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MORE THAN JUST AN INTERPRETER: THE IMPORTANCE OF EMBEDDED MILITARY IN AN EVOLVING DRDC ORGANIZATION

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Exercise Solo Flight

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EXERCISE *SOLO FLIGHT* – EXERCICE *SOLO FLIGHT*

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INTRODUCTION

The global transformation from the industrial age into the information age is dramatically changing the conduct of military affairs. Nations are developing individual solutions that meet their cultural ideology, risk acceptance, and fiscal and industrial capacity.¹ For instance, does a nation favour expeditionary operations, is quantity preferred over quality, can manpower overcome equipment deficiencies, and can the national industrial complex provide the necessary equipment?² The operational solutions to these defence questions are underwritten by defence science and technology (S&T) organizations. A nation's investment in defence S&T is thus a key indicator of the extent to which it embraces modernization.

The Canada First Defence Strategy (CFDS) indirectly emphasizes the importance of S&T through unrelenting allusion to having the tools that the Canadian Armed Forces (CAF) need “to deliver a balanced, multi-role, combat capable force that will give the government the necessary flexibility to respond to a full range of challenges in the years ahead”³. In reality, the CFDS is an untenable grocery list of all possible military tasks, with no assigned priorities for support or funding. As a result of this ambiguity, the Department of National Defence (DND) has been spread too thinly to be able to prioritize defence S&T projects and continues to dabble in industrial age warfighting initiatives. Sooner or later, Canadian defence policy will have to adapt to the realities of the 21st century.

¹ Timothy Garden, *The Technology Trap: Science and the Military* (United States: Brassey's Defence Publishers, 1989), 2.

² Richard Coopey, Matthew Uttley, and Graham Spinardi, *Defence Science & Technology: Adjusting to Change* (United Kingdom: Harwood Academic Publishers, 1993), 1-3.

³ Department of National Defence, *Canada First Defence Strategy* (Canada: DND Canada, 2008), 5-6.

In response to tightening federal budgets and “efficiency” initiatives, Defence Research and Development Canada (DRDC) launched its own transformation in 2011-2012. That transformation resulted in a centralization of authority in order for the institution to more tightly control programming and personnel. It has also incorporated trends used by its closest allies to leverage academia and industry to build the body of science knowledge that will support defence S&T efforts into the future. The new framework enables DRDC to focus on maximizing the impact of its outputs for its clients.

Within the DRDC machinery is a cadre of military staff officers working at the tactical and strategic levels to facilitate defence S&T integration with the CAF. These are more than just translators of blue (science) to green (military) and back. They are educated and experienced and provide liaison, operational advice, research and project management capabilities, as well as higher-level administrative and managerial oversight. Under the backdrop of an inevitable day of reckoning for modernizing Canadian defence policy, the purpose of this paper is to identify what skillsets should be sought by DRDC for its military cadre and what needs to be done to ensure that their corporate knowledge is leveraged for defence S&T benefit beyond their initial posting.

Discussion begins with the concept of *Revolution in Military Affairs* in order to identify how S&T advances are being adopted by defence super/great powers, isolated medium powers, and largely collaborative nations. The Canadian approach will be summarized from the CFDS, from recent promises made by the Trudeau Government, and by reviewing the 2013 publication *Science and Technology in Action: Delivering Results for Canada’s Defence and Security*; it will then be compared to other nations’ models. Building from this discussion, the recent structural changes to DRDC will be explored as a linkage to how Canadian defence S&T has reorganized to be more responsive to a client that will increasingly require its services.

It is at that point that the roles and responsibilities of embedded military personnel become the focus of the essay and the thesis is truly explored. A tremendous investment of time and capital provides DRDC with military staff who can conduct experimentation, manage projects, communicate effectively with clients and industry, and perform organizational management and administrative duties. While very little of the corporate knowledge that was earned at the tactical level returns to DRDC directly, as former military embeds progress through their careers in other organizations they spread awareness of DRDC initiatives, capabilities and capacities. This counter-intuitive model will be supported through discussion on the size and relative top-heaviness of the DRDC military cadre. The reader will be left to ponder how DRDC and the CAF would manage this cadre if future Canadian defence strategy increases the profile of defence S&T.

