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Cover

**The Black Devils Clearing
No-Man's Land (Anzio, 1944)**

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'Wolves of the Russian Spring': An Examination of the Night Wolves as a Proxy for the Russian Government



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Left Out of Battle: Professional Discourse in the Canadian Armed Forces



In Defence of Victory: A Reply to Brigadier- General Carignan's "Victory as a Strategic Objective"



The Implications of Additive Manufacturing on Canadian Armed Forces Operational Functions

CANADIAN MILITARY JOURNAL

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NOTE TO READERS

As a bilingual journal, readers should take note that where citations are translated from their original language, the abbreviation [TOQ] at the end of the note, which stands for "translation of original quote", indicates to the readers that the original citation can be found in the published version of the Journal in the other official language.

Welcome to yet another summer edition of the *Canadian Military Journal*. This time out, our cover is graced by Silvia Pecota's tribute to the Second World War's First Special Service Force (1st SSF). The image depicts a 1st SSF member about to attack a German position at the Anzio beachhead south of Rome in early-1944. It was at Anzio that the Germans dubbed the Force the 'Devil's Brigade,' or 'The Black Devils.'

1st SSF was an elite American-Canadian commando unit that was under the overall command of the United States Fifth Army. Originally activated in July 1942 as a joint US-Canadian force of three small regiments and a service battalion, consisting of roughly-equal participation from both Canada and the United States, this all-volunteer force first deployed to the Aleutian Islands in July 1943 as part of an invasion force on the island of Kiska, but the invaders soon discovered that the island had already been evacuated by the Japanese. Next, the Force deployed to the Italian theatre of operations in late-1943. Thoroughly trained in mountain climbing and alpine fighting tactics, the Force was deployed against the German Winter Line at La Difensa and Remetanea, the last entrenchment before the Gustav Line, and the intent was that an Allied push through the mountains would get their forces closer to Rome. After incurring significant casualties, 1st SSF was successful in successfully assaulting La Difensa in December 1943, and this determined attack formed the basis for the 1968 motion picture, *The Devil's Brigade*. However, the mountain campaign was not without cost, during which time 1st SSF suffered 77% casualties, 529 in all, including 91 dead, 9 missing in action, 313 wounded, and 116 exhaustion cases.

After the mountain campaign, 1st SSF was redeployed to the Anzio beachhead, where they also fought with great distinction, and after fighting their way northward, they entered Rome on 4 June 1944, one of the first Allied units to do so. Thereafter, the Force was deployed on Operation *Dragoon*, the invasion of southern France, again seeing extensive combat. Then, on 26 August, the unit was formally disbanded, and most of the Canadians became replacements for the 1st Canadian Parachute Battalion. The First Special Service Force was awarded the French *Croix de Guerre* with Silver-Gilt Star, as well as the US Distinguished Unit Citation for extraordinary heroism. Additionally, a large number of the Force members were honoured for individual acts of valour, including Sergeant Tommy Prince, Canada's most decorated First Nations soldier of the Second World War. Of note, all modern American and Canadian Special Operations Forces trace their heritage back to this elite fighting unit, and in 2013, the United States Congress passed a bill awarding the First Special Service Force the Congressional Gold Medal.

With respect to our current issue, Defence Scientist Matthew Lauder leads off with a compelling narrative about the Russian Night Wolves Motorcycle Club, and while contemporary

mainstream media sources have branded the club the Russian equivalent to the Hell's Angels, Lauder maintains that is not the case. In his words, "...the organization is not an outlaw motorcycle gang – which implies a rejection of mainstream culture, strict loyalty to the biker club rather than to the state and deep involvement in criminal enterprises. Rather, the biker image of the Night Wolves is a carefully curated façade meant to provide a semblance of rebelliousness all while the group serves as a tool of the state. Moreover, the Night Wolves are just one part of a vast network of non-profit organizations, military associations, and private businesses working at the behest of the Russian government." Interested? Read on...

Next, Intelligence Officer Andrew Duncan observes that in Canada's latest published defence policy, *Strong, Secure, Engaged*, the concept of deterrence has made a comeback. That said, while the concept of deterrence is certainly emphasized in the document, Duncan believes that unfortunately, it is "...not examined in significant depth within Canada's military doctrine." He then elaborates on the pitfalls associated with various deterrence models and strategies, highlighting the various challenges that have emerged over time, in particular, the apparent inability to view a given situation from an adversary's perspective. "However, academic and military professionals can take this opportunity to correct this oversight, and craft a unique Canadian perspective with respect to deterrence that can help avoid armed conflict and promote the peaceful resolution of disputes." Duncan is followed by Colonel Howard Coombs, who maintains that Canada has had, from the earliest years of the Canadian armed services, a rich tradition of relying upon "...other militaries for guidance regarding key aspects of the profession of arms," but that "...the idea of Canadian Armed Forces (CAF) professional discourse... did not seem to evidence itself in any consistently-discernable or institutionalized fashion." Howard believes that our armed forces are not intellectually inquisitive with respect to knowledge required by the Canadian profession of arms, and that "...without an invigoration of dialogue in both public and military spheres, the professional understanding of the CAF will continue to be taken from our primary allies."

Moving right along, Infantry Officer John Keess offers a compelling counterpoint to an equally-compelling article embodied in Brigadier-General Carignan's "Victory as a Strategic Objective: An Ambitious and Counter-Productive Concept for High Command," which we published last year. In it, the general argued that victory, in the conventional sense, is an outdated concept, the striving for which will bring challenges that are likely to shroud substantive successes. However, Keess disagrees, believing this train of Western military thought has "...devalued the military's focussed application of physical force in favour of more vague notions of 'effects.'" He continues, "In doing so, we have clouded many important issues about the limits and imperatives of applying force; we have, in essence, turned theory, which should simplify the complex, into something which adds complexity."

EDITOR'S CORNER

With respect to military science and technology, Defence Scientist Christopher Bayley and Engineering Technologist Michael Kopac examine the manufacturing process known as Additive Manufacturing (AM), which is commonly referred to as 3D Printing, and its numerous applications within Defence. They are followed by Major Caleb Walker, who examines the rise and the application of Lethal Autonomous Weapon Systems (LAWS). Walker contends that "...LAWS will be used by powerful states in the very near future," and that "...for the sake of all states in the international rules-based system, the use of LAWS must be controlled, inspected, and regulated – and that this requires an open and global dialogue which needs to start immediately."

We then offer two very different opinion pieces for consideration. In the first, Infantry Officer Dave Johnston believes that there is much to be learned by military professionals through the study of military history with respect to surmounting modern military challenges through study of what failed and what succeeded in the past. To that end, and given that these challenges are many, Johnston maintains that "...we must focus upon the significant, strategic challenges which may be informed by the past." Then, Armoured Officer Christopher Young relates his own recent experiences with respect to the use of child

soldiers in South Sudan, and how it relates to the "...new initiative circulating within government circles concerning the need to do more about child soldiers, and specifically, advocating for Canada to get involved in new and novel ways to counter their use." In sum, Young believes: "The new child soldier doctrine and training needs to move beyond simple models of child soldiers, and instead, provide guidance on what the expected response should be to these more complex arrangements involving children which have become the new norm, particularly with respect to peace support operations."

Next, our own Martin Shadwick examines what he refers to as Canada's fighter replacement conundrum, and how it has developed and evolved from an historical context. Finally, we close with a brace of book reviews, which we hope will pique the interest of our readers.

Until the next time.

David L. Bashow
Editor-in-Chief
Canadian Military Journal



HMCS *Whitehorse* departs San Diego, California, as part of Operation *Caribbe*, 23 April 2018.

DND photo XC06-2018-0001-445 by MARPAC Imaging Services



ITAR-TASS News Agency/Alamy Stock Photo/J3ND59

In St. Petersburg, Night Wolves Motorcycle Club leader Alexander Zaldostanov (front) rides his motorcycle during a ceremony marking the start of a new motorcycling season, 6 May 2017.

‘Wolves of the Russian Spring’: An Examination of the Night Wolves as a Proxy for the Russian Government

by Matthew A. Lauder

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Introduction

Contrary to most portrayals by the mainstream media of the Night Wolves Motorcycle Club (MC) as Russia’s equivalent to the Hell’s Angels,¹ the organization is not an outlaw motorcycle gang – which implies a rejection

of mainstream culture, strict loyalty to the biker club rather than to the state and deep involvement in criminal enterprises. Rather, the biker image of the Night Wolves is a carefully curated façade meant to provide a semblance of rebelliousness all while the group serves as a tool of the state.² Moreover, the Night Wolves are just one part of a vast network of non-profit organizations, military associations, and private businesses working at the behest of the Russian government.³ The Night Wolves exemplify a larger trend by the Russian government to outsource activities to non-state actors that are traditionally conducted by the state intelligence and defence entities. These outsourced activities include, but are not limited to, intelligence collection, propaganda dissemination, agitation and provocation, combat operations and tailored violence, including intimidation and targeted assassination.⁴

This article has three objectives. First, it will explore the evolution of the Night Wolves, from an anti-establishment motorcycle club to a vast patriotic network. Second, it will examine the role of the Night Wolves in support of the Kremlin’s geopolitical



Moscow, the Kremlin, and Moscva River by night.

objectives. Third, it will explore the trend of the Russian government outsourcing of intelligence and defence activities to non-state actors, as well as discuss the implications for the Canadian Armed Forces (CAF) and the North Atlantic Treaty Organization (NATO) assurance operations in Eastern Europe.

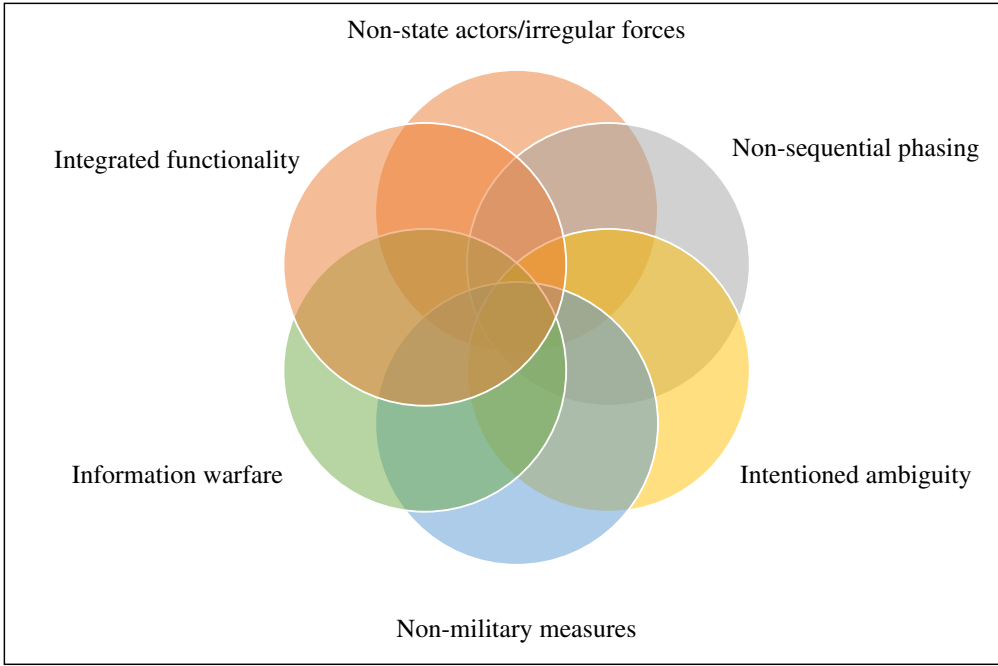
Non-Linear Warfare

Before proceeding with a discussion of the Night Wolves and the broader effort by the Kremlin to outsource intelligence and defence activities, it is important to situ-

ate this examination within the overarching operational concept of Non-Linear Warfare (NLW).⁵ This concept provides a framework for the application of both non-military and non-state actors as key enablers of contemporary conflict. Largely credited to General Valery Gerasimov, the Chief of the General Staff of the Russian Armed Forces, and to a lesser extent Vladislav Surkov,⁶ chief ideologue and special advisor to Vladimir Putin, NLW is designed for the contemporary operating environment (COE).⁷ It is also believed to be the construct Russia will likely apply in the future to gain influence over its near abroad.⁸



Russian President Vladimir Putin and First Deputy Defence Minister and Chief of the General Staff of the Russian Armed Forces Valery Gerasimov (centre) attending joint Russian and Belarussian military exercises in the Leningrad Region, 18 September 2017.



environment, which includes managing both the message and the means of dissemination.¹² The fifth feature is integrated functionality, which is the horizontal and vertical integration of assets, tactics, and strategies to generate effects.¹³ The last feature is non-sequential phasing of operations, which implies a lack of clear delineation or separation between the six (6) operational phases of NLW.¹⁴ In other words, the non-linearity in NLW speaks to the fuzzy, discontinuous, and iterative manifestation of the operational phases. As such, the NLW concept should be treated as an *abstraction* rather than a *blueprint* for the conduct of operations.

Illustration 1: Non-Linear Warfare – Features.

Based upon the examination of Russian military operations in Crimea and East Ukraine, NLW can be divided into six (6) complementary features (see Illustration 1: Non-Linear Warfare – Features). The first is the central role and reliance upon non-state actors as the primary belligerents, which provide a local image to the conflict.⁹ The second feature is *intentioned ambiguity*, which implies the deliberate and pervasive use of obfuscation, deception, disinformation and deniability at all levels of conflict.¹⁰ The purpose of intended ambiguity is to create a debilitating level of uncertainty and to prevent the state-sponsor from being implicated in what otherwise appears to be an internal conflict. The third feature is the primacy of non-military measures, which generally occur at a ratio of 4:1 over military measures. Non-military measures include, but are not limited to, diplomacy, economics, natural resources, technology, and ideology, as well as other government departments (OGDs), commercial enterprises and the leveraging of formal and informal social networks, including organized crime groups and expatriate populations.¹¹ The purpose of non-military measures is to ensure a condition of prolonged and simmering conflict that remains below the threshold of war so as not to compel an international military response. The fourth feature is that of information warfare and the requirement to shape the information

Origin and Evolution of the Night Wolves

Influenced by *perestroika*, the Night Wolves came into being in 1983 as a group of anti-establishment rock music fans and motorcycle enthusiasts.¹⁵ In May 1989, the group formally became known as the Night Wolves MC. Characterized by an anti-establishment worldview, the Night Wolves modelled itself on US outlaw motorcycle gangs.¹⁶ During the initial years, the group provided security at rock concerts, and is believed to have operated a protection racket on behalf of an organized crime group.¹⁷



Vladimir Putin and Alexander Zaldostanov together at the motorcycle club in Moscow, 7 July 2009.

RIA Novosti/ Reuters/RTR2SELS

By the early-1990s, Alexander Zaldostanov, known as the ‘Surgeon,’ assumed the leadership of the Night Wolves.¹⁸ It was also during this period that the group went through an initial transformation, changing from a seemingly anti-establishment biker club to an organization with subtle patriotic leanings.¹⁹ In August 1991, members of the Night Wolves defended the Kremlin from an attempted coup by hardline communists. For his efforts, Zaldostanov was presented a medal by Boris Yeltsin, then President of Russia.²⁰

In 1992, the Night Wolves opened Russia’s first rock music nightclub and a tattoo shop. Shortly thereafter, they held Russia’s first international tattoo convention and bike show, opened a motorcycle shop (Wolf Engineering), and launched a biker clothing line (Wolf Wear). Several years after it opened, the nightclub burned down. Zaldostanov purchased the property, and by 1999, opened a new Night Wolves clubhouse, along with a bike centre, concert venue, dance club, restaurants, and a hotel. Zaldostanov also rewrote the Night Wolves charter, centralizing power and giving himself full ownership over the club.²¹ In response, many of the original members left the Night Wolves.²²

The early-2000s marked a period of spiritual transformation for the club.²³ At least some of the impetus for the spiritual transformation has been attributed to Zaldostanov embracing Orthodox Christianity after he was involved in a motorcycle accident in 1999.²⁴ However, Alexei Weitz, who joined the club in the mid-2000s and served as an official in the Right Cause, is also credited with nurturing the relationship between the Night Wolves and the Russian Orthodox Church, as well as formalising Zaldostanov’s religious worldview.²⁵

Over the last decade, the relationship between the Night Wolves and the Russian Orthodox Church has strengthened significantly.²⁶ For example, the Night Wolves sponsor motorcycle pilgrimages to holy sites, and Zaldostanov meets regularly with Patriarch Kirill, the leader of the Russian Orthodox Church and a former KGB agent,²⁷ to discuss co-hosting patriotic events.²⁸ Club members have also defended the church against protests.²⁹

The relationship between the Night Wolves and the Kremlin also deepened during this period. In 2008, the club attended a rally to mark the victory of Dmitry Medvedev as President, and in 2009, Zaldostanov met with Putin at a motorcycle rally in Sevastopol. Putin also rode with the Night Wolves at the 2010 Sevastopol motorcycle rally, and publicly thanked Zaldostanov for his service to Russia at the 2011 motorcycle rally in Novorossiysk. In 2013, Putin awarded Zaldostanov the Order of Honor medal for his work on youth patriotic education and for preserving the

memory of the fallen from the Great Patriotic War (The Second World War). Zaldostanov also served as a torch-bearer at the 2014 Sochi Olympics, and the Night Wolves flag was flown on the Russian portion of the International Space Station.³⁰

In addition to the political and spiritual transformations, the Night Wolves also experienced significant organizational growth over the last decade. By the mid-2000s, there

were more than 40 Night Wolves chapters across Russia and Europe.³¹ In 2014, the club opened a chapter in Chechnya and made Ramzan Khadyrov, the Head of the Chechen Republic, an honorary chapter leader. By 2016, the Night Wolves had 51 chapters, and approximately 5000 members.³²

“By the early-1990s, Alexander Zaldostanov, known as the ‘Surgeon,’ assumed the leadership of the Night Wolves.”

The Night Wolves Network

Zaldostanov and the Night Wolves are just a small part of a vast patriotic network with operations across Russia and Europe, as well as emerging business interests in Asia (see Illustration 2: Night Wolves – Network Structure). This patriotic network can be divided into three general areas; that of (1) patriotic education and outreach, (2) security and training, and (3) professional affiliations. Patriotic education includes the main chapter of the Night Wolves and Bike Centre in Moscow, the 51 Night Wolves chapters across Russia and Europe, the Russian Motorcyclist Association, and various youth patriotic organizations and associated business assets.³³ While some of these entities operate as private businesses, the youth organizations and the Russian Motorcyclist Association operate as non-profit organizations. Security and training includes Wolf Holdings, which is separated into several departments

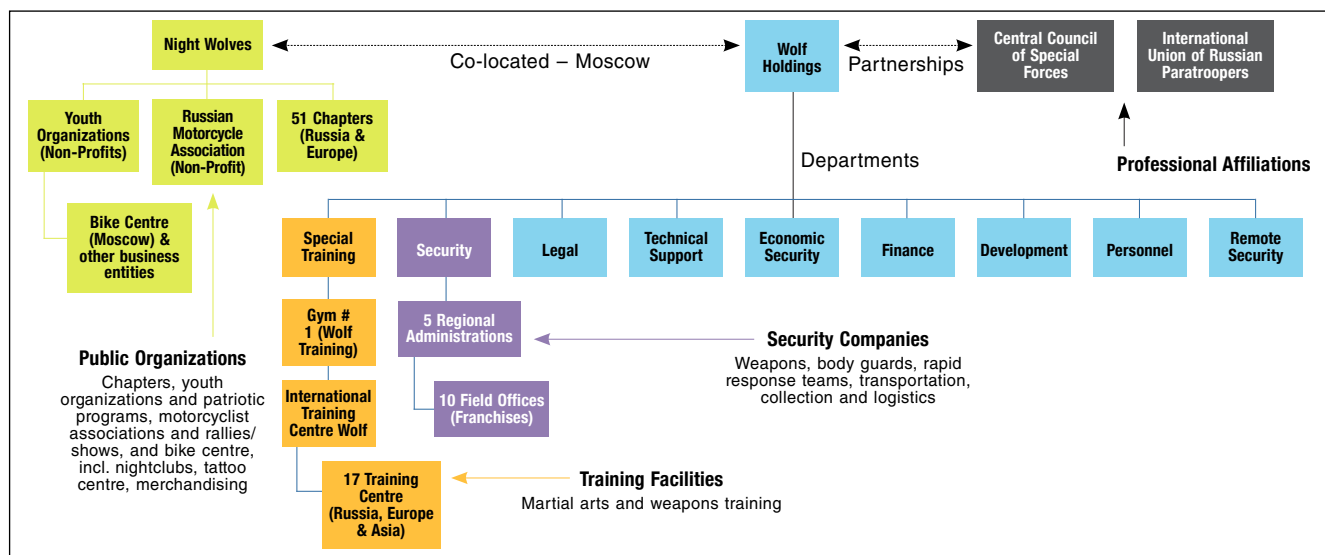


Illustration 2: Night Wolves - Network Structure [not exhaustive].

(i.e., Special Training, Security, Legal, Technical Support, Economic Security, Development and Remote Security). Professional affiliations include partnerships with the International Union of Paratroopers and the Central Council of Special Forces.

Ownership of the Night Wolves is extremely difficult to determine, largely due to convoluted and regularly changing organizational names and ownership. For example, in 2011, Zaldostanov was a founder and a partial owner (40%) of Wolf 77 Ltd, which owns 100% of its parent company, Wolf International Holding Security Structures (Wolf Holdings). Wolf Holdings was later bought by Gennady Nikulov³⁴ and Vyacheslav Stegalov,³⁵ who own 80% and 20% respectively.³⁶ Nikulov also *owns or has owned* at least three individual Night Wolves chapters, and he currently serves as president of Wolf Holdings, as well as being a board member of the International Union of Paratroopers. While Zaldostanov no longer owns Wolf Holdings, the main office is co-located with the Night Wolves main chapter in Moscow. Other components of Wolf Holdings appear to operate as franchises, with various well-connected individuals owning varying percentages of the businesses. In addition, Zaldostanov owns or serves as president of several related commercial entities and non-profit organizations associated with the Night Wolves. For example, it is believed that Zaldostanov owns 100% of the Bike Centre in Moscow, and serves as president of the Night Wolves non-profit youth education organizations. In addition, the non-profit organizations own various commercial entities, such as restaurants

“The Night Wolves played a small but important role in the Russian military operation to annex Crimea.”

and nightclubs, which generate significant revenues. In 2007, the nightclubs generated approximately \$2.4 (US) million.³⁷

Support to the Russian Government

The Night Wolves played a small but important role in the Russian military operation to annex Crimea. Prior to Zaldostanov’s arrival in Simferopol on 28 February 2014, members of Sevastopol Night Wolves chapter were supporting the Russian military, possibly as early as 20 February 2014.³⁸ Activities during this period included collecting intelligence, distributing propaganda, organizing protests and self-defence units, and coordinating with Russian Special Operations Forces.³⁹ When the vanguard of the Russian military arrived in the early hours of 27 February 2014, the Night Wolves became much more involved in the military operation by coordinating road-blocks and targeting local officials for intimidation.⁴⁰ By early March, Night Wolves conducted joint operations with Russian *Spetsnaz* units. For example, members of the Night Wolves, with support from the Russian military, conducted a raid on a Ukrainian naval facility. The Night Wolves also secured a natural gas facility and captured a senior officer of the Ukrainian State Border Service. It is important to note that the Night Wolves were one of only two non-state actors to be permitted by the Russian military to conduct armed operations.⁴¹ It was believed that other groups, including the Cossack militias, lacked the appropriate



Members of the Night Wolves attending a burial service for Soviet soldiers in Crimea, 30 October 2014.

military training or were too aggressive to be employed in armed operations, which demanded no casualties or minimal casualties.⁴² As such, most self-defence units were largely tasked with guarding buildings, protecting pro-Russian protesters or maintaining vehicle checkpoints. Upon completion of the military operation, at least 11 members of the Night Wolves, including Zaldostanov, were awarded the campaign medal “For the Return of Crimea.”⁴³

The Night Wolves involvement in Crimea did not end with the annexation. In June 2014, the City of Bakhscisarai awarded a contract to the Night Wolves for the provision of municipal security services and youth patriotic education. Additional discussions were held with representatives from Wolf Holdings about the implementation of a safe-city program. By late- 2015, the Night Wolves also formed a rapid response team with local police, and patrolled areas of Sevastopol.⁴⁴

In East Ukraine, the Luhansk chapter of the Night Wolves was one of the first non-state actors to join the nascent pro-Russian militias, which were largely comprised of local volunteers and a handful of Russian operatives.⁴⁵ As the Ukrainian military advanced on Luhansk in the summer of 2014, the Night Wolves assisted pro-Russian militias with blockading the city.⁴⁶ Later in the summer of 2014, the Night Wolves joined with other pro-Russian militia groups, backed by the Russian military, and laid siege to the Luhansk Airport.⁴⁷ The Night Wolves also provided travel documents *to* and facilitated the transport *of* several high-ranking Ukrainian government members to Russia. Utilising its extensive social network, the

Night Wolves also played a key role in recruiting fighters to serve with pro-Russian militias.⁴⁸ By 2015, approximately 40 members of the Night Wolves had fought with pro-Russian militia groups in East Ukraine, and at least three members were killed in combat.⁴⁹

Since the establishment of relatively static frontlines, the Night Wolves have served as a special police squad. According to Vitaly Kishkinov, leader of the Luhansk chapter, the Night Wolves are now considered “...part of the [Luhansk People’s Republic] Ministry of Internal Affairs,” and are tasked with guarding critical infrastructure and patrolling the community to ensure law and order.⁵⁰ In 2017, the Americans added Wolf Holdings, Gennady Nikulov, and the Bike Center to the economic sanctions list for *participation in or support to hostilities in Ukraine.*

Although paramilitary activities are likely the most controversial form of support, the Night Wolves provide a range of other services to the Russian government. In 2015, for example, they joined forces with like-minded politicians and veterans and started the anti-Maidan movement.⁵¹ Primarily led by Zaldostanov, the purpose of the anti-Maidan movement is to protect the Russian government from a colour-revolution, largely through the suppression of dissenting views.⁵² At a February 2015 anti-Maidan protest, Zaldostanov, surrounded by members of the Night Wolves, unfurled a large banner that read, “The Wolves of the Russian Spring.” It was an unsophisticated attempt to mock both the Euromaidan movement and the Arab Spring, which are regarded as US foreign interventions under the guise of democratization. As noted by Dr. Mark Galeotti, an expert and prolific writer on transnational crime and Russian security affairs, the Night



Vasily Fedosenko/Reuters/RTF3G23G

Armed men believed to be Russian servicemen outside a Ukrainian military base in the village of Perevalnoye, near Simferopol, 5 March 2014.



Members of the Night Wolves pose on top a Red Army tank at the German-Russian museum in Berlin while commemorating the 70th anniversary of the end of the Second World War, 8 May 1945.

Wolves are a "...case study in the Kremlin's strategy of adopting and taming potentially hostile groups and using them precisely as tools of control – counter-counterculture, as it were."⁵³

hostile act.⁵⁵ Poland, however, refused to acquiesce, and the Night Wolves were forced to bypass the country. Further, in 2017, the Night Wolves were banned from entering Georgia, Ukraine, and Poland.

The Night Wolves also organize two other complementary activities in support of the Russian government. The first is that of motorcycle rallies. While several different motorcycle rallies are coordinated by the Night Wolves each year, the most controversial is the Victory Ride to Berlin, which commemorates the Soviet victory over Nazi Germany. Conducted annually since 2015, the ride starts in Moscow in late-April and finishes at the Soviet War Memorial in Berlin every 9 May. However, several countries see the ride as a deliberate provocation, and they have attempted to block the ride.⁵⁴ For example, Poland banned the Night Wolves from entering the country during the 2016 ride. In response, the Kremlin summoned the Polish ambassador and informed her that the ban was considered a



Members of the Night Wolves look on after being denied entry into Poland at a border crossing near Brest, 27 April 2015. They were part of a group heading to Berlin to commemorate the 70th anniversary of the end of the Second World War.

