capacity for large deployments using railways.[9]

In March 2018, the European Commission presented an Action Plan to improve military mobility in the European Union and beyond. This plan came to fruition as result of a requirement to enhance security. It centres on a number of measures designed to overcome physical, procedural or regulation-based obstacles. One of the initiatives involves upgrading the transportation infrastructure, including railways, to allow for quicker deployments of forces.[10]

The significance of military rail movements and the general establishment of security in Europe in the last decade have resulted in new projects being developed. One of these is the dual-use (civilian-military cooperation) transportation infrastructure renewal. It is promising the provision of funding to fill capability gaps experienced by civilian enterprises. One such plan is the development of Rail Baltica. This route will be an 870 km long high-speed corridor from Tallinn to Poland, passing through Latvia and Lithuania. Its addition will not only aid military movements but also crisis management contingencies, cargo and passenger transportation, as well as a reduction in pollution due to an anticipated decrease in the use of personal vehicles. This type of dual-purpose initiative is deemed to be especially valuable in less developed areas of Europe.[11]

The successful, widely used railroad system in Europe serves as an example to Canada. The building of new routes for dual military and civilian use offers multiple advantages, yet is in contrast with the seemingly shrinking Canadian railroad transportation system.

The Decline Of Railways In Canada

The end of World War II brought about a new era of change in transportation across Canada. The airlines offered a rapid, affordable travel option from coast to coast. Road transportation almost simultaneously experienced steady development as more cars and highways became available to the Canadian population. The trucking industry, with its door-to-door delivery capability, expanded exponentially. In 2009, Statistics Canada reported that rail transportation contributed $5.4 billion to the economy while trucking was responsible for $17.1 billion, more than threefold that of the railways.[12] Today, 70% of freight is transported by truck compared to 30% moved by rail.[13]

The above maps from 1943 and 2019 demonstrate the disappearance of railways in Eastern Ontario. A resulting effect on the CAF is that Pembroke and Petawawa are no longer serviced by the Canadian National Railway or any other rail company.

The building of the Saint Lawrence Seaway in the 1960's also had a negative impact on railways in Ontario. This development of a new waterway allowed ocean-going vessels to reach the Great Lakes and ports such as Toronto and Hamilton. CNR routes like the Cornwall – Cardinal link were removed and branch lines such as the one from Golden Lake to Pembroke also disappeared.[16]

Canadian Forces Bases such as Gagetown, Petawawa and Borden dismantled their railheads completely, leaving no choice but to use contracted or military road transportation. In 2020, Exercise Maple Resolve was cancelled and vehicles slated for this operation were returned by two trains from Wainwright, Alberta. Because of the lack of rail service to Petawawa, the trains were off-loaded in Prescott, Ontario and 130 vehicles were driven the Base, a distance of 230 km,.[17]

Ambulance trains once existed and were an option available to the CAF. The Movement Support Rail manual still makes mention of them.[18] It would be difficult to envision even tendering for such a train today. Not only would the industry be puzzled, but also likely not be able to provide without extensive conversion of passenger cars. The preference for the CAF to move casualties by road and air most probably means that serving members may never see another ambulance train.

Fig 1. Eastern Ontario Railways in 1943.[14]

Fig 2. Eastern Ontario Railways in 2019.[15]

From 2011 to 2020 there were just 16 military rail movements, or less than two per year. Competition from regular railroad customers wanting to utilize the same flat cars required by the military has made it difficult for the CAF to use trains.[19] As a result, the Canadian Armed Forces have minimized the use of rail transport.

CONCLUSION

Since the end of the Second World War, railway companies have been losing ground to airlines and road transport. This shift has forced the dismantlement of tracks and loading ramps on most Canadian military Bases, obliging the CAF to almost exclusively employ road transportation, with only an infrequent use of trains. To compound the issue, the railroad giants themselves seem to prefer their regular customers, such as farmers and the oil industry in the west, making the less frequent military customer of less interest.

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US FOREIGN MILITARY SALES:

A TRANSPARENT SOURCE OF SUPPLY

by Major Simon Bowser

Maj Bowser spent three years (2017-2020) working in Foreign Military Sales while he was posted to 1 Canadian Forces Logistics Liaison Unit as the Detachment Commander with the United States Army Security Assistance Command. During his time with the US Army he held positions as Army LO to the Enhanced Freight Tracking System working group, Deputy Chairperson of the International Customer User Group, and Chairperson of the Security Assistance Liaison Officer Committee. Maj Bowser is currently completing the final requirement of his post grad studies in Government Contracting and Acquisitions from the American Military University, while employed at CTC HQ as the G8.

AIM

The Department of National Defence is in a perpetual state of investment and reinvestment to ensure its members are equipped and ready to protect Canada and its interests. The aim of this paper is to highlight the Foreign Military Sales (FMS) program of the United States' (US) Department of Defense (DOD). It will articulate the advancements DOD has made to increase value for international partners, including oversight, supply chain management, and training, and demonstrate that US FMS is a viable source of supply (SoS) that should see increased use by Canada.

INTRODUCTION

Canada's current Strong Secure Engaged (SSE) defense policy's vision has three pillars. Strong at home requires the Forces to be ready, through both training and equipment, to defend Canada and assist our governments in times of domestic crisis. Secure in North America means upholding commitments to Canada's strongest defense

U.S. MARINES WITH COMBAT LOGISTICS REGIMENT 17, 1ST MARINE LOGISTICS GROUP, I MARINE EXPEDITIONARY FORCE, CONDUCT VEHICLE RECOVERY DRILLS ON CAMP PENDLETON, CALIFORNIA, APR. 6, 2021.THE MARINES OF MOTOR TRANSPORTATION PLATOON PRIDE THEMSELVES NOT ONLY ON THEIR VEHICLES, BUT ON EACH MARINES' HARD WORK, DEDICATION, AND DRIVE TO EXCEL IN ALL THEY DO.

PHOTO BY JOEL RIVERA-CAMACHO ON UNSPLASH

partner through interoperable equipment, practices, and processes. Being engaged in the world is dependant on Canada's ability to be interoperable with its allies abroad in combined operations.[1] Each of these pillars has requirements for acquisitions that support the Canadian Armed Forces (CAF) in obtaining both equipment and training. Being able to accomplish this vision and the 111 associated initiatives requires a significant investment in defence spending. For this reason, the policy also includes a plan to increase the defence budget from $18.9 billion to $32.7 billion by 2026-27.[2]

This projected increase will create additional demands on defence suppliers. Canada's defence industry has approximately 600 vendors of various sizes, with annual sales totalling $10 billion. While these suppliers do have research and production capacity to support some of the CAF's needs, 60% of their output is exported.[3] These companies will undoubtedly expand in response to the increased demand, however, the growth, research and development (R&D) investment, and breadth of systems produced will still pale in comparison to that of the US.