THE REVOLUTION IN MILITARY AFFAIRS – WHERE DOES CANADA SIT?

The term Revolution in Military Affairs (RMA) conveys the idea that “the manner in which warfighting has changed so profoundly that former approaches are rendered obsolete”.⁴ The concept is generally applied at the state level, and typical examples of countries which have radically transformed include the US, Russia, and Israel. Two primary factors drive these changes: breakthroughs in technology; and a visionary concept of operations that both incorporates those breakthroughs and respects the ideology of state in question. As such, the RMA in each country has resulted in widely varying operational concepts for current and future warfare.⁵ Canada is observing technological advancement and the growing wave of RMA without committing to substantive changes in its own military affairs.

⁴ Dima Adamsky, *The Culture of Military Innovation: The impact of cultural factors on the revolution in military affairs in Russia, the US, and Israel* (United States: Stanford University Press, 2010), 1.

⁵ For the purpose of this essay, RMA will apply to kinetic, warfighting technologies. The cyber domain shall be left for experts in that field.

The US has become “the most techno-centric military in the world”⁶, maintaining a defence research and development effort that dwarfs those of all other nations⁷. This is largely due to an immense and innovative industrial complex that embraces things that are new and futuristic, as well as the broader western immediate gratification culture that favours quick action and results. S&T is embraced by the military, the government, and the people, and the ability to target and strike from a distance has transformed the expectations of the US public with respect to the human costs of war. The US military engages in expeditionary conflicts and expects to hold such a technological superiority that any numerical disadvantage is comfortably mitigated.

The Russian path has led to a very different RMA result. A strong, centralized, authoritarian regime, based on trusted doctrinal concepts prevented techno-romanticism and kept the role of emerging warfighting technologies to their rightful, niche roles.⁸ Russian defence science is very strong, producing some of the best armoured personnel carriers, warships, and fourth-generation fighter aircraft; however, numerical advantage is a quality all of its own, and the bulk of Russian military activities are carried out by overwhelming masses of reasonably-equipped troops commonly using a combination of special and conventional forces in the type of hybrid warfare that was recently demonstrated in the Ukraine.⁹

The RMA in Israel represents a third distinct end state. In the case of Israel, the entire nation is engaged in a single conflict, and most citizens have partaken in either military or security-related governmental action. Industry is honed to operational requirements and continually refines technological solutions that meet the evolving needs of the Israeli Defence

⁶ Adamsky, *The Culture...*, 91.

⁷ Lothar Ibrügger, “The Revolution in Military Affairs,” Special report by the NATO Science and Technology Committee for the NATO Parliamentary Assembly, 1998.

⁸ Adamsky, *The Culture...*, 54-57.

⁹ Diego A. Ruiz Palmer, “Back to the Future? Russia’s hybrid warfare, revolutions in military affairs, and Cold War comparisons,” NATO Defence College Research Paper 120 (Rome: DeBooks Italia, 2015).

Force. For their unique conflict, Israeli S&T companies are world leaders; however, the scope of their efforts is very narrow.

Canadian defence culture is a mix of many of these factors. While Canadians exhibit western instant gratification impatience, the Canadian industrial complex and national treasury are not tooled or mandated to support the manufacturing or procurement of the wide range of technologies required to fully enable a technologically superior force. Similarly, Canada does not have military of sufficient size to adopt a Russian-style approach where good capability is augmented with superior numbers. If Canada would commit to one conflict, or even one type of conflict (e.g. counterinsurgency, arctic or amphibious operations), then the Israeli approach may be feasible; however, the Canadian Government's call to make the CAF "more agile, and better equipped"¹⁰, as well as to "...renew Canada's commitment to United Nations peace operations"¹¹ suggest that the spectrum of conflict for the CAF is unlikely to decrease.