The second activity is that of motorcycle shows, which are used as a platform for youth patriotic education. Although varying in form, the shows tend to highlight themes such as the requirement for patriotic duty, the evils of US global hegemony, and the moral and spiritual decay of the West.⁵⁶ One of the most grandiose bike shows took place in Sevastopol in August 2015.⁵⁷ Entitled, “The Forge of Victory,” the event was broadcast live on Russian TV. The bike show included dozens of actors and thousands of bikers who re-enacted the Russian military intervention in Ukraine, portraying pro-Russian militias as freedom fighters, and the Kiev government as a junta under the control of the West.⁵⁸

Similar shows are held at the Night Wolves facility in Moscow as part of a state-sponsored annual Children’s Christmas festival. From 2013 through 2015, the Night Wolves received approximately \$130,000 (US) a year from the Russian government to stage the festival.⁵⁹ At one event, Putin told the crowd that the Night Wolves do not just ride motorcycles, they “...perform military-patriotic work. Historical memory is the best cement that binds people of different nationalities and religions into one nation, in one powerful country – Russia.”⁶⁰

As an extension of the youth-focused motorcycle shows, the Night Wolves are expanding their Moscow facility to include a dedicated youth patriotic education centre. In addition, the club received more than \$280,000 (US) to help fund the construction of a patriotic sports park in Sevastopol.⁶¹ The Night Wolves also

plan to build five similar facilities in major urban centres across Russia.⁶² In total, theirs and associated organizations received approximately \$1 million (US) in government grants in between 2013 and 2014.⁶³

Outsourcing: Trends and Implications

Four trends serve to illustrate the breadth of the outsourcing effort by the Kremlin. The first trend is that of outsourcing state propaganda activities. Operating from a nondescript office in St. Petersburg, the Internet Research Agency came to prominence in 2014, earning the moniker the ‘Russian Troll Farm.’⁶⁴ Sponsored by the Russian government, the Internet Research Agency is reported to have had a monthly budget of over \$500,000 (US), and employed approximately 400 hundred people to troll and post comments on social media sites and online news media.⁶⁵ However, the Internet Research Agency is not limited to propagandizing via social media. In late-2014, the agency was linked to at least one well-publicized pro-Russian and pro-Syrian art exhibit in New York City.⁶⁶ More recently, the Internet Research Agency has rebranded itself as an online news media conglomerate, and it operates under the name of FAN (Federal News Agency).⁶⁷

“Four trends serve to illustrate the breadth of the outsourcing effort by the Kremlin.”

The second trend is the outsourcing of offensive cyber operations to cyber-criminals and hacker groups.⁶⁸ While Russian intelligence services are increasing in-house offensive cyber capa-



Russian soldiers standing guard in a central street in Syria’s eastern city of Deir Ezzor, 15 September 2017.

DOMINIQUE DERDA/AFP/Getty Images/848758160

bilities, Mark Galeotti notes that the Kremlin "...still depends, to a considerable extent, on recruiting cybercriminals, or simply calling on them from time to time, in return for their continued freedom."⁶⁹ Exemplifying this approach is that of Evgeniy Bogachev.⁷⁰ Indicted in the US, Bogachev originally designed malware that siphoned millions of dollars from bank accounts. However, at the behest of Russian intelligence services, Bogachev modified his malware to collect information from the computer networks of US and allied defence and intelligence agencies, specifically retrieving information related to the conflicts in Ukraine and Syria.⁷¹ Several other notable examples of cyber outsourcing exist, including Advanced Persistent Threats (APT) 28 and 29, more commonly known as Fancy Bear and Cozy Bear, respectively. While these hacker groups are considered to be under the direction of Russian intelligence services, they are believed to be informal actors and, quite possibly, a cyber technology firm.⁷² Moreover, non-state actors, including Nashi and a St. Petersburg-based crime group known as the Russian Business Network, played a key role in execution of cyber-attacks on Estonia in 2007, and during the Russian invasion of Georgia in 2008. Lastly, CyberBerkut, a hacker-group believed to be under the direction of the Russian intelligence services, conducted most of the cyber-attacks that facilitated the Russian military operation to annex Crimea, as well as the invasion of East Ukraine.⁷³

"Contrary to mainstream media portrayals, the Night Wolves are not the Russian equivalent of the Hell's Angels."

The third trend is the outsourcing of activities in support of military operations to private military corporations (PMCs).⁷⁴ While there are at least ten Russian-owned PMCs currently in operation, Wagner Group is particularly noteworthy and it exemplifies this outsourcing trend.⁷⁵ Registered in 2014, Wagner Group is led by retired Lieutenant Colonel Dmitry Utkin, who previously served in the 2nd Spetsnaz Brigade. Wagner Group has been operating in Syria since 2015 and its employees are reported to have participated alongside the Syrian military in the liberation of Palmyra.⁷⁶ In addition, the group deployed to East Ukraine in direct support of the Russian military. Referred to as "the Cleaners," members of Wagner Group were tasked with collecting intelligence, conducting subversion, and eliminating internal issues with the pro-Russian militia command structure.⁷⁷ According to media reports, this effort involved arresting or assassinating key leaders of the pro-Russian militias.⁷⁸ In 2017, the US added Utkin and Wagner Group to the economic sanctions list for participation or support to hostilities in Ukraine.⁷⁹

The fourth trend is the outsourcing of tailored violence,⁸⁰ as well as intelligence collection, logistical support to military operations and "black cash" fund raising to organized crime groups.⁸¹ For example, in 2014, a Federal Security Service (FSB) snatch team slipped across the border and abducted an officer of the Estonian Security Police. The purpose of the abduction was to impede an investigation by Estonian authorities into an illegal cigarette trafficking operation conducted by a Russian organized crime group.⁸² In short, a portion of the profits from the trafficking operation were redirected back to the FSB, which then used the money to fund active measures and clandestine operations.⁸³ Utilizing their trafficking and smuggling networks and black-market connections, Russian organized crime groups have also

provided logistical support to combat operations in Ukraine, mostly the transport of illegal weapons.⁸⁴ Moreover, at least 12 assassinations have taken place in Turkey of former Chechen resistance fighters and political activists. Rather than being conducted by Russian intelligence services, it is believed the assassinations were outsourced to a Russian crime group.⁸⁵ Several other people, including citizens of Russia and Western countries, are believed to have been killed by Russian organized crime groups at the behest of the Russian government.⁸⁶

While there are numerous reasons for outsourcing, such as cost effectiveness and expendability of assets, the principal reasons are twofold. First, it allows the Kremlin access to people with highly specialized and unique skills, which are either underdeveloped, or of limited quantity within government. Second, it supports the intended ambiguity feature of Non-Linear Warfare.

Implications for the CAF and NATO

The question remains: What does this mean for the CAF and NATO? Based upon an examination of the Night Wolves, as well as an analysis of the four outsourcing trends, the following implications have been identified:

- 1) The Russian government will continue to utilize non-state actors to conduct the full range of informational, intelligence, logistics, and combat activities in support of NLW. Efforts by non-state actors will focus on undermining the legitimacy and credibility of the political institutions of the targeted country. The full-breadth of informational attacks should be expected, with a focus on propaganda activities supported by tailored and highly targeted offensive cyber operations;
- 2) The Night Wolves will continue to play a supporting role in the execution of future NLW activities, especially to shape the information environment and help to establish the covert origins of conflict;⁸⁷
- 3) The Night Wolves possess an extended network of assets across Europe, which includes chapters and martial arts and paramilitary training facilities.⁸⁸ It should be expected that this network will be leveraged by the FSB for intelligence collection, source identification, talent spotting, and recruitment. It is quite possible that this network will be used against CAF and NATO personnel when deployed in support of reassurance operations. It should also be expected that the Night Wolves will be used to recruit local agents for the purposes of political agitation;⁸⁹ and,
- 4) As a key part of Russia's propaganda campaign aimed at its near abroad, the Night Wolves will likely seek out and leverage Russian expatriate populations in targeted countries to support controversial public events. These events will be used to create and amplify political and social wedge issues, and to gain widespread media attention.⁹⁰ In an effort to justify the events, the Night Wolves will present themselves as defenders of the memory of victory over Nazi Germany.



RIA Novosti/Reuters/RTX1C71R

The leader of the Night Wolves, Alexander Zaldostanov, and a veteran photographed while waiting for the Victory Day parade in Red Square, Moscow, 9 May 2015.

Conclusions

Contrary to mainstream media portrayals, the Night Wolves are not the Russian equivalent of the Hell's Angels. Rather, the Night Wolves is a large network of patriotic businesses, non-profit organizations, and professional associations. Although originally an anti-establishment movement, the Night Wolves have gone through a series of transformative phases. In the early-1990s, they first demonstrated their patriotic inclinations when members defended the Kremlin from an attempted coup by hardline communists. In the 2000s, the relationship between the Night Wolves and the Russian government, as well as the Russian Orthodox Church deepened, and by 2010, the group was well on its way to being considered an apparatus of the state. On several occasions, Putin has publicly acknowledged the group's patriotic activities, including support of military operations in Crimea and East Ukraine.

The Night Wolves, however, exemplify a broad trend by the Kremlin to outsource activities traditionally conducted by state intelligence and defence services. These activities *include* but are *not limited to* intelligence collection, propaganda dissemination, offensive cyber operations, political agitation and provocation, combat operations, and tailored violence. While there are numerous reasons for the Kremlin to outsource, such as cost effectiveness and expendability of assets when the task is completed, the principal

reasons are twofold. First, it allows the Kremlin access to people with highly specialized skills, which are either underdeveloped or of limited quantity within the government. Second, it provides for intentioned ambiguity.

There are a number of implications that need to be considered by the CAF and NATO, in particular, as they relate to conduct of reassurance operations in Eastern Europe. First, the Russian government will continue to make extensive use of non-state actors to perform informational, intelligence, logistics, and combat activities. Efforts by non-state assets will focus upon undermining the legitimacy and credibility of the political institutions of target countries. Second, it should be expected that the extensive network managed by the Night Wolves will be leveraged by the FSB for intelligence collection, including source identification, talent spotting and recruitment. These assets may be used against CAF and NATO personnel. It should also be expected that the Night Wolves will be used by Russian intelligence services to recruit local agents for the purposes of political agitation and fomenting discontent. Lastly, the Night Wolves will likely seek out and leverage Russian expatriate populations in targeted countries to support provocative public events to create and amplify political and social wedge issues. As such, the CAF and NATO should identify and develop potential counter-measures to Russian aggression, especially activities conducted by non-state actors.



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Missed Steps on a Road Well-Travelled: Strong, Secure, Engaged and Deterrence

by Andrew J. Duncan

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Introduction

In *Strong, Secure, Engaged: Canada's Defence Policy*, the concept of deterrence made a comeback. The verb "to deter" makes a prominent appearance in a number of the Canadian Armed Forces Core Missions, and the document even offers a definition of the term. *Strong, Secure, Engaged* goes so far as to point out that Canada benefits from the deterrence effect provided by both NORAD and NATO, and acknowledges "...new threats from non-state actors, and challenges in the space and cyber domains have returned deterrence to the centre of defence thinking."¹

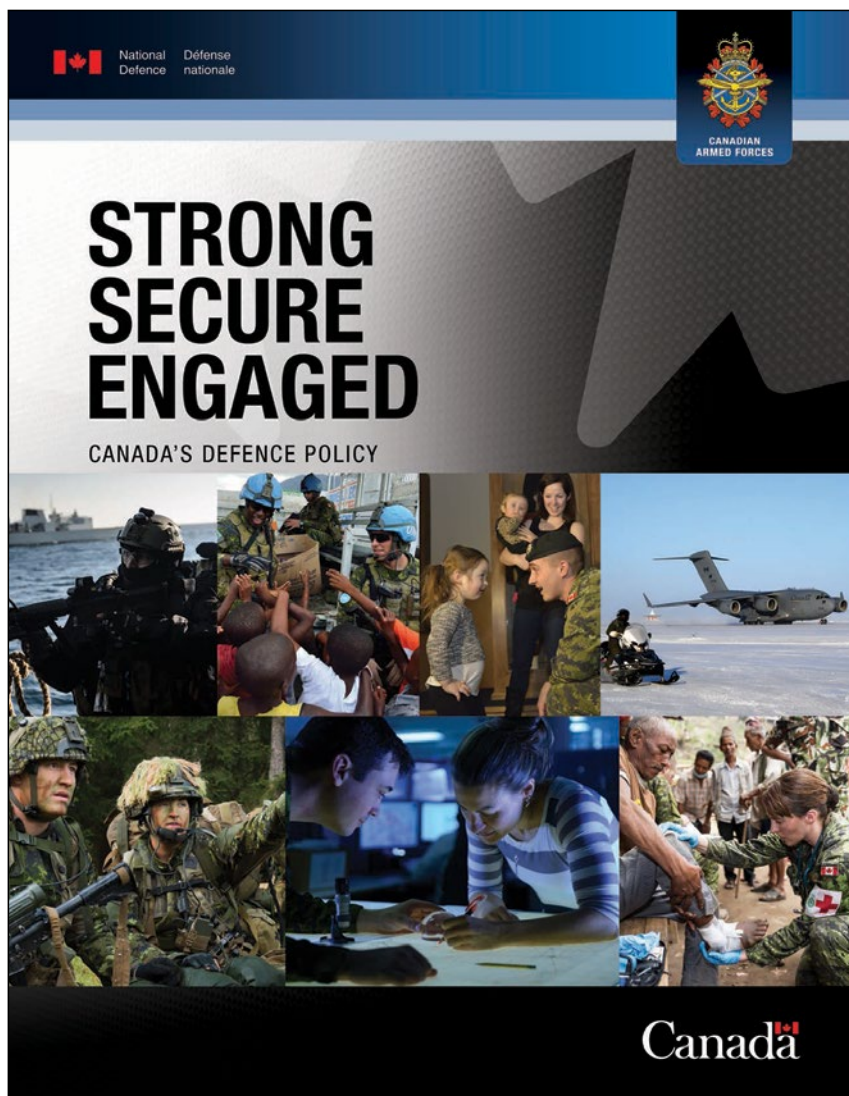
A review of former defence policy documents emphasizes how notable the prominent appearance of deterrence is within *Strong, Secure, Engaged*. In the *Canada First Defence Strategy* of 2008, the verb "to deter" only appears once in reference to defending Canada.² In 2005's *A Role of Pride and Influence in the World: Defence*, deterrence makes an appearance, albeit a limited one.³ Even in 1994's *White Paper on Defence*, written when Cold War memories were still fresh, deterrence is only mentioned with regards to Canada's contributions to collective security.⁴

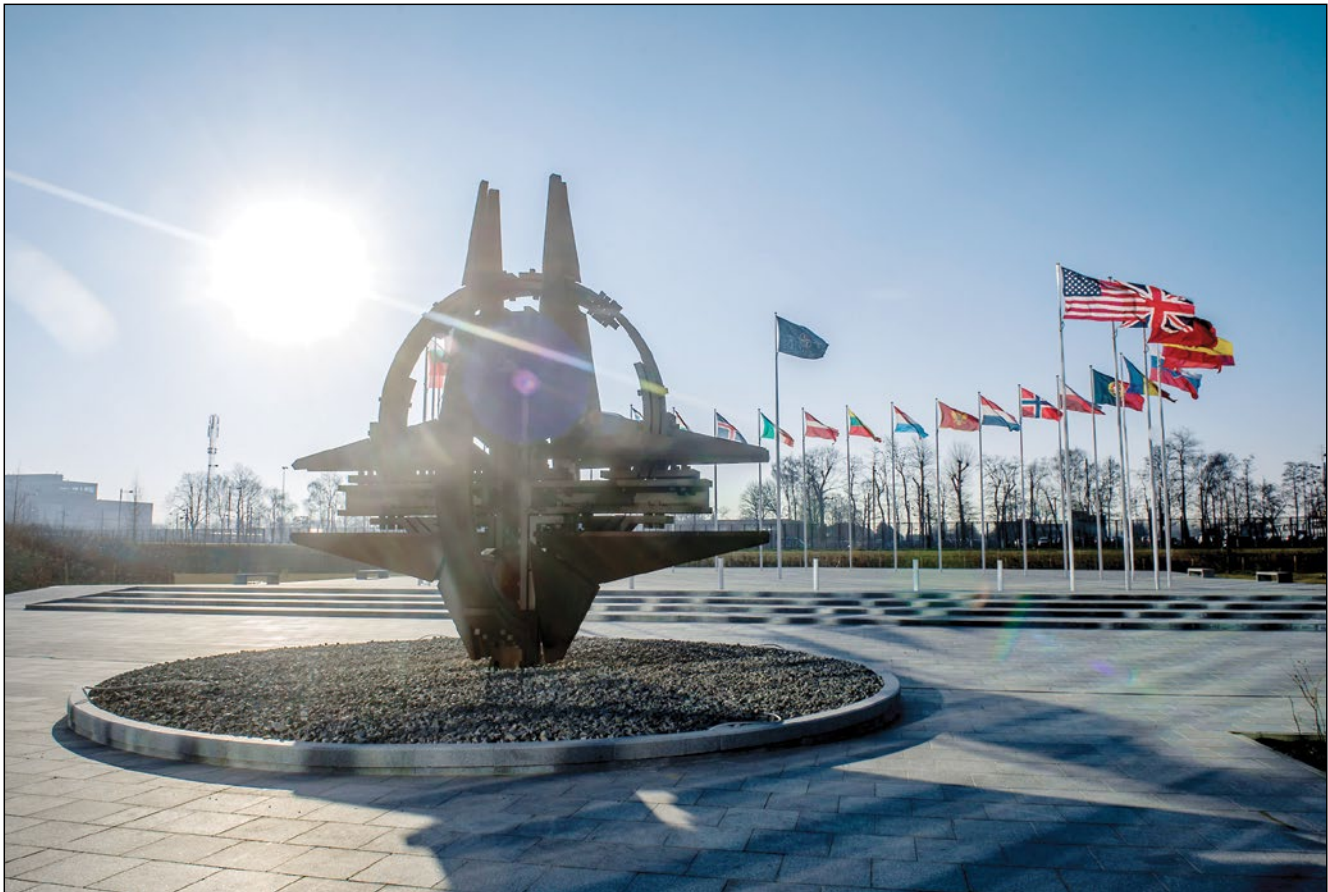
Given this re-emphasis upon deterrence, one would expect the idea to be examined in significant depth within Canada's military doctrine. Unfortunately, this is not the case. Canadian Armed Forces publication CFJP 01 (Canadian Military Doctrine) only examines deterrence briefly in the chapter dealing with the generation and application of military power, and in portions of the document focusing on operations other than war. The definition also differs from that in *Strong, Secure, Engaged*.⁵ Further, CFJP 03 (Joint Operations) only outlines deterrence as an intended effect, but does not examine the concept in depth.⁶ Although NATO and US authorities have delved deeply into the topic, it does not appear that the general idea of deterrence has been examined by Canadian Armed Forces doctrinal authorities for quite some time.

This situation is regrettable. Deterrence theory has undergone many challenges and changes since its prominence during the Cold War, most of which have enhanced our understanding of the topic. Unfortunately, the definition of deterrence offered in *Strong, Secure, Engaged* overlooks a critical element of deterrence theory and may lead to a flawed understanding of the topic. Despite this false start, there exists a large body of knowledge regarding deterrence produced by allies and academia that can provide a foundation for a unique Canadian doctrinal examination of the topic.

Strong, Secure, Engaged: Getting Deterrence Wrong

As mentioned previously, deterrence appears multiple times in *Strong, Secure, Engaged*. The motivation behind this reappearance is difficult to ascertain. Although deterrence and related concepts appear in the Defence Policy Review Summary of Roundtable discussions, they are limited to the topics of cyber security





NATO Headquarters, Brussels.

and technology, shaping NATO's own deterrence policies, and NORAD. Only in the topic of cyber security does a participant discuss the topic in detail, outlining a potential national strategy for cyber deterrence.⁷ The Public Consultation Online Report does not mention deterrence at all, except perhaps indirectly through the concerns of Canadians in countering potential threats.⁸ It is therefore probable that the increased inclusion of deterrence is the result of consultations with experts that occurred outside of these more public events, influenced by contemporaneous discussions on deterrence within NATO and other allies.

Despite this technocratic origin theory as to its re-emergence, the definition of deterrence advanced by *Strong, Secure, Engaged* is flawed. The offered definition of deterrence in the document is "discouraging a potential adversary from doing something harmful before they do it." The term "something harmful" is vague and subjective, and may owe its origins to a normative internationalism currently popular in Canada.⁹ As currently written, the definition in *Strong, Secure, Engaged* encourages mirror-imaging Canadian perceptions onto potential adversaries, leading to issues when crafting communications in support of deterrence efforts.

"Despite this technocratic origin theory as to its re-emergence, the definition of deterrence advanced by *Strong, Secure, Engaged* is flawed."

Although possibly useful for developing public support for defence policies, the definition is not practicable for defence and national security officials and must be abandoned for one that better reflects thinking on the subject. As will be demonstrated, better and more nuanced definitions of deterrence exist that explain the interplay between actors in a deterrence situation.

Deterrence Theory and the Forms of Deterrence

In order to understand conventional military deterrence, it is necessary to draw two important distinctions in how the term is used. Specifically, the term "deterrence" becomes easier to comprehend if one views it both as a theoretical model and as a strategy. Deterrence as a theoretical model acts as an intellectual framework through which all national security practitioners can view a particular deterrence problem, with the usual caveat that all models have their limitations. Deterrence as strategy can be understood as those ways and means employed by an organisation to exercise control over its situation to achieve the end of deterrence in a way that supports that organisation's interests.¹⁰ Although the best way to view deterrence is from a holistic perspective across all the instruments of national

power, the examination that follows will focus upon deterrence from a predominantly conventional military perspective. It will also restrict itself to the forms of deterrence strategies, as it will assume the structures and capabilities of the Canadian Armed Forces will remain relatively constant due to political and social imperatives that stress military flexibility over force specialization.

A Theoretical Model of Deterrence

It is generally agreed by many academics and practitioners that deterrence can be defined as “persuading an opponent not to initiate a specific action because the perceived benefits do not justify the estimated costs and risks.”¹¹ This is in contrast to the concept of coercion, which seeks to “persuade others to do something that may not be in their particular national interest.”¹² In other words, deterrence is trying to dissuade an actor from committing an act, whereas coercion is more concerned about the use of force to trigger an action. For the most part, deterrence is preferred to coercion as it entails fewer costs, less moral quandaries, and is less likely to result in secondary effects that further destabilize the strategic environment. Whilst it should be noted that some authors dispute this taxonomy, and instead subordinate deterrence to an expanded idea of coercion, for the purposes of this analysis, the impact is minimal.¹³

From the perspective of *theory*, deterrence is the outcome of a relationship between at least two actors. On the one side is the actor contemplating *action*. From the perspective of this *potential adversary*, the deterrence question is one of *action* versus *inaction*. In choosing between the two, the potential adversary weighs the estimated benefits, perceived costs, and risks of action, as well as those same perceptions of inaction. The closer the action is linked to critical interests (i.e., regime survival); the potential adversary is more inclined to perceive the benefits as necessary. On the other hand if the action is only linked to peripheral interests, the potential adversary will be inclined to scrutinize the costs more closely. Therefore as an action linked to a *peripheral interest* (i.e., little damage to the regime) moves towards a *critical interest*, the risk-taking propensity of an actor increases.¹⁴ The strategies available to the potential adversary also have an impact upon the decision to take action, as will be discussed later.

Sitting opposite the potential adversary is the actor looking to achieve deterrence. In order to achieve it, this *detering actor* must present enough of a credible threat to the potential adversary to impact their assessment of the costs and risks of action. The perception by a potential adversary of a credible threat is the product of three factors. The first, political will, reflects the willingness of the deterring actor to use their power and face the costs and risks of doing so. As with the potential adversary, the propensity for risk taking is understood to increase as the issue in question approaches the critical interests of the deterring actor.¹⁵

The second factor, termed by some as “technical capacity,” or “the military balance,” represents the forces at the disposal of the deterring actor. The value of these forces for deterrence is their ability to compress the generation of violence in time, denying potential adversaries the time to adapt or to take mitigating actions. This increases the cost of action to the potential adversary, making the action under consideration less attractive.¹⁶ Finally, a factor that is often overlooked is that of communications. This can be defined as information conveyed from the deterring actor to ensure the potential adversary perceives the destructive potential of the deterring actor’s political will and technical capabilities in a manner advantageous to the deterring actor.¹⁷

The deterring actor has a number of challenges with respect to ensuring the factors of political will, technical capacity, and communications are generating the proper effect in the decision-making calculus of the potential adversary. The appearance of political will is often difficult to maintain within liberal democracies, as citizens have an obligation to debate ethical questions pertaining to defence and international relations.¹⁸ This is further complicated by the use of some information warfare techniques by potential adversaries, who could misinterpret the tone of public opinion in the deterring actor by giving too much credence to their own information warfare efforts.¹⁹ Misinterpretations can also arise regarding the technical capacities and forces belonging to the deterring actor. During the Cold War, the destructiveness of nuclear weapons was thoroughly

understood by all the parties involved. Their ability to generate widespread destruction in a very short time period meant that no state actor involved could adapt quickly enough to survive, yet alone advance its situation. However, the less-than-total destructiveness of conventional capabilities means that countermeasures can be developed, which, in turn, are themselves vulnerable to technical developments. The end result is a never-ending degree of uncertainty that can easily be misjudged.²⁰ Communications can seek to reduce the possibility for misunderstanding, but must be conducted in a manner that takes into account the interests, perspectives, leadership, and

culture of the potential adversary.²¹ Incidentally, many critics believe that Western nations have demonstrated an inability to tailor deterrence communications to non-Western adversaries, and they must develop a better understanding of potential adversaries to ensure future success.²²

The Forms of Strategies of Deterrence

There are three main forms of deterrence strategy open to a deterring actor, each of which can be employed separately or in conjunction with one another. The first, known as deterrence by denial (or defensive deterrence), seeks to create a deterrence effect by using forces to oppose directly the potential aggressor’s aims.²³ Some analysts of this strategy emphasize the “denial of benefits” of the action being considered by the potential adversary,²⁴ whilst others stress “efforts to make the target of aggression indigestible and therefore too

“There are three main forms of deterrence strategy open to a deterring actor, each of which can be employed separately or in conjunction with one another.”



CFR/C/DND photo PCP85-7

Intercept of a Russian Tu-95 Bear bomber by a Canadian CF-101 Voodoo interceptor during the Cold War.

difficult to take and hold.”²⁵ The form of deterrence by denial can be further broken down into four general options; each can be used to conceptualize how forces are arrayed in physical and non-physical domains. Specifically, a deterring actor can use their forces as part of a static defence, a forward defence, a defence in depth, or a mobile defence. In the case of a static defence, forces are deployed into static positions with a view to repelling an attack as far forward as possible. Although this tends to be viewed as the politically “safe” option, it also encourages an inflexible mindset that can leave a defending force vulnerable to bold action, particularly if an adversary achieves a breakthrough. A forward defence once again sees defending forces deployed forward in a linear manner, but emphasizes flexibility through mobility over static positions. Although this form of defence is better equipped to counter a breakthrough, it is still somewhat vulnerable to bold offensive actions. The third option, a defence in depth, is designed with forces distributed across strong-points or lines of defence. Should an adversary achieve a breakthrough, a defence in depth can absorb a significant amount of momentum, although the disruptive effect of adversary forces in the defended area does require some acceptance of political risk. The final form of defence, a mobile defence, is the boldest of all. Ideally, the defending force employs a screening force forward and finds, fixes, and strikes the adversary at its most vulnerable, inflicting a decisive defeat that will guarantee a restoration of the *pre-bellum status quo*. Needless to say, this form of deterrence by denial poses considerable political risk, as it assumes physical terrain or portions of the non-physical battle space can be exchanged for a decisive blow later.²⁶

The second form of deterrence is known as *offensive* deterrence (or deterrence by punishment/defeat). This form of deterrence achieves the end effect by using the threat of retaliation on the potential adversary, imposing costs not necessarily related to the offending action.²⁷ Like deterrence by *denial*, offensive deterrence can be broken down into options with specific objectives and risks. The first and most aggressive, deterrence by *defeat*, threatens the potential adversary with complete military and political defeat. Whilst the most costly and politically risky form of offensive deterrence, this strategy may be necessary if the potential adversary views the issue at hand as being linked to the critical interest of survival. One significant risk with deterrence by defeat is that unless properly communicated, actions taken in support of this deterrence strategy may be interpreted by a potential adversary as indicators for offensive actions targeting their survival. Therefore unless carefully managed, a strategy of deterrence by defeat can actually hasten the conflict it is meant to prevent.²⁸ The second form of offensive deterrence, deterrence by *punishment*, threatens to impose costs short of complete military and political defeat. Although less risky than using deterrence by defeat, deterrence by punishment requires an extensive knowledge of potential adversary forces, infrastructure, and political/social/economic conditions in order to calibrate the punishment so that it impacts the potential adversary whilst stopping short of threatening their existence.²⁹

A third form of deterrence exists that is often absent from some literature. Referred to in US doctrine as “Deterrence by Encouraging Adversary Restraint,” this method seeks a deterrence effect both through actions designed to convince a potential adversary of the benefits of continued restraint, and actions tailored to minimize the perceived costs. This can include military actions, such as pointedly not deploying certain military capabilities, as well as tailoring military operations to avoid unintended and unnecessary costs on the potential adversary.³⁰

Although each of the three forms of deterrence strategies is distinct, they often overlap and blend together in practice. It is sometimes difficult to determine when defensive deterrence ends and offensive deterrence begins. For example, deterrence by denial employing a mobile defence shares some characteristics with deterrence by defeat, particularly if the potential adversary is a regime dependent upon the military for political stability. This can have implications when trying to shape potential adversary behaviour. To complicate matters further, an optimal national deterrence strategy must incorporate diplomatic, informational, military, and economic lines of effort at the strategic, operational, and tactical levels. Perceptions of threats using the other instruments of national power are subject to the same miscommunications and misinterpretations as military ones and in conjunction with military actions can be interpreted in an

“The success or failure of a deterrence strategy also depends upon the strategic ways available to the potential adversary.”

unintended manner. Despite these ambiguities and complications, deterrence is almost always preferable to the alternative. If properly coupled with diplomatic efforts, a well-considered military deterrence strategy can play a large role in avoiding armed conflict.