In 2018 the US produced and sold $192.3 billion worth of weapons systems, a 13% increase over the previous year,[4] representing over 50% of the world market. Its long established and well-known top five industry leaders Lockheed Martin, Boeing, Northrup Grumman, Raytheon, and General Dynamics account for 76% of the total US production.[5] While each of the firms spends considerable amounts of internal funds on R&D, the US Government spends an additional $55 billion. This is 300 times more than Canada's $183 million. These expenditures, which account for 79% of the spending of all countries in the Organization for Economic Cooperation and Development (OECD), are the reason why it is the world leader in new defence technology and production .[6]

The US has a strong program for supporting the defense needs of its partners, allies, and developing nations. Of the $192.3 billion in defence industry sales, $55.4 billion is exported to allies and partners by the Defense Security Cooperation Agency (DSCA).[7] It is responsible for advancing "the US national security and foreign policy interests by building the capacity of foreign security forces" through the administration of US security cooperation (SC) programs focused on FMS,[8] the program that facilitates the sale of US military equipment to other nations.

While Canada recognizes that there is a benefit to the US FMS program, we do not use it to a significant degree. At the end of 2019, Canada's total FMS program consisted of only 334 open cases, with an order value of $3.7 billion (USD).[9] This included naval, air, and land-based weapons systems and related replacement parts, as well as training, munitions, publications and repair cases. With advancements in technology and process, the US FMS system provides ample opportunity to become a more formidable SoS for Canada.

DISCUSSION

There are mitigating factors to increased FMS spending. The Industrial and Technological Benefits (ITB) policy: Value Proposition Guide outlines five criteria that should be used to evaluate value propositions for defense and security procurements. They are:

a. Work in the Canadian defence industry,
b. Canadian supplier development,
c. Research and development in Canada,
d. Exports from Canada, and
e. Skills development and training.[10]

As four of these criteria directly reflect the goal of the ITB to benefit Canadian suppliers, industry, and research and development, it is apparent that any increase in investment in external SoS must be met with complete process transparency. This is critical not only to Canada also to other partner nations. Recent studies of government acquisitions have shown that, despite the presence of oversight bodies such as the National Audit Office (NAO) in the UK,[11] and Government Accountability Office (GAO) in the US, modern acquisitions are failing to meet budgetary and schedule targets due to lack of oversight.[12] DSCA, recognizing this, has made advancements that allow for increased oversight, supply chain management, and training, in order to improve transparency.[13]

Oversight

As FMS occurs outside Canada, the CAF's ability to ensure fair processes and value could be perceived to be limited. While government to government relationships focus on strategic level activities, DSCA has programs and processes to improve oversight at lower levels as well. At the operational level, it coordinates with the Directors of the partner nations' purchasing agencies. This happens at quarterly meetings of the Foreign Procurement Group (FPG), where security assistance policy is developed, explored, and amended, when applicable[14]. At the tactical level, the International Customer User Group (ICUG) represents the interests of FMS partners, with a focus on gaining enhanced access to US FMS IT systems and constituting working groups to improve IT transparency and capability.[15]

To further perpetuate transparency, every partner nation is invited to have an LO stationed at one of the three IA's program offices. In addition to Canada's project based LOs and exchange officers around the country, the CAF has three dedicated FMS LO detachments in the US, one at each IA, sponsored by ADM(Mat) D Mil C. Each of these LO detachment members has enhanced screening by the US State Department and each IA's security command, which permits them access to the US systems of record for inventory viewership, process management and requisitioning, supply chain oversight, and business analytics.

Oversight of the processes is further enhanced at both tactical and operational levels by the web-based Security Cooperation Information Portal (SCIP). SCIP, created by DSCA, provides "visibility of information about US FMS and other key security cooperation programs and processes.[16] It provides a user-friendly interface for enhanced managerial oversight.

Supply Chain Management

The Defence Logistics Agency (DLA) is the global supply chain manager for the DOD and other federal agencies. DLA "supplies 86 percent of the military's spare parts and nearly 100 percent of fuel and troop support consumables", supporting over 2,400 weapons systems with approximately five million line items.[17] The SCIP provides access to applications that allow FMS managers to have up to date, controlled access to DLA's information. This includes the FedMall inventory application, Material Release Order (MRO) tracker, and Enhanced Freight Tracking System. The system also houses discrepancy and repair reporting applications for managing supply discrepancy reports (SDR), transportation discrepancy reports (TDR), and the return of repairable items web-application (WebRoR).[18]

Using the SCIP, the CAF can maintain knowledge of product availability, accurately predict administrative and procurement lead times, and monitor the flow of materiel from US supplier to CAF depot, including receipt and signature. This level of oversight creates stability and transparency when determining if FMS will provide the best product, at the best price and most efficient service in order to deliver the right product in the right quantity, at the right price, at the right time.

Training and Education

While the CAF does not currently have a dedicated FMS training program, the US DOD does offer security cooperation and FMS courses through the Defense Security Cooperation University (DSCU).[19] These courses are open to individuals posted into positions in the US, and while spaces on classroom courses are limited, some are available for free through their online learning portal. They provide information targeted at US FMS employees, including US DOD Security Cooperation Officers (SCOs), and international partners.

The CAF also has its own collection of primary guidance on FMS. The Procurement Administration Manual (PAM)[20], and two sections of PSPC's Supply Management Manual (SMM)[21] cover technical questions and process flow. There are also two Material Management Instructions (MMIs)[22] [23] that, when read in conjunction with the US Security Assistance Management Manual (SAMM), describe the FMS process. The SAMM[24] is the guiding document for US FMS.

The corporate knowledge held at PSPC and ADM(Mat), in conjunction with the detailed MMIs, PAM, and SMM, provides a wealth of knowledge for CAF members involved in FMS. This body of knowledge, when added to the US FMS guidance of the SAMM and DSCU courses, ensures that those involved are well informed and capable of understanding the system and using the available tools to enhance transparency.

CONCLUSION

The US systems for oversight, supply chain management, and training are robust and transparent. The oversight provided by the international partner organizations of the FPG and ICUG, that DSCA facilitates, ensures that US policy supports FMS as a dependable SoS. The IT systems, and the access afforded to those Canadian agents working within the embassies, detachments, and purchasing departments in Ottawa, provide for unprecedented control and transparency of the supply chain from request to receipt. Finally, the training and FMS body of knowledge available from DSCA and Canada itself ensure that those operating in FMS understand how to maximize the benefits it affords. The enhanced transparency renders FMS a dependable, transparent option, the use of which the CAF should increase to accomplish Canada's strategic and operational initiatives.

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MEMBERS OF HER MAJESTY'S CANADIAN SHIP SASKATOON CAREFULLY MANEUVER THE SHIP AROUND A LARGE PIECE OF ICE WHILE TRAVELLING THROUGH THE AMUNDSEN GULF ON AUGUST 22, 2015 DURING OPERATION NANOOK.

PHOTO BY CPL DONNA MCDONALD, AETE IMAGERY DATA SYSTEMS.

THE VESSELS OF THE NAVAL ESTABLISHMENTS

Non-Attributed

H.M.S. TECUMSETH

Built at Chippewa in 1815 H.M.S. Tecumseth was one of two post-war armed transport vessels put in ordinary at Penetanguishene (the other being H.M.S. Newash) with the advent of the Rush-Bagot agreement in 1817. She was originally equipped with two 24 lb. long cannons and two 24 lb. carronades. H.M.S. Tecumseth was originally active on Lake Erie through to the end of 1816 before being transferred to Lake Huron the following spring.