The CFDS envisions a CAF that will "deliver excellence at home, be a strong and reliable partner in the defence of North America, and project leadership abroad by making meaningful contributions to international security" by being able to address the full range of current and future defence and security challenges¹². While replete with bravado, the wording of the CFDS actually opens the door to the current reality in which Canada is an increasingly minor partner in NORAD and CAF participation in global conflicts is always as part of a coalition.

Similar to many European nations, the CAF have neither the manning nor the equipment to conduct unilateral full-spectrum military operations over a protracted period. Unlike Canada, these NATO nations have devised a strategy wherein each contributes a specific capability to a

¹⁰ David Johnson on behalf of the Government of Canada, Throne Speech 2015, 12 Apr 2015.

¹¹ Government of Canada, Minister of National Defence Mandate Letter, Office of the Prime Minister, 13 Nov 2015. Accessed at <http://pm.gc.ca/eng/minister-national-defence-mandate-letter>.

¹² DND, *CFDS...*, 3-4.

collective protection umbrella¹³. In relation to this, the Canadian force generation capacity is relatively ad hoc, in that the CAF may be tasked to send headquarters (HQ) organizations, Special Operations Forces (SOF) teams, Royal Canadian Navy ship(s), Mentor and Trainer Teams, fighter-bombers, or land combat troops (to name a few options available). From this perspective, the CAF can be seen as more like the Australian Defence Forces in that there is a capability to force generate many different capabilities, while continuing to meet unique national defence challenges such as vast territories and coastlines, varying ecosystems, and a can-do domestic attitude.

The bill for keeping such a wide range of capabilities, in addition to domestic and NORAD-specific assets, is untenable and has, in part, led to the in-progress defence review. Under the backdrop of defence spending scrutiny (read reduction) and a plethora of operational tasks, fleet and manpower readiness are failing. The defence policy goal of the new Liberal Government seems to acknowledge this fact and opens the door further to aspects of the European collective defence model when it uses terms such as “stronger and leaner, more agile, and better equipped...¹⁴”.

Concerned that the S&T capability gap will continue to widen, the European NATO model of pooling resources has allowed participating countries to focus on specific technological advancements and generally keep apace of the US and Russia.¹⁵ There have been many successful results of this approach: the Eurofighter competes with the F-35 and Su-35; the Leopard 2 tank is in many ways superior to the M1 and T-90; and the UK disruptive camouflage pattern has been adopted by much of the US Army. Canada’s geographic situation is different

¹³ Ibrügger, “The Revolution...”

¹⁴ Justin Trudeau, email post to DND, 12 Nov 15.

¹⁵ Ibrügger, “The Revolution...”

though; the luxury of falling under the US security umbrella dissuades Canada's dedication such multilateral coordination.

Challenged by the extremely diverse operational requirements of the CAF, DRDC is both an organization of home-grown solutions as well as an engaged international S&T partner. As will be discussed in the next section, DRDC must therefore maintain a critical capability to address issues of strategic national importance as well as to leverage the work and resources of international defence S&T partners.¹⁶ While the former is self-explanatory, the latter is met through the participation in, and often leadership of many collaborative S&T initiatives, including The Technical Cooperation Program (TTCP), bilateral and multilateral research programs, and ad-hoc information exchange opportunities such as international conferences and symposia.

In summary, the CAF is an organization that has broad national responsibilities due to its unique geography and the flexibility that Canada wishes to maintain in terms of contribution options for coalition operations. While this strategy is politically pleasing, it has proven to be untenable; perhaps the ongoing defence review will initiate an overdue RMA that articulates Canadian 21st century warfighting. As a key enabler to the CAF, DRDC has a strategy to support the broad spectrum CAF engagement strategy. DRDC labs must provide standalone expertise in areas of national strategic interest as well as working in a wide variety of S&T 'coalitions' to economize effort.