The success or failure of a deterrence strategy also depends upon the strategic ways available to the potential adversary. A potential adversary contemplating offensive action generally has three broad military strategies from which to choose. The first, known as the *attrition*, is based upon defeating an opponent through a series of battles of annihilation, whereby ultimate success depends on wearing down the defender until further resistance is impossible.³¹ Although some actors may be inclined to adopt a strategy of attrition if critical interests are at stake, the high cost and unpredictability of a prolonged conflict render this option undesirable unless absolutely necessary.³² The second strategy available, called the “*blitzkrieg*” strategy by some or the “*manoeuvre*” strategy by others, advocates mobility, firepower, and shock to defeat an enemy by incapacitating their decision-making. This avoids the costly strength-on-strength battles that characterize attrition, but requires highly trained and coordinated forces.³³ The third strategy available, known as the *limited aims* strategy, concentrates upon attaining a specific objective, such as a particular territory. Unlike the other two strategies, a limited aims strategy does not set out to defeat an



A US Standard Missile-3 target missile interceptor being fired on a test launch from the guided missile cruiser USS *Lake Erie* in mid-Pacific, 16 May 2013. This was the third successful consecutive intercept at the time.

US Navy Photo/DVIDS/834664



A cyber warfare operations journeyman monitoring live cyber attacks, 3 June 2017.

adversary decisively. Instead, the adversary seizes their objective and quickly adopts a defence, preferably before the offended party can respond. If the potential adversary believes it can weather the reaction, a limited aims strategy offers a way to obtain a specific objective at a lower cost than through an attrition strategy, with military means of lower quality than those required for a blitzkrieg/manoeuvre strategy.³⁴

The interaction between the military *deterrence* strategy chosen by the deterring actor and the military *offensive* strategy chosen by the potential adversary plays a significant role in the success or failure of deterrence. It does so by influencing the military cost calculations of the potential adversary. For instance, a strategy of deterrence by denial using static and forward defences is less effective if the potential aggressor believes they have forces that can employ a blitzkrieg/manoeuvre strategy. Conversely, deterrence by denial relying on defences in depth or a mobile defence motivated by a deterring actor's fear of complete defeat may encourage a potential aggressor to limit their objective to a short, sharp "land-grab." Offensive deterrence strategies face similar dilemmas. Deterrence by punishment only works if the potential adversary has something of value that can be accessed and damaged by the deterring actor. Offensive deterrence by defeat

has the added complication of *post-bellum* responsibilities for the deterring actor threatening it, which can lead to doubts within the potential adversary as to the viability of the threat.

Critiques of Deterrence

Although many aspects of deterrence theory and the ways of its related strategies are widely accepted, they have also come under criticism by a number of national security scholars. These critics argue that classical deterrence theory, which emerged in the wake of the Cold War, tends to assume logical and orderly decision-making within rational state actors.³⁵ However, evidence exists suggesting that decision-making within states is not always logical, orderly, or rational. Some have even argued the very idea of an objective standard of rationality is deeply flawed, as it may vary from actor-to-actor, based upon their perception of themselves and their environment. Attempts to adapt deterrence theory to this critique have proven superficial at best, and are often limited to grafting additional considerations onto classical deterrence models for decision-makers to consider. The 1970s idea of "strategic culture" and current attempts to incorporate social constructivism into deterrence models are cases in point.³⁶

The emergence of new actors and domains has also challenged some of the fundamentals of deterrence theory. The increased presence of non-state actors, such as non-governmental organisations, militias, and insurgents, has brought to light limitations in classical deterrence theory and certain forms of deterrence strategies. Debates with respect to deterrence in the cyber and space domains, whilst they have helped validate certain aspects of deterrence theory, have also challenged certain components of it due to the asymmetries between actors in those particular domains, as well as difficulties pertaining to attribution.³⁷

Perhaps the most troubling critique of deterrence theory and its strategies is the failure of many practitioners to understand it properly. The confused views of some inside the American defence establishment are a case in point. In JP-03 Joint Operations, the Notional Joint Combat Operation Model lists activities that occur at various levels of intensity throughout a joint military operation: Shape, Deter, Seize Initiative, Dominate, Stabilize, and Enable Civil Authority.³⁸ By reducing deterrence from the level of strategy to simply a set of military activities on the *road to war*, JP-03 inadvertently undermines deterrence as a possible strategy to *avoid* war.³⁹ There also exists significant concern that some practitioners, particularly military officers, fall prey to professional imperatives that undermine the deterrence strategy at hand. This is most often the case with deterrence by denial scenarios, wherein many military officers, eager not to lose in

the potential conflict they are tasked to avoid, deploy forces in excess of those needed to deter through denial. This “over-kill” tendency can be interpreted by potential adversaries as preparations for offensive operations, thus undermining the desired end state. Although close military-political coordination and well-targeted intelligence can mitigate this dilemma, it will always plague conscientious military professionals.

Canada and Deterrence

Successive Canadian governments have used all the forms of deterrence, a conclusion supported by an examination of Canadian military operations and policy declarations over the past few years. Deterrence by denial is part of the strategy underlying the current Enhanced Forward Presence in Latvia. Although not large enough to defeat any potential conventional military aggression, the EFP’s presence and capabilities increase the costs and risks of a Russian conventional military offensive.⁴⁰ The announcement in *Strong, Secure, Engaged* concerning the rebuilding of the Canadian Army’s air defence capability, a key “means” within deterrence by denial strategies, further supports a level of comfort in deterrence by denial strategies. Canada’s support for alliances such as NATO and concepts like the responsibility to protect also demonstrate a willingness to use offensive forms of deterrence, a point lent credibility by Canada’s participation in



DND photo by Corporal Desiree T. Bourdon/AP16-2018-0029-141

A Latvian Armed Forces soldier creates a range card during Exercise *Claymore Soaring*, a sub-set of Operation *Reassurance*, staged in the Meza Mackavici Training Area, 5 April 2018.



Prime Minister Justin Trudeau and Defence Minister Harjit S. Sajjan together at a press conference at CFB Esquimalt, 2 March 2017.

NATO and US-led operations in the past. This support for the occasional use of offensive deterrence was further bolstered in *Strong, Secure, Engaged* with the public acknowledgement of the challenges posed by anti-access area denial weapons to the RCAF (thus indicating an offensive role for the fighter fleet), and announcement of an offensive cyber capability. All told, Canada has demonstrated flexibility in its use of conventional deterrence strategies, and appears to be re-examining some key components of its military “means” to provide that same strategic flexibility into the future.

Conclusion

Deterrence theories and strategies are nothing new, and they have been reviewed and scrutinized multiple times since the start of the Cold War. Their return to Canadian defence policy is welcome, but not without complications. Whilst there exist generally-accepted deterrence models and strategies that can serve as a basis for the writing of military doctrine supporting the new defence policy, they cannot be accepted

“Deterrence theories and strategies are nothing new, and they have been reviewed and scrutinized multiple times since the start of the Cold War.”

blindly. In order to examine the topic effectively, military professionals must acknowledge the serious challenges that have emerged over the past few years. However, an even more difficult problem exists. A deterring actor’s efforts are undermined from the start if they are incapable of viewing the situation from the adversary’s perspective; either by not understanding the potential adversary’s motivations, or by imposing their own perspectives onto them. Unfortunately, *Strong, Secure, Engaged* has offered Canadians a definition at odds with the collective expertise of generations of scholars and practitioners, increasing the chance of this problem occurring. However, academic and military professionals can

take this opportunity to correct this oversight, and craft a unique Canadian perspective with respect to deterrence that can help avoid armed conflict and promote the peaceful resolution of disputes.



NOTES

- 1 Government of Canada, *Strong, Secure, Engaged: Canada's Defence Policy* (Ottawa: Queen in Right of Canada, 2017), p. 50.
- 2 ----, *Canada First Defence Strategy* (Ottawa: Her Majesty the Queen in Right of Canada, 2008), p. 7.
- 3 ----, *A Role of Pride and Influence in the World: Defence* (Ottawa: Her Majesty the Queen in Right of Canada, 2005), pp. 6, 18, and 27.
- 4 ----, *1994 White Paper on Defence* (Ottawa: Her Majesty the Queen in Right of Canada, 1994), Chapters 3 and 6.
- 5 Department of National Defence, *CFJP 01 Canadian Military Doctrine* (Ottawa: Her Majesty the Queen in Right of Canada, 2009), pp. 2-1 to 2-3, 6-8, and GL-2. CFJP 01 defines deterrence as "The convincing of a potential aggressor that the consequences of coercion or armed conflict would outweigh the potential gains. This requires the maintenance of a credible military capability and strategy with the clear political will to act." This is in contrast to *Strong, Secure, Engaged* which defines deterrence as: "At its core, deterrence is about discouraging a potential adversary from doing something harmful before they do it."
- 6 ----, *CFJP 3.0 Operation* (Ottawa: Her Majesty the Queen in Right of Canada, 2010), pp. 3-7 to 3-8, 6-11, and 6-13.
- 7 Ipsos Public Affairs, *Defence Policy Review Summary of Roundtable Consultations* (Ottawa: Ipsos Public Affairs, 2016), pp. 38-39, 40-41, 64.
- 8 ----, *Defence Policy Review Public Consultation Online Report* (Ottawa: Ipsos Public Affairs, 2016), pp. 22-23.
- 9 Marc-Olivier Cantin, "A Year under Trudeau: The Fundamental Shifts in Canadian Foreign Policy" in *Global Policy Journal* (16 October 2016), at <http://www.globalpolicyjournal.com/blog/19/10/2016/year-under-trudeau-fundamental-shifts-canadian-foreign-policy>. Accessed 15 January 2018.
- 10 Harry R. Yarger, "Towards a Theory of Strategy," Chapter 8 in *Guide to National Security Policy and Strategy* (Carlisle, PA: US Army War College, 2006), p. 108.
- 11 Michael S. Gerson, "Conventional Deterrence in the Second Nuclear Age," in *Parameters* (October 2009), p. 34.
- 12 Department of National Defence, *CFJP 01*, p. GL-2.
- 13 Rob de Wijk, *The Art of Military Coercion: Why the West's Military Superiority Scarcely Matters* (Amsterdam: Amsterdam University Press, 2014), pp. 16-18. De Wijk argues that coercion is defined as "the deliberate and targeted use – or threat to use – of power instruments to manipulate and influence the politico-strategic choices of an actor..." It is therefore much broader than the Canadian definition, and encapsulated deterrence. De Wijk adds a concept alongside deterrence called 'compellence,' which he defines as "the use of force to revise an action that has occurred."
- 14 United States Department of Defense, *Deterrence Operations Joint Operating Concept*. Version 2 (Washington: United States Department of Defense, 2006), pp. 19-23.
- 15 John Stone, "Conventional Deterrence and the Challenge of Credibility," in *Contemporary Security Studies* 33, No. 1 (April 2012), p. 111.
- 16 *Ibid*, pp. 112-116.
- 17 *Ibid*, pp. 117-119. Other models break the theory down into the four components of balance of military forces (technical capability), costly signalling and bargaining behaviour (communications), reputations (political will), and interests at stake (which is incorporated into the above model within political will).
- 18 *Ibid*, p. 111.
- 19 Maria Snegovaya, *Putin's Information War in Ukraine, Russia Report 1* (Washington DC: Institute for the Study of War, 2015), pp. 19-20. Snegovaya discusses the Russian tendency of its information warfare practitioners to overstate their effects on Western thought in order to secure their personal advancement.
- 20 Stone, pp. 112-113.
- 21 *Ibid*, pp. 117-119.
- 22 *Ibid*, p. 118-119; Patrick M Morgan, "Evaluating Tailored Deterrence," in *NATO and 21st Century Deterrence* (Rome: NATO Defense College Research Division, 2009), p. 41; and Jeffrey S. Lantis, "Strategic Culture and Tailored Deterrence: Bridging the Gap between Theory and Practice," in *Contemporary Security Policy* 30, No. 3 (December 2009), pp. 478-479.
- 23 Michael Rühle, "Deterrence: what it can (and cannot) do," in *NATO Review Magazine* (2015), at <https://www.nato.int/docu/review/2015/Also-in-2015/deterrence-russia-military/EN/index.htm>. Accessed 3 January 2018.
- 24 United States Department of Defense, p. 26.
- 25 Michael Petersen, "The Perils of Conventional Deterrence by Punishment," in *War on the Rocks*, (11 November 2016), at <https://warontherocks.com/2016/11/the-perils-of-conventional-deterrence-by-punishment/>. Accessed 5 July 2017.
- 26 John J Mearsheimer, *Conventional Deterrence* (Ithaca, NY: Cornell University Press, 1990), pp. 50-51.
- 27 Rühle; and United States Department of Defense, p. 6.
- 28 Gerson, pp. 41-42.
- 29 United States Department of Defense, pp. 26-27.
- 30 *Ibid*, pp. 27-28.
- 31 Mearsheimer, pp.29-30, 33-35.
- 32 *Ibid*, pp. 29-30, 33-3; and Gerson, p. 37.
- 33 Mearsheimer, pp. 29-30; 35-43;
- 34 *Ibid*, pp. 53-56.
- 35 Frank C. Zagare, "Reconciling Rationality with Deterrence: A Re-Examination of the Logical Foundations of Deterrence Theory," in *Journal of Theoretical Politics* 16, No. 2 (2004), pp. 107-117.
- 36 Jeffrey W. Knopf, *Rationality, Culture and Deterrence, Project on Advanced Systems and Concepts for Countering Weapons of Mass Destruction* (Monterey, CA: Naval Post Graduate School, 2013), pp. 5-36.
- 37 Dorothy E. Denning, "Rethinking the Cyber Domain and Deterrence," in *Joint Force Quarterly* 77 (National Defense University, 2015), pp. 9-16; Forrest E. Morgan, Deterrence and first-strike stability in space: a preliminary assessment (Santa Monica, CA: RAND Corporation, 2010), pp. xii-xv, 42-49.
- 38 United States Department of Defense, *Joint Publication 3-0: Joint Operations* (Washington, DC: United States Department of Defense, 2017), pp. V-7 to V-15.
- 39 Joshua Pollack, "From LeMay to McMaster: The Pentagon's Difficult Relationship with Deterrence," *War on the Rocks* (29 December 2017), at <https://warontherocks.com/2017/12/lemay-mcmaster-pentagon-difficult-relationship-deterrence/>. Accessed 5 January 2018.
- 40 Juri Luik and Henrik Praks, *Boosting the Deterrent Effect of Allied Enhanced Forward Presence Policy Paper* (Tallinn: International Centre for Defence and Security, 2017), pp. 8-9.



Two of the Canadian Army's prominent intellectuals from the inter-war years, Lieutenant-Colonel (later General) H.D.G. Crerar, and Lieutenant-Colonel (later Lieutenant-General) E.L.M. Burns, pictured here in Italy, 1944.

Left Out of Battle: Professional Discourse in the Canadian Armed Forces

by Howard G. Coombs

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*The nature of war has not changed, but that which surrounds and enables war has.*¹

~Major-General Walter M. Holmes, MBE, OStJSB, MSM, CD

Introduction

After a presentation on his experiences as a United Nations peacekeeper in the Middle East and Cyprus, one of the Royal Military College of Canada (RMC) students in the audience asked Major-General (Retired) Walter Holmes what one should study to ready oneself for the challenges of current and future operations. To this question, Holmes in part

answered with the above statement. This response prompted a degree of introspection, and later, class discussion. That further exchange concerned the nature of the contemporary security environment, and, more importantly, how one could become cognizant of those issues that were important to the Canadian profession of arms. This was all very interesting, as I was at the time researching an article on the counterinsurgency debate in the United States, and what similar discussion was happening in Canada. Surprisingly, I had discovered little indication that demonstrated substantive Canadian debate around perceived issues with counterinsurgency, and certainly nothing that mirrored the heated dialogue that had occurred, and is still ongoing, within the American military. My research question then changed from “what?” to “why?”- Why was there a lack of similar professional debate in Canada concerning how we conducted warfare in Afghanistan, particularly since the cost of our involvement was so high.² From there, the line of inquiry became broader, to encompass the idea of Canadian Armed Forces (CAF) professional discourse and why did it not seem to evidence itself in any consistently-discernable or institutionalized fashion. The absence of such indicators helps

demonstrate that the CAF looks to other militaries for guidance regarding key aspects of the profession of arms, and that intellectual tradition has existed, to a greater or lesser extent, from the earliest years of the Canadian services.

Ludwig Fleck and Thomas Kuhn – Theories of Intellectual Change

Ludwik Fleck, a Polish doctor who examined the philosophy, sociology, and history of science, advocated the concept of “thought collective,” which he defined as those who were participants in a definable and collective structure of thought, generated by an esoteric circle of authorities, or experts. This group communicates knowledge with other practitioners and interested parties to solicit feedback on their views. Knowledge passes from the inner to outer circles and back again so this cycle is strengthened and collectivized. Fleck believed that this complex open system of exchange can at times create a weakening of existing systems of beliefs and encourage new discoveries and ideas.³

Fleck suggested that all participants in thought collectives have shared ownership of experience and theories, and, therefore, changes in knowledge are most likely during periods of confusion when dissonance exposes differences between competing belief systems, and eventually produces new thought styles in an effort to address perceived inconsistencies.⁴ It must be noted that in the Canadian context, the absence of structured and

progressive evolutionary change within the bodies of knowledge can be indicative of, at times, the overwhelming influence of thought collectives formed by allied military practitioners in the United Kingdom or the United States.

In a similar manner to Fleck, theorist Thomas Kuhn emphasized the relationships within and between professional groups as being necessary to the creation and migration of knowledge. He utilized the concept of the paradigm to include communities of scientific practitioners who share common beliefs, as well as to describe the shared belief, or theory. His thoughts concerning paradigm shifts describe the process by which practitioners change the paradigms that provide their mental frameworks. Kuhn proposed that over time anomalies gradually appear, which cannot be explained by the existent paradigm through “normal” science and these incongruities prompt new research and eventual reconstruction of the field in a manner predicated upon a need to account for the previously unexplainable irregularity.⁵ Kuhn believed that paradigms are necessary to focus research, and that the true sign of a mature science is a continuous transformation from one paradigm to another through successive paradigm shifts produced by scientific revolutions.⁶ He also believed that as the new paradigms, or schools of thought, gain credence and attract practitioners, the older paradigms and communities of practitioners disappear. Specialized journals, the activities of groups of practitioners and demands for specific professional curricula, such as that in staff colleges, are associated with the implementation of new paradigms.⁷



J6 Imaging/CFC

Canadian Forces College Toronto.

The Role of Staff Colleges

Related to these ideas is the content of professional military education. If one wishes to understand a nation's interpretation of war and other conflict, one must understand the professional education of that nation's military. A firm grasp of the professional education of the military is vital because this learning shapes the activities of a nation's military by providing paradigms to interpret war and other conflict. The composition and provenance of such education plays an important role in the formation of specialized military competencies that permit the profession of arms to perform its primary function – the structured use of violence on behalf of the state.⁸ Canada's military has adopted three discernible paradigms in the material used in its professional military education. These have been derived from the allied influence and the experience of conflict since the 19th Century. The creation and manifestation of these paradigms in Canadian staff education stemmed from British, then Canadian, and, more recently, American influences.

It would be inaccurate to conceptualize staff colleges merely as military technical institutions. Rather, staff colleges are holistic in their curriculum, and reinforce the professional aspects of the profession of arms; empiricism, administration, and specialized knowledge.⁹ Staff colleges also provide students the opportunity to form relationships with other military practitioners, both instructors and students. The professional relationships created in this fashion also include alliance and coalition partners who send instructors and students to each other's institutions. This transnational¹⁰ community has bonds that facilitate the transmission of professional knowledge between connected militaries.

One could opine from this discussion of theories of intellectual change and the relationship of staff college curricula as indicators that the emergence of new ideas pertaining to military knowledge and practice would be indicated by vigorous debate in a myriad of forums – public and professional. Conversely, the absence of Canadian discourse, coupled with knowledge change within Canada's profession of arms indicates that the discussion had likely occurred elsewhere prior to Canada adopting those ideas.

Canada's Imperial Military – Supporting the Pax Britannica

Dr. Doug Delaney, an RMC professor and former infantry officer, recently published *The Imperial Army Project: Britain and the Land Forces of the Dominions and India, 1902 – 1945*, which explores the relationship of Canada's military, primarily the Army, to that of the British Empire.¹¹ Delaney's study of this relationship is a detailed examination of the Imperial ties that bound the Dominions to the Empire. This was a common theme with Canada's professional soldiers even after the First World War.

In 1935, Lieutenant-Colonel Kenneth Stuart, editor of *Canadian Defence Quarterly (CDQ)* and a future Canadian Chief of the General Staff (CGS), produced a draft article entitled "Canada and Imperial Defence – The Application of the Principles of Imperial Defence," which he intended to publish in the CDQ.¹² Stuart believed that each nation of the British Empire had a responsibility for Imperial defence, at least in broad terms, and each had to be prepared to render "mutual support" when the military and political situation demanded. Stuart defined mutual support as assistance that might be provided to the United Kingdom or any other "important part of the Empire" in times of war.¹³

These discussions had roots that reached back to the Edwardian era, when political and military authorities from Britain and the Dominions met during a succession of colonial and Imperial conferences to discuss closer military cooperation.

In 1907, a resolution was passed to create an Imperial General Staff to coordinate with and advise the land forces of the empire through local sections in member countries. The 1909 conference commitment to standardize as much as possible the equipment, organizations, and operating procedures of the military forces of Britain, India, and the Dominions also furthered the aim of Imperial cooperation. Canadian military historian George Stanley argues that the 1909 agreements "had one aim, that of making the Canadian militiaman into a replica of the British Territorial Tommy in arms, training,

equipment, and habits of thought."¹⁴ These conferences continued throughout the interwar years as a discussion forum for Imperial defence, among a vast array other issues, and the Imperial General Staff did its best to extend its influence throughout the empire.

Staff colleges were crucial to producing qualified staff officers, as well as creating, implementing, refining, and preserving specialized professional knowledge. Canada needed staff-trained officers for its Permanent Force, so from 1903 onward, the Dominion sent selected officers to the British Army Staff College at Camberley, where they trained up to GSO I level. In the system of staff appointments used at that time, the lowest grade general staff officer was a GSO III, normally holding the rank of captain, who assisted more senior appointments. The usual GSO II was one rank higher, and customarily, a major in charge of a portion of a staff, or supporting a more senior-ranked staff officer. At the highest level was a GSO I, typically a lieutenant-colonel, but could be of higher military rank depending upon the size of the organization. The Militia List of 1914 indicates that eight serving officers had passed staff college (psc), and another four were in the process of completing their training.¹⁵ The material taught at staff colleges created, among practitioners, a collective understanding of how a military organization or its components were intended to operate in a chaotic world. By the early 20th Century, some of this material had been formally codified for the armies of the Empire in the *Field Service Regulations* (1909). Canadians accepted that the British would supply guidance, operating procedures, and principles with respect to military matters. They had agreed to the cooperative agreements of the Imperial conferences. Besides, the small size

"If one wishes to understand a nation's interpretation of war and other conflict, one must understand the professional education of that nation's military."



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General "Harry" Crerar just before going to France, 1944.

of the Canadian militia worked against the creation a Canadian separate staff education system or a uniquely Canadian staff college. And it would have been bad for Imperial cooperation. Lieutenant-Colonel H.D.G. (Harry) Crerar, also a future Chief of the General Staff (CGS) and First Canadian Army commander during the Second World War, was not alone in thinking that he could "...imagine no worse blow to the practical assimilation of the Military Forces of the Empire than that each Dominion should have its own Staff College."¹⁶ The implication was that a distinct national staff college would feed a distinct national army and therefore erode Imperial ties.¹⁷

The Imperial cast of the Canadian Militia was mirrored in its more recently- created sister services, the Royal Canadian Navy (RCN), established in 1910, and the Royal Canadian Air Force

"If there was one noteworthy Canadian initiative during these inter-war years, it was the establishment in 1923 of the professional journal, *CDQ*."

of a distinctly-Canadian paradigm in staff education as a result of the experiences of the Canadian military during that conflict. Regardless, it is evident that in the late-1930s, *CDQ* assisted in creating and maintaining a degree of discourse within the professional community of the Canadian military, albeit for the most part, discussions that reflected the Imperial relationship.²⁵

(RCAF), created in 1924. Both these elements looked to their British counterparts, the Royal Navy (RN) and the Royal Air Force (RAF), for guidance and assistance in professional matters. Members of the RCN attended RN institutions for professional education and advanced training, while the RCAF followed suit with the RAF.¹⁸

If there was one noteworthy Canadian initiative during these inter-war years, it was the establishment in 1923 of the professional journal, *CDQ*. The existence of this journal demonstrated a desire to establish discourse on defence issues.¹⁹ The Chief of the General Staff, Major-General J.H. MacBrien, a 1914 graduate of Camberley, had noted the need for a service publication in Canada that would attempt "...to reflect military thought, examine critically the direction of military development, and study in some degree the trend of world movements" and *CDQ* grew from that need.²⁰ One example of the intellectual engagement it engendered was a lively dialogue which took place between Lieutenant-Colonel E.L.M. "Tommy" Burns (later a Lieutenant-General and Corps Commander, as well as being responsible for the initial United Nations Expeditionary Force I), and Captain G.G. (Guy) Simonds (later a Lieutenant-General and Chief of Staff of the Canadian Army), in 1939 as to the correct balance of tanks and infantry in a division for the best achievement of flexibility and interoperability.²¹ Both men were staff college graduates, Simonds

from Camberley in 1937, and Burns from Quetta in 1928.²² However, it is necessary to emphasize that while this discussion has been quoted numerous times, it followed on from discussions that had already taken place in Europe.²³ In retrospect, the *CDQ* was an especially significant journal with regard to professional knowledge, since its establishment acknowledged that there might be a distinctive "school of military thought" in Canada that was separate from its Imperial counterpart.²⁴ However, this prediction was not fulfilled until after the Second World War with the emergence

Lieutenant C.E. Nye/DND/LAC/PA-171701



Lieutenant-General "Tommy" Burns, General Officer Commanding 1st Canadian Corps, consults a map enroute to Rimini, Italy, 23 September 1944.

Renaissance and Decline

The Second World War created momentum for the education of the Canadian military, and it had a positive impact upon the degree of professional introspection generated. Britain could not support the education and training of a greatly-expanded Canadian military, and, as such, national institutions were created to address that need. Furthermore, the post-Second World War discussion that took place within the Chiefs of Staff Committee seemed to indicate that from 1939 to 1945, there had been a lack of interoperability between the RCN, the Canadian Army (CA),²⁶ and the RCAF. This shortcoming was attributed to the development of a "single-service" focus. Consequently, the form of future Canadian professional military education was debated during November 1945. These inter-service deliberations revolved around the perceived need for a unified versus single service education. Through this discussion, the decision was made that the services would continue to provide staff education for junior and intermediate officers. Still, the requirement for a jointly conducted staff education at the senior officer level was highlighted.²⁷ This need was later addressed, albeit at a higher level of education than envisioned in these original discussions, with the establishment of the National Defence College (NDC) three years later.²⁸ From this immediate post-war discussion, one can discern that the Chiefs of Staff of the respective services recognized that professional military education needed to contain the knowledge gained during that conflict. In turn, this understanding of the necessity to include those lessons impacted the content of the curriculum of both the Canadian Army and the RCAF Colleges. Throughout the post-war years, the RCN addressed its need for staff officers by sending a small number of students to the Canadian Army and the RCAF Staff Colleges, as well as the Royal Navy Staff College in Greenwich.²⁹

To a certain extent, it seems as if post-war inter-service cooperation was determined by the RCAF, whose correspondence during and after the Second World War demonstrated that they vigorously sought the involvement of both the RCN and the CA in the RCAF war staff courses. While the Army also conducted similar activities, the same breadth and depth of primary sources pertaining to this subject does not exist. One might be able to attribute these initiatives to the legacy of cooperation with the Empire imbued within the pre-war staff army college system.³⁰

On the other hand, the origins of staff education in the RCAF lay within the more recent RAF College at Andover.³¹ Much of the early RAF curriculum was broad in nature, focused upon producing progressive officers versed in the employment of their newly-formed air force. The first commandant of the RAF Staff College, Air Commodore H.R.M Brooke-Popham, later the wartime Supreme Commander Far East, observed that the curriculum was designed to develop "...the habit of steady reading and thinking rather than...the acquisition of a mass of detail."³² One can argue that this flexible and strategic intellectual approach, combined with the ongoing needs

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(Left to Right) Lieutenant-General Guy Simonds, Field Marshal Bernard Montgomery, and General Harry Crerar in consultation.



Air Chief-Marshal Robert Brooke-Popham with General Archibald Wavell in the Far East, 1941.

of Land-Air (in early years sometimes known as Army-Air),³³ Combined³⁴ and Joint³⁵ Operations of the Second World War, created a desire to integrate other services as much as possible into the curriculum of the RCAF War Staff Courses, which commenced in 1943.³⁶ Wartime curriculums had a pronounced emphasis upon understanding those with which they would have to *operate*, and those they would have to *fight*.