H.M.S. BEE

The schooner Bee was one of the three major transport vessels operating mainly out of the Penetanguishene Naval Establishment. Built at Nottawasaga (along with her sister ships Wasp and Mosquito) and schooner rigged, she was designed to negotiate the waters of the Great Lakes, and served as a vital link in the carrying of essential equipment and supplies between British bases and locations.

BATTEAU

These flat-bottomed boats were used extensively at the Nottawasaga River depot and their employment there is documented in the entries of the logs of vessels such as H.M.S. Tecumseth and H.M.S. Newash. They connected the River route to the Establishment at Penetanguishene where they were deployed in great numbers. The survey of 1820 lists eight batteaux, ranging in length from 35 to 40 feet. Although absent from the 1827 survey, three are listed for sale in 1831-2.

GIG

The Oxford English Dictionary describes the gig as a "light, narrow, clinker-built ship's boat, adopted either for rowing or sailing". Gigs are anywhere from 16 to 27 feet in length, and suited to swift rowing with six or eight oars. Gigs were sometimes the private property of the captain, or commander. They were common vessels in Upper Canada. The 1820 survey of Penetanguishene notes a gig of 29 feet and one of 20 feet. In 1827 there was one of 24 feet. The list of boats for disposal in 1831-2 included a gig of 19 feet and two of 32 feet. The latter were described as "late survey boats" and are almost certainly the "Troughton" & "Ramsden" utilized by Bayfield & Collins.

JOLLY BOAT

The Oxford English Dictionary defines the jolly boat as a "clincher-built ship's boat, smaller than a cutter, with a bluff bow and very wide transom, usually hoisted at the stern of a vessel, and used chiefly as a hack-boat for small work." The jolly boat was frequently known as the "blood boat" from the practice of using it to transport fresh meet from shore to ship. Jolly boats were carried by the Tecumseth and Newash and came to Penetanguishene with them in 1817. Their use for a wide variety of tasks is illustrated in the two warship ships' logs.

THE SKIFF

The Oxford English Dictionary defines the skiff as "A small sea-going boat, adapted for rowing and sailing; especially one attached to a ship and used for purposes of communication, transport, towing, etc. Hence a small light boat of any kind." At Penetanguishene a skiff of 14 feet in length is recorded in the 1820 survey; two are returned in 1827— one of 16 feet, the other of 12 feet.

INTERVIEW WITH SARAH BARNES-HUMPHREY

You were recently named in the Top 100 Most Influential Women Leaders in Supply Chain by both Supply Chain Canada and Global Women Supply Chain Leaders, so congratulations on those achievements. Can you tell us what drew you into the supply chain field and how you got started? Was this where you saw yourself early in your working life?

Thank you! I feel like Supply Chain is in my blood because as far back as I can remember my family had been talking about logistics at the dinner table. My parents owned a freight forwarding company, and after high school I wasn't sure what I wanted to do so I went straight into the family business. I originally wanted to be a detective like my grandfather was in Scotland Yard, but the more I learned about supply chain the more I knew that is where I was meant to be. I worked in every aspect of the business, so I got a really good understanding of how important supply chain is to any organization, and I was hooked!

You are the host of the popular podcast, blog, and YouTube channel Let's Talk Supply Chain. What inspired you to go into digital media and create these great products?

In 2015, I was the Director of Sales and Marketing of a freight forwarder and I knew that it was important for us to tell our brand story. I was listening to a lot of podcasts at the time and I thought "well, hey, if Lewis Howes can do it why can't Sarah Barnes-Humphrey"? So that's what we did. In the fall of 2017 we shut the doors to our family business and I continued on the journey in digital marketing, not knowing where it would lead, only that I enjoyed it.

Today thousands of followers listen to your podcasts, read your blog posts and you have appeared in a number of media outlets. How were you able to attract so many followers?

I am so grateful and blessed to have the community and followers that I do. I think it's because I show up. I truly believe consistency is key, so I show up by releasing great content at the same time every week; I show up when I make a mistake and I show up as my true self. I also have really great team members who are passionate about what we do and work hard to create good content.

In your podcast, you have a series titled Women in Supply Chain. What are some of the key features, roles, perspectives, or assets you see women bringing to the supply chain environment?

There are too many to count really. I started the series because I wanted to learn more from women in the industry, the hurdles they faced, how they overcame them, get their advice, and just to understand how they got to where they are today. We feature women from all walks of the profession so it gives a really great insight into how they think and what each one of them brings to the table. We are all unique and the more we share the more we can work better together.

One of the advantages of being a podcast producer is the opportunity to interact with a diverse set of guests. What are some of the key or memorable lessons you have learned from your guests?

Again, too many to count. Each guest brings something different to an episode, a unique perspective, different personality, and we just have a great time. The most inspiring stories come from the authentic conversations we have on our Blended Podcast, which is our newest offering in diversity and inclusion. We talk about some hard topics but each person shares their actual feelings, knowledge and opinions, and we all end up learning from each other.

In thinking about the future of supply chain or logistics in general, what are some of the trends leaders should be checking into now?

Manufacturing is a big one right now. Before the pandemic most companies were manufacturing for global markets. Manufacturing in China and shipping around the world. Now, because of all the supply chain disruption we have seen, a lot of leaders are taking a closer look at their options. Sustainability is another key area. Boards are taking a closer look at sustainability practices and strategies within their organizations. From packaging to manufacturing processes sustainability is becoming more of a driving force in decisions.

We don't often hear a lot of post-secondary students talk about going into supply chain. We see many considering working in general business, marketing, human resources, finance, or accounting, but not as frequently in the field of supply chain or some type of logistics related job. How do you think we can recruit more people into supply chain occupations?

It is so important for supply chain leaders to talk about what they do, give us a glimpse into their day to day and talk about how much they enjoy it. We also need to see more diverse voices speaking out so that the next generation can visualize a path to success in this field. One of the ways Let's Talk Supply Chain is getting involved is by featuring the next generation in our content. We recently released a monthly live show on our Linkedin, Facebook, Twitter and YouTube accounts called Coming in Hot with Abby Baird, who is a supply chain management student at the University of Arkansas. Abby brings energy, fun, shares her learnings and has guests who answer the biggest questions weighing on the minds of the next generation. We also started a Tik Tok channel to inspire younger people to learn more about a career in supply chain.

What advice would you give to someone who is just starting out in the supply chain world that would help them have a successful career?

Linkedin is your best friend. Create your profile so you stand out from the crowd, engage with posts through reactions, commenting and sharing posts with your own perspective. Connect with folks you would like to learn more from or who have a position you aspire to have. Ask a lot of questions and take every opportunity to try something new; you don't know what you like or don't like or what you might be good at it until you try something new, and there are so many opportunitiess to explore in supply chain.

What characteristics do you think supply chain leaders need to possess to be effective in today's fast paced world?