THE EVOLUTION IN S&T AFFAIRS – WHERE DOES DRDC SIT?

The 2010 federal budget announced a number of cost containment measures in order to ensure that the government was delivering programs in an efficient manner. From this, the

¹⁶ Department of National Defence, *Science and Technology in Action: Delivering Results for Canada's Defence and Security* (Defence Research and Development Canada: DND Canada, 2013), 8.

Deficit Reduction Action Plan (DRAP) emerged in 2011. DND was one of many departments targeted, and as such, the programs and organization of DRDC were scrutinized. This scrutiny led to significant organizational changes, after which embedded military personnel remained a key enabler for client communication and DRDC output delivery.

Prior to 2011, many S&T programs were coordinated at laboratory levels. As such, corporate visibility on milestone achievements, client satisfaction, and technological innovation was limited. Instead, “the centre” was focused on fiscal issues such as manning and resources. Managed by the Treasury Board, DRAP was focussed on accountability and value for money. DRDC therefore suffered when its metrics for success (i.e. client satisfaction) were either too loosely tracked or too intangible for the auditors. As a result, the organization was penalized from the manning and funding perspectives, and significant reform was required.

To address the DRAP-induced emphasis on metrics that prove the value of the organization, DRDC began its own transformation in 2011-2012. *Science and Technology in Action: Delivering Results for Canada’s Defence and Security* (the DRDC Strategy) was published in 2013, articulating the products of the transformation effort as: more centralization of defence and security S&T decision-making authorities and administrative functions; more integration with other government departments (OGDs); and an articulation of the future direction of defence and security S&T investments.¹⁷

From a DRDC corporate perspective, a consolidation of decision-makers and accountants into the centre satisfied the requirement for more integration with OGDs and led to better coordination of the direction of future S&T programming. It also provided the organization with an opportunity to improve project tracking data, such as the real-time documented program of work, to protect itself against future government cost-cutting initiatives.

¹⁷ DND, *Science and Technology in Action...*, 3-4.

For their part, the labs mourned the loss of their relative autonomy. They were also concerned about relatively slow institutional responsiveness due to additional administrative levels beyond their sphere of influence. The concern was that project proposals derived from grass-roots common sense and/or long-nurtured relationships with CAF clients and international partners would now have to pass through the corporate centre of the organization and risked getting stalled or altered. However, many of the quick impact projects (short duration, minimal resourcing) that have historically made DRDC relevant and responsive to CAF stakeholders are still being coordinated, approved, and executed at the lab level.

The DRDC Strategy states that it is essential for S&T outputs to be designed for maximum impact, and that “in order to be so, they must be highly relevant, directed to the right people at the appropriate level, in an accessible format and delivered at the optimal point in the decision cycle.”¹⁸ It also emphasizes the need for effective communication with both the client and the government. Yet to do so, a balance must be made between the client’s immediate needs and the DRDC professional responsibility to provide long-term “technological and knowledge advantage”¹⁹.

Immediacy is alluring, gratifying, consistent with the aforementioned western culture that favours quick action and results, and most certainly relevant. The client and the government want answers as soon as possible in order to respond to operational issues, support procurement decisions, or to justify continued political support; DRDC wants to be, and needs to be seen to be, responsive and enabling. In short, DRDC and its clients want to focus on projects that have the most impact. Furthermore, federal funding cycles are short and the future of a research

¹⁸ DND, *Science and Technology in Action*..., 9.

¹⁹ *Ibid.*

program is only as secure as the ideology (i.e. public support) of the government, so it behooves DRDC to produce more frequent, tangible results.