Consequently, while during the Second World War both War Staff Courses had instructors and students of the other services and taught about each other's service, it was the RCAF that – due to the nature of their operations, ranging from *strategic* to *tactical*, with a multi-service and multi-nation perspective – had a much more integrated and wide-ranging philosophy of professional education. It was not a vision of education focused upon a single service. At the end of the Second World War, the RCAF began designing future longer courses that had significant elements of

participation at the RCAF Staff College continued, and in 1957, the RCN chose to focus their priorities for staff education upon the RCAF Staff College.⁴³ By 1965, the RCN was utilizing a *number* of RCAF professional education opportunities.⁴⁴

“The RCN students who participated in RCAF staff education saw this professional experience of value.”

Perhaps this can be attributed to the RCAF view of professional military education. In the years after the Second World War, the RCAF had embraced a philosophy of holistic education to develop a breadth and depth of competencies necessary throughout an officer's career. This educational construct was formed in a manner akin to that of the United States Air Force “Air University” concept.⁴⁵ By the 1960s, this included oversight by RCAF Training Command, an Air Force College Headquarters, based at the RCAF Staff College, the Staff College, the RCAF Staff School, used to qualify officers for squadron command, and an Extension School, which allowed graduates of the RCAF Staff School to qualify for Staff College.⁴⁶

inter-service knowledge, land-air cooperation, and combined operations. The first of these longer courses commenced immediately after the war, in October 1945. Initially six months in duration, in 1948, this staff education was extended to ten months. These ten-month RCAF courses continued until 1966, when the impending unification of the Canadian services into a single military force initiated the commencement of transition courses at the newly created inter-service Canadian Forces College (CFC).³⁷

After the Second World War, the CA established a staff course that was conducted on an annual basis and had a ten month duration.³⁸ Its purpose was the same as that of the war staff courses and pre-war staff colleges, and was *narrowly* but *precisely* defined as, “...to train officers for second grade [GSO II] appointments in field and static formations.”³⁹ While the ten month criterion reflected the duration of other Commonwealth staff colleges, the CA course eventually become almost two years in length, between 1959 and 1965, as a result of a desire to teach all aspects of conflict, nuclear and non-nuclear. However, with unification of the Canadian military in 1966 the course was reduced back to ten months until 1973, when the final restructuring of staff education resulted in CA students becoming part of the Canadian Forces professional development system for this level of staff education. Despite this change, a junior version of the CA staff course continued from 1974, and it still exists.⁴⁰

The RCN students who participated in RCAF staff education saw this professional experience of value. In 1945, Lieutenant Commander J.E.M. Hoare, Royal Canadian Navy Volunteer Reserve (RCNVR), who was attending a wartime RCAF staff course, opined: “My colleagues here are a good bunch and the course is well worthwhile.”⁴¹ In 1955, the RCN requested additional vacancies from the RCAF.⁴² This support for RCN



Members of "A" Squadron, Royal Canadian Dragoons, stop for lunch and a chat with local villagers on patrol near Mataban, Somalia, in 1993.

During this time, discussions began over combining the three services and their professional education systems. It was recognized that integration would create mixed staffs of navy, army, and air force officers, who all needed an understanding of joint operations. Thus, a joint education system was of concern to all. Accordingly, in December 1964, the Vice Chief of the Defence Staff (VCDS) directed that a study be conducted "...to determine the staff officer training requirements for the services with the object of introducing an integrated staff course in September 1966."⁴⁷

In 1965, the VCDS Working Group produced a short report on the future of staff education for the Canadian Forces. This report marked the demise of single service staff colleges. The RCAF Staff College was deemed the best organization to serve as a model for a centrally-run professional education system. In 1966, the RCAF Staff College became the Canadian Forces College. The goal of this new organization was to provide a comprehensive Officer Development System for all Canadian services.⁴⁸

The Diminution of Professional Discussion

In the absence of joint doctrine and the dismemberment of what had been a thriving Canadian professional military education system, Canada looked towards the United States, which had supplanted Great Britain as her primary ally. The effects of utilizing United States sources for doctrine and

education can be discerned in 1977 CFC curriculum guidance to its directing staff. The syndicate discussion concerning the American Joint Planning Process (JPP) included a query with respect to the relevance of learning a foreign planning procedure. The notes provided as instructor guidance stress that this seminar is designed to bring students to the conclusion that, given the absence of a corresponding Canadian system, this American process was the desired option.⁴⁹

While the courses offered by the Canadian Army and the RCAF staff colleges were created using the Canadian knowledge painfully gained over years of conflict, the curricula retained some of its British heritage, and also absorbed increasing American content. Some of this inherited alchemy was lost in the 1970s. In the absence of Canadian joint professional military knowledge following unification, that of the United States was used. One example of this was the 1995 adoption and teaching of the "operational level of war" verbatim from American doctrine, with little discussion or comprehension of its implications.⁵⁰ The result was a Canadian unified force that did not "own" aspects of its own professional knowledge, with a commensurate impact upon the coherence of its professional capability.

The incidents in Somalia resulted in the Commission of Inquiry into the Deployment of the Canadian Forces (CF)⁵¹ to Somalia (1993-1997). Some of its results pertained to academic and professional education. By the late-1990s, ministerial direction



Clouds of smoke rise over Manhattan as the twin towers of the World Trade Center in New York collapse, 11 September 2001. More than 3000 people were killed in the 9/11 attacks, including those killed in the Pentagon strike and the occupants of the hijacked aircraft.

was issued that raised academic requirements for officers and expanded professional military education. The former created a “degreed” officer corps, while the latter increased professional requirements. The gap in professional military education caused by the 1994 closure of the National Defence College in Kingston led to the approval and establishment of the Advanced Military Studies Course (AMSC) and the National Strategic Studies Course (NSSC) at the Canadian Forces College in Toronto in 1998. These two separate courses have since been combined into the ten-month senior leadership National Studies Program. Mid-level leaders were educated at the then-Canadian Forces College Command and Staff Course, which was revitalized to become the Joint Command and Staff Program. For the Army, with its Staff College in Kingston, the post-1972 five-month Canadian Land Forces Command and Staff Course for junior officers has become a much-shortened Army Operations Course. Both the Navy and Air Force have taken steps to revitalize professional development for officers in the first part of their careers. Furthermore, these changes have not been confined to the officer corps; the Non-Commissioned Member Professional Development program in St.-Jean, Quebec,

“The 9/11 terrorist attacks provided the Canadian government with the impetus to reestablish defence and security credentials with the Americans...”

was created in 2003, and is focused upon the professional education of NCOs in the broader, non-service or trade specifics. Throughout the same period of educational reform, steps were taken to ensure that all officers had an undergraduate degree and access, if needed, to postgraduate education. All this was done in an effort to ensure that the CAF leadership was intellectually able to deal with the complexities of the 21st Century security environment.

Despite this intent, these initiatives were still nascent or had not yet been enacted when

Canada became involved in Afghanistan. The 9/11 terrorist attacks provided the Canadian government with the impetus to reestablish defence and security credentials with the Americans, which took the form of a military contribution to Operation *Enduring Freedom*. Whether knowingly or not, Canada became bound to a commitment that inexorably grew with time and more inextricably bound us to our American allies. In a similar fashion to the adoption of the operational level of war, our use of United States counterinsurgency doctrine in Afghanistan demonstrates the continuing prevalence of the American influence on the Canadian profession of arms.



Fight to Win ~ First Battalion Princess Patricia Canadian Light Infantry in action in the Panjway District of Afghanistan during the summer of 2006.

Conclusion

“We steal things from other countries because they ‘sound cool’ or they worked in a past war and we put them in our doctrine without ever developing the foundation (intellectual base, experience, understanding, etc.) and they are never incorporated properly...”⁵²

~Email from a Canadian Senior Officer 2017

This snippet from a recent email sums up the crux of the problem. The CAF is not intellectually inquisitive regarding the knowledge required by the Canadian profession of arms. The hallmarks of paradigm change are absent from alterations to professional knowledge. Both Ludwik Fleck and Thomas Kuhn emphasized the role of concurring practitioners in the spread of knowledge. The Canadian military, as likeminded professionals, have prior to the Second World War and in the years since Unification adopted the perspective of its major ally in professional matters. This unquestioning assimilation of a foreign viewpoint has had a corresponding and continuing impact, not only upon the professional education of the Canadian military, but more importantly, upon the intellectual approaches utilised by its senior leaders and commanders when planning military activities in response to national direction, and in effect, determining the Canadian Way of War.⁵³

In military terms, the phrase “left out of battle” denotes the percentage of the unit strength deliberately not included in high-risk operations, and would, if the worst occurs, be the elements upon which a unit could be reconstituted. It is evident from the articles in professional journals, such as the *Canadian Military*

Journal, discussions via emails and social media, as well as other interactions, that the desire for professional discourse exists, but that it needs to be operationalized by the senior leadership, both the General/Flag officer and Chief Warrant/Chief Petty Officer senior appointments of the CAF. They are not only institutional leaders, but “Stewards of the Profession of Arms.” Their active participation in professional and public discourse could be much increased and could provide an example for all. Furthermore, it is necessary to promote common understanding of Canadian military knowledge, along with integrated structures that encourage such examination and dissemination over the course of a career.⁵⁴

Without an invigoration of dialogue in both public and military spheres, the professional understanding of the CAF will continue to be taken from our primary allies. As Canadian historian and Korean War veteran Bill McAndrew observed when discussing the unhesitating 1995 adoption of the American vision of the operational level of war: “Trying to absorb foreign doctrines second-hand will be as fruitless as transplanting tropical plants in the tundra.”⁵⁵

This article is respectfully dedicated to the memory of Dr. Bill Bentley, MSM, CD, who devoted many years to enhancing Professional Development within the Canadian Profession of Arms.

I would like to thank Lindsay M. Coombs for her assistance in the editing of this manuscript.



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In Defence of Victory: A Reply to Brigadier-General Carignan’s “Victory as a Strategic Objective”

by John Keess

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Introduction

In its Spring 2017 edition, the *Canadian Military Journal (CMJ)* published Brigadier-General Jennie Carignan’s article, “Victory as a Strategic Objective: An Ambiguous and Counter-Productive Concept for High Command.”¹ It was a well-written and compelling article in which she argues that military victory, in the conventional sense, is an outdated concept, and that continuing to insist upon it will bring several tactical, operational, and ethical challenges that are likely to shroud a substantive success. To get past these mental obstacles, she argues that we will need to discard old ways of thinking – particularly Clausewitzian

analysis – and focus upon “achieving peace” instead of attaining victory. To support her thesis, she cites the philosophy of Professor Marc Imbeault of the Royal Military College Saint-Jean, as well as case studies in Vietnam and Afghanistan. Although a courageously and well-written article, I believe it is fundamentally wrong, part of a larger strain of thinking in Western military thought that has devalued the military’s focussed application of physical force in favour of more vague notions of ‘effects.’ In doing so, we have clouded many important issues about the limits and imperatives of applying force; we have, in essence, turned theory, which should simplify the complex, into something which adds complexity.

This article will argue that although the character of war changes, its nature does not. Further, the nature of war holds military victory as a precondition for strategic success. Reading General Carignan’s article, four central objections came to mind: first, that she fundamentally misrepresents Clausewitz’ writings; second, that she mischaracterises the exemplary campaigns that support her thesis; third, that the assertion that a focus upon victory results in unethical behaviour is not borne out by historical

example; and last, that her substitute to military victory – achieving peace – is not a realistic alternative with which to employ and organize military force. The first objection has been addressed to an extensive and precise degree by Doctor Bill Bentley in the Summer 2017 edition of the *CMJ*, and thus, I will focus upon the last three. Victory may never be final, but there is also no success without it. By examining the contrast between war’s enduring elements – its *nature* – and the means by which it is currently waged – its *character* – it will be demonstrated that the pursuit of victory must remain at the centre of our thinking.



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Carl von Clausewitz.

Victory in History: Vietnam as a case study

“My strategy is one against ten; my tactic is ten against one.”

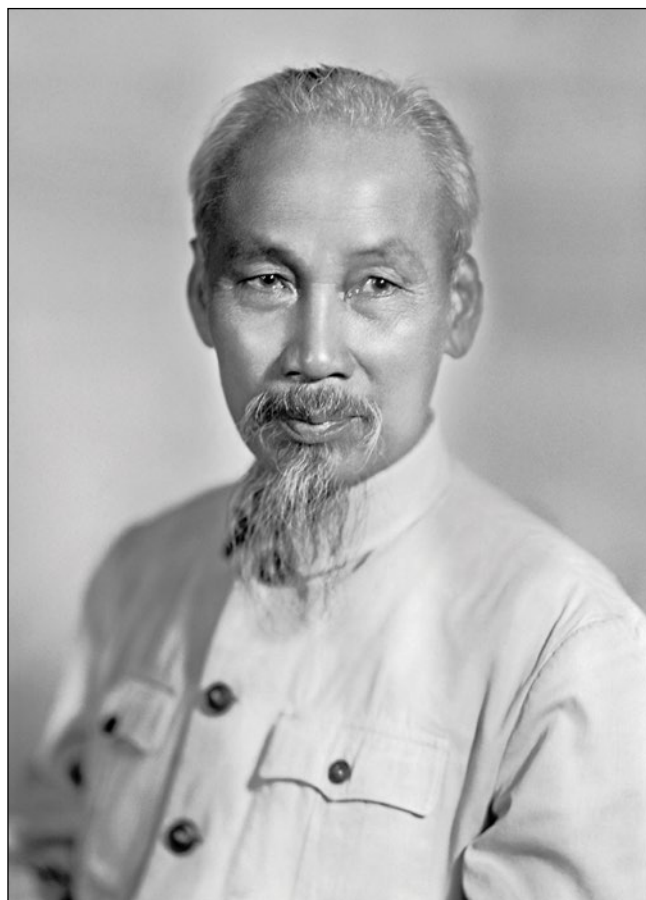
~ *Mao Tse Tung*²

Brigadier-General Carignan uses the example of the Second Indochina War³ as a demonstration of why military victory does not matter. The American experience in Vietnam, as it is widely understood in the West, seems to support the idea that military balance is irrelevant. After more than a decade of intense struggle, the Western-backed regime in Saigon fell to Communist forces. Years later, Carignan points out, a mere five days before Saigon fell, an American officer confronted a North Vietnamese counterpart and pointed out that the US had lost no tactical battles, but that his wise opposite merely replied that it did not matter.⁴ This is an instructive episode. On one hand, victory seems pointless – the total defeat of the Communist forces in the Tet Offensive years earlier seems

hollow.⁵ If the Americans and South Vietnamese held the field, and still lost the war, surely our conventional definition of military success is shallow to the point of being useless?

On the other hand, this exchange took place five days before Saigon fell, with Communist tanks rolling through the streets, enabled by reliable lines of communication. The so-called ‘Ho Chi Minh Trail’ was, in fact, neither a trail, nor named after Ho Chi Minh. Called the Son Strategic Supply Route or Highway 559, it was maintained largely by regular, uniformed soldiers driving well-camouflaged trucks and supported through impressive feats of military engineering. Stopping the flow of supplies through Indochina was primarily a technical problem – most notably the inability of American air forces to attack moving supply columns at night in dense foliage.⁶ These problems were nothing new – Marmont would meet with an equal lack of success in cutting off Wellington’s strategic supply lines through Portugal during the Peninsular War in 1810, and the Axis forces would have an equally difficult time in stopping the flow of materiel to Montgomery’s forces in Egypt in 1942. Then, as in Vietnam, success was not had by wily guerillas, but by well-planned, well-resourced, well-led conventional campaigns that had victory as their end. Yet, the fact remains that the North Vietnamese still managed to defeat a much larger, much more technically advanced adversary. How could this have happened?

The relationship between military victory and strategic success in Vietnam can best be expressed through the Clausewitzian concepts of “polarity” and the “third case of interaction” which demonstrate that different combatants in a conflict may have different means, ends, and motivations. The complex interactions



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Ho Chi Minh.

of these factors play a large part in determining what “victory” means. In *On War*, polarity is defined as the relationship between two opposing goals – perfect polarity is a zero-sum game, where the aims on one side are the precise negative of the other, whereas many conflicts have combatants whose aims are different but not necessarily opposite. To illustrate polarity, think of the Chinese resistance to Japanese occupation in the 1930s and 1940s. Although the Communists and Nationalists opposed each other bitterly, they both held the common view that Japan must be ejected from China. So, for the duration of the war, both combatants had a mixed polarity which then flipped into a full polarity once the Japanese were defeated.⁷

**“To illustrate polarity,
think of the Chinese
resistance to Japanese
occupation in the 1930s
and 1940s.”**

The concept of the “third extreme” in which Clausewitz discusses the “maximum exertion of strength” complements our discussion of polarity. Here, he argues that combatants’ strength is made up of two components – their means and their will, which is in turn closely tied to motive. As one side finds a way to exert more strength, either through new resources or moral retrenchment, in terms of “pure theory,” it should push the other towards a maximum exertion of strength themselves.⁸ But here must take note of the literary context – Clausewitz, who wrote in Hegelian dialectic, goes into great depth about the limit of pure theory and clearly defines it as an impossibility, noting in particular that domestic political constraints will have an effect upon just how far one side is willing to go in terms of effort or losses to win a war.⁹ We thus see that two sides fighting a war may have different social-political motivations which shape their military effort, their definitions of victory, and the intensity of their exertions. The confluence of these aspects and their complex interactions were well at play in Vietnam.

Polarity and the third extreme were on display in Vietnam early on, especially during the battle Dien Bien Phu (1954). With the French garrison surrounded by overwhelmingly superior forces, they called on the US to mobilize its massive air power to break the encirclement and relieve the garrison. At the time, the Americans declined to do so, as they were reluctant to engage in a land war in Asia for the sake of rescuing what they believed to be a fading European colonial possession.¹⁰ This reluctance for involvement evaporated, however, when the US decided to commit land and air forces to Vietnam in what was seen at the time as a purely *anti-communist* struggle in the same area, and would end up dropping far, far more ordnance in 1964 than it would have taken to relieve Dien Bien Phu a scant ten years earlier. Thus, the polarity between the US, the Viet Minh and the French forces was not so complete as to push the Americans into direct action. This would change. A mere six years after the political ambivalence for intervention under the Eisenhower administration, John F Kennedy noted that:

“As French influence in the political, economic and military spheres has declined in Vietnam, American influence has steadily grown. This is our offspring – we cannot abandon it, we cannot ignore its needs. And if it falls victim to any of the perils that threaten its existence – Communism, political anarchy, poverty and the rest – then the United States, with some justification, will be held responsible; and our prestige in Asia will sink to a new low.”¹¹

This is a stirring call to arms, but it was not reflected in the American commitment to Vietnam. Despite the grand scale of men and materiel – some estimates put the peak US number of troops at well over half a million,¹² the US was always limited its military involvement to the *defence of South Vietnam*, not the *defeat of North Vietnam* – in essence, a perpetual holding campaign against a determined hybrid opponent who was in it to win. In the words of Sir Thomas Daly, the senior Australian soldier during the Second Indochina War, “...the major lesson is that we should never allow ourselves to become involved in a war that we don’t intend to win. Holding campaigns are fruitless. They result in a loss of life which is incommensurate with the results achieved.”¹³ Was it, then, in the words of Walter Cronkite, “...the bloody experience of Vietnam is to end in a stalemate. To say that we are closer to victory today is to believe

in the face of the evidence, the optimists who have been wrong in the past,”¹⁴ or was it that *victory* in any reasonable sense was never really an option when *stalemate* was always the objective?

General Giáp, the commander of North Vietnamese forces, answered this question unambiguously. The North Vietnamese had far more to lose than the Americans did; they merely had to avoid defeat long enough to have the Americans withdraw their superior *conventional forces* to allow for the People’s Army of



General Võ Nguyên Giáp.

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Lucius Annaeus Seneca, 4 BC – AD 65.

Peace Through Strength: The ethics of victory

“All savageness is a sign of weakness.”

~Seneca¹⁶

Another of General Carignan’s arguments against retaining the concept of victory as an organising factor for military thought and practice is that it is likely to result in unethical behaviour:

“This means that, if senior commanders are fixated upon the concept of victory, their fixation may be detrimental to soldiers on operations, who may take for granted that the end (victory) justifies the use of unacceptable means to achieve it. The concept of victory that transcends all levels, from tactics to grand strategy, may change in status and meaning in time and space... If we extend the paradox farther, we realize that even if a soldier wants to act morally, the need to win at any price may push him or her to commit atrocities in the name of the victory the troops have been directed by the high command – whether explicitly or implicitly – to achieve....] In his article “Le paradigme analytique du tortionnaire,” philosopher Marc Imbeault explains that the more just the cause, the more noble and urgent the goal, the more the end seems to justify the means.”¹⁷

It is interesting that the evidence used for this assertion is philosophical, and not historical; a quick look at number of limited and more general conflicts shows no correlation between more total objectives and cruelty on the part of combatants. Take, as an illustration, the complex, limited and somewhat esoteric objectives pursued by the combatants in the Thirty Years’ War (1618-1648 A.D.). Although campaigns were often fought with somewhat minor political objectives and the conflict ended with a complex treaty that, arguably, strengthened the states involved, the burdens, and occasional casual cruelties, imposed by marauding armies had harsh and often brutal effects. It took *centuries* for some of the devastated areas of Germany to fully recover.¹⁸

Contrast the behaviour, then, of these rampages with the conduct of the Western Allies in the Second World War. Fighting over many of the same territories, the war had a far different tenor – this was a total war seeking the complete political destruction of one side or another, waged with few restrictions. In his speech to the departing contingents of the Allied Expeditionary Force in June 1944, Eisenhower told the troops:

“You are about to embark upon the Great Crusade, toward which we have striven for many months.... In company with our brave Allies on and Brothers-in-Arms on other Fronts, **you will bring about the destruction of the German war machine....** Your task will not be an easy one. Your enemy is well-trained, well-equipped and battle-hardened. He will fight savagely.... I have full confidence in your courage, devotion to duty, and skill in battle. **We will accept nothing less than full Victory!** [author emphasis added]”¹⁹

North Vietnam to advance into the south of the country. Despite the popular image of a Vietnamese soldier being a pyjama-clad guerrilla wading through a jungle on his way to an ambush, *this* is how the Second Indochina War came to an end – a decisive, combined-arms advance with well-disciplined, well-led, and well-equipped forces. In fact, the North Vietnamese had tried conventional assaults both at Tet in 1968 and during the Geneva negotiations in 1973, but after their failure, Giáp had decided to conserve his strength until the balance of forces was favourable – far from a unique strategy that invalidated victory, it was not dissimilar from that employed by the Romans during the Second Punic War (218-201 B.C.). Never did Giáp assume that he would achieve his political objective without a decisive military victory.¹⁵ Vietnam is not a cautionary tale about the hollowness of victory; it is a lesson about fighting a war with no intent to really win it, and an assertion of war’s unchanging nature. This raises the question: if fighting long, inconclusive wars is military ineffective, can it also be seen as ethically unsound?

“Vietnam is not a cautionary tale about the hollowness of victory; it is a lesson about fighting a war with no intent to really win it, and an assertion of war’s unchanging nature.”

These were not ‘combatants’ going to achieve peace in an abstract sense. They were warriors going to physically destroy a formidable army protecting a regime they despised, and they knew it. Many of them had seen the bombed-out areas of London or lost friends on other fronts. But where was the mass cruelty? Despite local instances of reprisals on civilians or breaches of the laws of armed conflict surrounding prisoners,²⁰ there were no systematic outrages, nor were they particularly widespread. The Allies gave quarter when it was asked and transported prisoners to clean, well-built POW camps where imprisoned German soldiers were provided with food, shelter, and in many cases, work and education *above what they were receiving in the Wehrmacht*.²¹ After the war, the United States pushed allies to abandon punitive plans like the Monnet Plan and the Morgenthau Plan, which would have seen Germany ‘pastoralised,’ and instead implemented the Marshall Plan, which saw West Germans off rationing years before the victorious British population.²² In less than twenty years, Germany – or at least West Germany – went from being a pariah state to being an integrated member of the European community, prosperous, innovative in the arts and industry, and democratic in spirit. A similar transformation happened in Japan, where a remarkable amount of restraint was shown on the part of the victors despite

the sadistic treatment imposed upon allied prisoners during the war, and the unconditional surrender demanded by the Allies.

One possible explanation for this seemingly-inverse relationship between an emphasis upon victory and ethical behaviour is offered by John Keegan in his seminal work, *A History of Warfare*. Keegan argues that war is in fact a *cultural* and not a *political* phenomenon. The corollary is that different societies create different fighting forces with different norms – so while the highly-organised Prussians of the Napoleonic era might have engaged in large-scale killing on the battlefield, they abhorred the smaller-scale killing committed by Cossacks as part of their habits of rape, pillage, and murder conducted while acting as deep reconnaissance in advance of the main army.²³ The question then is that we must wonder which kind of culture and organisation is better able to enforce ethical behaviour in soldiers – a functionalist hierarchy with clearly-defined aims, or a loose, ambiguously-defined group with quixotic aims? If we begin defining military operations and commitment in vague terms that justify endless deployments with little by way of measurable results, are we really better preparing soldiers to act ethically? It is fully possible to have an intellectual conception of war based upon achieving decisive victory with cultural restraints on immoral and unethical behaviour, to which many a surviving German PoW could testify. It is also



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General Dwight D. Eisenhower, Supreme Allied Commander Europe, talking with American paratroopers on the evening of 5 June 1944 as they prepared to jump into Normandy.

more than likely that an armed group wandering *ad infinitum* without a clear goal – means unto themselves – is prone to act barbarously, as a refugee from one of the myriad small-scale, indecisive conflicts going on today might relate. These wars, known to history for the brutality of the combatants, gained much of their fuel for cruelty from a cultural system that recognised neither ends nor means as Imbeault, or for that matter, we, would recognize.

Alternatives to Victory? Afghanistan and the unchanging nature of war

“For the course of a war is determined mainly by military considerations....in no case must the military leader allow his operations to be influenced by politics *alone*....It is of no concern to him how politics can subsequently use his victories or defeats; it is up to politics to exploit them.”

~Helmuth Von Moltke²⁴

Afghanistan provides a compelling study of victory. General Carignan rightly points out that Afghanistan remains an “ambiguous success” where many a local military victory seemingly led to no tangible political outcome. Moreover, she related from her personal experience that soldiers often found themselves repeating dangerous and exhausting tasks without seeing a direct effect. This story is compelling, but looking beyond it, we have to ask why “victory” in Afghanistan seems so elusive, not whether the concept of victory itself is flawed.

Victory in Afghanistan seems intangible because it was both achieved and abandoned. Multiple military and political projects with different aims were implemented simultaneously: An American-led counter-terrorist mission under the name Operation

Enduring Freedom (OEF), and a NATO-led nation-building mission called the International Security Assistance Force (ISAF). For one of these missions – the counter-terrorist effort against Al-Qaeda in the wake of the 9/11 attacks – the mission has been an unambiguous success. Within months of the US commitment of military assets – primarily Special Forces and air power – an anti-Taliban alliance had seized Kabul and Afghanistan was used as a base for a long but decisive campaign of direct

action against Al-Qaeda. Although it took time, OEF resulted in the removal of Afghanistan as an effective base for Al-Qaeda operations. And though Al-Qaeda remains as a global presence, it is essentially stateless. Even its previously glossy magazine, *Inspire*, has declined in quality as the organisation progressively lost a firm base from which to operate.²⁵

Seemingly omnipresent in 2001 when attacking the World Trade Center, the Pentagon, and potentially the White House, by 2011, recruits were having to pay for their own equipment, and its attacks have become less frequent and less sophisticated.²⁶ This is not because we have “achieved peace” in Afghanistan or elsewhere, it is because the counter-terrorist mission has been successful in physically destroying the places where Al-Qaeda trained and operated, and, in many cases, key people as well.

“Victory in Afghanistan seems intangible because it was both achieved and abandoned.”