Empathy is a huge one, and creating safe spaces is also important. Learning to understand instead of respond comes out of empathy. It's really the only true way we can learn about our team members in order to best support them in their journey. Knowing their goals and understanding what they are good at, both personally and professionally, allows leaders to assess someone holistically and to make the most out of their time within an organization, to the benefit of both parties. Then creating safe spaces drives opportunities for innovation. People want to feel heard and so those spaces are extremely important to provide for open dialogues and hearing different perspectives, which lead to innovative thinking and new ideas.

Are there any parting words of wisdom you would like share with us?

Right now is the best time to be in supply chain! The world is watching and there are exciting times ahead. Thank you so much for speaking with me!

About Sarah

Sarah Barnes-Humphrey is one of Canada's most prominent supply chain podcasters and a leading edge industry speaker. She has worked in various roles within the supply chain industry for 20 years. Her podcasts and blogs can be found at: letstalksupplychain.com

TARGETED LOGISTICS TRAINING

A QUANTITATIVE MODEL FOR TECHNICAL TRAINING IN A NEW-SYSTEMS ENVIRONMENT

by Major Andrew J. Adach

MAJ. ANDREW ADACH IS THE OFFICER COMMANDING Support Company at the Canadian Army Advanced Warfare Centre (CAAWC) and has been in the Canadian Armed Forces (CAF) for 16 years. He has experience at the institutional, brigade, joint, and training centre levels as a Logistics Officer and holds a Master's in Business Administration with specialization in Project Management.

AIM

This paper will explore a targeted training model for the implementation of new technology levied through the Defence Supply Chain (DSC) modernization initiative and for wider adaptation as and when required.

INTRODUCTION

As new technology and process innovation continue to enhance our professional relevance and collective capability, shifting the paradigm how personnel understand and employ these resources is equally pressing. In the departmental planning process of DSC modernization, overlooking an appropriate training model will underpin a fragmented integration of a new capability. This paper will employ the forthcoming implementation of Automated Identification Technology (AIT)[1] as a backdrop to the design of a targeted training model for new technology implementation.

In an environment of infinite alternatives, choice can be a daunting proposition. Perhaps this is why Canadians of all demographics and reasons enter the Canadian Armed Forces (CAF) in the first place. The conceptual soldier is one of obedience and limited freedoms, steadfast in their moral conviction, predictable, and nothing else, right? … Not quite! The modern soldier is ripe with intention and moves about their military careers and duties with constant adjustment and corrections, each one's path dissimilar to the others. The variance in those choices holds organizational clues, both institutionally and personally, and if extrapolated, can help leaders make verified, behaviour-based decisions. A deliberate analysis of the propensity of CAF personnel to resist or adapt to new technology will help quantify the organization's human readiness and lay the framework for targeted training modalities.

DISCUSSION

In April of 2010, the Defence Resource Information Management Systems (DRMIS) became the official system of record for the Department of National Defence (DND), amalgamating stove-piped and outdated systems such as the Financial Management and Accounting System (FMAS) and the Material Acquisition and Support Information System (MASIS) into a single platform.[2] The training package which accompanied this endeavour was comprehensive but slow in its delivery, and followed a national phased approach from west to east, with easternmost bases and national depots not seeing training commencement until late 2013.[3] With a focus on roles and positions, localized training took place in order to render the system operable and ensure users retained a serviceable capability. In 2016, the DRMIS in-service support contract was awarded, in part, as a means to rectify the failures to adequately train our experts.[4] [5] A decade from the system onset, Material Management Technicians (MM Techs), formerly Supply Technicians, and other users have a functional reliance on unofficial 'DRMIS Subject Matter Experts (SMEs)' within each organization, made up of technicians who embraced the technology at its onset, or had the wherewithal to adopt it as a cornerstone of their craft. In reality, all MM Techs must be adequately trained to assume the appropriate user roles in order to manage material throughout the DSC and in numerous capacities. The initial training package sets the tone for how the capability will be embraced and

its success is a direct derivative of the intention of its users to adapt it.. Alas, the existential conundrum posed by the Strategic Joint Staff (SJS) J4 Supply was how do we develop appropriate training packages as we head into another DSC modernization?[6]

When a technological change is implemented, end-users may decide to adopt or resist it based on their evaluation of the technology features at its introduction.[7] This conscious consideration process can be categorized as behavioural intention, and is the sum of several explanatory variables. Venkatesh et al., in their study of multi-variant analysis, asserted that behavioural intention was an indicator of 'use behaviour' and developed a unified theory of acceptance and use of technology (UTAUT).[8] This is important because it allows us to take a qualitative factor like behavioural intention and quantify it into useful analytics to determine the propensity of new technology users to adopt or reject new technology. From a project stakeholder perspective, this will help qualify an initiative like AIT and take it from the realm of plausible to probable [or improbable] before any significant investment has been made.

AIT is a widely utilized total asset visibility tool applied within most supply chain networks, both public and private. Its goal is to fulfil a strategic gap in the provision of material to users by enhancing the ability of organizations to provide end-to-end tracking. It has been used since the 1980s and has aided companies like Walmart and Toyota to collect and control supply data for analysis in support of their supply chains and strategic distribution. The technology can increase the accuracy of inventory records by automating data collection and enabling transmission of that data.[9] The DSC modernization project is in the definition phase of integrating this new capability, which will subsequently enter implementation in March of 2022.[10] This event provides an appropriate model and pilot to understand how user behavioural intention predicates system success.

Within the UTAUT model, performance expectancy, effort expectancy, and social influences are used as independent variables, together shaping the behavioural intention of users.[11] Building on the multi-variant model, moderators are inserted to understand the nuanced demographics of unique populations. Venkatesh et al., proposed age, gender, experience, and voluntariness,[12] but other studies have been successful in limiting or changing the moderators to suit their objectives.[13] [14] In fact, in 2016 Venkatesh et al., published a subsequent research paper citing over 50 cases in which moderators and other factors had been successfully altered to fit the model to unique scenarios.[15] In the case of AIT implementation within the CAF, the original moderators could be exchanged for rank, age, and/or trade to understand how they impact intention to adopt the technology. The resultant derivative is a quantitative understanding of the propensity for each rank and trade across the CAF to adopt AIT.

Without undermining the utility of this model for determining the success of new technology implementation at an organizational level, further extrapolation of the moderators will give specific, in-service demographic information on who are the early adopters and who aren't. In turn, the AIT project training team can focus the initial training scheme on how it is delivered and to whom. Furthermore, in a federal government-based study, effort and performance expectancy, two independent variables from the UTAUT model, positively correlated with end-user training capacity on technology acceptance,[16] proving the model to be a useful indicator of training success in this realm. This assessment provides a clear path for targeted training options that consider user adaptation intentions. By interpreting the model outcomes between moderators and independent variables, the potential weak-points in a traditional training scheme can be pinpointed and reinforced through a targeted approach. Through the use of targeted training, the Royal Canadian Logistics Service (RCLS) and CAF writ large will obtain a greater user involvement and potential cost-benefit over non-targeted methods.