‘Blue Sky’ science, that which is focused on “the secrets of nature in the absence of tight controls”²⁰ rather than for an immediate application, is more difficult to justify in this model. While knowledge advantage is highly relevant to DRDC scientists, the client is much more interested in results that can answer immediate operational questions relating to issues such as capability improvement and procurement advice. However, effective communication of the idea that blue sky science is an investment, not a hobby, will ensure that some such capacity remains within the DRDC purview.

The government and senior echelons of the CAF cannot hope that DRDC will be able to produce good S&T advice if it has no fundamental understanding of emerging and next-generation developments. But in the information age, it is often academia and industry that are pushing the limits of science. There is thus no requirement for the Canadian government to generate all knowledge in-house; the transformed DRDC thus outsources much of the heavy lifting. While the UK, and to some extent the US, have discovered the advantages and dangers in over-commitment to or empowerment of external S&T partners²¹, keeping DRDC focused on knowledge fusion and application (as well as classified knowledge) offers great potential to satisfy both scientific exploration and product delivery into the future.

Individuals at the interface between the client and DRDC or the government and DRDC must be prepared to meet these two distinct challenges. The first is easy: take a client requirement and turn it into a DRDC project, then take the results and communicate them back to

²⁰ Martin Kilduff, Ajay Mehra, and Mary B. Dunn, “From Blue Sky Research to Problem Solving: A Philosophy of Science Theory of New Knowledge Production,” *Academy of Management Review*, Vol 36, no.2 (2011), 300.

²¹ Keith Hartley, “The Future of Outsourced Services in the UK Defence Sector,” UK, Business Services Association Policy Report (June 2015): 24, 51-53.

the client. Of course, this is an oversimplification of a complicated and iterative process, but the task is quite straightforward. It is much harder to succeed in the second challenge as blue sky science does not produce tangible short-term success metrics. The individuals with these responsibilities must be carefully chosen as they are ambassadors for the organization and may be the only conduit through which information can flow.

Historically, military personnel embedded within DRDC have performed much of the client liaison due to their familiarity with military operations and protocols. It is also highly likely that at the tactical level, these officers have received some advanced education in order to be able to interact with defence scientists and engineers about both science and project management.

For many of the same reasons, military personnel can help to ensure maximum impact in that DRDC products are delivered to the right people at the right level. It is therefore important to also include military staff in the upper echelons of the DRDC corporate centre. The difference at this strategic level is that instead of being about science, discussion is more about programming and governance; wider intellectual preparation in management, administration, and governance is preferred over targeted education in science and engineering.

However, unlike traditional succession planning, career continuity within DRDC is severed between the tactical and strategic level military cadres due to this dramatic change in skill set requirements. As will be discussed later, the very small establishment size for the military cadre and the wide variety of military trades involved prevent the development of an internal career progression model.

Military staff at both levels have an inherent understanding of CAF processes which can be leveraged by DRDC project managers as they formulate programs and prioritize work.

However, the relatively junior military embeds at the tactical level advise on tactical issues, while senior staff provide policy context and other institutional level guidance. Ideally, these two levels provide the crucial two-way communication bridge between blue and green, ensuring that outputs are ready when they are needed, such as key decision points in procurement cycles. The evolved roles and responsibilities of military staff will be further explored in the next section.

In summary, DRDC suffered institutionally due to DRAP. It has since taken corrective action to ensure that it will be better able to account for its expenditures in order to avoid future force reductions. The most dramatic measures were to consolidate decision-making and administrative staff, to focus on projects that were highly (and immediately) relevant, and to develop a project management approach that emphasized tangible success metrics and progress tracking. Using this new framework, DRDC hopes to maximize the impact of its output and the traditional role of embedded military personnel should continue to provide much value for DRDC at both the tactical and strategic levels.

THE EVOLUTION OF THE MILITARY CADRE

The roles and responsibilities of military staff within DRDC vary from lab to lab, as well as from crisis to crisis within the corporate centre.²² To be clear, while there are specific organization positions for the military, it is not uncommon for that member's actual tasks to be very different from their official job description. It is in part due to this agility that the presence of military staff is welcomed throughout the organization. The much greater benefit, however, is the liaison and administrative capability that they bring.