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DND photo by Sergeant Daren Kraus/AR2010-0177-28



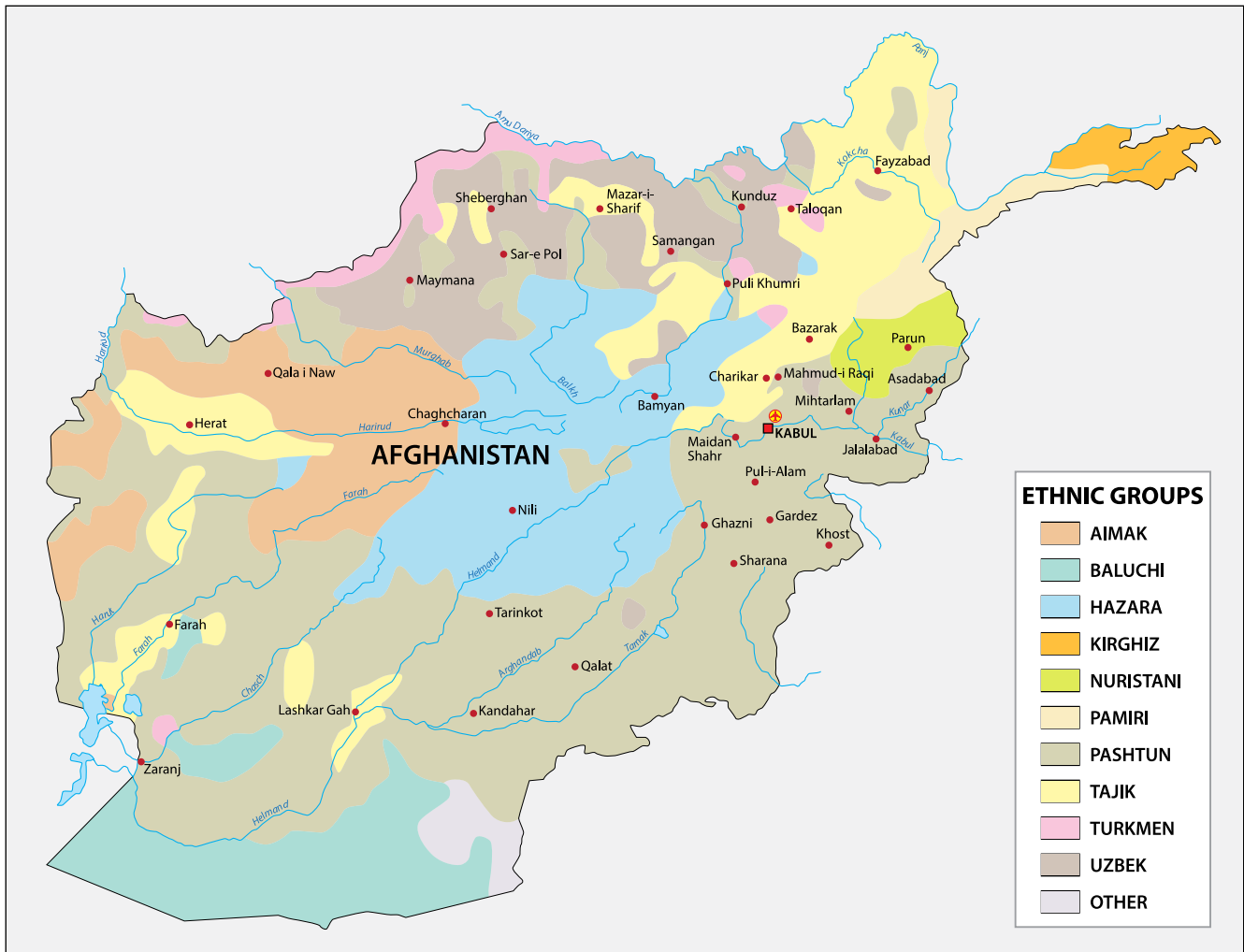
The second, nation-building mission in Afghanistan has not been nearly as successful, but we need to understand this lack of decisiveness through the lens of the limited war that it is. In 2003, well after OEF had established itself on the ground, the European component of NATO spearheaded the creation of the International Security Assistance Forces. ISAF, unlike the OEF forces already in the country, would have a larger nation-building mandate, with the aim of not destroying Al-Qaeda, but the far more complex task of bringing peace and security to Afghanistan. Originally based in Kabul, it expanded to the rest of Afghanistan, beginning in 2006. But while doing so, it never had well-defined or achievable aims. Its component countries all had varying domestic political imperatives, and resources were far too short to conduct major, sustained combat operations.²⁷ In 2007, for example, ISAF had 41,700 troops, 6500 of whom were composed of National Support Elements (NSEs) to complete a stated mission of:

“...conduct[ing] military operations in the assigned area of operation to assist the Government of Afghanistan in the establishment and maintenance of a safe and secure environment with full engagement of the Afghan National Security Forces, in order to extend government authority and influence, thereby facilitating Afghanistan’s reconstruction and contributing to regional stability.”

A tall order, especially at a troop density of one soldier for every eighteen square kilometres of terrain.²⁸ By 2010, ISAF’s strength had grown to 130,313, but this merely meant that the

number of troops deployed covered one soldier for every five square kilometres of land,²⁹ and the increase was a temporary ‘surge.’ By 2012, the number was down to 102,508³⁰ and by 2014, a mere 28,360.³¹ Such numbers would have been adequate for a counter-terrorism role, but was not close to realistic for such an expansive mission. By contrast, the New York City Police Department, in 2017, filled over 51,000 positions [including 34,000 uniformed officers – ed.], less than a thousand of them with civilians,³² to police a city of eight million people in a stable, Western democracy. Why were 130,000 troops asked to pacify a country of nearly 35 million people in a mountainous, unstable, fractious country, and also expected to build a new national army in the process?³³

The answer is that Afghanistan *was*, and *remains*, a limited conflict, posing no direct existential threat to any of the contributing nations. As bad as the Taliban are, they do not threaten the survival of the current international system or any Western government. It remains unlikely that sufficiently large commitment would have ever been made – the pressure on the third extreme is just too low. And although 130,000 troops is a large number, it was not nearly large enough. In post-war Germany – which had no ongoing insurgency – the Americans alone assessed an absolute minimum requirement of 377,000 occupation troops.³⁴ Victory was desirable but not essential, and the war was both resourced and constrained as such. Here, perspective is vital. We cannot allow our collective experience in a single, limited conflict to invalidate the concept of victory merely by the fact that it is recent.



Map of the ethnic groups in Afghanistan.

Conclusion

“The pursuit of victory without slaughter is likely to lead to slaughter without victory.”

~ John Churchill, 1st Duke of Marlborough³⁵

Brigadier-General Carignan’s article is well-written and holds much merit, but the flaws in her argument reflect a larger, unnerving trend in Western military thinking: the notion that we are in a post-historical age where not only the *character* of war is changing, but also its very *nature*. Although it is a topic for another study, our adoption of such doctrines as effects-based-operations (EBO) imply that we assume an abundance of information will allow us to define and develop well-maintained paths from cause to effect. This, in turn, enables us to think of war as capable of achieving a number of carefully-controlled aims in a multiplicity of spheres, as opposed to the mere defeat of the enemy on the battlefield.

“War has not fundamentally changed, and the more we try to think our way around its fundamental truths, the more likely we are to become lost in mental side-trails.”

It is worth remaining temporally humble. Everything we have seen today has its roots in the past, and when we look back far enough, it is not hard to find societies and military commanders who had to deal with rapid technological change, economic transformation, and societal redefinition. War has not fundamentally changed, and the more we try to think our way around its fundamental truths, the more likely we are to become lost in mental side-trails. In the words of General James Mattis:

“For all [those] saying that the nature of war has fundamentally changed, the tactics are wholly new, etc, I must respectfully say ... ‘Not really.’ Alexander the Great would not be in the least bit perplexed by the enemy that we face right now in Iraq, and our leaders going into this fight do their troops a disservice by not studying (*studying*, vice just *reading*) the men who have gone before us. We have been fighting on this planet for 5000 years and we should take advantage of their experience.”³⁶

It goes to say that if victory formed the basis for the achievement of political objectives in the past, it is going to be the cornerstone of such objectives in the future. ISAF, with its kaleidoscope of authorities and caveats, fundamental lack of flexibility, and conflicting mission with OEF demonstrated that war cannot be won by policy statements. The Second Indochina War, far from demonstrating the shortcomings of victory as a valid concept, merely demonstrated its essential quality: the Americans tried to win a war without winning, whereas the North Vietnamese remained focussed on the conquest of the south. As we ponder Brigadier-General Carignan's assertion that we must advise political leaders carefully with respect to the utility of military force,³⁷ we would do well to remind ourselves that war's dynamics remain uncontainable through overly complex philosophical and analytical underpinnings. At its root, wars end when one side *imposes its will, or fails to impose its will*, on its opponent. Its essential simplicity makes it all the more difficult, and its persistence speaks to a collective primal violence that manages to haunt the human race even as we progress so far in many areas of peace. Ultimately, we must be prepared to secure victory – and nothing less – against those forces which pose a threat and have the means to end our free and independent existence. Further, we

must be prepared to accept that this victory will never be final, as the forces which generate chaos, despotism, slavery, and other inhumanities are part of the human psyche. To quote another French philosopher, we are in our own ways, Sisyphus, pushing a rock up a mountain for eternity:

“I leave Sisyphus at the foot of the mountain! One always finds one's burden again. But Sisyphus teaches the higher fidelity that negates the gods and raises rocks. He too concludes that all is well. This universe henceforth without a master seems to him neither sterile nor futile. Each atom of that stone, each mineral flake of that night filled mountain, in itself forms a world. The struggle itself toward the heights is enough to fill a man's heart. One must imagine Sisyphus happy.”³⁸

And so, let us not forget our aim, and bear our burden with courage, clarity, and humility. Let us prepare for the next mountain.

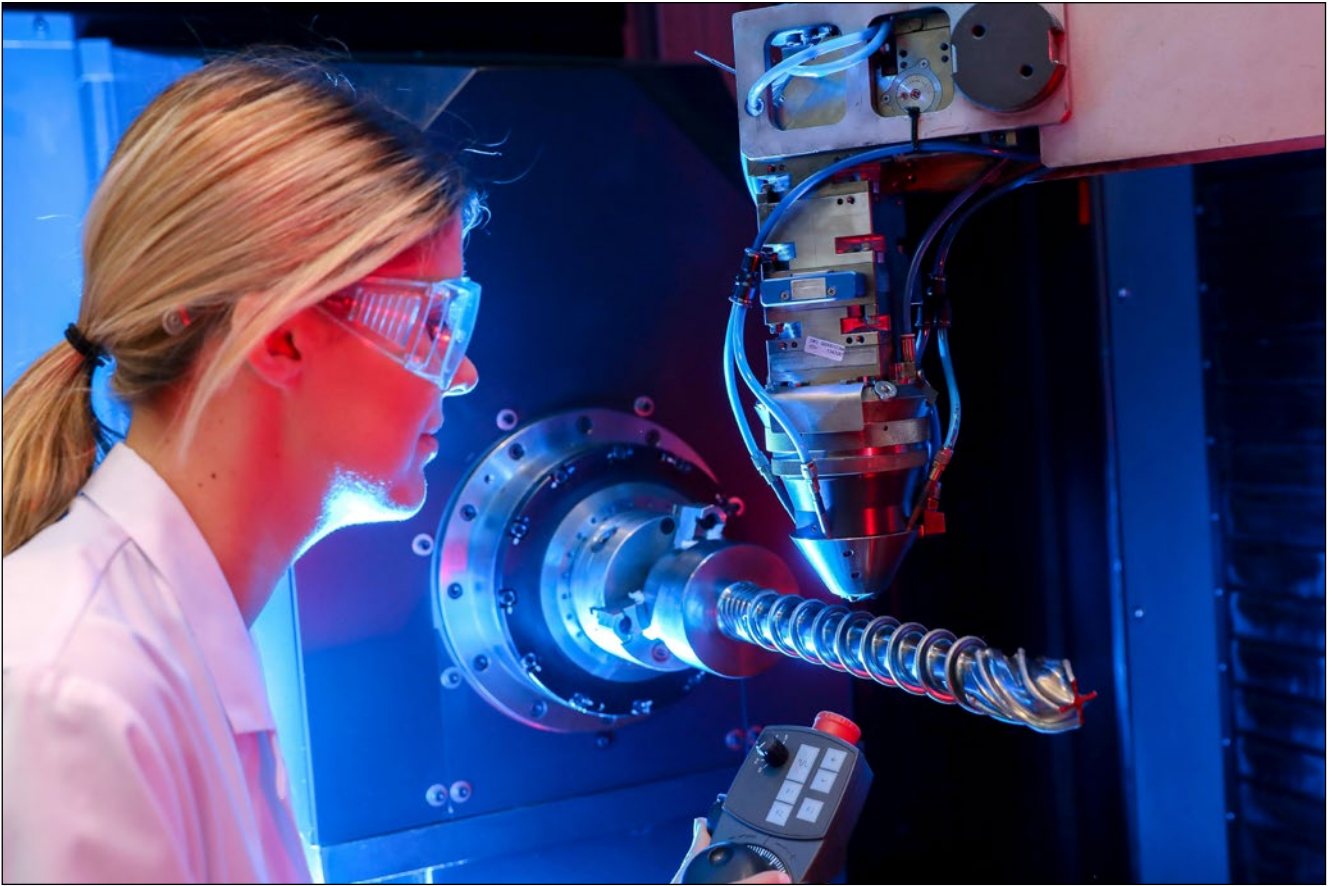
CMJ



DND photo by Sergeant Daren Kraus/AR2010-0177-31

NOTES

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- 7 Carl von Clausewitz, 1984. *On War*. Translated by Michael Howard and Peter Paret. (Princeton, NJ: Princeton University Press, 1984), p. 83.
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A hybrid laser machine tool for additive manufacturing (AM). This researcher is working on a 3D printing machine for industry, which is able to create large metal parts from scratch and to finish them with great precision.

The Implications of Additive Manufacturing on Canadian Armed Forces Operational Functions

by Christopher Bayley and Michael Kopac

Christopher Bayley is a Senior Defence Scientist with Defence Research & Development Canada (DRDC). He is currently leading efforts within the Naval Platforms portfolio in parts-on-demand, has advised the office of Chief Scientist on the disruptive aspect of Additive Manufacturing, and briefed the Army Science & Technology board on military specific applications of this technology.

Michael Kopac is an Engineering Technologist with DRDC who specializes in polymer chemistry.

Introduction

Additive Manufacturing (AM), commonly referred to as 3D Printing, is a collection of manufacturing techniques that create objects by depositing layers of material based upon digital models. It is an emerged manufacturing process that stems back to the development of stereo-lithography, but it has seen a resurgence of international interest following the expiration of some key patents in 2009. According to the Wohlers Associates, an industry analyst, AM industries grew over 25% in 2015.¹ Part of this growth includes applications within Defence in which comparatively small production runs and high development costs

constitutes one of the seven supply chain scenarios that favor AM. Other factors which will tend towards the use of AM to manufacture parts have been identified as: circumventing long lead-times, high inventory costs, reducing the reliance from a single supplier, manufacturing close to market in order to reduce shipping costs or circumvent import/export restrictions, and enabling increased functionality.²

The range of materials which are amenable to this manufacturing process are as diverse as its applications. They range from biological materials, polymers, cement, metals, and combinations thereof, and form products which stretch from microns to meters. The only restriction is that the material needs to be placed into position and either fused, or solidified with the underlying material. The process may be used alone, in which case, an idea can go directly from a 3D design file to a finished part or product (direct-digital manufacturing), or may constitute a stage within a larger manufacturing process.

According to Dr. John Burrow, Deputy Assistant Secretary of the US Navy, few manufacturing processes touch so many aspects of the military enterprise extending from the design, procurement, logistics, sustainment, and care of the wounded soldier. AM is included on the CAF "Future Security Environment 2013-2040"

technologies watch list, and is included on the list of emerging disruptive technologies [an innovation that significantly alters or displaces an established technology, or creates an entirely new industry – Ed.] by Innovation, Science and Economic Development Canada, while advanced manufacturing, of which AM is a part, is specifically cited in the Federal 2017 Budget as an area of targeted innovation. However, despite the frequency of references to AM being disruptive, and of particular interest to Defence, CAF leadership in defining potential applications is lacking.³

The intent of this article is to highlight the breadth of application that AM could affect the Canadian Armed Forces (CAF) Operational Functions. Concepts of employment in which AM provides an enabling capability are discussed through illustrative vignettes which highlight how AM technologies are being used in Defence applications around the world. It is hoped that by identifying the breadth of potential applications that AM is capable of disrupting, a tipping-point is reached and the requirement to invest in AM innovations will be realized.

AM within the Canadian Army Operational Functions

The 2014 Emerging Disruptive Technology workshop sponsored by the Canadian Army Land Warfare Centre (CALWC) identified how AM could influence the Canadian Armed Forces (CAF) operational functions of Command, Sense, Act, Shield, Sustain and Generate. Figure 1 illustrates the results of the consultative process that involved the input from subject matter experts and Canadian Army (CA) personnel on the perceived impact that AM will have over the intermediate (5-10 years) and longer horizon (10+ years). While the CALWC study focused upon CA operational functions, the results are largely Service independent.

Sustain

Of all potential concepts of employment for AM, none have been as widely embraced as sustainment. Within the realm of sustainment, potential applications include parts-on demand, free-form manufacturing of infrastructure, and enabling customized health care solutions. AM has been identified as a solution to resolve the spare parts inventory problem as the logistics associated with spare parts is time consuming, expensive and complicated. Already the use of AM to either shorten or simplify the logistics tail is one of the most prevalent applications for AM. This is particularly pertinent for ageing platforms in which there is no longer the availability of Original Equipment Manufactured parts. Remaking of the parts via conventional forging, casting, and machining can often take up to two years, not including the additional time required for the qualification of the part. In addition to short circuiting long-lead times, AM may also be considered for parts with high production costs due to complex geometries, high fixed costs (i.e., tooling), or those that are produced in low volumes.⁵

AM need not be restricted to the manufacturing of small parts, but is equally capable of constructing infrastructure, including the building of base camps, and humanitarian efforts, or enclosing contaminated areas with limited exposure to personnel. Commercially, AM in this marketplace is termed construction 3D printing, and it generally utilizes a fiber reinforced fast drying Portland cement and precision gantry to additively deposit layers of cement. Its disruptive potential is that it can be used to rapidly construct large concrete structures without the need for forms, either directly at the construction site or as pre-fabricated slabs which are subsequently transported and assembled on-site.

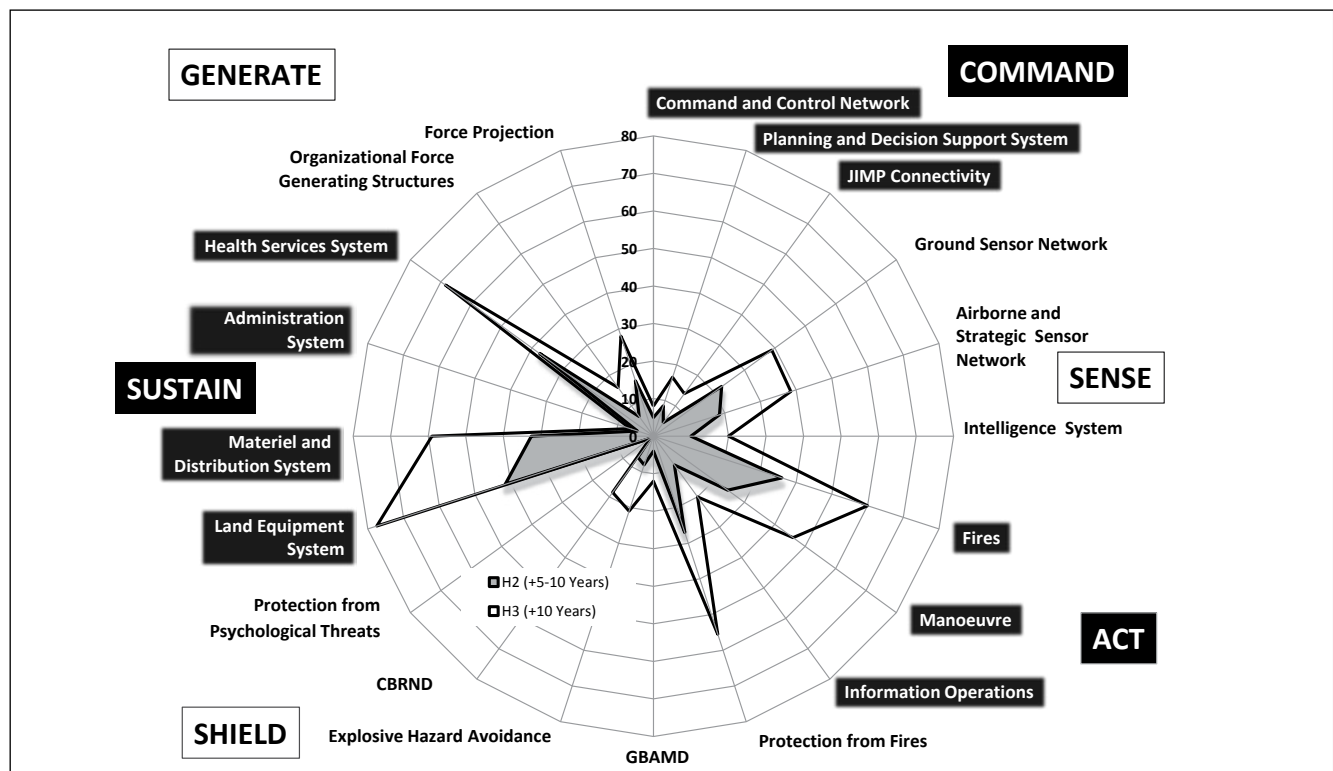


Figure 1 – Impact of AM across the CAF operational functions.⁴

Costs associated with the construction 3D printing of a disaster relief structure are comparable with traditional shelters fabricated from timber and steel, with the potential advantage of improved durability and longevity. Current efforts within the US Army Research Laboratory include the fabrication of infrastructure from natively-acquired feedstocks (i.e. printing buildings using indigenous materials), which parallel the commercial efforts, such as D-Shape, which utilizes a binder to join particles of sand together forming an artificial marble, and the US National Aeronautics and Space Administration (NASA) efforts to use extra-terrestrial materials for lunar structures. Construction 3D printing need not only consider the direct fabrication of structures, but can also involve the printing of building blocks and bricks. Emerging Objects, an Architectural research group, has printed irregularly-shaped hollow blocks that when nested together can resist earthquakes. The earthquake resistance is achieved by allowing each block to move independently rather than as monolithic mass, as would be the case for a conventional mortar rectangular wall. In this case, construction 3D printing provides an economical means to manufacture the structural components (i.e. the blocks) which may be able to resist blast loadings in an analogous manner, as they have been shown to resist earthquakes. Thus, potential Defence applications for construction 3D printing could be found within the context of domestic disaster relief, humanitarian efforts, and potentially blast resistant structures that are superior to rectangular block and mortar construction.⁶

One of the leading applications of AM identified in the CALWC study resides in health services. This perceived effect mirrors a 2013 NRC Scientometric Analysis,⁷ which identified that biomedical applications are one of the leading industries associated with AM. For these applications, the ability of AM to mass produce complex and customizable topological structures is the main benefit. In the field of regenerative medicine, there is broad interest in AM from printing organs to living skin tissues. AM provides the means to “assemble” the hierarchical arrangement of different cell types in their correct order. The philosophy of “print the essentials, and let biology take care of the rest” is widespread, and it results in either the direct printing of the cells using bio-compatible inks, or printing the vascular network and then infiltrating them with living cells. While currently no solid organs have been produced in the lab, the state of the art is in printing organoids, which are in themselves a desired outcome. Organoids are a means to investigate drug screening and delivery and a potential replacement for animal surrogates. Indeed, given estimates that 20% of drugs fail due to patient toxicity, testing on manufactured tissues and structures would be a useful intermediary stage in any drug development process.⁸

As personnel protection keeps on improving, events which were once fatalities are increasingly becoming injuries. The prevalence of burns constitutes 10-30% of battlefield casualties, and the need to restore high quality skin cannot be overstated, since scars constrict motion and are a permanent disfigurement. In-vivo bio-printing of skin involves the selective deposition of various cellular materials. It can include both *micro* and *macroscale* features that mimic natural skin, and

can be tailored with pigmentation, cellular gradations necessary to account for wound depth, and macroscale ridges. To date, bio-printing is still unable to fully replicate natural skin in terms of its morphological structure, biochemical, and physiological properties. However, some simple skins have been printed with limited functionality in in-vivo studies.⁹ Another biomedical application is orthotic implants, with a key driver being the potential for bespoke implants that match the requirements of wounded soldiers. While the field of orthopedic implants is likely well served through civilian research, maxillofacial reconstructions arising from defence specific injuries are being developed at the US Veterans Affairs and Walter Reed Hospital. In this regard, AM is one of the technologies enabling the provision of personalized medicine and the rehabilitation of wounded soldiers.¹⁰

Act

The CAF operational function of Act includes attacks, manoeuvres, and information operations. Within this function, AM has been found to be particularly disruptive to the development of munitions. Freely available designs for AM-printed weapons emerged on the internet in 2011, and to date, there are 36 separate listings on a Wikipedia site devoted to AM weapons and parts. Of these, the Liberator [Defence Distributed, Austin TX] was the first open-sourced printable firearm, and apart from its firing pin, it is made entirely from AM. Above all, the Liberator highlights the disruptive potential of AM. Its design is freely available to all, to use or modify at the manufacturer’s discretion. The manufacturing process circumvents regulations for firearm manufacturing, firearm acquisition, and registration processes, and being non-metallic, it can be easily concealed. While the Liberator is only a single-shot handgun, it is a parable of what is possible. At a larger scale, AM can enable state and non-state actors alike to circumvent international restrictions on arms, modify designs, and conceal the arms manufacturing process typically used to track the proliferation of nuclear weapons. AM also presents a problem in controlling legitimate and illegitimate uses of raw materials listed under the international traffic in arms regulations (ITAR). As such, it provides a means to conceal the manufacturing of the illegitimate products in-or-among legal applications.¹¹



A US Marine Corps 3D-printed unmanned aircraft system.

US DoD photo by Corporal John Hamilton/17927-M-MK246

The use of AM for weapons is not new. In 2004, Lockheed Martin patented the use of AM to tailor the fragmentation of munitions. The capability of such design features generate controlled fragments that can radiate in specific directions, thereby increasing the lethality from within the same design space. Since then, bringing together layers of printed metals, energetics, and other materials layered onto substrates that comprise the initiation chain, the arrangement of primers, fuses, and explosives, which are arranged to facilitate how the device goes from safe, to armed, to ultimately detonating, have begun.¹²

Rocket Crafters [Titusville, FL] is using AM to assemble the propellant grains in their hybrid solid-liquid rocket engines suited for small payloads which emphasize reliability and safety ahead of propulsive power, and in 2016, NASA reported that they had assembled and tested a developmental liquid fuel rocket engine comprised completely of AM parts. Similarly, in 2017, Rocket Lab [Auckland, NZ] has flight tested their Electron Rocket powered by the 3D-printed Rutherford Engine. The Rutherford engine uses 3D printing to manufacture the engine chamber, injector, turbopumps and main propellant valves, and this allows the Rutherford engine to be manufactured in three days versus a month for traditional approaches. If successful, the Rocket Lab AM printed Rutherford Engine poses a disruptive potential in launching payloads into space, and exemplifies how the adoption of technology has enabled a relatively small and inexperienced nation to compete in a market dominated by those with a historical strength in space exploration.¹³

In the US, a focus of the Army Research Laboratory efforts in AM is to increase the payload of smart munitions. The expectation is that printed structural-electronics could reduce the form factor of the electronics, thereby increasing the volumetric density. Additionally, such printed electronics would be intrinsically case-hardened to withstand high inertial loads (G-Forces). The printing of structural electronics is already a reality. In 2014, a team at the University of Texas developed the printed electronics six-sided gaming die shown in Figure 2 that contains the necessary integrated electronics required to only illuminate the lights on the top surface of the die.

Considering the state of structural-electronics, tailored fragmentation patterns and rockets, which are either propelled by or manufactured using AM, 3D-printed munitions need not be just for static displays (Figure 3). Indeed, in 2015, Raytheon Missile Systems announced that they can use AM to manufacture 80 percent of a missile, including working rocket motors, fins, and guidance control parts. According to their press releases, AM decreases the manufacturing costs by streamlining production, while simultaneously increasing productivity.¹⁴

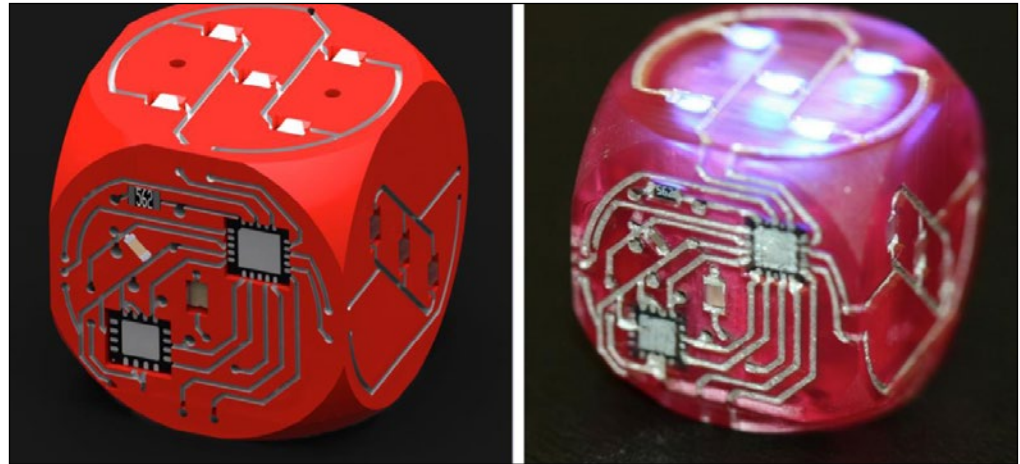


Figure 2 – 3D-printed structural electronics that includes the necessary electronics to illuminate the LED lights on the upper face when the gaming dice comes to rest¹⁵.