CONCLUSION

The CAF has a new-systems training gap that the RCLS is well-poised to define and resolve. The DSC modernization initiative is providing a strategic asset capability long overdue that risks being lynch-pinned by an initial training capability gap that, if history is an indicator, will negatively permeate a decade of use. AIT, specifically by design, will transcend the strategic imperative and fall to tactical-level users to provide capability effects. Defining user propensity to adopt the new technology, by understanding behavioural intention and discriminating the rank, trade, and/or age-based arbitrators, provides a quantitative baseline for targeted training opportunities. As is true that a team's output is tied to its weakest member, new systems technology is only as effective as its most basic operators.

PHOTO BY MARKUS SPISKE ON UNSPLASH

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THE NUTRITIONAL FITNESS IMPERATIVE

By LCdr Caroline Allan

Lieutenant-Commander (LCdr) Caroline Allan joined the Canadian Armed Forces in 2001. She graduated from the Royal Military College in Kingston, ON, with a Bachelor of Arts Degree in Business Administration. While she started her Naval Logistics career in finance, she came to realize her true passion when she became a qualified Food Services Officer. She has served as the Base Food Services Officer and Base Personnel Services Officer in Esquimalt, and currently works in Ottawa at the Director of Naval Logistics Office as the Senior Staff Officer for Food Services for the Royal Canadian Navy.

AIM

The aim of this paper is to highlight the fact that the Canadian Armed Forces (CAF) and its food services organization must change in order to be able to respond appropriately to food behaviors which threaten the wellness of the Forces. It will frame the issue at hand and suggest the need for further study into how the CAF can improve nutritional fitness.

INTRODUCTION

The current food landscape is not conducive to health and wellness. Warnings abound that negative food behaviors are harmful to health, yet obesity is growing to epidemic proportions, and the CAF is not immune. Health and wellness are key to deployability and therefore vital to the ability of military forces to act when called upon. This paper, therefore, will be focusing on the requirement to promote and maintain nutritional fitness considering the current threats facing it.

To show that the need for the CAF to respond to the growing crisis is urgent, an outline of the current societal food trends leading to unhealthy weights, including CAF-specific data, will be presented first. The next section will outline the negative impacts of those trends on both the individual and organization. Third, a review of both the personal and institutional benefits of improvement in this area will be shown. Lastly, the silo'd and insufficient actions taken to date from a CAF perspective will be covered. To conclude, a summation of the key arguments that signal the need to act will be presented followed by a call for further study.

DISCUSSION

Current Societal Food Trends

The availability and consumption of fast food (and associated unhealthy food options) frame the current food culture.[1] Canada's Food Guide provides foundational guidance: "The objectives of the guidelines are to promote healthy eating and overall nutritional well-being, and support improvements to the Canadian food environment."[2] Its recommendations include a high intake of fruits and vegetables, whole grain and protein foods, opting for plant-based protein foods more often, and water as the drink of choice.[3]

A nutrient-poor diet, one heavy in fast food, carbonated drinks, processed meats and refined grains, will be energy-dense, high-fat and low-fiber.[4] These poor dietary patterns are associated with increasing rates of overweight and obesity, which are rising among Canadian adults, according to the Public Health Agency of Canada, from 49% in 1978, to 64% in 2017.[5] Many health-focused organizations are sounding the alarm. The WHO has termed the global obesity phenomenon "globesity".[6]

Outlined in BALANCE – The CAF Physical Performance Strategy, information from the FORCE Fitness Profile 2016/2017 shows similar startling trends in the CAF ranks. On average, 47% of males and 59% of females would be considered overweight, and 24% of males and 33% of females classified as obese.[7]

The United States Army has recognized this threat to their operational capability. The Army Public Health Center speaks to the imperative thusly: "Mission readiness demands a properly fueled body - this could mean the difference between top performance and mission failure."[8] From enlistment standards[9] and weight monitoring programs, to the Army Body Composition Program,[10] nutritional policies, education for members, and the Warfighter Nutrition Guide,[11] the US Army has implemented concrete measures to address the danger.

Negative Impacts

The Canadian Medical Association noted "Obesity is of particular concern to Canada's physicians because it increases a person's risk of developing a number of serious health problems: high blood pressure, high blood cholesterol, heart disease and stroke, type 2 diabetes, osteoarthritis, lower back pain and other musculoskeletal disorders, and many types of cancer."[12] These serious and life-altering illnesses can significantly impact the lives of CAF members.

Beyond the physical are the invisible and equally devastating impacts on mental health. Obesity is linked to increased mental illness, anxiety, depression and low self-esteem. These, too, can have significant effects on individuals. Stigma is another problem facing those who are obese, which also escalates mental health issues.[13]

Not surprisingly, these physical and mental ailments are leading to high health care costs and further stretching health care resources. Obesity Canada states "The annual direct healthcare cost of obesity (including physician, hospitalization and medication costs) is now estimated to be between $5 billion and $7 billion. This cost is projected to rise to $9 billion by 2021."[14] The resulting burden on the health system cannot be ignored.

The profession of arms is mentally and physically demanding. High performance is necessary to ensure continued mission success. The US Army put it as follows: "Individuals with desirable body fat percentages generally exhibit increased muscular strength and endurance, are less likely to sustain injury from weight bearing activity, and are more likely to perform at an optimal level."[15] It follows then, that soldiers, sailors and aviators who are plagued by detrimental health conditions will not be able to perform at the levels the CAF needs from them.

Personal and Institutional Benefits

Conversely, the benefits of improved nutrition are equally far reaching. Maintaining healthy weights contributes to a reduction in illness, injury, mental health issues and health care costs. Many chronic illnesses impacted by diet are among the leading causes of premature death in Canada, including cardiovascular disease and certain cancers.[16] One aim, therefore, of improved nutritional fitness is a reduction in many chronic illnesses and

improved longevity. A secondary effect is the associated decrease in overall health care costs and demand on health services .

Overall improved quality of life for CAF members is a key benefit for both the CAF and society at large. When speaking of the need to support CAF members, Strong Secure Engaged states: "Offering steadfast support to our people not only builds a strong and agile defence organization, but also acknowledges the sacred obligation the Government of Canada has to our military personnel, Veterans, and their families."[17] Strong, healthy soldiers, sailors and aviators are the backbone of military forces. Improved health and nutritional fitness are tied to improved operational capability for the CAF.

Silo'd and Insufficient Actions to Date

BALANCE includes Performance Nutrition as one of its Performance 4 (P4) Behaviours affecting physical performance.[18] While Command support is voiced, concrete actions that are widely known and implemented remain more elusive. Collaboration among key stakeholders has been limited, given that various organizations are operating in isolation. Within the RCN, one such example is the project to remove deep fat fryers on ships, a measure which has not extended to Bases.[19] This lack of a unified, holistic approach adds confusion to a field which is already complex.

While Health and Wellness Working Groups (WGs) exist at various Bases/Wings, the sequential roll up to increasingly higher-level forums, with the proper visibility and attendance by the right people, is not in place.[20] Various stakeholders have similar goals, but continued operation in silos is not leveraging all the knowledge, resources and best practices that can be achieved with collaboration at every level.