Tactical level positions within DRDC are typically occupied by officers who have a technical background in order to ensure that there is a baseline understanding of the scientific

²² The discussion in this section is largely drawn from consultation with individuals within DRDC. These individuals include civilians and military officers, from tactical level lab workers to strategic level corporate offices. The full list is not reproduced for this paper, but it is available upon request from the author.

concepts and project management challenges that await them in the field laboratories. Depending on their individual skill sets and organizational necessity, these officers are often a crucial liaison point between DRDC and the client. It is thus very important that they communicate effectively when they are interacting with clients about potential and ongoing projects, as well as the outputs of completed projects. The messenger must be managing expectations at the same time as marketing DRDC capability.

In fact, these lower-level embeds have huge influence within the field force on the perception of DRDC. A well-spoken, engaged, operationally savvy liaison officer brings credibility to the organization. Follow-on visits (or other communication) with updates and possibly outputs will ensure client respect and continued engagement with DRDC. Both sides clearly gain from effective liaison.

Within the lab, a competent military presence can help prioritize work and provide operational context that further connects the scientist with the CAF. They can also provide credibility for the lab when working in international collaborations as the voice of an engaged and well-informed client. These embeds often run small scale experiments, the type referred to above as “quick-impact”, or parts of larger projects that involve some military equipment with which they have particular experience. This small additional capacity for experimentation and field trials coordination helped solidify the excellent DRDC reputation during the 2005-2009 period, at the height of Canadian participation in the Afghanistan conflict, as clients such as CEFCOM and CANOSCOM knew that they could work through the military staff at the labs to quickly get solutions for their operational problems. The nurturing of such relationships needs to continue with CJOC and whatever new direction that the defence review provides with respect to 21st century Canadian warfighting.

Within the corporate centre, the roles and responsibilities of embedded military personnel can also vary greatly depending on the skill-sets of the individual and any surge requirements for staff. However, as mentioned above the tasks are much different than those at the lab level as the focus becomes strategic. Officers working at this level are concerned with project management, manning, funding, and program development. As such, the required skill sets include experience in personnel management and public administration.

To develop the “purpose-built S&T program that allocates funding in a balanced and integrated manner, and which establishes a clear path to exploitation and impact”²³, DRDC needs to have experienced administrators who intuitively know what the CAF is most likely to want. This will ensure that reasonable discussion and proposals can be developed internally prior to (or even concurrently with) client engagement. Furthermore, if DRDC is to champion client-led programming as described in the DRDC Strategy²⁴, it needs strong, savvy military experience in the corporate centre to provide early identification and refinement of client issues. For example, the 2014-2015 Portfolio of Projects provided the impact of budget reductions on DRDC projects including: 60% (\$3M) reduction in *Naval Platforms* funding when institutionally the CAF have AOPS, CSC, and the JSS projects suffering; 40% (\$2.5M) reduction in *The Soldier*, the Army’s top priority; 70% (3M) cuts in *Air Agility* (sustainment); and 70% (\$3M) cuts to Arctic-related force employment research.²⁵ Clearly, close liaison and a deep understanding of the procurement situation, operational focus, and department administration were required when making those tough, counter-intuitive decisions alongside the client.

Transformation changed how the enduring requirement to provide sound military advice to DRDC at both the tactical and strategic levels is accomplished. In an effort to better connect

²³ DND, *Science and Technology in Action...*, 8-9.

²⁴ *Ibid.*, 19.