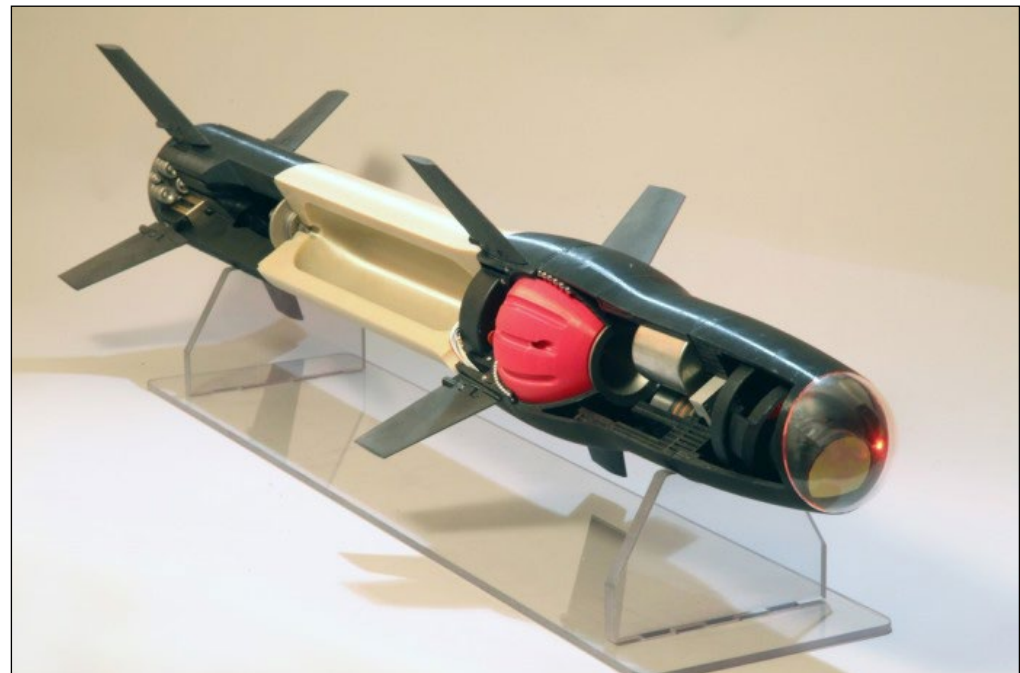


Figure 3 – Cut-away of a 3D-printed missile.

Generate

The impact of AM within the CAF operational function of Generate includes the development of personnel through training, and the realization of novel vehicles with increased capability. The size range of AM products can extend from the micron level to the meter scale, and is being used in the realization of unique military platforms.

E. Macdonald, IEEE Access

Raytheon Corporation

One of the most publicized AM systems suitable for manufacturing military platforms is the Big Area Additive Manufacturing (BAAM) system co-developed by the US Oak Ridge National Laboratory and Cincinnati, a tool and dye manufacturer. As the name suggests, the process is suited to large structures, and in August 2016, it was entered into the Guinness Book of Records for the largest monolithic 3D-printed item, a 748kg wing trim-and-drill-tool. The BAAM system has been used to build cars, utility vehicles, and small boats using engineered thermoplastics via melt extrusion processing. In 2014, Local Motors [Phoenix, AZ], a micro-fabricator, announced the Strati, the first 3D-printed car which was made using 50 individual parts, 90 percent of them printed. Initial production of these parts took only 44 hours, with an expectation that this can be reduced to ten hours by increasing either the number of printer heads, or their deposition rates. While still a niche application, German yacht builder Hanse Group announced in April 2016 the first 3D-printed hull, the Hanse 3D15. The stated objective in adopting AM was to shorten manufacturing times, along with the ability to offer customization to their clients.¹⁶

Along the same lines as the above two civilian applications of AM, the US Naval Sea Systems Command Naval Surface Warfare Center, Crane and Carderock are initiating projects in 2017 for an optionally-manned technology demonstrator that will enable an AM full-sized, operational submersible. This effort parallels the Carderock's Non-penetrating Optionally Manned Demonstrator (NOMAD) project that, via AM, has reduced the time and cost of manufacturing a hull from 3-5 months to one week, and reduced costs from \$500,000 to only \$22,000. At such prices and turnaround times, designers are able to trial how different shape and form factors influence key physical attributes. In addition to enabling a mindset of "failing fast and often," AM also has the capability of allowing material designs which are unconstrained by traditional manufacturing processes. AM-enabled materials allow complex internal structures within which acoustic waveforms can interact in order to create stealth materials. Thus, AM not only allows for the realization of modular and custom-shaped military vehicles, the materials themselves can be coordinated in order to exploit physical phenomena.¹⁷

The CAF Function of Generate also includes the training of military personnel, including field surgeons who are uniquely trained to address Defence-specific injuries. In this field as well, examples of AM are becoming common. True assessment and characterization of ballistic damage to humans has always been a challenge, due to unrealistic models of human tissue and organs, availability of cadavers and animals, and lack of suitable means of measuring the effects of ballistic impacts and explosions. The human surrogate typically embodies unrepresentative geometries, masses, stiffness, and levels of constraint when compared to humans. By exploiting the manufacturing freedom associated with AM, realistic human models have been developed with

inclusion of strain gages and other types of printed diagnostics at the point of manufacture. Surrogates that include topological features, such as different skin layers and underlying soft tissues, are being realized. The printed human surrogate developed in conjunction with the UK Ministry of Defence Centre for Defence Medicine for surgical training is one such example. The surrogate includes a functional heart and lungs made from varying grades of silicone that imitates the texture and hardness of the real organ perfectly. While intended for surgical training, printed human surrogates could allow an ethical alternative to animal surrogates for the depiction of the ballistic damage suffered in bones, tissues, and organs.¹⁸

Shield

The CAF Function of Shield relates to the protection from fires, explosive hazard avoidance, and chemical, biological, radiological, and nuclear defences (CBRND). AM, together with developments in other technologies, will enable in-theatre diagnostic capabilities for the protection of CAF personnel.

Advances in microscale AM and micromachining, in combination with printed electronics, has made it possible to reduce the size of bulky laboratory equipment to the extent that wearable chemical assay capability is a possibility. Such Lab on a Chip (LOC) advances have the potential to

allow for in-theatre and point-of-care diagnostics, and the characterization of potential chemical biological and nuclear threats. This capability is being realized through developments in micro-fluidics, micro-machining, and printed electronics. Already, microfluidic devices have become a reality in the health care sector for the analysis of biochemical parameters and diagnosis applications, due to their small dimensions, accuracy, low cost, low power consumption, and portability. Lately, such microfluidic devices are being developed and produced via microscale AM process. Microscale AM enables an opportunity to conceive three-dimensional designs, and to

manipulate surfaces and fluids in three dimensions. Most importantly, it provides a commercialization-ready fabrication route, and thus, nascent investments in the product design are carried through from the prototype stage all the way to fabrication.¹⁹

Sense

The CAF operational function of Sense is associated with physically gathering data from sensors, whether they are located in space, on the ground, or beneath the sea. These sensors detect changes in the electromagnetic spectrum caused by a perturbation of their fields. AM is particularly suited for their construction as the process is scalable over a range of length scales. In 1998, DRDC disclosed a flex tensional transducer design called the Folded Shell Transducer, intended for the

“The CAF Function of Generate also includes the training of military personnel, including field surgeons who are uniquely trained to address Defence specific injuries.”



Figure 4 – AM flexentional sonar projector.

generation of acoustic waves in low frequency underwater sonar systems (Figure 4). Fabrication of the transducer using conventional manufacturing techniques involved concessions to account for the finite tool radius necessary to machine the apexes of the corrugations, and that resulted in the sub-optimal performance. The full potential of the design was not realized until it was manufactured using AM. AM enabled the fabrication of a topologically-optimized design within just two iterations with improved performance over the conventionally-manufactured design.²⁰

Another possibility offered by AM is the integration of sensors into various military systems which, according to the director of the US Army Research Labs, will be a reality within the next 10-15 year time frame, and that was the focus of a 2014 UK broad area announcement seeking to develop integrated prototype sensor systems. The incorporation of sensors, wires, and energy storage within a structure is desirable as it reduces weight. Already, printable Li-ion batteries have been developed, in which layers of a slurry containing suspended nano-particles of Lithium Titanium Oxide are pressed out of a syringe and deposited with 100 nanometer accuracy. Eight patents have already been filed for these inks, and researchers are working on licensing and commercializing the technology in the next few years. The incorporation of an integrated power supply within a system could relieve many design constraints imposed by the necessity of external wires and batteries, let alone the weight savings. E-textiles with electronics integrated directly into the textile substrates enable the inclusion of wearable devices into soldier's uniforms. This can include either passive electronics, such as conductors and resistors, or active components like transistors, diodes, chemical absorbers, and sensors. Some examples are textile touch buttons which can then be connected to various devices and sensors that are mounted on woven conducting fiber networks.²¹

AM's ability to manufacture internal surfaces lends itself to the production of waveguide used for the transmission and reception of millimeter wavelength (microwave) signals, physically decoupling the receiver/transponder from the antennae.

A principal advantage of an AM waveguide is that it requires no further assembly, unlike conventional waveguide-based arrays that require soldering or brazing, block machining, or plate-assembled brazed structures. This significantly reduces their cost. Taking the case of a slot array antenna, the reduction in manufacturing cost of an AM waveguide was reported as one-tenth of its conventionally-machined counterpart, while simultaneously decreasing the production time, and adding complexity to the waveguide was found to only marginally increase the cost.²² Finally, the design freedom offered by AM allows the designer to optimize the dimensions of the array to suite the intended application, rather than being constrained by commercially-available shapes and sizes.

While many of the aforementioned illustrative vignettes have concentrated upon the ability of AM to develop intricate shapes, geometry is not necessarily the only property of interest. AM is well-suited for the fabrication-engineered materials (metamaterials) in which there are spatial variations. Two examples, gradient refractive index lenses, and spatially-variant lattice orientations, are structures in which electromagnetics and optical paths can be modified through its transmittance by imposing a spatially-varying gradient. While the make-up of the gradient structure differs, a common feature is that the materials topology is engineered to achieve the desired physical property. In the case of the spatially-variant photonic crystals, certain wavelengths of light can be abruptly bent 90 degrees, while other wavelengths are transmitted through the crystal,²³ a feat enabled through AM's ability to control the placement of material. Similarly, Voxtel [Corvalis, OR] overcame the scientific challenge of controlling the placement of nano-particle containing inks in order to make local changes to the refractive index of lenses. These gradient refractive index elements allow novel optical designs, which have led to rifle sights that have a 50 percent reduction in telescope weight and a 42 percent reduction in length,²⁴ and there is potential for their incorporation into other opto-electronic surveillance systems. The application of AM for the creation of engineered materials which have materials properties unlike their constituents, such as negative coefficient thermal expansion, and auxetic materials which expand when compressed, are also possible.

Challenges

The previous examples highlight the potential that AM has to offer over a range of CAF operational functions. In all the cases, the technology-readiness levels associated with each application is relatively low, but is expected to increase over the next decade. In *some* cases, the limiting factor is not the maturation of the manufacturing process, but the required changes to ancillary materiel and supply. Qualification of parts and processes rise to the top of the challenges associated with the use of AM for the production of parts. Conventional-based

approaches that imply a parts quality do so by correlating inspection results with a previously obtained physical characteristic. These correlations are obtained from a number of samples manufactured from identical parameters. Such an approach when applied to AM negates the economic advantages offered by this manufacturing process. Defence standards typically require that the process be verified and validated, and the parts be qualified and certified, as such variations between machines, and between parts made on the same machine cannot be tolerated. Quality assurance in AM is a real challenge, one that is being addressed by both civilian and defence research organizations alike.

“In direct-digital manufacturing, saboteurs will have unprecedented capability to surreptitiously modify designs with the intent of decreasing their reliability, or increasing functionality and features.”

Quality assurance aside, another significant challenge is intellectual property control, as concerns over the authenticity of products made using AM will need to address fears of counterfeit, forgeries, and saboteurs. In direct-digital manufacturing, saboteurs will have unprecedented capability to surreptitiously modify designs with the intent of decreasing their reliability, or increasing functionality and features.

Within National Defence, the Quality Engineering Test Establishment (QETE) has identified that AM is not yet mature enough for the Canadian Army to capitalize on the advantages offered by AM for the sustainment of military vehicles at their 202 Depot in Montréal, and elsewhere around the country. They conclude that there has been insufficient research and development within National Defence to ease the transition of this technology into a production environment. Lack of foresight in the development of the fundamental science has hampered the ability for the Canadian Army to incorporate AM within their repair facilities. Leadership within the Canadian Army to resolve the Research

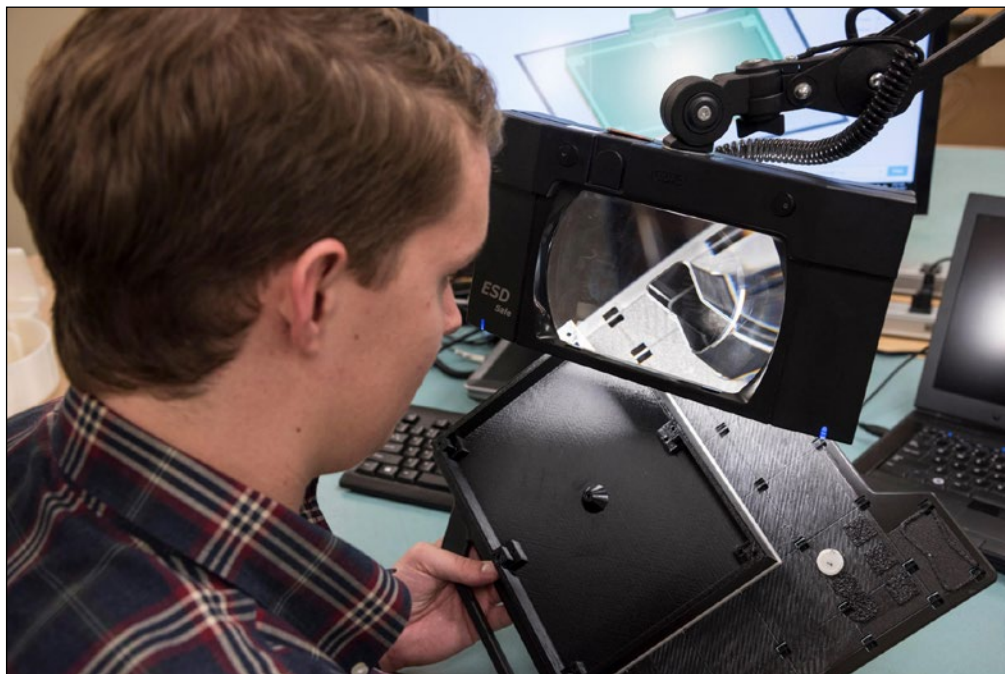
and Development gaps necessary to enable parts-on-demand is now emerging, but it will focus upon production applications. Programs that consider the breadth of disruptive potential that AM offers are required if the CAF is to realize the true disruptive potential that AM has to offer.

Conclusions

In most of the vignettes presented, AM enabled the direct manufacturing of products. Such products typically include internal features that challenge conventional manufacturing processes, or offer some degree of customization. Direct manufacturing streamlines the manufacturing process by reducing the amount of touch labour, and increases productivity while decreasing production costs. When AM is used to enable direct manufacturing, the advantages are above and beyond those associated with rapid prototyping, in which developers adopt a “fail fast and often” strategy.

AM has the potential to influence the spectrum of CAF operational functions of Sense, Shield, Generate, Act, and Sustain and it extends well beyond the concept of parts on demand. While parts on demand offers tangible benefits to combat the logistics ‘tail’ of maintaining a complete inventory of spare parts, it does not exploit the full disruptive potential offered by AM. Rather, AM enables the potential to realize unique designs, offers the potential to improve casualty care, build new infrastructure, and exploit optical, acoustical, and electromagnetic phenomena to conceive stealth structures and new sensors. In multiple vignettes, AM was responsible for simultaneously decreasing both production costs and manufacturing time. This is particularly relevant for Defence systems, which have high development costs and do not readily benefit from economies of scale.

Above all else, there is fundamental need for innovation in the areas of AM if we do not want to be left behind by nations that are rapidly leveraging new technology for their strategic benefit. As the Deputy Assistant Secretary of the US Navy stated in remarks at the Karles Invitational Conference in August 2016, “...we need to ensure that the fields are ploughed so when industry ‘marketizes’ a product, Defence is ready to accept this manufacturing method.”



A SPAWAR Systems Center Atlantic employee compares a 3D-printed part with the appropriate CAD design.

RP Library/Alamy Stock Photo/M12T9W

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US Army photo/Specialist Hubert D. Delany III/ DVIDS/4260085



Unmanned technology breaching the battlefield... An M58 Wolf robot is, in this case, remotely controlled to release a cloud of smoke in preparation for a Robotic Complex Breach Concept demonstration. This concept includes the employment of Robotic and Autonomous Systems in intelligence, suppression, obscuration, and reduction modes.

Prepare for the Flood before the Rain: The Rise and Implications of Lethal Autonomous Weapon Systems (LAWS)

by Caleb Walker

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Introduction

The development of Lethal Autonomous Weapon Systems (LAWS) in the next ten years is predicted to be more disruptive to international order than the development of nuclear weapons in the 1940s.¹ Autonomous Systems will allow the richest developed nations to fight at any intensity of warfare with less casualties and risk than ever before. However,

this technology will be clustered around only those states and non-state actors that have the necessary resources and technological infrastructure, combined with a highly-educated work force. The exponential growth of autonomous technology will "...create an ever greater chasm in equality and access to knowledge"² between the 'haves' and the 'have-nots.' When fully Lethal Automated Weapon Systems arrive, a handful of militaries and governments will have an extraordinary amount of power over the rest of the world. Because automated technologies will develop exponentially, the world will have little time to regulate and control their use after 'Pandora's box' has been opened. The time to plan for the flood is before the rain.

This article contends that LAWS will be used by powerful states in the very near future. It argues that, for the sake of all states in the international rules-based system, the use of LAWS must be controlled, inspected, and regulated – and that this requires

an open and global dialogue which needs to start immediately. The article will suggest that the Non-Proliferation Treaty (NPT) and the International Atomic Energy Agency (IAEA) provide a potentially viable model for an effective regulation regime, and proposes an ‘International Lethal Autonomous Weapon Systems Agency,’ which would report directly to the United Nations (UN) General Assembly and Security Council. While the world’s most powerful states and non-state actors (Google, Facebook, Amazon, and Apple) are competing to create fully autonomous systems in the near-future, all UN member states must act urgently to regulate the development and use of LAWS.

What are Autonomous Systems?

Autonomous Systems exist on a continuum, along which machines become more and more autonomous. Any system that can sense, decide, and act without human intervention has a degree of autonomy.³ The more autonomous the system is, the more responsible it will become for its own actions. A precision guided munition fired from an unmanned aerial vehicle represents an ability to sense and act against a target, but it is still a human pilot that decides to execute the kill chain. An automatic anti-ballistic missile system under development by the United States is an example of a system able to sense, decide, and act to engage a target (an incoming ballistic missile) without human intervention. Once functional, this would be an example of a higher level of automation on the continuum.

“The next step along the Autonomous Systems continuum is for the machine to seek appropriate targets on its own, using sensors and image processing.”

The next step along the Autonomous Systems continuum is for the machine to seek appropriate targets on its own, using sensors and image processing. It will make a decision to engage using a variety of actions, and then execute. This technology is available today, and is being implemented in several countries. Humans are no longer required to be ‘in the loop.’⁴ The specific focus of this article is to discuss Autonomous Systems that can sense, decide, and act without human intervention.

Exponential Growth of Technology

Information technology develops exponentially. A leading technological theorist, Ray Kurzweil, in his books, *The Age of Intelligent Machines (1990)* and *The Singularity is Near (2006)*, has shown that information technology, particularly computers, develops exponentially. A linear growth increases slowly, as in ‘one-plus-one,’ where after 30 computations, the sum would be 30. Exponential growth doubles, so that after 30 computations the sum would be a billion. Kurzweil uses the following example: the MIT computer in 1970 was the size of a building; in 2008, the cell phone in your pocket was a million times cheaper and a thousand times more powerful.⁵ On a graph, Kurzweil can show that the cell phone is a product of exponential growth in several domains of technology. Following exponential graphs, we can predict computer sophistication in the future.



An MQ1 Predator UAV.

When this exponential growth is mapped over the next ten years, Kurzweil has made predictions that would have enormous impacts upon states. He believes that: by the year 2025, some military UAVs will be 100% autonomous; by 2029, a computer will be able to pass a ‘Turing test’ by having the autonomous intellect of an ‘average human;’ and lastly, in that same year, the manufacturing, agriculture and transportation sections will be almost entirely automated. Kurzweil’s predictions are supported by the *U.S. DoD Unmanned Systems Integrated Roadmap*, and the *International Symposium on Technology and Society*.⁶

As automated technology continues to grow exponentially, there will be an increasing gap between those that are investing heavily in Autonomous Systems, and those that are not.⁷ There are fundamental barriers to entry into technologies that require vast amounts of funding, resources, and technological infrastructure to develop capabilities.⁸ Currently, the United States is – and will remain – the world leader in automation. The *U.S. Third Offset Strategy* aims at maintaining technological dominance and deterrence over Russia and China, nations that have both started to develop capabilities that would deny the U.S. and its allies the capability to operate on the sea, land, or in the air.⁹ The U.S. Deputy Secretary of Defense believes that the United States will stay ahead, or at least offset the threat, if they invest in key technologies, such as Autonomous Systems.¹⁰ Due to the prohibitive costs involved, there will be limited proliferation of this technology after initial development, but an ‘autonomous arms race’ is foreseen among the richest countries.¹¹

Today, the most substantial developments in Autonomous Systems come from the commercial sector. Google and Facebook are researching and developing ‘deep learning.’ Deep learning allows a computer model to find patterns to develop a high level of understanding of a problem. Essentially, it allows computers to learn on their own. Recently, Google’s *AlphaGo* program learned to play Go – an ancient Chinese strategy board game – on its own, and defeated the World Grand Master.¹² As stated in the Deputy Secretary of Defense’s address to NATO in 2016, “...today, almost all of the technology that is of importance in the future is coming from the commercial sector.”¹³ Commercial leaders in Autonomous Systems understand the risks of this new technology, and several have signed an open letter to voice their concerns. They believe that autonomous technology is progressing steadily, and its impact upon society is increasing.¹⁴ The open letter wants a ban on LAWS immediately.¹⁵ This should sound an alarm to the international community. The leaders in the development of autonomous technology believe the world is *years*, not *decades*, from development of these systems – and they are frightened by the implications for global security.

How Will Autonomous Systems Challenge the International Rules-Based System?

The United Nations, through the Convention on Certain Conventional Weapons, is beginning to discuss the implications of autonomous systems in the world. The Unmanned Aerial Vehicle (UAV) is not fully autonomous, and it does not allow autonomous decision making on the battlefield, but it is acting as a ‘canary in the coal mine.’ It provides the first indication of what changes we can expect in the international rules-based system. Nations are now able to engage in low-level conflict without proper oversight by the international community, and without physical risk to their soldiers.¹⁶ The debate follows an increasing trend towards lethal automated engagements around the world. These engagements are conducted with little-to-no media discourse or public debate.¹⁷ As shown in Figure 1, estimates collected by the *Council on Foreign Relations* detail significant U.S. engagements around the world.¹⁸ The relaxation of laws is quickly moving the international rules-based system into a realist structure that permits those countries that have the strength to engage in strikes against other sovereign countries.¹⁹

Syria	12,192
Iraq	12,095
Afghanistan	1,337
Libya	496
Yemen	35
Somalia	14
Pakistan	3
Total	26,172

Micah Zeinko and Jennifer Wilson, How many Bombs did the United States drop in 2016?, 5 January 2017.

COUNCIL ON FOREIGN RELATIONS

Figure 1 – US Bombs Dropped in 2016 (All Weapons Platforms)²⁰.

On 22 November 2013, then-UN Secretary-General Ban Ki-moon issued a report with respect to his concerns about UAVs. The *Report of the Secretary-General on the protection of civilians in armed conflict*, raises concerns about “...distinction, proportionality and precaution, in addition to the obligation to investigate grave violations resulting from drone attacks.”²¹ Ban was concerned about the lack of transparency and accountability with each attack,²² and a large bloc of member states remain concerned that the larger nations are able to increase the number of engagements of lethal force upon smaller nations.



UN photo 644074/Mark Garten

UN Secretary-General Ban Ki-moon.

Legal Justification

The use of LAWS is already being discussed by legal theorists. The immediate solution to the dangers of full autonomy is having humans part of the kill chain. The American Deputy Secretary of Defense has said, “Humans in the United States’ conception will always be the ones who make decisions on lethal force, period. End of story.”²³ However, as systems become faster and more complex, human integration might become impossible. A leading technology theorist, Bill Joy, believes that the decision to delegate lethal engagements to the Automated System will be made in the near future. This is because the world and combat will be moving far too quickly for humans to maintain pace.²⁴ However, there has to be a concerted effort to keep humans in the ‘kill chain.’ This will require international agreements and regulation.

Writers, such as the Australian cybersecurity expert Dr. Jai Galliot, in *Military Robots: Mapping the Moral Landscape* believes that “...employment [of fully autonomous systems] is ethically permissible.”²⁵ The argument leans upon the social contract between governments and the public. The public expects the government to protect their military personnel and not allow them to be exposed to ‘unnecessary risk.’ The United States Air Force’s operational risk management policy of “most logical choice for any given task is that which meets task requirements while exposing personnel to the ‘lowest acceptable risk.’”²⁶ This logic believes

“The use of AM for weapons is not new. In 2004, Lockheed Martin patented the use of AM to tailor the fragmentation of weapons.”

that the state must allow the military to use autonomous systems in order to protect their own citizens. This ‘social contract’ expects the liberal democracies’ militaries to act efficiently and effectively. They must be allowed to win wars without exposing their own citizens to ‘unnecessary risk.’²⁷

These arguments do not look at the relationship between states or between states and non-state actors. International law must discuss new weapons systems. The 1977 *Additional Protocol to the Geneva Conventions*

Article 36, specially states that the development, acquisition, or adoption of a new weapon, means, or method must be determined by a High Contracting Party.²⁸ As the continuum of autonomy will be involved in almost every modern weapon system in the world, it may not be acceptable to leave this with a High Contracting Party. Instead, an independent body will be required. The United Nations agreed to bring a group of governmental experts on LAWS together in 2017, with the intent of negotiating a ban.²⁹

States may want to use autonomous systems in order to ensure their soldiers are not exposed to ‘unnecessary risk,’ but is that legal? The prominent American political theorist Michael Walzer’s *Just and Unjust Wars: A Moral Argument with Historical Illustrations* discusses Just War Theory and the two criteria of the right to go to war (*ius ad bellum*) and the right conduct of war (*ius in bello*). Autonomous Systems impact the right to go to war, *Ius ad bellum*, by lowering the barriers to entry into war. It enables an



UN photo 715035/Rick Bajornas

UN Headquarters, New York City.

unwilling democratic nation to go to war, as their authority rests upon public opinion. The nation can limit casualties, and therefore engage in a conflict with less oversight and public discourse.³⁰

Autonomous systems will also change the right conduct of war, *jus in bello*. A historical example, such as the submarine, allowed a change in the convention of practice, in which an attacking naval ship no longer had to rescue survivors of the ship it attacked. This was because it was too risky for the submarine to surface and would render submarine warfare impractical. This military necessity made naval warfare more brutal and dangerous. Instead of asking if submarines should be used at all, international law changed its conventions. It would not be a stretch to believe that new technologies will be allowed in order to support military necessity. Walzer's criteria for just war are not built upon a firm moral foundation, but instead, upon conventions agreed between states for their mutual interest in times of war.³¹ These conventions that are agreed upon in times of war are often done after the conflict has begun. An international organization must define ethical contentions before conflict.

What Can We Learn from Nuclear Non-Proliferation?

The non-proliferation of nuclear weapons provides us an example of an effective international organization that could regulate Autonomous Systems. An international oversight body could discuss the appropriate threshold to use LAWS in conflict. Today, there are nine recognised nuclear

weapon states. This is a reduction from twelve in 1991, when South Africa, Belarus, Kazakhstan and Ukraine also possessed nuclear weapons, but have since relinquished them.³² In the 1960s, before the Non-Proliferation Treaty (NPT), it was believed that there would eventually be 30-35 countries with nuclear weapons. This did not transpire.³³ American professors of political science and international affairs Matthew Fuhrmann and Yonatan Lupu argue in their article, *Do Arms Control Treaties Work? Assessing the Effectiveness of the Nuclear Non-proliferation Treaty*, "...our results indicate that the NPT has been effective in reducing this risk [proliferation]. It supports claims that the NPT plays a crucial role in nuclear proliferation dynamics."³⁴ Their research stresses the importance of international institutions in influencing state policies.³⁵

As Professor Paul Springer, an expert on innovation in digital communications writes in *Military Robots and Drones: A reference Handbook*, "...only by attempting to actively manage the proliferation and utilization of these new devices will states have any chance of preventing the very worst possible scenarios."³⁶ An article supportive of LAWS by technology ethics authorities Thomas Simpson and Vincent Muller, *Just War and Robots' Killings*, argues that:

International organisations likewise have a moral mandate to ensure that badly-ordered societies are nonetheless accountable for not deploying killer robots in ways that contravene the laws of war.³⁷

The leading figure in the International Rules-based system, the UN Secretary-General, reported in 2013 that the discussion on autonomous systems must "...begin immediately and not once the technology has been developed and proliferated. It must also be inclusive and allow for full engagement by United Nations actors, [International Committee of the Red Cross] ICRC and civil society."³⁸ The technology and the *ability to use* the technology is advancing exponentially. There are grave concerns from the commercial sector, academics and the leading voices in international security that believe that Lethal Autonomous Weapon Systems require transparency, oversight, regulation, inspections, and engagement. A pre-emptive ban on LAWS has been endorsed by 19 countries, with the People's Republic of China submitting a position paper to the Convention on Certain Conventional Weapons requesting more discussion on the issue.³⁹

Conclusion

The success of the NPT and the IAEA support the concept of enacting a non-proliferation treaty and an international agency that monitors LAWS immediately. International institutions can influence state policies, open a dialogue, and develop some transparency. The world is racing towards disaster, and once we open 'Pandora's Box,' we will no longer be able to

"The development of autonomous systems in the next ten years will be the most disruptive revolution since nuclear weapons."

control the proliferation of these systems. LAWS will be a larger disruption to the international order than nuclear weapons. Elon Musk (the co-creator of PayPal, Tesla and SpaceX), Stephen Hawking, and Bill Gates (one of the richest men on Earth), all warn about the use of LAWS.⁴⁰ Individual states will justify their use: using the social contract to their own citizens; a new conventional practice; or the fact that such systems enable countries to engage in unpopular wars. States' arguments to use the technology must be balanced with an international response to protect weaker states and their citizens.