A small team of Registered Dieticians resides at Strategic Joint Staff (SJS) J4 Food Services.[21] Due to its size, the team is primarily focused on maintaining existing policies and programs, such as the National Standardized Cycle Menu, which offers one healthier option per meal.[22] Only one portion standard currently exists, thereby lacking consideration of GBA+ principles and the ability to cater to individual caloric requirements.[23] SJS J4 Foods has trialed or rolled out various initiatives, including promotional materials and colour-coded markings, but high staff turnover ,coupled with lack of oversight or a structured network for monitoring and feedback, has led to implementation that has been disjointed and sporadic.[24]

The Province of Ontario stipulates that, on average, adults and youth (13 and older) need 2,000 calories a day.[25] Ontario has implemented policy to help inform consumers via the Healthy Menu Choices Act. "As of January 1, 2017, all food-service chains with 20 or more locations in Ontario must post the number of calories in the food and drink items they sell."[26] Nutritional information on meals served in CAF facilities has not been readily available at food service locations to inform diners' decision making.[27]

PHOTO BY CPL PAES

CONCLUSION

Continued harmful food trends will propagate the obesity epidemic and continue to negatively impact the CAF's operational capabilities Improved nutritional fitness programs can have a multi-faceted positive effect on the health and wellness of personnel. It behooves the CAF to undertake significantly greater, collaborative and more impactful steps along the path to better nutrition for its members.

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Retention in the Canadian Armed Forces

By Major Lindsay Stirling

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AIM

The Canadian Armed Forces (CAF) requires qualified, professional personnel to fulfill its tasks mandated by the Government of Canada. However, there are enduring challenges with retaining members with the essential skills and technical expertise. This paper will discuss the long-term retention problem within the CAF and highlight the civilian strategies being employed to overcome retention issues.

INTRODUCTION

Retaining personnel within the CAF has been an ongoing struggle andt not an easy problem to solve. It affects most occupations and is one that is not exclusive to the CAF, but also exists within civilian industry. The lack of retention can be defined as "an unsustainable attrition rate of qualified personnel opting to release from the CAF prior to their mandatory retirement age."[1] The inability to retain personnel has a direct impact on the CAF's ability to meet expectations and complete the tasks assigned to it by Government. In addition, the loss of the technical and corporate expertise affects the CAF's ability to support operations and increases the need to recruit and train new personnel. In the meantime, the lack of qualified personnel to fill the multitude of vacant positions adds further pressure on existing members to bridge capability gaps, complete mandated tasks and support the mission by working harder and longer, resulting in increased levels of stress.[2] Since historical efforts have not resolved the problem, there is a requirement for modern and more appealing retention strategies to entice members to remain in the CAF, based on best practices utilized by industry.

I will demonstrate this thesis by reviewing the issues and results provided in Auditor General Reports and CAF Retention Surveys, as well as explore the efforts put forward by industry to address retention issues within the logistics profession.

DISCUSSION

Ongoing Retention Issues within the CAF

Shortly after the implementation of the Force Reduction Program that took place between 1992 and 1996, the CAF started experiencing significant issues with retaining personnel and has also been operating below required manning levels.[3] The Auditor General report from 2002, which focussed on recruitment and retention, provided reasons why military members left the Forces voluntarily which included family concerns, organizational climate and morale, and leadership.[4] In an effort to address these concerns, a CAF Retention Survey was conducted from November 2002 through February 2003, representing 19 occupations across all environments. The analysis showed that of the two levels of attrition related issues, individual and organizational, some of the individual issues concerned individual development, postings and recognition, where organizational issues focused more on senior branch leadership and the future of the CAF.[5] The survey established that "if building a retention culture is desirable, a focus on individual needs and flexibility in policy and leadership style is required." Moreover, further recommendation advised that "Career Managers need to pay more attention to members' needs and aspirations and move away from vacancy management to fill positions."[6]

The subsequent Auditor General report in 2006 indicated that, since the last report in 2002, there were only minor improvements made by the CAF and noted that additional work was still required.[7] This audit identified two key areas of concern. First, approximately 50% of Regular Force members having 15 years or more of service were soon becoming eligible to retire. Second, those members who had recently joined the CAF were also at risk to leave the Forces.[8] The CAF attempted to implement quality-of-life programs, as well as changes to terms of service contracts (from 20 to 25 years), and implemented an increase in the compulsory retirement age to 60 years to help counter the attrition concerns. It soon became apparent that these changes may have only further aggravated retention issues as they focused on what was best for the organization rather than the member.[9] Of note, prior to the Auditor General Report in 2006, the CAF devised an Exit Survey issued to members upon retirement to provide insight on the main issues surrounding retention. This survey was issued between 2005 and 2007 and identified that work-life balance was the main reason members were leaving the CAF.[10]

The subsequent Auditor General Report was produced 10 years later, in 2016, and noted that attrition rates were comparable to the previous reports. Additionally, the report outlined that, despite efforts that have been made by the CAF, it fell short of the required manning levels needed to achieve CAF objectives, and retention issues still remained. A prominent point from the report, and one of concern, is that, although a CAF Retention Strategy from 2009 outlined 40 projects to address the retention issues, very little had been done to initiate any of them.[11]

Around the time the 2016 report was released, the CAF authorized a study to explore key concerns for military members, which led to the release of The 2016 CAF Retention Survey: Descriptive Analysis. Both the

Retention Survey and Strong Secure Engaged identify that retaining our military personnel is of the upmost importance and, more specifically, that a serious problem exists, such that significant changes need to be made to secure the preservation of the CAF both now and in the future.[12] Moreover, messaging from both these documents adheres to the same objective: "With the high cost associated with the training, and, therefore, replacement, of employees and the impact this has on the overall effectiveness of the organization, retaining employees is paramount. Personnel retention is thus a strategic concern for the CAF and one of its priorities."[13]

Industry Efforts to Retain Personnel

As it is becoming more difficult to acquire and retain talented individuals, it has been necessary for companies to develop more creative retention strategies. They have done so in such areas as coaching and mentoring opportunities, flexible work arrangements and implementing stay interviews. A stay interview is an interview between a manager and an employee that's designed to learn what keeps employees working for an organization and what aspects need improvement.

Coaching and Mentoring Opportunities

"Mentoring is a natural one-on-one, mutual, committed relationship formed between a mentor and mentee designed to promote personal development beyond any particular institutional goals."[14] Sodexo, a food services and facilities management company, offers a Spirit of Mentoring program aimed at all levels of the organization, highlighting areas such as potential senior-level managers, women and minorities, and frontline workers. It encompasses leadership training, peer-to-peer mentoring, as well as all-employee access to a web-based mentoring platform. Sodexo's goal is to "continue to improve the quality of life for its employees through this enriching culture of mentoring."[15] After more than 14 years since the program began, employees have seen enhancement in their strategic thinking, networking and leading change abilities, in addition to improved leadership skills. They also noted an increased connection with the organization, a better knowledge of business practices and feeling valued by the company. The company has also, in turn, reaped the benefits of increased employee retention levels and improved employee job performance.[16]