²⁵ Department of National Defence, “Portfolio of Projects: FY 14/15”, DRDC (2014): 15, 26, 46, and 77.

with clients at the senior level, the Directors General (DGs) moved out of the labs and were centralized in Ottawa. In fact, of the seven current “Portfolio” DGs (Army, Air Force and Navy, CJOIC, SOF, etc.), most are embedded within their directly-supported DND/CAF organizations in order to be as integrated as possible at the strategic level.²⁶ The advice to the DGs now comes directly from the organizations, whereas the pre-transformation model saw the DGs relying on assigned senior military officers within their lab staff.

Some of these senior (LCol) positions have been allocated to other areas, including post-transformation gaps that appeared as the organization began to stabilize. Having a senior military cadre with strategic level skill sets greatly enhances institutional agility during this period of transition until roles and responsibilities are stabilized into an enduring HQ structure. DRDC recognizes that such skills are not learned at the tactical level within DRDC but rather from broad strategic level employment elsewhere in the CAF. As such, dipping into the external pool of potential military staff is generally preferred to the option of promoting junior staff from within the organization.

DRDC holds much of the responsibility for the DND institutional understanding and incorporation of technological advances, and when the Canadian Government accepts that an RMA is both inevitable and required, investment in defence S&T will likely increase. In order for DRDC to be as responsive as possible to the government and to the CAF, the right military embeds are required. At the tactical level, those officers need to be operationally savvy, technically competent, and effective at communicating, as the credibility of the organization with the field force lies largely on their shoulders. In the corporate centre, military staff must be proficient in operating in the strategic environment. Experience in management and public

²⁶ Department of National Defence, “Standard Operating Procedure 902-1: Program and Project Key Appointments, V1.2”, ADM (S&T) (Jan 2016), 2-3.

administration are key enabling skills, and are not necessarily built at the tactical level. The next section addresses how the military finds and/or develops the right people to fill those roles.

THE DEVOLUTION OF FORCE GENERATION

In order to provide the broad range of expertise required to perform key technical and administrative functions, DRDC military staff come from many different occupations. Each occupation has typical career progression models and, aside from the Bioscience Officer trade which requires time at S&T labs, most of these models do not generally include postings to DRDC. While the employment is both challenging and rewarding for the individuals involved, the CAF considers filling DRDC positions as amongst its lowest priorities and employment within DRDC is generally considered “low-range”²⁷. For its part, DRDC does not have the military manning establishment to support promotion from within and it therefore devolves this responsibility, knowing full-well that an individual may never return, to the broader CAF.

At the labs, officers with science and technology backgrounds are required. This list includes Aerospace, Maritime, Construction and Combat Engineers, Communications and Signals Corps officers, as well as many other technical trades that are inherently ready for technical employment within their fields of expertise. In a CAF structure that manages personnel for tactical success rather than institutional leadership, Career Managers focus on formal succession plans for operational unit employment and only a select few technical streams. For instance, the Combat Engineer Career Manager focuses on officer progression streams for front line combat and geospatial units, as well as a select few infrastructure and capital project management organizations in order to ensure that successful commanders and leaders are developed. No trade has a career progression model that sees junior officers build experience in

²⁷ “Low-range employment” is a Canadian Army term that articulates the relative importance and challenges of a particular position. High-range employment experience is essential for promotion as it leads to additional points on an individual’s annual assessment.

DRDC labs so that they can be promoted and return with corporate knowledge as ACDs or even senior staff within the institution.

Generating interest for young officers to accept DRDC positions is greatly enabled by the sponsored post-graduate degree program in which formal technical education is traded for obligatory service at a lab. This arrangement works well for the labs as new military staff, most of whom have some tactical level operational experience, arrive with the relevant academic background to contribute to the organization.

In the corporate centre, the tasks of military staff are more managerial in nature and are therefore more accommodating of the much greater variety of institutional experience that senior officers normally hold. In fact, few (if any) corporate positions require dedicated post-graduate education, and broadly-transferrable experience from other institutional CAF positions enables senior military staff within DRDC to perform their administrative functions. The challenge for DRDC is to be recognized by the CAF as a high priority employer and thus have more opportunity to influence the selection of assigned military staff.