The development of autonomous systems in the next ten years will be the most disruptive revolution since nuclear weapons. It took the world decades to understand and regulate the proliferation of nuclear weapons. As technology is moving exponentially, particularly in the commercial sector of information technology, the world will not have *decades, years, or even months* to control the use and proliferation of LAWS. The international community requires regulation and an international agency to influence state policies, open a dialogue, and develop some transparency on this issue. LAWS must be regulated. This must start immediately. We must prepare for the flood before the rain.



US Army photo

The Modular Advanced Robotic System, one of four unmanned ground vehicles demonstrating lethal applications at Fort Benning, Georgia, 16 October 2013.

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Campagne de France, 1814, by Ernest Meissonier ~ Napoleon Bonaparte and his staff are shown returning from Soissons after the battle of Laon.

Historical Insights to Strategic Challenges

by Dave Johnston

The future has no place to come but from the past.

-Neustadt and May, *Thinking in Time*

Introduction

The past has predictive value. Military professionals would do well to study history, for warfare is replete with theorists and practitioners who mastered the art of war in their time. We may improve the likelihood of surmounting modern day military challenges by observing the successes and failures of the past. Being that these challenges are many, we must focus upon the significant, strategic challenges which may be informed by the past. This article seeks to analyze two of these large issues – strategic challenges that face military leaders now and into the future. The first challenge is how we achieve a *knowledge advantage*. Exponentially increasing amounts of data must lead to better and swifter decisions on the battlefield. We may resolve this challenge by applying historical improvements in data analysis along with offsetting technological change with similar changes to organization and doctrine while coping with diffusion. The second strategic challenge is *postmodern warfare*, characterized by the asymmetry between nations and networks along with the decoupling of physical action and harm. This postmodernism is overcome through history's solutions to previous generations of warfare. Ultimately, this article contends

that militaries may surmount the two strategic challenges through constructive forethought: success is achieved by *looking ahead* while *reasoning back*.

Strategic Challenge 1 – Achieving the Knowledge Advantage

Data must enable decisions. As the information domain becomes increasingly important, military organizations must achieve better decision-quality information faster than their opponents. Defence analyst John Arquilla and political scientist David Ronfeldt wrote that warfare is no longer dominated by manoeuvre and firepower: “What distinguishes the victors is their grasp of information.”¹ This challenge is partitioned into two sub-themes. First, commanders have access to an overall increase of data. In the book *Turning Point*, American historian and strategist Kenneth Allard noted that decision-makers in the First Gulf War were “enabled” with 700,000 telephone calls, 152,000 data messages and 35,000 tactical radio frequencies.² The unquestionable increase in connectivity since that time, predicated upon Moore's Law, suggests that recent conflicts are no less awash in data. And yet, information must enable decisions, not paralyze them. I can personally recall early versions of Blue Force Tracker technology in the Canadian Army's fleet of Light Armoured

Vehicles which physically inhibited the movement of the crew while providing no discernable advantage for command and control. Allard states that information systems are helpful only when they reduce the fog of war, and that commanders must be capable of winning without technological assistance: “The command structure is the one part of a military organization that, more than any other, must function as a weapon of war. It must either be a lethal, predatory weapon, capable of preying upon and killing other command structures – or else it runs the risk of becoming a bizarre, expensive techno-gaggle more likely to generate friction than to reduce it.”³ To achieve an advantage over adversaries, military organizations must turn *data into wisdom* (see Figure 1).

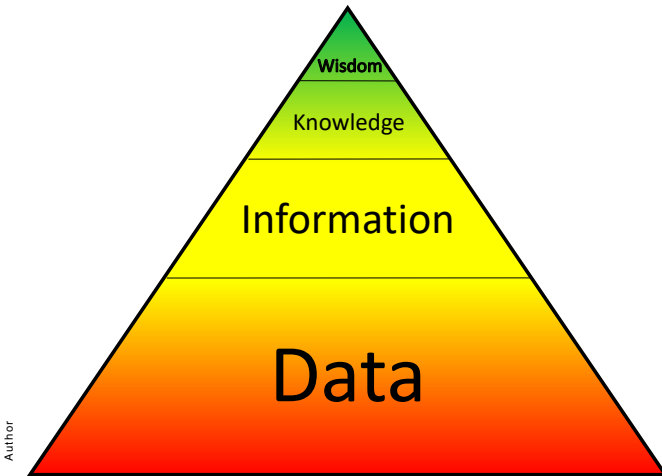
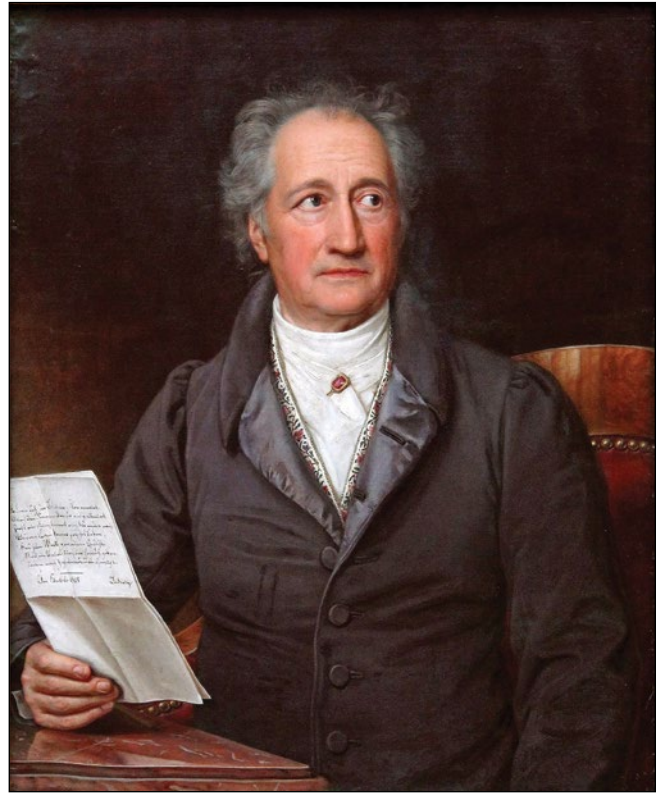


Figure 1 – From Data to Wisdom.

To further complicate decision-making with increased data, the speed of war continues to accelerate. Prior to the Second World War, war was fought at the speed of rail and telegraph. Tanks, aircraft, and radio technology quickened this pace to battles won or lost in days, hours, and sometimes minutes. Today, with the information revolution, war is fought in a matter of seconds. Lightning-quick attacks with automated kinetic weapons and in the cyber domain have far-ranging strategic effects.⁴ Decision making, then, needs to be that much faster. With an ever-more complicated environment from which decisions must be made despite imperfect knowledge, commanders struggle to maintain the knowledge advantage. To solve this challenge, we must turn to prior models.

One solution for the challenge of the knowledge advantage is simply to get better at synthesizing big data into wisdom. The current, novel, glut of data does not need to overwhelm us as we have the technical capacity to process it. Indeed, others have previously solved this problem. At the turn of the 19th Century, the German philosopher and statesman Johann Wolfgang von Goethe wrote: “The modern age has a false sense of superiority because of the great mass of data at its disposal, but the valid criterion of distinction is rather the extent to which man knows how to form and master the material at his command.”⁵ During the American Civil War, despite the preponderance of telegraph reporting across a significantly vast area of operations, General Ulysses S. Grant boiled the problem down to its essence: “Find



Johann Wolfgang von Goethe, German writer and statesman.



General Ulysses S. Grant, as Commander of Union Forces during the American Civil War.

out where your enemy is ... strike at him as hard as you can and as often as you can, and keep moving on.”⁶ During the Second World War, Panzer Division HQs received great amounts of data, yet they functioned well, partially due to their prior willingness to decentralize authority through the First World War concept of *Auftragstaktik* or Mission Command; similar results were replicated later by Israel’s Moshe Dayan through *Optional Control*.⁷ Likewise, the British Chain Home Stations and the Observer Corps achieved timely processing and structuring of data into wisdom. Success in the Battle of Britain, however, may be more a result of the American philosopher and systems scientist C. West

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Churchman's systems approach: Winning by viewing technology and people as "sets of components that work together for the overall objective of the whole."⁸ These examples demonstrate that the military complex has successfully and broadly surmounted data challenges in the past. Modern day militaries can accomplish the same success once attuned to the problem and once willing to resist the reflex to centralize control.

Concurrent to improved data synthesis, military organizations must maximize technological, doctrinal, and organizational change while coping with the inevitable diffusion to our enemies of the same (see Figure 2).



Figure 2 – Arquilla's Innovation Model.

the Panzer Divisions to synergize with the new technology of the era, principally tanks, planes and radio.¹² Germany then formalized these concepts into doctrine, and seemed poised for early victory in Europe. Their significant fault, for the purposes of this analysis, was failure to recognize that the Allies would seize upon their technology, organization and doctrine. The Allies, significantly the U.S. and Russia, imitated and diffused German advancements, thereby stemming earlier defeats and regaining relative superiority.¹³ Diffusion inevitably places a *best used by date* on the lifespan of a technological advantage.

Applied to the knowledge advantage, a military organization must connect new technology with organizational design and culture, implement doctrine and be prepared for adversaries to do the same. Doctrine, however, should adopt the American sociologist Moris Janowitz's definition as an *operational code*: professional thought with significant elements of historical continuity that, at the same time, "undergoes change as a result of experience and self-criticism."¹⁴ Through these two solutions – better data synthesis and balance across the four functions of successful innovation – militaries can achieve a knowledge advantage.

Strategic Challenge 2 – Postmodern Warfare

As related to military affairs, postmodern warfare indicates a departure from the current generation of warfare. William Lind *et al.* wrote in 1989 that the world was entering Fourth Generation warfare, characterized by mission-type orders, dispersed operations, and technological advancement.¹⁵ But we seem to be edging beyond the Fourth Generation. The first characteristic defining this postmodernism is the seismic shift in the adversary. Nations no longer primarily fight nations; nations fight networks.¹⁶ Small wars with sub-state actors increased in quantity by a third between 2010 and 2016.¹⁷ The contagion of terrorism spread in parallel: "The 'global war on terror' that President George W. Bush once proclaimed has morphed into terror's war on the world... a seven-fold increase in incidents and a

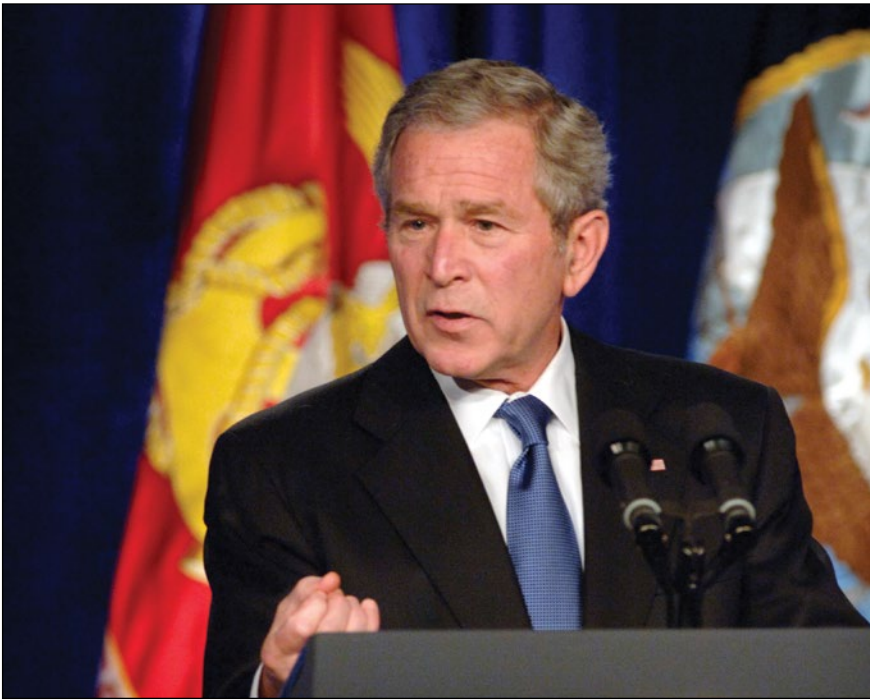
quintupling of casualties."¹⁸ The increase in the number and level of violence in post-modern war is amplified by asymmetry in motivations. As in Vietnam, Afghanistan, and Iraq, the foreign power fights for airy and perhaps unattainable goals while the insurgent fights to protect the life of his family.

<p>Strategic Challenge 1 Achieve a Knowledge Advantage</p> <ul style="list-style-type: none"> • Glut of Data • Increased Speed of War 	<p>Solutions</p> <ul style="list-style-type: none"> • Synthesize data into wisdom • Balance organizational, doctrinal and technological change with diffusion of the same
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Figure 3 – Strategic Challenge 1 and Solutions.

John Arquilla explained that periods of rapid, deep, and significant technological change require militaries to pivot organizational design and doctrine in response while simultaneously responding to the benefits and drawbacks of diffusion and imitation by our adversaries.⁹ New technology must be considered and implemented, yet without wholesale reliance upon it. Arquilla wrote that the U.S. military has a "fixation on technological solutions."¹⁰ The American political conservative William S. Lind *et al.* proposed that there were "...two major catalysts for change in previous generational shifts: technology and ideas."¹¹ Organizations must be culturally and structurally designed to receive and successfully implement these innovations. Germany adopted *Blitzkrieg* due to both a socio-cultural need for swift victory and key thought leaders willing to champion new ideas. It designed

Postmodern Warfare is similarly defined by the decoupling of physical action and harm. Warfare began as a highly visceral event involving face-to-face contact. The first decoupling occurred with rifling and breech loading, machine guns, and indirect fire.¹⁹ Range was now less tightly coupled with accuracy. Today, this decoupling has been fully realized. In postmodern war, physical action is only the backdrop to malevolence and "firepower becomes a mere appendage to information."²⁰ Prior to the turn of the 20th Century, the Polish banker and writer about modern industrial warfare Ivan Bloch identified that: "The range, accuracy, and rate of fire of modern firearms ... made the 'decisive battles' which had hitherto determined the outcome of wars now impossible."²¹ A modern perspective would add that decisive



US DoD photo by R.D. Ward/201092488

President George W. Bush in a 19 March 2008 speech on terrorism delivered at the Pentagon.



US Navy photo by Petty Officer 1st Class Mark O'Donald/DVIDS/270863

General Stanley A. McChrystal in Afghanistan, 2010.

battles *are* possible, but not solely on a physical plane. With the Information Revolution, war is increasingly won or lost through virtual means. Cyberwar involves the disruption or destruction of information and communication systems, with the potential that “victory can be attained without the need to destroy an opposing force.”²² Postmodern war is asymmetric and increasingly virtual.

There are excellent historical insights to solve the challenge of postmodern warfare. First, modern militaries must reduce bureaucracy. This reduction dovetails nicely with the accelerating

speed of war discussed above, but it has wider-ranging implications. It will produce its own decoupling effects – delinking the level of desired effects with the degree of command authority. Japanese organizational theorist Ikujiro Nonaka and international corporate strategist Hirotaka Takeuchi wrote that autonomous teams – the ‘adhocracies’ of Henry Mintzberg, the Canadian academic and author on business and management – thrive because managers set challenging goals and endow high degrees of autonomy. Team members, as “... ‘boundary-spanning units,’ begin to interact with their external environment, accumulating both tacit and explicit knowledge.”²³ In this instance, their Japanese perspective of explicit knowledge – doctrine – and tacit knowledge – experience – is highly relevant to military bureaucracies. The U.S. military empowered small units of action during General Stanley McChrystal’s tenure. He identified subordinate elements operating in a “proximate but largely parallel existence” and sought to create what he coined a *Team of Teams*.²⁴ These innovations were only thinly adopted; had it been pursued wholesale, the U.S. military would be poised more advantageously to fight networks.

The next solution to postmodern warfare is to promote iconoclast leaders. Each era of warfare has leaders who rise above their organizational culture to enact significant innovative change. Abraham Lincoln championed an innovative approach to the Civil War through the inclusion of technology – rail and telegraph – with the doctrine of the cordon offensive.²⁵ During the Second World War, key armoured leaders of Germany (i.e. Guderian, Rommel) were juxtaposed with the “Stodgy, unimaginative officer corps of Britain and France who refused to [innovate].”²⁶ Militaries must accept that successful leaders are necessary in times of war. The style of leader, however, may lack popular support or the minor graces of civil society. The modern day iconoclasts – U.S. Admirals William McRaven and Arthur Cebrowski, U.S. Generals David Petraeus and Stanley McChrystal, or Canadian Generals Lewis MacKenzie and Rick Hillier – possessed the

executive functions required for postmodern war.* They identified external trends, diffusions and shocks and rose above their culture to achieve success, albeit these successes were in some cases aborted by early departures.²⁷

* As an iconoclast, Hillier was eminently quotable. When discussing the nature of the CAF in 2005, he controversially stated “We are not the Public Service of Canada. We are not just another department. We are the Canadian Forces and our job is to be able to kill people.” As quoted in *The Globe and Mail*, 16 July 2005, at: <https://theglobeandmail.com/news/national/generals-talk-of-terrorist-scumbags-praised/article18241070/?ref=http://www.theglobeandmail.com>.

Finally, military forces must find complementary actions to the attritive leadership targeting that has principally defined the war between nations and networks up to this point. When targeting Al Qaeda in Iraq (AQI) Jordanian jihadist Amir Abu Musab al-Zarqawi, McChrystal knew that "...finding the man would not destroy his organization – especially given how resilient and decentralized AQI was."²⁸ The swarm tactics of the Mongols might be most applicable. Their success relied upon a strategy of "disrupting an enemy's communications, then to strike at his heart ... where they wished, when circumstances were deemed favorable."²⁹ Perhaps lessons from the Cold War might apply, as in finding a balance between counter-force targeting and counter-value targeting.³⁰ In a postmodern sense, the *value* being countered would not target civilian populations, at least not in a kinetic sense. If leadership targeting was united with aggressive influence activities, disrupted revenue streams and neutralized mass media and social media messaging through cyberwar, the value of terrorist groups would significantly decrease, along with their capabilities. These three solutions in concert provide an answer to the challenge of postmodern warfare.

Conclusion

This article offers historical insights into modern-day strategic challenges. The challenge of attaining the knowledge advantage is met by observing historical improvements in data analysis and balancing the four broad functions of successful innovation. Postmodern warfare can be overcome through reducing bureaucracy, privileging iconoclasts, and targeting broadly. Though these challenges seem significant, in particular since they are often observed along with a host of others not discussed in this article, the overall solutions can be reduced to straightforward ideas. First, organizations must be able to recognize that change is happening around them, both internally and externally. Once that realization occurs, they must consider adjusting themselves to new realities. This does not require change simply for the sake of change, but as the American strategist Jeanne Liedtka wisely emphasizes, "...novelty does not necessarily create value."³¹ Last, organizations must realize that the inverse may be also true, since risk may not be reduced by an aversion to change. Failure to change may increase both costs and risk. In the end, success is simply achieved through constructive forethought: prudently look forward while wisely reasoning back. New solutions often come from old books.

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Strategic Challenge 2 Postmodern Warfare

- Nations v. Networks
- Decoupled physical action and harm

Solutions

- Reduce bureaucracy
- Privilege iconoclasts
- Target broadly

Figure 4 – Strategic Challenge 2 and Solutions.

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Child soldiers of the Sudan People's Liberation Army, Southern Sudan.

Child Soldiers

by Christopher J. Young

There is a new initiative circulating within government circles concerning the need to do more about child soldiers, and specifically, advocating for Canada to get involved in new and novel ways to counter their use. To that end, the Canadian Armed Forces issued a Joint Doctrine Note (JDN) early in 2017 which provided guidance to personnel on the ground regarding the expectations of action they would take when encountering child soldiers in various situations.

The interim guidance is a useful starting point for guidance with respect to dealing with child soldiers, but does require more refinement. For a start, the definition of a child soldier is generally understood in Canada to be someone under the age of sixteen, but this is not yet legally binding, nor is it universally agreed upon. Further, the use of the term 'child soldier' carries specific cultural understandings which may mitigate against considering children in other non-routine conflict situations. I believe the model employed to construct the framework is somewhat dated. More recent deployments overseas have shown that the older model of child soldier from, for example, the Rwandan crisis, has been superseded. From my recent deployment in South Sudan, here are three more recent and likely models that should

be considered. Please note that these are more or less composite models based upon an amalgam of my experience as a Military Liaison Officer (MLO), plus that of my peers during my recent South Sudan deployment (*Op Soprano*).

The first is a fairly standard interaction with the belligerents in the conflict, the two main parties in South Sudan being the Government of South Sudan South Sudanese People's Liberation Army (SPLA), and the opposition being the SPLA (In Opposition), or SPLA-IO. Both operated more or less alike as a motorized infantry force. When we travelled to visit a local garrison commander outside of Juba, the capital of South Sudan, we would typically enter an armed camp that housed a battalion or brigade level headquarters. The local commander, either SPLA or SPLA-IO, would allow us to enter the camp in our MLO vehicle with a couple of guards: the rest of our force protection element (usually a 'company minus') would be expected to remain outside the camp. While we were moving inside the fairly large camp to meet with the commander and his staff, we would typically see a few young soldiers carrying weapons who appeared to be under the magic age of sixteen. One would see more of the young soldiers during the yearly recruiting drives, and in those camps that were responsible for recruit training, as would be expected.

The second involves a visit to an internally-displaced persons (IDP) camp: most of those I encountered were run by the SPLA-IO. By running, I mean the IO controlled access to the camps and protected the camps in case of attack by SPLA troops. Within the camps, there were mostly women and children to be found, with a smattering of old men well over fighting age. There was also a (small) number of surprisingly-healthy young men of fighting age, appearing to just be 'hanging about.' Often, when approached, they would feign an ignorance of English and strive to avoid having to answer questions. We believed they monitored the camps and ensured compliance with directives from the local commander.

Usually, the numbers we saw within the camps were well below the numbers the non-governmental organization (NGO) groups monitoring the camps told us were present. That was due to a couple of factors: first, numbers were routinely inflated to garner more monies from the UN and other donors for support. Second, the women and children were often out during the day on normal subsistence tasks, either collecting firewood or harvesting food for sustenance. At the same time, it was very clear that the women and children in the camps were providing, willingly or otherwise, support to the SPLA-IO's armed garrison. Not only are the majority of the IDPs in the camps from the local areas, and therefore have ties to the members of the local armed force,

they are more often than not from the same ethnic group. Thus, while it was not clear what support was being provided by the women and children, it was quite clear that, in the spirit of the new Canadian guidance with respect to child soldiers, the IO can be considered to be very likely violating UNICEF Paris Principles.

A third scenario was more common and it concerns the ethnic groups (tribes) involved in the cattle trade. By way of background, cattle play an important role in South Sudan in marriage: young men require a certain number of cattle as a dowry to purchase a bride. That dowry requirement has escalated during the civil war, meaning that the young men from a specific tribe now band together whenever one of the tribe requires assistance in rustling the necessary cattle from another tribe to meet a dowry commitment. While the Dinka and Nuer are major ethnic groups that practice cattle rustling, the Murle people, a Nilotic ethnic group within South Sudan, are perhaps the most well-known and most vilified because of their partially-nomadic lifestyle and lengthy migration routes.

In any case, cattle raids have escalated to large endeavours often featuring large gangs of young men from two opposing groups, now armed with automatic weapons (vice the former armament consisting of bow and arrows and spears). *Frequently,*



DND photo IS2012-0004-38 by Sergeant Norm McLean

On 4 December 2012 in Yambio, South Sudan, Commander Paul Earnshaw, RCN, the Canadian MLO at the time, discusses any changes in the local situation with Captain Ngong Mawien, then-Deputy Commander of the Sudan People's Liberation Army.

and *particularly* when involving Dinkas, the clashes bring the SPLA into the mix. There is no question that many of those young men involved in the fighting are tribal children under the age of sixteen. Further, because cattle rustling is an ongoing threat, tribal groups are forced to involve all their young men in the defence against raids, leading to very hostile young men carrying weapons they often employ without provocation. The UN, for example, has documented a number of attacks on its convoys by young men who pop out of the bush, fire a clip off in the direction of the convoy, and then vanish into the bush again. The only provocation appears to have been the presence of a UN convoy in the general area.

Under all three scenarios, the action on the part of UN MLOs who were involved in similar circumstances was limited to two responses. The first, obviously, was to ensure that the possible presence of child soldiers was reported up through the UN chain: that was usually through the MLO patrol report submitted through the chain of command. The second was that, when possible, the presence of child soldiers was brought up during discussions with the local commander, either SPLA or SPLA-IO. This latter response was never successful: local commanders would deny employing child soldiers, or indeed, children at all in support of operations. In the case of the IDP situation, the question was posed to NGOs supporting the IDP camp operations: typically, the response was a shrug of the shoulders and comments that suggested it was the way things were. In either case, I never heard of any follow-up on the part of the UN, or of any plans to deal with those instances of suspected child soldiers having been identified.

What was clear from my experience is that those armed groups operating in South Sudan were quite savvy about the UN and its stance on child soldiers; and indeed, they worked to ensure that there was no negative press identifying them as using children in support of combat operations. At the same time, children can be found actively supporting operations through a variety of arms-length arrangements, such as those seen between IDP camps and armed garrisons. The new child soldier doctrine and training needs to move beyond simple models of child soldiers, and instead, provide guidance on what the expected response should be to these more complex arrangements involving children which have become the new norm, particularly with respect to peace support operations.



A twelve-year-old child soldier in the Sudan People's Liberation Army, Southern Sudan.

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Showing cosmetic wear befitting its age, a Bagotville-based CF-18 in an afterburner climb over the Parc des Laurentides while enroute to the Valcartier firing range.

The Fighter Replacement Conundrum

by Martin Shadwick

The procurement of fighter aircraft, by any nation, is frequently a messy, convoluted and controversial affair. From the British TSR-2 and the American F-111B (the abortive USN variant of the F-111) in the 1960s to the Swiss fighter referendum of May 2014 (in which voters narrowly defeated the planned acquisition of the Saab *Gripen*), a host of considerations and complications – be they political, financial, industrial, military, or technical in nature – have played havoc with the best laid procurement plans. Canada, given the acrimonious and multi-faceted travails of the Avro *Arrow* and, to a lesser extent, the CF-104 *Starfighter* and the CF-5, has not escaped this fate. That said, there have been some noteworthy exceptions, most notably the well-managed and laudably transparent New Fighter Aircraft (NFA) program launched by the government of Pierre Trudeau in 1977. The NFA competition ultimately led to the acquisition of 138 McDonnell Douglas (later Boeing) CF-18 *Hornets* between 1982 and 1988. Successor governments in search of a replacement for the now long-serving CF-18 have, however, proved unable to

replicate the *comparatively* tranquil NFA experience. The Harper government's selection of the Lockheed F-35A *Lightning II* in mid-2010 drew sharp criticism from a number of quarters, including the Office of the Auditor General, on the grounds of price, process and a perceived lack of transparency, ultimately leading to a political "reset" (but not a definitive decision), while the government of Justin Trudeau has drawn blunt criticism for its two-track approach embracing both an interim supplement to the CF-18 (thereby meeting a perceived "capability gap") and a definitive successor to the CF-18. Indeed, as Richard Shimooka of the Macdonald-Laurier Institute (MLI) posited in a trenchant January 2018 MLI Commentary, the Trudeau government's 12 December 2017 decision to abandon its original plan for an interim buy of Boeing F/A-18E/F *Super Hornets* avoided "what was likely to have been one of the most disastrous defence procurements in Canadian military history. With the possible exception of the Ross rifle debacle in the First World War, no major procurements would have resulted in such catastrophic damage to the military's capability at such an exorbitant cost."



CFR/C/DND photo PCN-79-160

Six CF-104 *Starfighters* in close formation late in the aircraft's service life in Europe.