Deloitte, a professional services company, has created a digital mentoring program in response to COVID-19. The 180-day program provides individuals with the opportunity to engage company professionals on a virtual platform to examine career considerations and job responsibilities, as well as the chance to benefit and learn from seasoned professionals.[17] Also part of the professional/financial services industry, Klynveld Peat Marwick Goerdeler (KPMG) offers a program called Avenues, targeted at individuals who are at the initial stages of their chosen career path. This program provides employees with a dedicated development manager who provides one-on-one guidance, mentorship and feedback, and ensures the employee is exposed to an assortment of opportunities within the organization, allowing for a more personalized career plan.[18]

Flexible Work Arrangements

Some companies, KPMG included, have also established a flexible work environment for their employees, allowing for compressed work weeks, flexible time, telecommuting and flexible work space. For those with families, they have enabled a working parents networking group that provides the opportunities of like individuals to share ideas and experiences on ways they can bring about balance between their personal and working lives. With greater demands for work-life balance, many employers are implementing adjustable work practices as a strategy towards retaining their best personnel.[19]

Stay Interviews

Many employers have an understanding of the concept of exit interviews, stay interviews are a relatively more recent concept. While the former provide companies with insight as to why an employee left the organization, it is a missed opportunity for the employer to convince the employee to stay. As the name implies, stay interviews allow the employer to gain an understanding of employee concerns and provide for action steps to be taken. Companies such as ArcelorMittal USA, a global steel and mining company, have incorporated stay interviews as part of their business practices and report the positive effect this has had on the retention of their workforce.[20]

Trucking HR Canada is also taking a more proactive role to retain their skilled workers, utilizing stay interviews with its employees on an annual basis, as a minimum, to provide managers with an understanding of what employees deem important. Placing a focus in this area gives managers an understanding of what motivates their employees and presents an opportunity to develop a retention strategy that meets their needs. "The best approach is to veer away from a 'one-size fits all' retention strategy and focus on customizing offerings to support retention of top talent."[21]

CONCLUSION

Retention of CAF members remains a serious issue. More action must be taken to retain personnel. Many civilian companies have developed and successfully implemented creative retention solutions, allowing them to better hold on to their talented employees.

RECOMMENDATION

The CAF should institute similar programs to those found in industry in order to more effectively address retention problems.

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MILITARY-CONNECTED STUDENTS: THE APPROACH AT FANSHAWE COLLEGE

By Darryl G. Cathcart

INTRODUCTION

Since Veterans Affairs Canada (VAC)[1] announced a robust education and training subsidy for Canadian Armed Forces (CAF) Veterans, there has been an increased interest on the part of academic institutions in exploring and developing tailored programming for this unique group of students. This VAC sponsorship enables Veterans to be financially supported during the pursuit of a college diploma, university degree, or other recognized courses and programs. Coupled with a renewed public awareness of the well-being of CAF service members, Fanshawe College in London, Ontario, Canada, decided to pursue a program that supports the post-secondary education of military-connected learners. These students are those who have a significant tie to Canada's military, whether they are still serving, retired, or immediate family of a service member. They have not gained a great deal of scholarly attention since the end of federal sponsorships associated with the mass-demobilization periods of the 20th-century. [2, 3]

While the lack of empirical data presents several constraints, Fanshawe College immediately realized the potential of this group of students and embarked on an exploratory journey. Stated differently, Fanshawe College accepted that there was a lack of institutional knowledge and tailored support, so it was decided to employ a design thinking approach that produces an "iterative exploration of options."[4] Based on extensive U.S. literature, we know that military-connected students face unique challenges in the pursuit of post-secondary studies. The aim of this note on the emerging practice is to present some initial observations in the ongoing development of a tailorable and scalable military-connected campus at Fanshawe College. This campus is defined as the alignment of efforts in developing, synchronizing and allocating resources that produce an organizational capacity to support a group of unique students.

Organizational Structure

Fanshawe College is located in southwestern Ontario with an average student population of 21,000. To effectively produce an organizational change, the college's efforts must permeate each faculty simultaneously along with the existing student support and administrative dimensions.[5] Another challenge presented was the lack of an internal change agent possessing knowledge power[6] where "organizational knowledge is context-specific, relational and dynamic."[7] The implication for Fanshawe is that a gap was identified, leading the college to partner with an external consultant, the author, to conduct an initial investigation, develop options, and implement a tailorable academic and social support framework. Fanshawe's approach was built upon finding an appropriate place in the institution for this project to reside, and the inclusion of an external advisor, and sought cross-campus input through faculty and senior administrative representation on an advisory committee.

Theoretical Approach

Military-connected students are not a homogenous group, rather they represent an extremely diverse, underrepresented population in higher education. While little is known about the number of such students in Canada, according to Veterans Affairs Canada, 764 Veterans were enrolled in post-secondary education between 2018 and 2020. During this same period over 5,500 CAF Veterans were deemed eligible for the ETB[8]. The nature of military service in Canada is such that service members come from all segments of Canadian society. Little research focused on the intra-group differences between these students, meaning this group is often investigated as one homogeneous cohort versus considering the ethnic, racial, sex, cultural, orientation, and gender differences. For military-connected students, enrolment in higher education is met with a duality of social disadvantage, both as a serving or former member of the military or identifying as part of a marginalized community. Viewed in aggregate, these overlapping ecosystems push this cohort to the margins of higher education during a period of prolonged identity shift and uncertainty.

The implementation of this initiative at Fanshawe College is viewed through a transformative research paradigm. This means that power is central to understanding the issue and how inclusion in higher education is viewed, not through a single lens, but by a broader approach which includes the voices of those who were not traditionally considered.[9] In framing the investigation in this manner, the exploration addresses both the potential social marginalization of this unique group of mature students with the personal transition that occurs upon enrolment in post-secondary education.

Initial Results

During the preliminary stages of this project, the central focus of effort remained on determining the composition of the military-connected student population coupled with generating greater institutional awareness. Fundamental to the success of supporting this underrepresented population is cultivating an authentic relationship between these students and Fanshawe faculty, staff, and administration. This connection is fostered through greater awareness of the student population, their noted challenges, and understanding of the type of life experiences commonly associated with service in the Canadian Armed Forces (CAF). In doing so, this approach will serve as the foundation upon which potential barriers are reduced and learning is fostered.

Military-Connected Students

An initial issue was the lack of a common institutional definition and dearth of demographic data surrounding this cohort. For Fanshawe College, they are defined as current serving Regular Force (full-time), Primary Reservists (part-time), Veterans, Department of Defence (DND) public servants, and immediate family (spouse or adult child) of CAF members and Veterans. This determination was made for several reasons. First, financial assistance may be afforded to each of these sub-categories dependent on organizationally related policies. Secondly, Fanshawe acknowledged the duality of commitment surrounding military-connected students, where this socially constructed view is nested within the college's desire to provide barrier-free access to education for all. A sixth sub-category, foreign military Veteran, was added to this proposed definition, which was driven by the geographic proximity of the college to the U.S. and the anecdotal information provided to the advisory committee.