Although junior officers build some organizational experience during their first DRDC tour, their training and employment is very much tactical and most do not develop strategic level skills that would prepare them for employment at the corporate level. With roughly 10 LCol and 10 Capt/Maj positions of various trades, DRDC is much too small and top-heavy to have a sustainable internal promotion-progression model²⁸, and an individual's initial strategic level experience must be gained elsewhere.

DRDC actually benefits from having the very large CAF pool of staff who have experience working at the institutional level. The cost of employing personnel with little or no

²⁸ DRDC military staff do have some promotions but these tend to be concentrated at the tactical level (i.e. captain to major) or at the strategic level (i.e. senior major to LCol), rather than for individuals making the transition between the two.

organizational experience is the investment in an initial training period; however, the impact for DRDC is minimal because the skill sets and job responsibilities of strategic level personnel are so commutable. Conversely, pushing individuals with some DRDC familiarity out into the broader CAF helps to ensure the continued awareness and integration that keeps DRDC relevant. Such personnel work in front line units, project management organizations, capability development think tanks, and many other organizations that form the client base of DRDC.

To summarize, DRDC needs technically-educated, tactical level military staff as well as broadly-experienced strategic level military staff. There is little continuity between these two classes of embeds and, combined with the small size of the DRDC military establishment and numerous trades involved, there is no S&T career progression model. Instead, its military cadre is reabsorbed into the CAF after its first DRDC tour and is somewhat leveraged to spread awareness about the role and capabilities of DRDC. Military personnel who enjoy a second DRDC tour are concentrated at the institutional level and they will have earned their experience at the strategic level elsewhere in DND. As the relevance of DRDC will inevitably increase in the future, these informed officers provide an opportunity to ensure that DND leverages DRDC capabilities and recognizes the importance of assigning it the right people.

CONCLUSION

Based on the global transition into the information age, old paradigms for where to invest defence S&T efforts need to be challenged. Technology is advancing at an exponential pace and there is significant danger that Canada will find itself on the wrong side of the gap between “have” and “have not” nations if it continues to dabble in an untenable number of defence initiatives. Major changes in the way that DND conducts its affairs are both required and

unavoidable, and as with all nations, the future Canadian defence strategy will be a unique blend of technological and ideological factors.

For its part, the DRAP-induced centralization of DRDC authorities gives the corporate centre tighter control over S&T programming. Consequently, there is institution-wide focus on projects that have maximum impact for CAF. There is also much better communication with financial auditors when they want to know “what have you done for me lately?” Future work will have to confirm if the current DRDC structure is appropriate once the organizational structure has stabilized, and possibly, in the wake of a Canadian RMA.

The role of embedded military staff has endured the current DRDC transformation and has proven their worth to the organization. Military staff provide essential tactical level scientific and operational experience as well as connectivity to the field forces. At the strategic level, their breadth of experience and the commutability of institutional skillsets helps to shape project definition and administer the organization. There is no reason to expect that the advantages of having embedded military personnel will diminish; however, the manner in which military staff are currently posted to DRDC typifies the low priority that DND and the Canadian government put on S&T.

Although DRDC military staff are currently able to fulfil their post transformation mandate, with no tangible commitment for how to embrace technology, the government continues to [invest] as little as it can get away with.²⁹ A pragmatic, but unconventional career progression model provides sufficiently qualified military embeds at both the tactical and strategic level. This makes up for the insufficient establishment numbers and career stream

²⁹ Binyam Soloman, “DRDC CORA TM 2008-050 Defence Science and Technology Strategy: An Economics Perspective,” Defence Research and Development Canada: Central Operational Research Team Technical Memorandum 2008-050 (Nov 2008), 28.

continuity to sustain formal, internal professional development. The question becomes whether things would change if Canada were to undergo an RMA and the government increased the profile of defence S&T.

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