The Conservative element of this fighter procurement tale – this woefully frustrating tale – commenced with the declaration in the Canada First Defence Strategy of 2008 that Canada required 65 next-generation fighter aircraft and moved into much higher gear following the Harper government's July 2010 announcement that it would replace the CF-18 with the F-35A. In its view, "...not only does the F-35 meet all of the Canadian Forces operational requirements for a next-generation fighter aircraft, the F-35 offers the best value by providing exceptional capability at the lowest cost with excellent benefits and opportunities for the Canadian defence industry. This acquisition will equip the Canadian Forces with the aircraft it needs to defend Canada's sovereignty and contribute to the defence of North America and international security." Approximately \$9 billion was committed for the acquisition of 65 F-35s and "associated weapons, infrastructure, initial spares, training simulators, contingency funds and project operating costs." Delivery of the new aircraft was expected to commence in 2016.

Initial media and other reactions to the July announcement were mixed. The F-35 decision, for example, drew strong endorsements from the *Globe and Mail* and the *National Post*, but also prompted vigorous criticism, on a variety of grounds, from columnist Jeffrey Simpson, defence analyst Michael Byers, former Associate Deputy Minister of National Defence Alan S. Williams,

and others. Intriguingly, and perhaps surprisingly given Jean Chrétien's success in bashing the Progressive Conservatives with the EH101 helicopter during the 1993 election campaign, the Harper government's decision to procure the F-35 made little more than a cameo appearance during the Federal election campaign of 2011 – even though the Liberals of Michael Ignatieff pledged to cancel "the Harper [F-35] deal," declaring that "when Canada purchases new fighter planes, we will have a transparent, competitive process to procure equipment that best meets our needs, achieves best value for money, secures maximum industrial benefits, and fits a realistic budget."

The findings of a Spring 2012 report from the Office of the Auditor General, however, breathed new life into the criticisms of those who already harboured doubts about the F-35 and/or the process leading to its selection, and it significantly altered the political optics, and the political stakes, of the proposed purchase. The report, the first by new Auditor General Michael Ferguson, was sharply critical of the Department of National Defence, positing that:

"...there were significant weaknesses in the decision-making process used by National Defence in acquiring the F-35 to replace the CF-18. By the end of 2006, the Department was actively involved

in developing the F-35 and a number of activities had put in motion its eventual procurement. In the lead-up to the government's 2010 announcement, required documents were prepared and key steps were taken out of sequence. Key decisions were made without required approvals or supporting documentation."

"National Defence did not provide complete information in a timely manner. For example, briefing materials prepared for decision makers did not explain the basis for and limitations of projections of industrial benefits to Canadian companies, and the risks of relying on the projections for decision making. In addition, briefing materials did not inform senior decision makers, central agencies, and the Minister of the problems and associated risks of relying on the F-35 to replace the CF-18. Nor did National Defence provide complete information to Parliamentarians."

"National Defence likely underestimated the full life-cycle costs of the F-35."

In his introduction, noted Ferguson, "National Defence and Industry Canada recognized that Canada's participation in the Joint Strike Fighter (JSF) program provided opportunities for industrial benefits to Canada, and they took appropriate steps to help Canadian industry take advantage of those opportunities. In contrast, National Defence did not recognize early enough that its involvement in the program had procurement implications. Consequently, it did not engage Public Works and Government Services Canada (PWGSC) early enough to establish a suitable process, consistent with procurement rules and including appropriate safeguards, to manage a project of this nature and magnitude." He continued: "When National Defence decided to recommend the acquisition of the F-35, it was too involved with the aircraft and the JSF Program to run a fair competition."

The immediate result included testy exchanges in the Public Accounts Committee and undivided media and political attention. In response, the Harper government launched a "Seven-Point Plan" in April 2012 to "restore public confidence and reset the process to replace the CF-18 fleet." The plan included the freezing of the funding envelope for the acquisition of the F-35, the establishment of a National Fighter Procurement Secretariat within PWGSC, a requirement that DND provide annual updates to Parliament on the cost of the F-35, an evaluation, by DND, of "available aircraft" to "sustain a Canadian Forces fighter capability" (with a review and challenge function being performed by an Independent Review Panel), a requirement that the Treasury Board Secretariat commission an "independent review of costs," a requirement that the Treasury Board Secretariat "ensure full compliance with procurement policies" prior to project approval, and the provision, by Industry Canada, of updates to Parliament on Canadian industrial participation the Joint Strike Fighter program. Reaction to the "Seven-Point Plan" was predictably varied. Some argued that the Harper government, still seen as essentially pro-F-35,

was attempting to defer making a decision until a more propitious moment, perhaps after the next election. Others saw the plan as potentially useful, as an opportunity that could have been seized upon by the Harper government to regroup and move forward, if need be with a fighter competition. Time, however, had run out.

The federal election of October 2015 secured a solid majority for the resurgent Liberals of Justin Trudeau. Although defence policy, including fighter re-equipment, was not a major issue during the campaign, it did enjoy a somewhat higher profile than in recent elections. The defence plank of Justin Trudeau's 2015 platform declared bluntly that a Liberal government, "... would not purchase the F-35 stealth fighter-bomber. The primary mission of our fighter aircraft will remain the defence of North America. We will *immediately* [emphasis added] launch an open and transparent competition to replace the CF-18 that will exclude requirements that do not reflect Canada's interests, such as first-strike stealth capabilities. We will reduce the financial procurement envelope for replacing the CF-18s. Instead of budgeting for the acquisition of 65 F-35s, we will plan to purchase an equal or greater number of lower-priced, but equally effective, replacement aircraft." Intriguingly, the Liberal defence plank pledged to "fast track and expand the capital renewal of the Royal Canadian Navy," noting that "additional ship requirements identified through our review will be funded by choosing to replace the existing CF-18 [fighter aircraft] with a more affordable aircraft than the [F-35]."

Marginally more than one year later, in November 2016, the Trudeau government announced that it would launch, "within its current mandate, an open and transparent competition to replace the legacy fleet of CF-18 fighter aircraft." It also announced – in a move that touched off understandable debate – that "Canada will immediately explore the acquisition of 18 new [Boeing F/A-18E/F] *Super Hornet* aircraft to supplement the CF-18s until the permanent replacement arrives. The Government will enter into discussions with the U.S. Government and Boeing regarding use of these jets for an interim period of time." In defending the proposed acquisition of *Super Hornets*, Ottawa argued that "Canada's current [fighter] fleet is now more than 30 years old and is down from 138 aircraft to 77. As a result, the [RCAF] faces a capability gap. We have an obligation to NORAD to have a certain number of fighter jets mission-ready at all times, as well as an obligation to NATO. The number of mission-ready planes we can put in the air today is fewer than our NORAD and NATO obligations combined." The interim fighter concept drew fire from many quarters, including a plethora of retired air force commanders, for being "ill-advised, costly and unnecessary," strategically unsound, and a wasteful and counterproductive diversion of scarce aircrew and groundcrew. Others saw it as overtly political – that is, an attempt to utilize a non-existent or exaggerated or at least acceptably risk-manageable "capability gap" to justify a further delay in the selection of the definitive replacement for the CF-18. In a 2017 survey conducted by the Macdonald-Laurier Institute, 88 percent of the defence specialists



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The Lockheed Martin F35A *Lightning II*.

surveyed rejected the interim *Super Hornet* concept. Ironically, Boeing itself – in classic “own goal” mode – proved a pivotal threat to the proposed F/A-18E/F *Super Hornet* acquisition when, on 27 April 2017, it launched a trade complaint against Bombardier for the sale of C-Series airliners to Delta Airlines. Senior Canadian officials were, rightly, indignant. Defence Minister Harjit Sajjan told a CANSEC audience on 31 May 2017 that Boeing’s action against Bombardier was “unfounded” and “not the behaviour we expect of a trusted *partner*” [emphasis in the original]. He also took note of the Minister of Foreign Affairs statement that Canada was reviewing its procurement involving Boeing, including the interim fighter acquisition.

The Liberal’s June 2017 statement on defence policy, *Strong, Secure, Engaged*, pledged to replace the legacy CF-18 fleet with 88 “advanced fighter aircraft” – remarkably, a future fighter force 35.5 percent larger than the 65-strong F-35 fleet envisaged by the Harper government in mid-2010 – following an “open and transparent competition.” The new fleet would help to “counter today’s evolving threat environment,” “improve [Canada’s] air control and attack capability,” and “allow us to fully meet both our NORAD

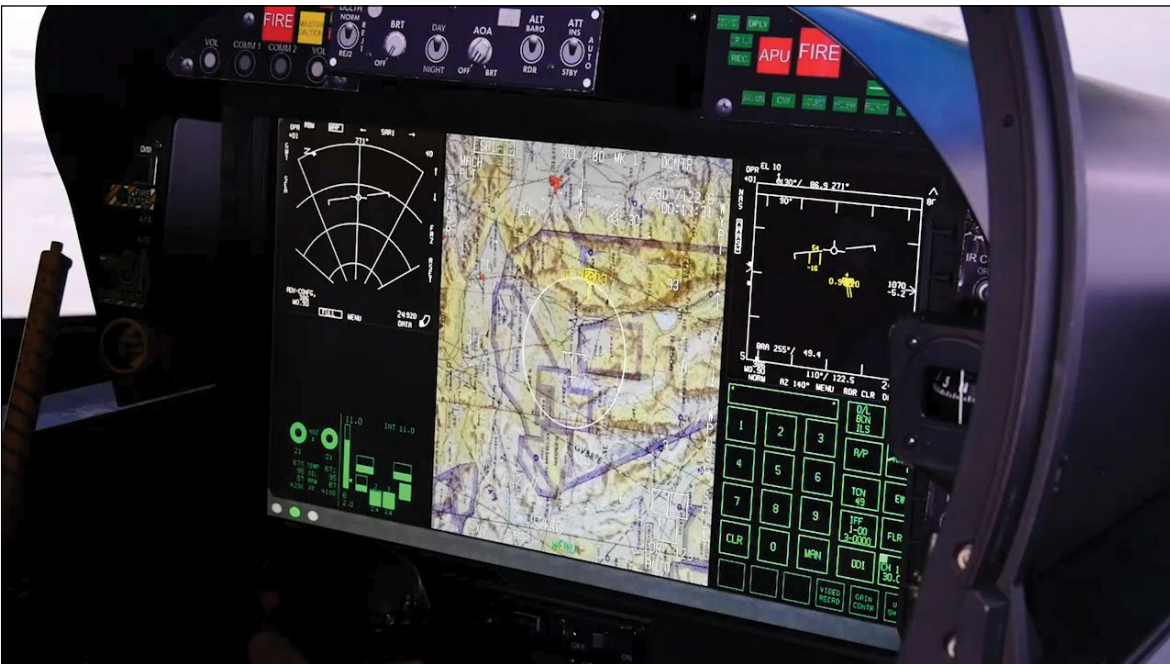


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The high-technology large area display glass cockpit of the F35A *Lightning II*.



The Boeing FA-18F Block III *Super Hornet*.



The F/A-18E/F *Super Hornet* cockpit is improved over the legacy F/A-18 *Hornet*, but the avionics for the E/F were designed to be 90 percent common with those of the proven C/D series. However, the Block III *Super Hornet* will feature a large area display glass cockpit pictured here, similar in design to that of the F35.

and NATO commitments simultaneously.” In a cryptic passage clearly related to the imbroglio with Boeing, the policy statement reported that the Government of Canada was “continuing to explore the potential acquisition of an interim aircraft to supplement the [legacy] CF-18 fighter aircraft fleet until the completion of the transition to the permanent replacement aircraft...”

On 12 December 2017, the Trudeau government reaffirmed its plan to acquire 88 “advanced fighter aircraft” following an “open and transparent” competition. Although the bids would be “rigorously assessed” on the usual grounds of cost, technical requirements and industrial, technological and economic benefits, the government added – in a direct nod to its annoyance with Boeing – that “the evaluation of bids will also include an assessment of bidders’ impact on Canada’s economic interests” since it was “important to do business with trusted partners.” When “bids are assessed, any bidder responsible for harm to Canada’s economic interests will be at a distinct disadvantage. This new assessment, as well as guidelines for its application as an ongoing procurement tool, will be developed through appropriate consultations.” The projected schedule included implementation project approval in 2021/2022, contract award in 2021/2022, first delivery in 2025, initial operational capability in 2026 and full

operational capability in 2031. Following an extensive consultation period with industry, the RFP for the new fighter is expected to appear in 2019.

The announcement reaffirmed the government’s intention to address the perceived “capability gap” but unsurprisingly jettisoned the original plan to acquire 18 new-build Boeing F/A-18E/F *Super Hornets* – which had also proved more expensive than first imagined by Ottawa – in favour of a similar number of legacy F/A-18A/B *Hornets* shortly to be made surplus to the requirements of the Royal Australian Air Force. The ex-RAAF aircraft would “be modified and undergo the technical work to be brought to a similar configuration to Canada’s CF-18 aircraft” – which would themselves require further life extension and upgrade work to remain in service for a longer-than-anticipated period of time – “and to ensure that they will be available to supplement the CF-18 fleet until the future fighter fleet is procured.”

At this juncture, the Future Fighter Capability Project (FFCP) is expected to draw bids from Lockheed (F-35A *Lightning II*) and Boeing (F/A-18E/F *Super Hornet*) and three Euro-contenders, Airbus Defense and Space GmbH (*Typhoon*), Dassault (*Rafale*)



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The Airbus Defense and Space GmbH *Eurofighter Typhoon*.



The Dassault *Rafale*.

and Saab (*Gripen*). Each would bring strengths and weaknesses to the competition. None are inexpensive.

The F-35, in spite of a variety of well-publicized technical and development issues over the years and an unquestioned ability to produce angst in Canadian politicians, remains a truly formidable contender – the only fifth-generation competitor in the field, a very large (and potentially huge) production and customer base, considerable growth potential, sophisticated low-observable (i.e., stealth) properties and, although seldom adequately appreciated outside the specialist community, unmatched surveillance, intelligence- and data-gathering, and data sharing and data fusion capabilities. In addition, Canadian industry has been associated with the F-35 for many years. Caveats include the uncertainties surrounding sustainment costs (in the long run, a much more important issue than initial acquisition cost) and, for some observers, the lack of a second power plant for Arctic operating conditions.

The *Super Hornet*, at one point expected to leave production as early as 2016 or 2017 but now destined to remain in production for a significantly longer period of time due to renewed USN

and foreign interest, is the product of an impressive lineage, is well-proven, rugged, and reliable, and offers the safety and security of twin engines. Its growth potential has not been exhausted. Indeed, the USN's forthcoming fleet of Block III *Advanced Super Hornets* – both new-production and life-extended and upgraded Block IIs – will incorporate an upgraded AN/APG-79 active electronically scanned radar, a large area display glass cockpit, an infrared search and track system, conformal fuel tanks and vastly increased data processing and networking capabilities. Caveats include the need for Boeing – in spite of a long-established presence in Canada – to re-establish its credentials, post-C-Series affair, as a good corporate and defence-industrial partner. The *Advanced Super Hornet*, like all contenders save the F-35, will also face questions about the age of the basic design by the time it reaches its full operational capability with the RCAF.

The capabilities of the three European contenders, all of which have logged considerable service with a variety of air arms, have been significantly enhanced and upgraded in recent years. None has exhausted its growth potential, and most if not all of which now appear set for somewhat longer-than-recently-anticipated

production runs (although these still pale by comparison with the projected F-35 production run and, in some cases, the *Advanced Super Hornet/Growler* production run). Two, the *Rafale* and the *Typhoon*, offer the virtues of twin engines. Many would argue, however, that whatever the military and technical attributes of the European troika, Canada should naturally default to an American design for a range of interoperability (broadly defined), defence-industrial and politico-diplomatic reasons. That said, some of the European players could offer most intriguing industrial and defence-industrial – and related – opportunities.

It is intriguing – although somewhat premature in the case of the current prime minister – to critique the fighter acquisition performances of the governments of Stephen Harper and Justin Trudeau. The former, posit some critics, fumbled the fighter file by failing to persuasively articulate the cases for a new fighter aircraft and the sole-sourcing of the F-35 – and then missed another potential opportunity following the “Seven-Point-Plan” reset. In fairness, some of the F-35 issues and problems identified in the 2012 report of the auditor general predated the Harper government. It is conceivable, too, that the Harper

government underestimated potential opposition to the F-35 because Canada’s industrial involvement in the JSF programme had drawn almost no public or media backlash during the Chrétien and Martin eras. Nor should Harper’s broader frustration with DND be discounted. In the case of the Trudeau *government*, most of the criticism to date has centred on the original decision to eschew the F-35, the use of the perceived “capability gap” as a fighter procurement adjunct, and the less-than-frenetic schedule of the Future Fighter Capability Project. These debates will continue, but at least the Trudeau government had the eminent good sense – with Boeing’s unwitting help – to abandon the awkward, resource-consuming and unneeded mix of legacy CF-18A/Bs and interim F/A-18E/Fs.

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The Saab Gripen E.

Reluctant Warriors: Canadian Conscripts and the Great War

by Patrick M. Dennis

Vancouver, UBC Press, 2017

312 pages, \$39.95 (HC)

ISBN: 9780774835978

Reviewed by
Terry Loveridge

This is an important book. The Great War has been often recalibrated in its historical presentation and Patrick Dennis has succeeded in doing it again. Many readers might be aware of the big trends: the *Blackadder Goes Forth* and the *Oh What a Lovely War* School of “lions led by donkeys” giving way to “the Learning Curve to Victory in the last Hundred Days” school are the most prominent. Australians and Canadians, too, are moving on from considerations of the mythos of nascent nationalism born at Gallipoli and Vimy, to a similar focus upon the climax of the war: that last Hundred Days. Lieutenant General Sir Arthur Currie was a strong proponent of this emphasis. For him, the Canadian Corps reached its apogee of effectiveness and contribution beginning on 26 August 1918. Yet, even Currie seemed less than fully aware of what this meant. Retired RCAF Colonel Patrick Dennis explains what this means, and he does it in such a convincing way that it is hard to imagine any book on Canadian land operations in the First World War not including *Reluctant Warriors* in its bibliography. Furthermore, it is just as difficult to imagine any teacher or academic not rushing to his or her lecture notes to change significant aspects of what is going to be taught hereafter.

The story of Canadian conscription has focused traditionally upon its divisive aspects at home, and its minimal impact overseas. In the end, there was little military necessity for Canadian conscription. The Military Service Act (MSA) material was inadequate, untrained, unmotivated, unreliable, and not enough of it arrived at the front to have an impact. Until now... Dennis demolishes these myths of conscription in detail and he does so in a literate and convincing fashion.

First and foremost, Dennis demonstrates, through records, letters, and statistics, that the conscripts were necessary, absolutely necessary, to the Canadian effort. Contrary to official versions of the story, the MSAs began arriving before the stunning success at Amiens and they kept arriving in a steady stream until war's end, three months later. The steady stream, naturally, went straight to the front to replace losses (97% of conscripts were infantry). Conscripts supplanted the volunteers ‘at the sharp end,’ so by the time the Corps reached Mons, the MSA boys composed about

25% of the strength of the infantry. Without them, the Canadians, like their Australian brethren, would have required replacement or reinforcement long before November 1918.

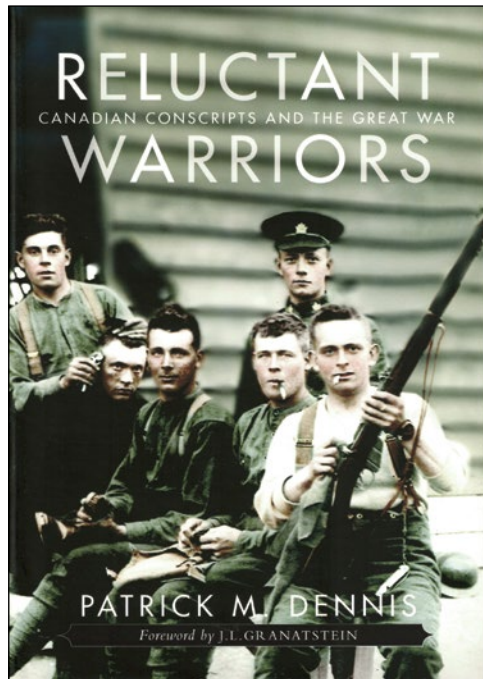
The reliable flow of replacements enabled the intense pace of Currie's Hundred Days, but Currie seems not to have appreciated that his tempo relied upon a stream of conscripts. The final phase remains controversial: the Corps performed at a superhuman level, but Currie, supported by most of his subordinate commanders, stands accused of pushing the Corps too hard. The MSA stream allowed him to keep pushing. Victory came too abruptly to analyse the impact of the late-comers. “Late-comers” was apparently enough judgment...

The MSA men, it turns out, were just as conscientious and trained as other replacements. Given the advances in training techniques and expertise, they were likely better prepared than were their 1916 or 1917 predecessors, but they were accorded a little something extra: blame. When victory produced its series of nationally embarrassing and violent incidents at holding for repatriation camps in Britain, and refusals to parade in fighting formations of the magnificent Corps, the generals, especially Currie, were quick to assume that the troublemakers were the reluctant MSAs.

The miscalculated ‘demob’ policy, the rush to move the superannuated into command positions, and the demoralizing insistence upon keeping idle hands busy with full pack route marches and painting rocks, were not appreciated as contributing factors. No one noticed, or *chose not to notice*, that many of the incidents centred around the old soldiers, and not on the new mob. The war was over and everything was wrapping up. It was quicker for Currie, Canada, official histories, and regimental histories to intuit rather than to analyse.

Dennis does not assert. He lets the MSA men, with their records, take on the mythology for themselves. He has struggled through a myriad of letters, casualty cards, and files to tease out the big narrative, but he pauses often enough to underline key points with individual stories. Thus, among the letters and records quoted, Dennis exposes the reader to specific examples, such as that of 20-year-old law student and conscript Private William Johnson of Bracebridge, Ontario. Johnson was shot in the head while capturing Orange Hill, just west of Monchy-le-Preux, on 26 August 1918. He had been in France for two weeks. His memorial reads “Faithful Unto Death,” and this can be taken as an inscription for the 3000 other MSAs who died in the war (16% of NCM casualties in the Hundred Days), and that number includes the 1500 non-battle deaths.

Their stories refute ideas of malingering, of sketchy training, and lack of dedication. Their letters, for the most part, are as enthusiastic, as proud, and as fatalistic as those written



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in 1916. Few, if any, reflect an impression of being dragooned into service. They just did not come until it was clear they were needed. They were, indeed, “reluctant heroes.”

Many an important book deserves to be read, and, too often, this requires focused effort. Dennis’ book is not one of those. It is a military analysis and it is a history, but it flows well. If bits seem repetitive, it is because the men’s stories have many common elements and Dennis minimizes these as best as he can. He tells the story chronologically, but manages to weave his themes throughout it almost invisibly. The final chapter summarizes the myths and anti-myths that emerge, but by then, he is ‘preaching to the choir,’ for his reluctant heroes have already convinced the

reader that a new narrative has already shaped the story of Canada’s Great War. Dennis and UBC Press had done an excellent, *even* classy job of supplementing the text with sufficient and supportive maps and appendices and spread relevant illustrations throughout the text. The introduction by none other than the distinguished Canadian historian J.L. Granatstein gives the book the weight it deserves, especially since it contains his *mea culpa* on conscripts, “I am now forced to admit that I was flatly wrong to argue as I did.” It seems we all were.

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Joey Jacobson’s War: A Jewish Canadian Airman in the Second World War

by Peter J. Usher

Waterloo, ON, Wilfrid Laurier University Press, 2018

395 pages, \$29.99 (soft cover)

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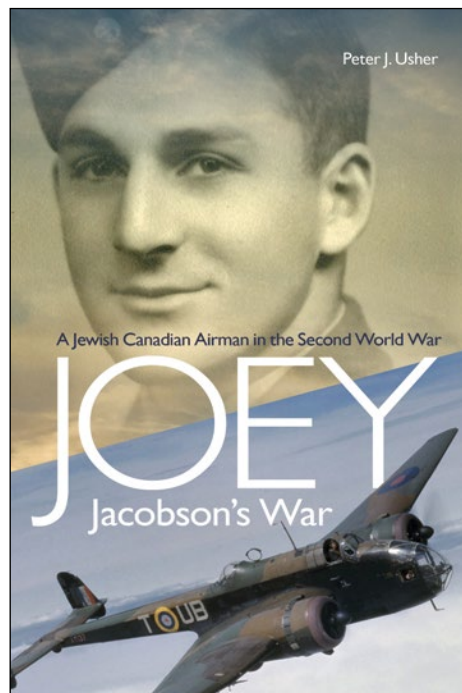
Reviewed by

David L. Bashow

Author Peter Usher was born in Montréal in 1941, the infant cousin of Joey Jacobson, who went overseas and into combat that same year. Drawing upon Cousin Joey’s diary and letters for inspiration, he began researching and chronicling the experiences of Canada’s airmen in the Second World War, and in particular, the early years of the bombing campaign. The letters and the diary entries, which commence shortly after Joey’s student days at McGill University, along with his own extensive research, would have a profound impact upon Usher. In his own words: “By virtue of my undertaking, Joey came alive and immediate to me in a way that any other uncles (middle-aged men when I was a boy) never had. I liked them, of course, but a generation stood between us. Joey’s letters and diaries revealed a vibrant young man in whom I could recognize something of myself at that age. But he had been confronted by circumstances that I had not. And so, I came to see and also to wonder about what I too had lost, and to grieve for the man I never met.”

This is a wonderful book for many reasons, including the depth of meticulous research conducted by the author. However, its uniqueness does indeed rest in the first-person narratives of Joey’s diary and note book entries, and the letters to and from his

friends, and, most particularly, those to his father. And the great strength of these writings is that they were written very much ‘in the now,’ and not encumbered by the passage of time, faded recollections, and perhaps, the sober reconsideration of issues after years of musing about occurrences long since passed. Joey was a prolific and very skilled writer, fascinated by the world around him, the great events that were unfolding all around him and his place within in them, including what the future might offer.



Peter Usher’s sources are extensive and varied. The diary and letter components, which this reviewer believes constitute the very heart and soul of the book, are skilfully blended with a wealth of both primary and secondary sources to effectively situate the letter and diary entries in space and time, collectively forming a rich tapestry of a young Canadian’s short but incredibly full life.

Joey Jacobson was born in Montréal of a successful middle-class Jewish family in 1919, shortly after the end of ‘the war to end all wars.’ A star athlete on the McGill *Redmen* football team, he graduated from that university with a Bachelor of Commerce degree in 1939. Poised to join and advance in his father’s successful office furniture business, the Second World War soon intervened, and Joey’s sense of adventure, coupled with a patriotic spirit bolstered by a profound sense of duty to take the fight to the enemy by virtue of his faith, beckoned him to the colours. Upon joining the RCAF, he trained as an air observer and deployed overseas in early-1941. After further training in England, Joey joined 106 Squadron of 5 Group within Bomber Command, flying in twin-engine Handley Page *Hampdens* as part of the Command’s nascent air offensive against Nazi Germany. During the following months, Joey’s letters and diary entries would contain a wealth of thoughtful and articulate considerations of myriad impressions, viewpoints, and concerns, for he was a very skilled writer, possessed of a keen, inquiring mind and an unquenchable thirst for knowledge

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and meaning in life. Through it all, Joey radiates a great love of life and friendships, an unequivocal faith in the legitimacy of the Allied cause, and a profound desire to help make the world a better place, both at the time and in the future, and by extension, his place in that future world. And yet, and with increasing awareness throughout his operational tour and the realities of the dangers he continuously faced in combat, he was pragmatic enough to realize that he might not survive the conflict within which he was both deeply embedded and committed. Regrettably, his misgivings would hold true, and he would perish, along with the three other members of his crew, on 28 January 1942, after a crash landing in a winter field in Holland on his 24th operational mission.

Recurring themes in Joey's correspondence and diaries revolve around the national characteristics of the various combatants, "...as these might affect the war's outcome," the perceived need for the United States to commit to the war and throw its weight behind Britain, and while he professed great praise for the British people in general, "...the dead weight of the class system in Britain." Hand-in-hand with the candour of this young Canadian's written observations exists a need to appreciate the relative infancy of the

bombing campaign during which time Joey's observations were penned, for such written observations of that dark period are rare indeed. Readers must bear in mind that these very early months of Bomber Command's air offensive were generally rudimentary and ineffective, a mere shadow of what the air offensive would eventually become. Joey Jacobson's observations speak volumes of those actually prosecuting the war at the time, and the need for change and improvements in many directions.

In closing, this book is a true gift in the uniqueness of its perspective, and it is highly recommended reading.

Lieutenant-Colonel (Ret'd) David L. Bashow, OMM, CD, has written extensively on the history of Canadian military aviation, with an emphasis upon Bomber Command's Second World War offensive operations. His work in that field includes *No Prouder Place ~ Canadians and the Bomber Command Experience, 1939-1945*. David is currently the Editor-in-Chief of the *Canadian Military Journal*, and an Associate Professor at the *Royal Military College of Canada*.



DND photo PL7121

An early-war Handley Page *Hampden* crew pictured with their aircraft.