The majority of CAF service members are Caucasian male, 15.9% of the military are women,[10] 8.9% identify as a visible minority, 2.8% identify as an Indigenous person, 9.49% are not medically fit for their specific occupation,[11] nd, since the repeal of the 1992 CAF policy restricting homosexuality in the military.[12] a greater emphasis has been placed on recruiting and retaining members who identify as lesbian, gay, bisexual, transgender, queer or two-spirited (LGBTQ2) Military-connected students represent each of the aforementioned identifiers, yet the size and composition of Fanshawe's potential student population were unknown. In the fall of 2020, an email questionnaire, approved and administered by the college research department, was sent to all 19,104 students, which resulted in 124 students identifying as military-connected. It consisted of 20 questions, including military service association, college program details, and general demographics.

Of these students, 25 were Primary Reservists, one current serving Regular Force, 28 CAF Veterans, two DND civil servants, 28 were identified as immediate family of a CAF member, and 19 as foreign military Veteran. Of the 124 respondents, 40 indicated their biological sex as female and 82 as male. When asked about their program, the breakdown of these students reflected membership in each faculty. Finally, 20 students were financially sponsored by VAC, CAF, or Servicemen's Income Security Insurance Plan (SISIP) Manulife insurance. For those service members who were medically released from the military, retraining assistance may be accessed through SISIP Financial Services,[13] where education funding is available for Veterans under certain conditions.

The identification of this population confirmed some planning assumptions while highlighting many areas for continued exploration. Given the location of Fanshawe College, there was an expectation that Primary Reservists would number among the participants as there are no large Regular Force Bases or Wings near the campus; meaning it would be unlikely for students from this sub-category to be enrolled in on-campus programming. Fanshawe does have many online offerings, however, most participants indicated they were enrolled in full-time on-campus programs, with only 10 attending part-time. Additionally, the number of Veterans in pursuit of a diploma is not surprising as VAC identified 1310 contemporary Veterans living in the London area and over 10,000 in southwestern Ontario.[14] Given these figures, there was an expectation that some Veterans and immediate family would be enrolled at Fanshawe.

Identified Opportunities

In conjunction with the author, Fanshawe College identified several academic and social supports that would benefit these people and contribute to a positive learning environment. Upon leaving uniformed service, military members have the occasion to develop a renewed sense of purpose through further education and establishing a foundation in one's community. Given the transitory lifestyle of CAF members, settling in one area is a departure from their previous experience. This shift emphasizes that students are "an integral part of the inspiring community that exists for the surrounding region to succeed."[15] In other words, an interdependence is fostered between the college, students, and society; meaning, that successful institutional adaptations will aim to synchronize of all three of these elements. This idea is particularly relevant to military-connected students as the alignment of college and community-based support will contribute to a welcoming atmosphere upon successful graduation and reintegration into the local economy.

Prior to an institutional effort to harmonize military-connected initiatives, Fanshawe was already active on numerous fronts with the development of academic programs. These initiatives included the Maple Scholar program through the Kinlin School of Business, the Civil-Military Leadership Pilot Initiative (CMLPI), which is a cross-campus co-curricular program supported by the CAF and Fanshawe, and the college is a member of the National Advanced Placement and Prior Learning (N-APPL) program. The N-APPL is designed to provide academic credit for skills acquired during service. Fanshawe College will build upon these academic supports while simultaneously developing a social support framework for military-connected students. One social contribution to date has been the creation of a club for them. Additionally, opportunities may be uncovered where specialized programming can be explored for this demographic, where future curriculum changes can range from short professional development opportunities to a deliberate attraction strategy aimed at specific military occupations.

Ongoing Successes

While Fanshawe's program is continuing to develop, a key academic cornerstone has been laid. The college recently approved a 'Promise of Support' which encourages faculty and military-connected students to work together in recognizing potential competing priorities between academic and CAF employment requirements. This can manifest itself as a Primary Reservist being offered an unexpected training opportunity or extended academic timelines for a Regular Force member as a result of operational requirements. While these are just two straightforward examples, Fanshawe College's Promise of Support is a positive, college-wide acknowledgement of the dual commitment to learning and service of this group.

Fanshawe College has also received public support in a number of areas. A bursary, funded by 44 North Digital Marketing, has been established along with a community-

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supported financial support campaign. Innovative employment pathways are being developed, most notably through a partnership with Helmets to Hardhats, a non-profit that provides opportunities for transitioning service members, Veterans, immediate family, and senior Cadets. These efforts are enabled through a dedicated employment counselor; an individual who can merge the life experience of military-connected students, completion of formal certifications, and employer needs. Coupled with the creation of the club mentioned above, a Speaker Series was launched where presenters cover a wide range of topics including social and community awareness, leadership, and post-military success. Fundamental to the success of this club is the ambassador, where the inaugural president and vice-president are both CAF Veterans. Fanshawe College understands that the development of a military-connected campus is not a static process, so continued collaboration exists with a number of supporting agencies such as the elements of the CAF, community leaders, and industry. In aggregate, the outcome of these opportunities contributes to increased awareness, pathways to learning, and increased potential for post-military employment.

Areas for Refinement

Military-connected students are required to self-identify and without the ability to consistently define the on-campus population, there may be some lacking the necessary support. In Ontario, this self-identification effort is hampered by the centralized provincial application process where there is no consideration for this cohort of students. While a local solution is available, this is not optimal. Another area for continued improvement remains faculty, staff, and administration awareness given the crucial role they have in establishing a positive learning environment. Fanshawe College is fortunate to have some employees with prior military service and familial connections, however, there is a need to continue to increase the organizational understanding of this group of students. As faculty and staff gain more knowledge concerning their real and perceived transition challenges, this will contribute to the reduction of potential barriers to education. Coupled with increasing institutional knowledge, the cultivation of a specific environment for these students means that organizational awareness must include VAC, DND, and CAF policy comprehension concerning education and training support.

CONCLUSION

The fostering of a military-connected campus at Fanshawe College is an evolving initiative that aims to bridge the gap between Canada's Defence community and post-secondary education. The current shortage of Canadian military-connected student empirical data contributes to a lack of knowledge that may marginalize the concerns of this group. Simultaneously, acknowledging and understanding this deficiency provides Fanshawe College's advisory team with the opportunity to conduct in-depth research and shape the design of an academic and social support framework, inclusive of incorporating the voice of the military-connected student. For Fanshawe College and other post-secondary institutions, there is a great benefit in conducting a deliberate investigation into this subject area. In framing military-connected students as an underrepresented group of adult learners, a realization emerges that a cross-section of Canadian society is represented in the military; meaning these students come from all dimensions of diversity and cultural backgrounds. Their inclusion provides Fanshawe College with an opportunity to deliberately address a distinct and contextual education issue. The combination of unique life experience and a college diploma will result in positive multidimensional outcomes for them, the institution, and Canadian society.

About the author

Darryl G. Cathcart retired from the Canadian Army in 2017 after nearly 26 years of Regular Force service. As an infantry soldier and officer in The Royal Canadian Regiment, he conducted collective training and operations on four different continents. Darryl is a graduate of the Royal Military College of Canada, the United States Marine Corps Expeditionary Warfare School at Marine Corps University, the Canadian Forces College, and holds a Master of Education degree from Queen's University. Currently, Darryl is in his final year of a Doctor of Education in Educational Leadership at Western University with a focus on the role of training and education during the military-to-civilian transition period of service members.

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